



MX-1616-PP-POH

Fixed Pro Plus chassis featuring PoH HDBaseT out, mirrored HDMI out, HDMI in, IR input transmission card

MX-1616-PP-POH-CUSTOM

Modular Pro Plus chassis with selection of customisable analogue and digital PoH transmission cards.



WyreStorm Pro Plus PoH HDBaseT Solutions

Instruction Manual



Thank you for choosing this WyreStorm product.
Please read these instructions carefully before installing to avoid complications later.

Contents

1	Introduction
2	Features
3	Safety Precautions
4	Package Contents
5	Specification
6	Panel Descriptions <ul style="list-style-type: none"> i. Front Panel Description - Both Models ii. Rear Panel Description - MX-1616-PP-POH iii. Rear Panel Description -MX-1616-PP-POH-CUSTOM Card Options
7	Typical Application <ul style="list-style-type: none"> i. TX-POH-010 Transmission Card ii. All Cards
8	Connection
9	Basic Operation
10	Basic Remote Control
11	Advanced Operation
12	Routable RS-232 with MX-PP-POH
13	Routing Serial Commands from the MX-PP-POH
14	EDID Management - About EDID
15	Before EDID Adjustments
16	EDID Presets
17	Troubleshooting
18	FAQ
19	Maintenance
20	Provided Service
21	Mail In Service
22	Warranty
23	Warranty Limits and Exclusions
24	Disclaimer
25	Installation Reference Log <ul style="list-style-type: none"> i. Input Reference Log ii. Installation Reference Log - Output Reference Log

1. Introduction

The WyreStorm MX-PP-POH matrix range offers the ultimate in flexible and affordable Class B HDBaseT™ integration; for projects that demand the benefits of HDBaseT transmission, such as signal stability, distribution of full 1080p HD video, HD audio, Power-over-HDBaseT (PoH) and control via IR and routable serial control over a single Cat5e/6 cable up to 70m/230ft, yet may not require the transmission distance or feature set of full Class A HDBaseT.

Models in the MX-PP-POH range offer an HDBaseT Pro Plus matrix solution with PoH support for power passed along a single Cat5e/6/7 cable along with transmissions and control commands to enable receivers to operate without the need for local mains power at display zones.

This not only offers more flexibility and convenience during installation but also greater energy efficiency and an easier installation than a permanent mains connection as less power supplies are required for devices.

MX-PP-POH matrices also feature routable serial commands via RS-232 for individual control of sources from display zones using a WyreStorm Enado or third party control system – all of which adds up to a powerful package for applications of any size or budget.

MX-PP-POH matrices are available either in factory standard configuration, featuring HDMI input to HDBaseT and mirrored HDMI Output, or a modular customisable configuration featuring a matrix chassis and selection from a range of multi-format digital and analogue transmission cards that enable distribution and control to be tailored to the specifics of the project like never before.

Using our Virtual Rack system-planner available at **wyrestorm.com**, combinations of matrices and transmission cards can be selected and customised to personal specification, with orders submitted online, custom-built and shipped directly within 10 days from initial spec to final delivery.*

MX-PP-POH matrix solutions from WyreStorm offer incredible flexibility and versatility of custom transmission selection combined with the power and features of HDBaseT for solutions where stable HD transmission and control over distance is required, whether in a residential or commercial setting.

For further information on this product and other WyreStorm ranges, visit our website or download our latest product guide. **wyrestorm.com**

**Subject to stock availability*

2. Features

- Class B HDBaseT technology for one-cable transmissions of full HD 1080p video @60Hz, HD multichannel audio, routed control and power up to 70m/230ft, under perfect conditions*
- HDBaseT more resistant to electrostatic interference than conventional distribution
- (MX-1616-PP-POH) - factory configured with 16 standard transmission cards: HDBaseT PoH out, mirrored HDMI out and HDMI In (MX-1616-PP-POH CUSTOM) - selection of digital and analogue card options for customisable modular HDBaseT PoH configurations
- Full 3D Support frame packing (Blu-Ray) / stereoscopic (satellite/cable)
- Bi-directional, wide range IR control of inputs/outputs from source and display locations via discrete IR control (30 KHz to 56 KHz frequency)
- One-way routable RS-232 serial control allows central control of sources at all display zones via WyreStorm Enado and leading third party control systems
- PoH – power passed directly along Cat5e/6 cable up to 70m/230ft from the MX-PP-POH to all connected PoH-enabled display receivers - no additional power required at display location for PoH receivers
- Each output can be cascaded up to 7 times for even larger distributions spanning 112 displays covering a transmission distance of up to 7.8km / 12.6miles
- Matrix also cascadable up to 7 times (using a compatible HDMI pass-thru card) for the quick and easy creation of very large arrays of up to 784 displays
- Conforms to IEEE-568B standards
- HDCP compliant with constant feed to prevent screen drop-outs
- Reads, copies and manages EDID from connected devices
- Fully compatible with market leading third party control systems - full integration protocols available for WyreStorm Enado user interface and all leading control systems - see website for full list of compatible systems
- Choose from 5 switching methods – front panel buttons, local IR, IR call-back, RS-232 and LAN
- Remote control can also be learned into a universal remote handset to allow the control of multiple devices from one handset
- Compact 3U size
- Additional infrared extension port for longer IR connections
- Including mounting brackets, IR receivers, IR transmitters and remote control handset

NOTE: *Perfect transmission conditions denote cable run is within specified distance range of product, no electrical interference, the use of straight cable runs with no bends or kinks and no patch panels or wall outlets used. Please be advised that the presence of any of these factors in your installation may compromise bandwidth and signal strength.

3. Safety Precautions



WARNING

To reduce the risk of fire, electric shock or product damage:


1. Do not expose this apparatus to rain, moisture, sprays, drips or splashes and ensure that no objects containing liquids are placed on the apparatus, including cups, glasses and vases.
2. Do not place this unit in a confined space such as enclosed shelving, cabinets or bookshelves. Ensure the unit is adequately ventilated.
3. To prevent the risk of electric shock or fire hazard due to overheating, do not cover the unit or obstruct ventilation openings with material, newspaper, cardboard or anything that may restrict airflow into the unit.
4. Do not install near external heat sources such as radiators, heat registers, boilers or any device that produces heat such as amplifiers or computers and do not place near sources of naked flame.
5. Unplug apparatus from power supply during lightening storms or when unused for long periods of time.
6. Protect the power cable from being walked on, pinched or restricted in any way, especially at plug connections.
7. Only use attachments/accessories specified by the manufacturer.
8. Units contain non-servicable parts - Refer all servicing to qualified service personnel.

4. Package Contents

- 1 x MX-1616-PP-POH main unit - 16 input 16 output Pro Plus PoH matrix factory configured with 16 x TX-POH-010 transmission cards (HDMI in, HDBaseT & mirrored HDMI Out)
- or
- 1 x MX-1616-PP-POH-CUSTOM main chassis unit - 16 input 16 output Pro Plus PoH matrix chassis, custom-configured with 16 x card selections (specified by the customer via the Virtual Rack Configurator or physical order sheet mailed to your WyreStorm representative)

- 1 x Printed instruction manual
- 1 x Flash memory USB stick containing PC control software and digital copy of instruction manual (digital version can be downloaded from the product page on wyrestorm.com)
- 1 x Matrix mounting brackets (pair)
- 1 x 100-240v AC power supply
- 1 x IR extension cable
- 16 x IR TX transmitters (For Input source)

5. Specification

Operating Temperature Range	0 to +35°C (32 to +95°F)
Operating Humidity Range	5 to 90% RH (no condensation)
Output Bandwidth Signalling Rate	6.75Gbps
Input Video Signal	0.5-1.0 volts p-p
Input DDC Signal	5 volts p-p (TTL)
Maximum Single Link Range	1080p 36bit Deep Colour
Transmission Distance	Up to 70m / 230ft with Cat5e/6/7 using WyreStorm RX-1UTP-IR-70-POH Display Receiver (Under perfect transmission conditions including straight cable runs with no electrical interference, bends, kinks, patch panels or wall outlets.)
Attention Do Not Hotswap HDMI plugs or HDBaseT connectors - Please insert and extract cables carefully with the power SWITCHED OFF.	
Power is passed along transmissions so connecting and disconnecting cables while powered can result in damage to circuitry or possible injury.	
	 <p>Single Cat5e/6 PoH Display Receiver (70m/230ft)</p> <p>Part Number RX-70-IR-POH</p>
Video Format Supported	VESA: 640x480, 800x600, 1024x768, 1280x1024, 1600x1200, 1920x1080, 1920x1200 DTV/HDTV: 480i/576i/480p/576p/720p/1080i/1080p

Output Video	HDMI v1.4 with full 3D compatibility with frame packing/sequential (Blu-ray) and interlaced stereoscopic (satellite/cable broadcasts)
Audio Format Supported	HDBaseT: DTS-HD, Dolby True HD, multi-channel 5.1, 7.1, stereo - SPDIF Audio: DTS, AC3, PCM 5.1
Max. Transmission distance over HDMI	15m / 49ft –if a longer HDMI connection is necessary, use a WyreStorm HDMI-to-HDMI coupler for reliable, straightforward extension to double your HDMI cable capacity
Power Consumption	340 Watts (Max.)
BTU Rating (British Thermal Unit)	1160
Power Supply	100-240V AC
Dimensions (WxDxH)	440mm x 394.7mm x 132.5mm 17.3" x 15.5" x 5.2"
Weight	13.5Kg / 29.8lb
Rack Space Required	3U

6. Panel Descriptions

i. Front Panel Description - Both Models

- | | |
|---|---|
| 1 LED input/output select screen | 4 Output select buttons (left/right) |
| 2 IR receive window | 5 Confirm selection button |
| 3 Input select buttons (UP/DOWN) | 6 Rack handles |



ii. Rear Panel Description - MX-1616-PP-POH

- | | | |
|---|--|---|
| 1 HDBaseT PoH output ports (RJ45 Cat5e/6) | 6 RS485 port | 10 EDID DIP Switch |
| 2 Duplicate HDMI output ports (mirrors HDBaseT output) | 7 LAN port | 11 EDID DIP default diagram |
| 3 HDMI input ports | 8 RS-232 port (DB9) | 12 IR TX transmitter ports (corresponds to inputs) |
| 4 IR receiver port (IR RX) | 9 IR extension port - should front panel IR receiving sensor be obstructed or matrix enclosed | 13 EDID switch default diagram |
| 5 Earth ground point | | 14 IR TX transmitter ports (corresponds to inputs) |



Attention RS-232 and LAN ports are for matrix control. Ensure crossover UTP cable is used to connect the LAN directly to a computer or server, and a direct/straight through connection is used to connect via a router/switch.

Connection will fail if the incorrect cable is used.

iii. Rear Panel Description - MX-1616-PP-POH-CUSTOM Card Options

1 TX-POH-010



HDBaseT out, Mirrored HDMI out, HDMI in, IR in - “Default” card as standard on all non-CUSTOM MX-PP-POH matrix models. Offers 70m/230ft HDBaseT transmission including Video, Audio, Control & Power, combined with a duplicate HDMI output to allow simultaneous connection of a second local “mirrored” screen, AVR or extender product (including Cat5e/6/7, Fiber and Coax). IR in allows control signals to be sent to the sink device.

2 TX-POH-020



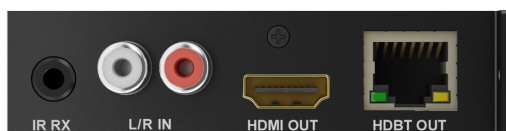
HDBaseT out, Source loop HDMI Out, HDMI in, IR in - Cascading card enabling a source to be injected into the matrix, split, and sent back out to be fed into another device (ie. another connected matrix). Featuring 70m/230ft HDBaseT transmission including Video, Audio, Control & Power. IR in allows control signals to be sent to the sink device.

3 TX-POH-030



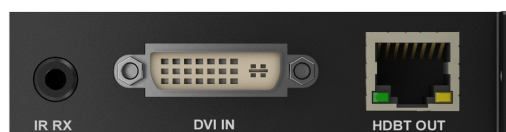
HDBaseT out, Audio breakout, HDMI in, IR in - Similar to the TX-POH-010 card, this variation offers a stripped audio feed from HDBaseT out. An optical port passes multi-channel PCM audio whilst the mini-jack outputs L/R analogue audio. Also features 70m/230ft HDBaseT transmission including Video, Audio, Control & Power. IR in allows control signals to be sent to the sink device.

4 TX-POH-040



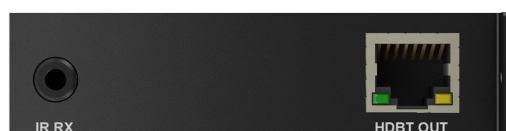
HDBaseT out, HDMI out, Audio In, IR in - For audio device integration, this card enables any analogue audio source to route through the video matrix. Also includes 70m/230ft HDBaseT transmission for Video, Audio, Control & Power with IR in for control signals to be sent to the sink device.

5 TX-POH-050



HDBaseT out, DVI in, IR in - Making an MX-PP-POH-CUSTOM matrix modular matrix compatible with high-end graphics cards, this module accepts a DVI-D signal as a source (1920x1200 @60fps). Also includes 70m/230ft HDBaseT transmission for Video, Audio, Control, Power and IR in allows control signals to be sent to the sink device.

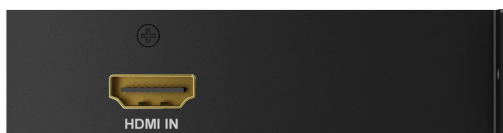
6 TX-POH-060



HDBaseT out, IR in - Allowing more outputs than inputs, this card allows the addition of a switched output to a smaller number of sources - 6x8, 3x6 or even 1x8. HDBaseT transmission of Video, Audio, Control & Power up to 70m/230ft with IR allowing control signals to be sent to the sink device.

7 TX-POH-070

HDBaseT out, VGA + Stereo audio in, IR in - Enables compatibility with legacy analogue computing equipment and embedding stereo audio into 1920x1080 VGA or 1920x1080p YUV signals. Also contains 70m/230ft HDBaseT transmission including Video, Audio, Control & Power. IR in allows control signals to be sent to the sink device.

8 TX-POH-080

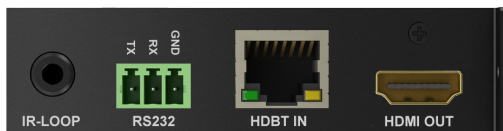
HDMI In - Perfect option should a system require more source devices than outputs. It allows unusual configurations such as 6x4, 7x5 or even 8x1.

9 TX-POH-090

HDBaseT out, YPbPr + audio, IR in - Component input card for connection of legacy component source devices (with audio) to the matrix - passes native source resolution.

Features 70m/230ft HDBaseT transmission including Video, Audio, Control & PoH.

NOTE: this card does not scale - passes signal only.

10 TX-POH-100

HDMI out, HDBaseT In, IR in, RS-232 - Enables 'remote sources' connection to the matrix up to 70m/230ft away using an HDBaseT transmitter, with received signals then routed by the matrix as with any local source.

Control of source device cannot be routed internally through the matrix - an IR loop port is included on the card for corresponding IR TX port connection using the CAB-IR-LINK WyreStorm IR Link cable (CAB-IR-LINK). Similarly, for RS-232 control a phoenix port breaks-out or injects serial commands to be sent down the HDBaseT link.

11 TX-POH-110

HDMI in, HDMI out, source loop HDMI out - HDMI in, HDMI out, source loop HDMI out, - Allows HDMI-only systems to be designed with sources and switched outputs both HDMI.

Enables simple 15m/49ft HDMI connection to AVR, local screens or different types of extension to be used for longer transmissions (coax, fiber, full class-A HDBaseT)

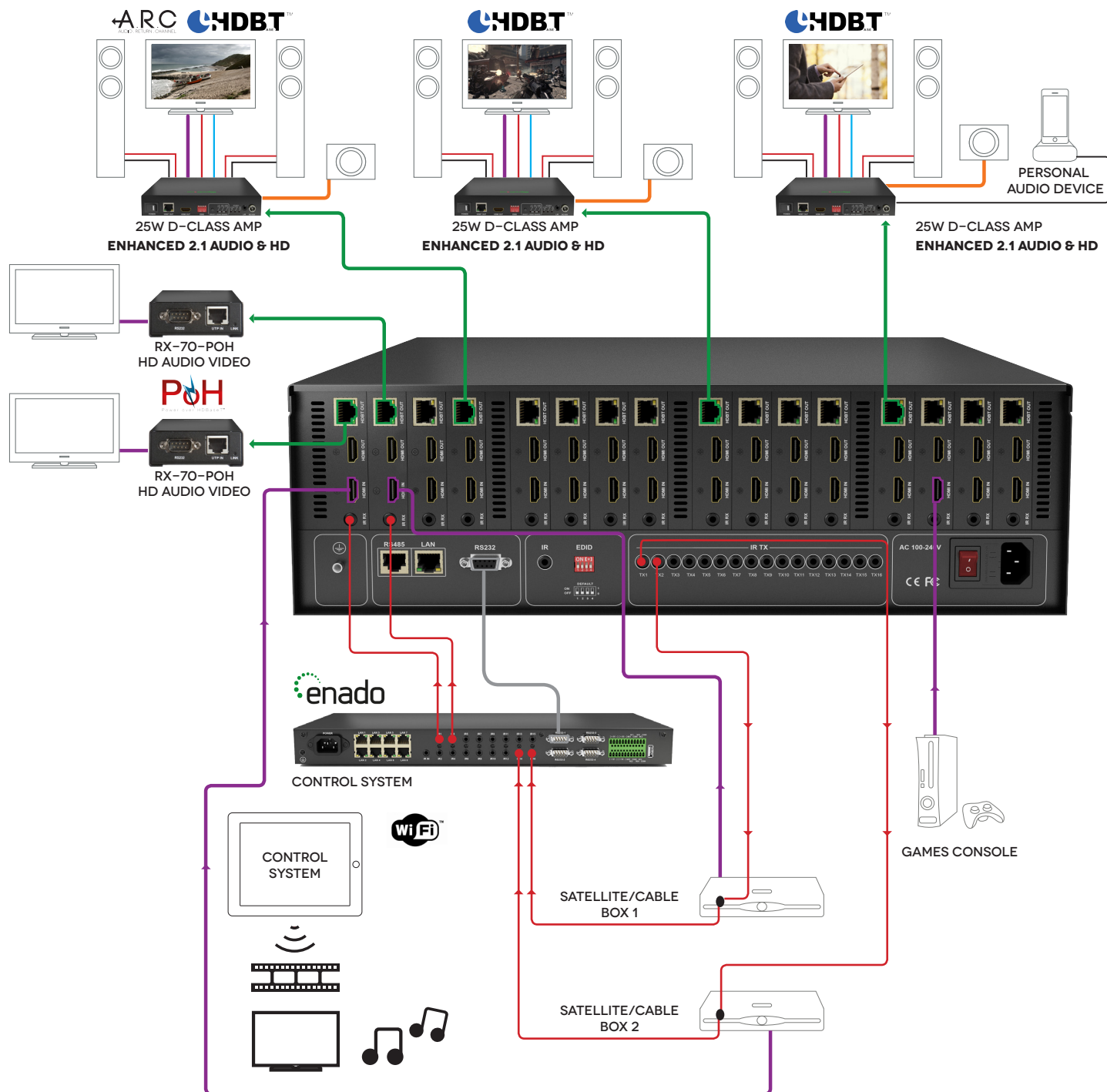
Featuring HDMI passthru source loop output to cascade matrices and expand distribution to fixed POH another CUSTOM POH matrix.

NOTE: Routed serial and 2-way IR is not possible using this card.

*For full information on matrix cascading functionality using Source Loop HDMI pass-through cards, see product page and Virtual Rack at wyrestorm.com.

7. Typical Application

i. TX-POH-010 Transmission Card



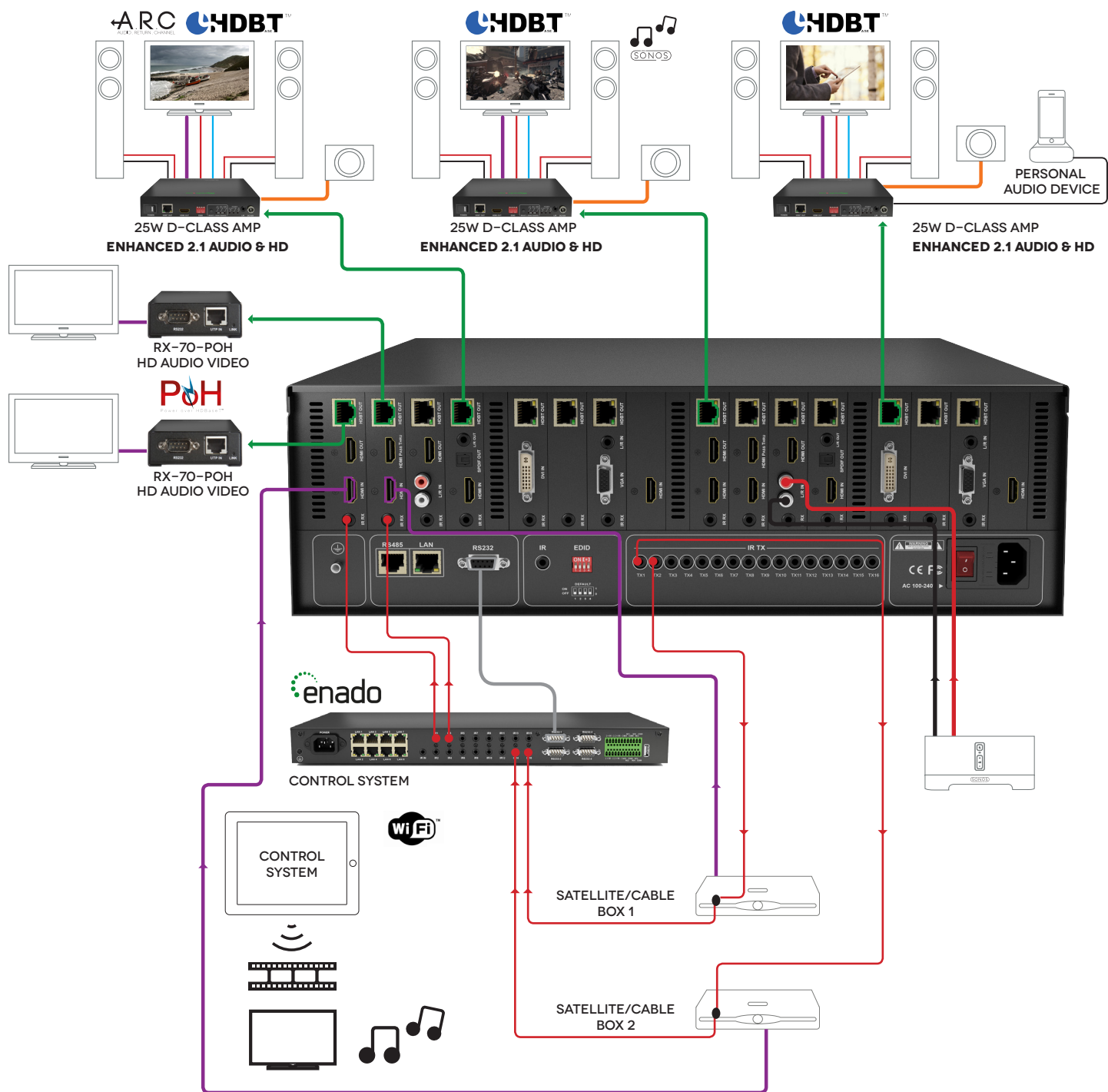
KEY

— CAT 5e/6 70M/230FT	— LINE LEVEL AUDIO
— VGA/DVI	— IR TX
— HDMI	— IR RX
— RS232	— SUB PRE-OUT



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ii. All Cards



TRANSMISSION CARDS / KEY

SLOT 1 - TX-POH-010	SLOT 9 - TX-POH-010
SLOT 2 - TX-POH-020	SLOT 10 - TX-POH-020
SLOT 3 - TX-POH-040	SLOT 11 - TX-POH-040
SLOT 4 - TX-POH-030	SLOT 12 - TX-POH-030
SLOT 5 - TX-POH-050	SLOT 13 - TX-POH-050
SLOT 6 - TX-POH-060	SLOT 14 - TX-POH-060
SLOT 7 - TX-POH-070	SLOT 15 - TX-POH-070
SLOT 8 - TX-POH-080	SLOT 16 - TX-POH-080



CAT 5e/6 70M/230FT	LINE LEVEL AUDIO
VGA/DVI	IR TX
HDMI	IR RX
RS232	SUB PRE-OUT

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8. Connection

1 Connect source devices (such as: Blu-Ray, computer, games console, satellite/cable, music streaming device, CCTV etc.) to the relevant input ports of the matrix output cards 1-16.

Attention Do Not Hotswap HDMI plugs or HDBaseT connectors - Please insert and extract cables carefully with the power SWITCHED OFF.

Power is passed along transmissions so connecting and disconnecting cables while powered can result in damage to circuitry or possible injury.

2 For IR control of sources from a display zone, connect an IR transmitter from the matrix to each source, ensuring the IR TX is attached directly over the infrared receiving area of the device, using the adhesive backing to secure in place.

HINT Locate the infrared sensor on devices by shining a flashlight onto the display panel of sources and look for a small sensor.

Adjustment of the IR TX position after installation may be required to achieve the best results as moving the sensor to different areas of the source facia can improve IR performance.

Plug the 3.5mm jack of the IR transmitter into the corresponding number IR TX port on the rear panel of the MATRIX.

NOTE Make sure the IR jacks and ports match up.

3 For two-way IR control of display from source location:

- i. Connect an WyreStorm IR link cable between the IR RX port on the matrix output cards to a control system.
- or**
- ii. Connect 3.5mm jack of the IR receiver into the corresponding IR RX port on relevant matrix output cards, ensuring the IR receiver eye is placed in clear view to receive an IR signal from the handset to be used to control.

4 Connect a good quality, well-terminated Cat 5e/6 cable with an RJ45 connector wired to 568B standard at both ends from the HDBaseT Output port of matrix transmission cards the UTP IN of the RX-70-IR-POH display receiver.

NOTE Although all WyreStorm products are tested

using Cat5e as standard, we suggest using Cat6 as the preferred cable due to its improved transmission capabilities.

Ensure both RJ45 connectors are pushed securely into each port and supported by the connector strain relief clip to prevent loosening.

If using a WyreStorm extender set, connect the transmitter device to the matrix via the HDMI port and connect to the RX-70-IR-POH receiver via Cat5e/6/7.

NOTE No power supply is required to the RX-70-IR-POH if connected from the MX-PP-POH matrix or other PoH-enabled transmission device.

The 5v power input on the display receiver is optional, and should be used only if there is insufficient power from the transmission device.

Attention Power is passed along the Cat5e/6 cable so the quality of termination, cable and condition are essential for successful delivery of video, audio, control and power to receivers. Poor quality terminations lead to intermittent performance and longer install times.

Attention PoH functionality will not be possible if using a non-PoH enabled Receiver.

Attention Sudden movement of the matrix and receivers/transmitters could lead to loss of picture and sound if connections become loose or strained, resulting in unnecessary service call-backs. We strongly recommend using the mounting brackets supplied to secure devices.

5 Connect HDMI OUT of the RX-70-IR-POH to the HDMI IN of the display device.

6 Plug the 3.5mm jack of the IR receiver into the IR RX port of the display receiver. Place the IR receiver sensor discretely on the front of the display with care taken to achieve a clear line of sight with the remote control to be used.

For two-way IR controlling the display from the matrix end: Plug the 3.5mm jack of the IR transmitter into the IR TX port on the display receiver, ensuring the transmitter is placed directly over the infrared receiving sensor of the display using the adhesive backing. Again, adjustment of receiver and emitter position may be needed to achieve the best IR signal distribution.

7 Switch on the power to your input sources, displays, and any display receivers used.

Attention All receivers must be connected to the matrix via UTP cable before matrix is powered on.

As power forms part of the HDBaseT carrier signal, if a transmission link can not be established between matrix and display receiver, it is unlikely the receiver will be able to draw power.

Should such problems be experienced between transmission and receiving device, investigate the root cause of the issue by following the checklist in the Troubleshooting section of this guide.

8 Finally, switch on the matrix at the rear and your WyreStorm system should now be fully connected and ready for use.

If IR transmitters and receivers are correctly placed discrete control of both sources and displays will be possible from either location.

Attention Remember, always switch off the matrix before unplugging any inputs or outputs – follow last on, first off protocol.

OPTIONAL CONNECTION:

1 If using a duplicate display or AVR mirrored to the HDBaseT Output, connect the display via the HDMI OUT port of a compatible HDMI Output transmission card.

2 For connection of RS232

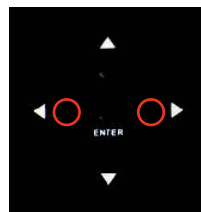
If you do not have IR control:

- Check your cables are straight with jacks firmly connected to ports.
- Check your IR sensors are unobstructed and able to receive infrared signals.
- Check direct sunlight on the IR TX or RX eyes is not affecting the infrared signal.

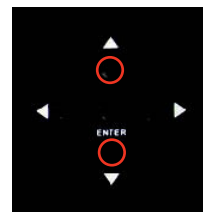
9. Basic Operation

The WyreStorm MX-PP-POH is designed with ease of set-up and use in mind. Basic switching of source inputs to output displays can be achieved via the front panel control of the matrix.

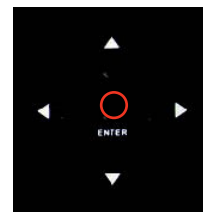
On power up, the front panel will flash as the matrix initialises. When the display stops flashing, the matrix is ready to use.



OUTPUT selection



INPUT selection



Confirm
OUTPUTS/INPUTS

OUTPUTS are selected by pressing the LEFT and RIGHT arrow buttons to scroll forwards and backwards numerically through the displays connected to the matrix. The corresponding OUTPUT channel number will blink on the display when reached.

1 Press the LEFT ARROW or RIGHT ARROW key to select an output. After the selection is complete, the corresponding LED indicator blinks.



Likewise, the UP and DOWN arrow buttons scroll numerically through any INPUT sources connected to the system. When the desired OUTPUT and INPUT is reached, push the ENTER button to confirm the selection. The display will stop blinking to confirm the matrix has been set.

2 Press the UP ARROW or DOWN ARROW key to select an input.



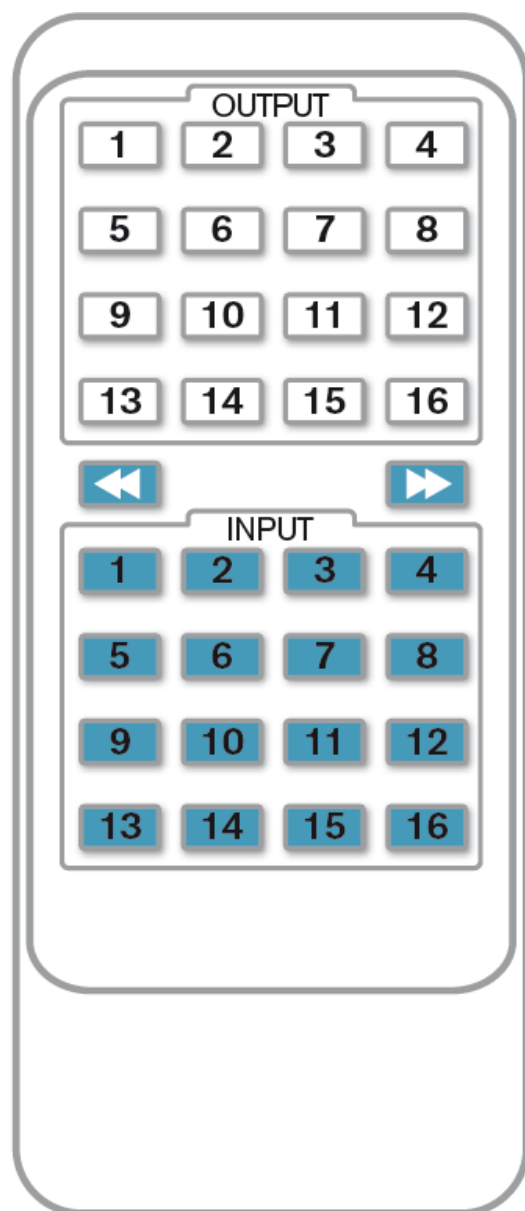
3 Press the ENTER key to confirm the selection. After the selection takes effect, the LED stops blinking.



Repeated pressing of the select button of a specific output scrolls numerically through the input devices connected to the matrix, with the corresponding LEDs illustrating when a device has been selected for that

particular output. The chosen input will automatically store for the output so, even when the matrix is powered off and on, the last selected input/output combination will remain.

10. Basic Remote Control



The same basic switching functions can also be accessed via the remote control.

Operation of the handset is the same regardless of location – locally (source/IR TX) or remotely (display/IR RX).

Simply toggle through the INPUT sources connected to the matrix by pressing the left/right arrow buttons in each numbered OUTPUT section on the handset.

Previous / next buttons






When using the remote control locally, i.e. pointed directly at the matrix, the previous / next buttons are used to scroll between the input sources connected to the matrix for each individual output display. So for example, using the previous / next buttons for 1 allows you to select the source to be set to display 1 manually.

NOTE Changing the System Code is only necessary if you are using two units within close range of the IR signal. If using in different parts of the same room it is likely that you will not need to change the setting.

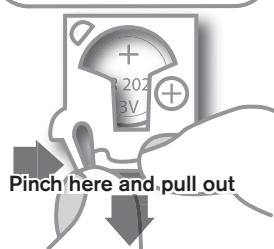
HINT If your remote control is not working, before changing the battery, try changing the System Code on the handset in case it has accidentally been switched to an alternative matrix control mode

Remote Control at the Display End (Remote IR)

When controlling the matrix remotely from the display side, the matrix automatically detects which particular output location the user is at and only allows the selection of sources 1-8 for that particular location using the  button - the right hand  button will be deactivated.

For example, if you are in the Master Bedroom with a display connected to output 3 of the matrix, the output zone is automatically detected so options 1-16 will correspond to sources 1-16 on the matrix. Press  buttons 1-6 to scroll through your options as you would channels on a regular TV remote.

To change handset battery

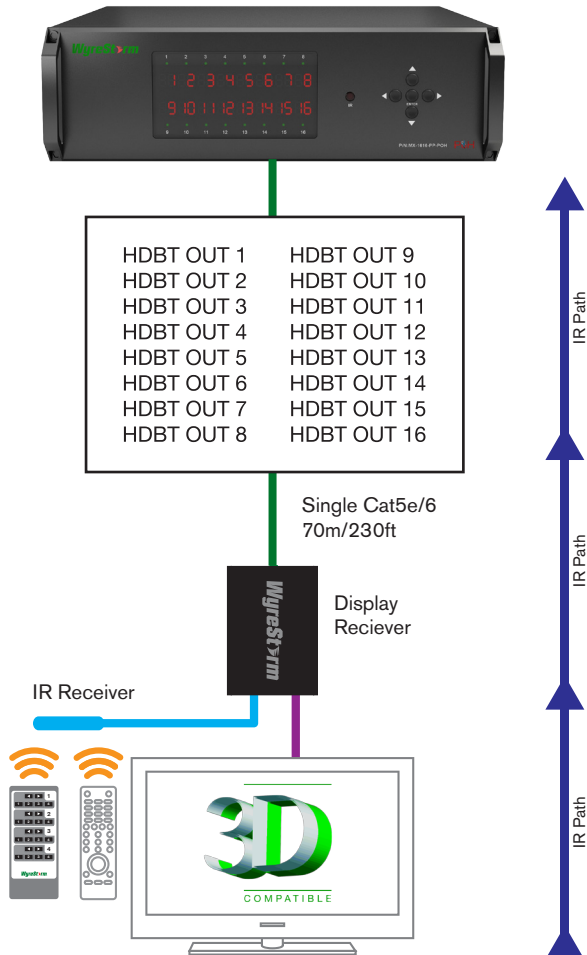


Install battery '+' side up and only use a CR2025 3v battery. Slide compartment back into the handset.

IR Call-back of Matrix and Source Devices

The WyreStorm MX-PP-POH is not only a switcher and extender of multiple HDMI signals to multiple HDMI receivers located remotely, it also passes IR control signals through the IR call-back system to the matrix and HDMI sources for full, independent control of all connected inputs from output locations.

Example: If OUTPUT 1 selects INPUT 3, the CALL-BACK IR signal of that RJ45 OUTPUT links INPUT 3 with IR TX3 for the signal to be combined and communicated for that input to be controlled remotely.

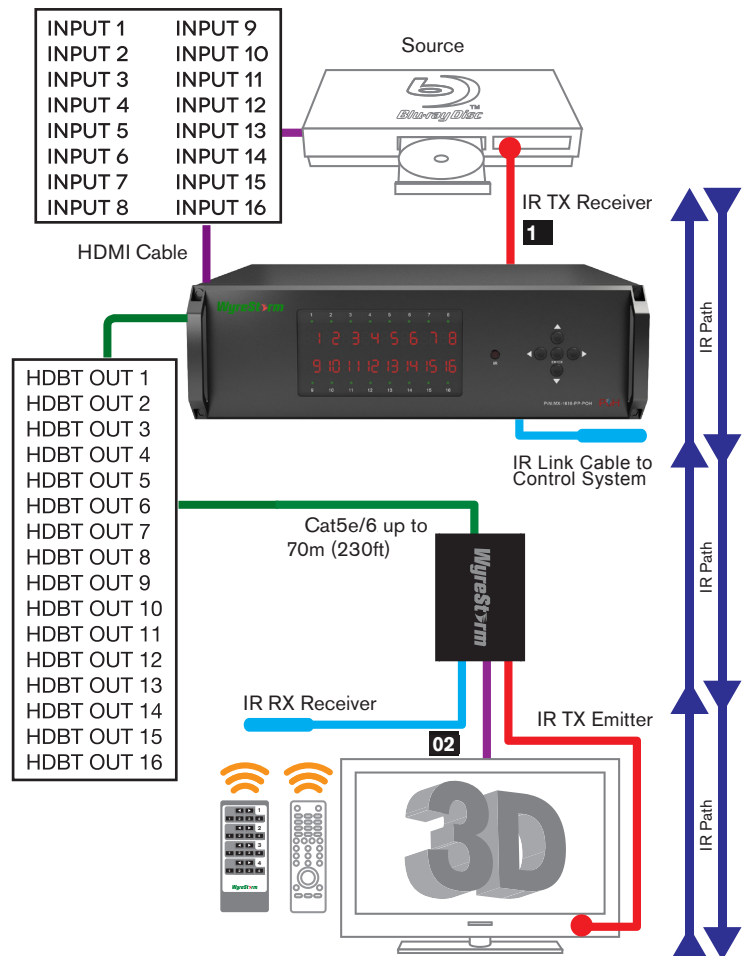


Two-way IR Call-back Between Matrix, Sources and Displays from Multiple Locations

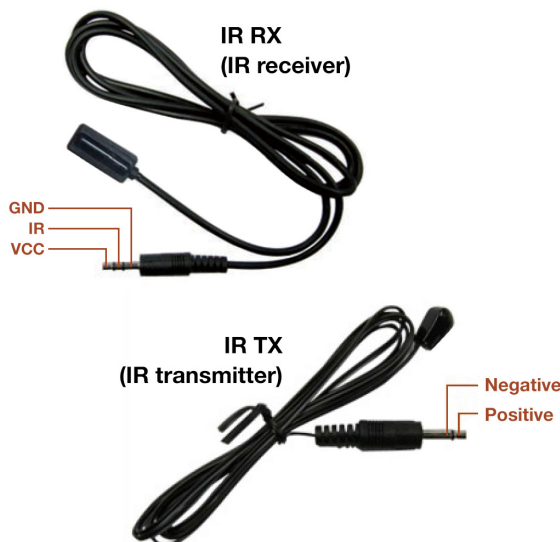
A key feature on our HDBaseT Pro Plus Matrix range is discrete IR control of the matrix, sources and displays from any location – so inputs at the matrix end can be controlled at a display location and displays can be controlled at the matrix location.

This is accomplished by placing a series of IR transmitters on devices to control and RX eyes at all locations you wish to control from, to enable the IR signal to travel both ways via the single Cat5e/6/7 cable.

The sequence of IR TX numbers correspond to the HDMI INPUTS so when an OUTPUT selects a certain INPUT, the CALL-BACK IR signal of that RJ45 port selects the relevant IR TX port to OUTPUT the control signal.



1 At Matrix end: Insert the 3.5mm jacks of the IR transmitters included with the unit into the IR TX ports at the rear of the matrix according to input. The IR signal is added to the signal of the input device so, for example, if the user is watching Blu-ray on input 3, the IR signal will be directed through the IR TX3 socket to control the device.



As each IR TX port is allocated to an individual input port, if the user is unable to establish IR control of the device, care should be taken to check that, firstly, the IR transmitter and input ports match (Input 1-TX1, Input 2-TX2 etc.) with plugs secured in correct ports, and secondly, that the IR transmitters are firmly attached directly to the front of inputs and covering infrared sensor windows of the source devices.

Some later adjustment may be needed to the location of the sensor to achieve the best performance results - sometimes moving the sensor to different areas on the source can improve IR performance.

NOTE Infrared receiving areas of devices can be located by shining a flashlight onto the front of the device – the sensor should be able to be seen through the plastic as a small, round object inside.



As with the IR TX, the IR RX ports are allocated to their respective UTP OUTPUT ports (Output1-RX1, Output2-RX2) with the IR signal converted to HDBaseT and carried along the single Cat5e/6/7 cable.

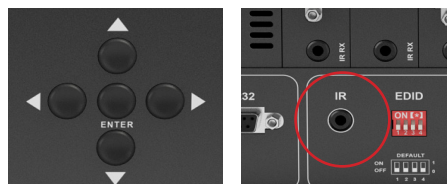
Insert 3.5mm jacks of IR receivers into RX ports, making sure the receivers themselves are placed in clear view at the to receive an infrared signal from the remote handset used control the display outputs.

2 At display end: Insert the IR RX jack into the IR RX port of the display receiver balun, with the IR RX eyes themselves placed in clear view on or near the displays to receive an infrared signal from the remote handset used to control inputs.

Insert the IR TX jack into the IR TX port of the display receiver balun, ensuring that the IR TX eye is securely attached to infrared sensor window of the display. Follow the same connection and positioning for all baluns/ displays connected to the matrix.

If all IR TX and IR RX eyes are positioned and connected correctly with sources, displays and display receivers fully powered and the matrix set to IR call-back enabled and IR TX Switch mode activated, two-way IR will now be possible.

IR Extender Control



Should local control of the Matrix via the front panel IR sensor be an issue, for example if the sensor is obstructed or the unit is installed in a closed area out of infrared line of sight, the IR RX Receiver included with the matrix can be inserted into the IR EXT port at the rear to extend the IR sensor range and enable local control of the system.

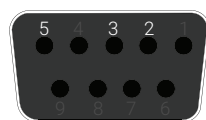


NOTE Misplaced or poorly secured IR TX and IR RX may result in intermittent IR control signals passed to and from the matrix. Check your placement and adjust if necessary.

11. Advanced Operation

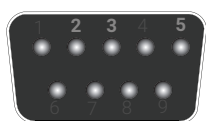
RS-232 Setting

Should third party control be required, please see below for control system configuration and hex code input. The RS-232 connection on the matrix is female DB9. Users can use USB-RS-232 cable (supplied) for connection to a PC or a straight through male-male (not supplied) for connection to a control interface.



Outside of DB9 female chassis port shown.

Pin 1: —
Pin 2: TX (Transmit)
Pin 3: RX (Receive)
Pin 4: —
Pin 5: GND (Ground)
Pin 6: —
Pin 7: —
Pin 8: —
Pin 9: —



Outside of DB9 male port shown.

Pin 1: —
Pin 2: TX (Transmit)
Pin 3: RX (Receive)
Pin 4: —
Pin 5: GND (Ground)
Pin 6: —
Pin 7: —
Pin 8: —
Pin 9: —

RXD Receive serial data

TXD Transmit serial data

Com Port Setting

Baud rate	115200
Data bits	8bits
Parity	None
Stop bits	1
Flow control	None

12. Routable RS-232 with MX-PP-POH

More Control

MX-PP-POH matrices feature routable RS-232 to allow each display zone to be independently controlled for up to 7 cascaded receiver devices (such as RX-70-IR-POH display receiver or AMP-001-010 digital audio amplifier/receiver) to be connected to each output of the matrix, with serial control commands sent centrally through the RS-232 port of the matrix to operate any display device within the 16 separate control zones managed by the matrix.

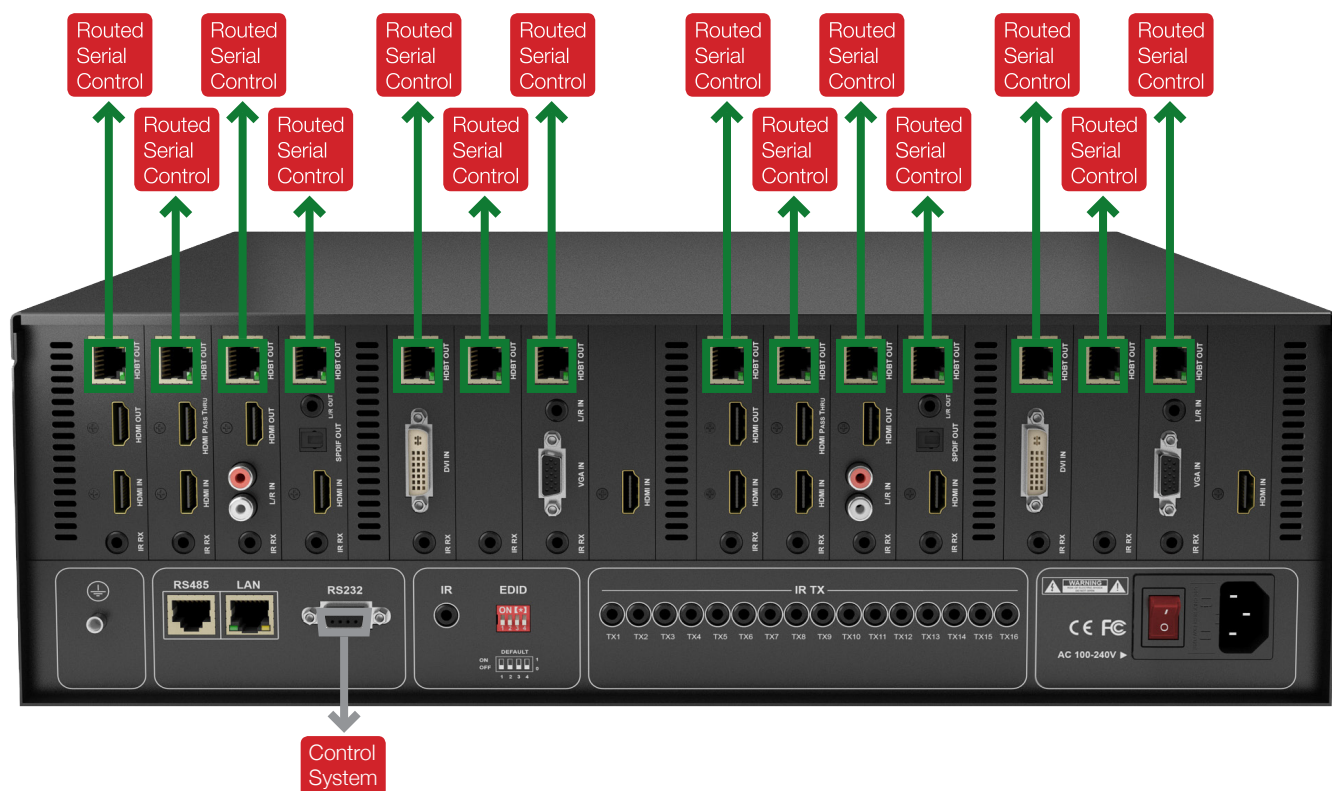
Commands are simply sent to specific receiving devices by their address, and ignored by others with a different address.

What Does This Mean?

Vast arrays of screens can be created easily by cascading matrix outputs to potentially distribute to 112 displays - each with its own fully routable serial control of display zone.

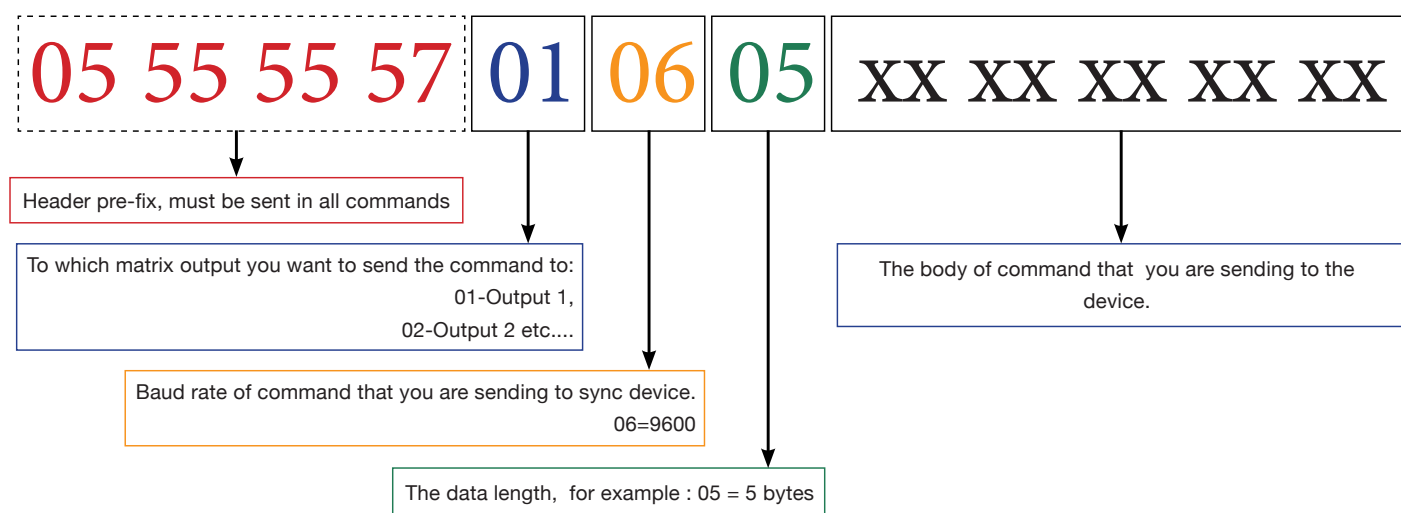
Customized Expansion.

For large commercial projects requiring even greater distribution, a customisable modular MX-PP-POH solution featuring HDMI source loop HDMI passthru offers the opportunity to cascade up to 7 matrices for a total distribution to up to 784 screens - each with routed control from a central location to all connected display zones.



13. Routing Serial Commands from the MX-PP-POH

If using serial control with MX-PP-POH matrices to control compatible display receiver devices, routed serial commands to the receiver device (RX-70-POH or AMP-001-010) via the matrix should be sent in the following command string:



For example to send a “power on” command to a TV connected to output 3, the command string would look like this: 05555557030605{TV power on command}

NOTE A 9-pin serial cable should be used between control system and matrix.

NOTE If cascading matrices using the TX-POH-020 transmission card to expand distribution, a separate serial cable must be used for each additional matrix connected – serial commands cannot be cascaded.

14. EDID Management - About EDID

EDID (Extended Display Identification Data) is data generated from each display in the system to communicate the capabilities of the device (720p, 2ch Audio, 1080p, 7.1ch Audio).

For communication between devices to be made, and successful connection achieved, devices must both request and send the required information. For example, a display will communicate 1080p capability with 2ch audio, which the source device will accept and output the correct format for the display. Problems can arise when different types of devices such as displays, sources and amplifiers are used within a system, making communication between them that much more difficult; sometimes resulting in connection problems.

In such instances EDID needs to be streamlined or guided for all devices to work together, with equipment such as the MX-PP-POH and RX-70-IR-POH display receivers perfectly placed to handle this process as communication between display and source is the most important in the system. The effective control and management of EDID is essential for the success of any integration, with this being achieved in most cases using the default setting on the matrix and receivers.

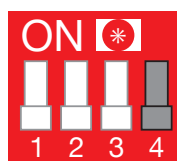
15. Before EDID Adjustments

Communication between sink, matrix and source devices should be automatically negotiated with the EDID DIP switch set to the default Normal Output (OFF) position. However, should device communication or compatibility issues be encountered during installation, please refer to the EDID DIP settings below.

If the maximum capabilities of the display are known, for example 1080p 3D with 2ch stereo audio, the DIP switch setting should be adjusted manually for matching EDID to be sent to the matrix.

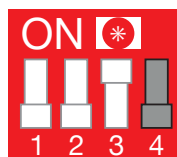
If the specification of the display is not known, simply copy the EDID from the display to matrix through the HDMI connection by setting all switches to the EDID Copy or Force Output (ON) positions and power cycling the matrix for the DIP setting to become active.

16. EDID Presets



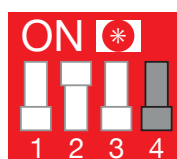
Copy EDID from the HDMI sink device to the currently selected input port

For example, when output-3 select input-1, the EDID of output-3 will be copied to input-1. (An HDMI output takes precedence over a UTP output. If a copy fails, the EDID will remain the same.)



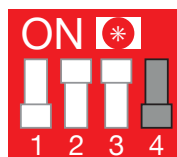
1080p 3D stereo

The matrix will use 3D compatible 1080p-stereo EDID when the DIP switch is in this setting.



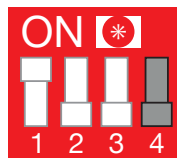
1080p stereo

The matrix will use 1080p-stereo EDID when the DIP switch is in this setting.



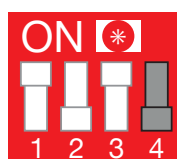
1080i stereo

The matrix will use 1080i-stereo EDID when the DIP switch is in this setting. This setting is useful if using an older model TV or if the screen does not support full 1080p.



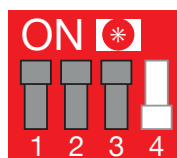
1080p 5.1

The matrix will use 3D compatible 1080p-5.1 EDID when the DIP switch is in this setting.



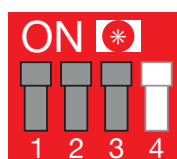
1080p 7.1

The matrix will use 3D compatible 1080p-7.1 EDID when the DIP switch is in this setting.



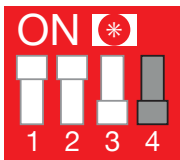
Normal Output

This setting instructs the matrix to check the hotplug voltage and EDID of the sink device prior to outputting the HDMI signal.



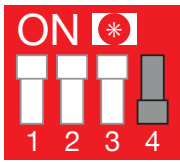
Force Output

This setting instructs the matrix to continually output HDMI signals regardless of hotplug voltage being detected from the sink device.



Reserved

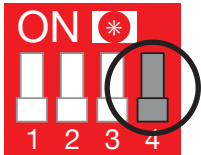
Reserved for future use



Reserved

Reserved for future use

NOTE EDID Switches that are marked in grey indicate the switch can be in any position.



17. Troubleshooting

Generally, the majority of HD distribution installation issues are either caused by minor connection errors, communication problems between devices, or when the transmission of high signal bandwidth is attempted using insufficient cable.

Should you encounter any technical difficulties when installing and configuring the matrix, we are confident solutions can be found by working through the following troubleshooting checklist before seeking alternative technical support.

No Picture or Poor Quality Picture

1) Power – are all HDBaseT transmitters or matrices powered? All units should have their own power source connected ie. 12v for 70m/230ft HDBaseT PoH transmitters – Please use power supplies included.

NOTE Display receivers do not need to be independently powered if part of an HDBaseT PoH extender set or MX-PP-POH Matrix solution. Non-PoH display receivers can also be powered via the display USB port by using the USB to 5v power cable also supplied with this model.

Are all sources definitely powered and firmly connected?

2) If possible, always use test equipment prior to installation and to troubleshoot any problems.

3) Distance – Is the cable too long for the signal to be transmitted effectively? The HDBaseT classification used within the transmitters and receivers allow transmission of 1080p up to 70m/230ft so make sure the cable distance matches the project requirements and is well within the maximum transmission distance of the signal.

NOTE If approaching the limits of the transmission capabilities, transmission should be extended by using another extender set to ensure the signal reaches its destination effectively.

4) Cable Joins – Joins in the cable run or RJ45 connectors can impact on signal strength, resulting in reduced transmission that may manifest itself in incorrect picture quality, picture dropping out or a complete lack of picture

5) Cable Choice and Signal Reduction – Are stranded patch leads being used as interconnects between patch panels or wall outlets? CCA (Copper Clad aluminium) cables being used? These can reduce transmission rates by up to 40% – we recommend solid core straight through with minimum connections used wherever possible.

6) Correct connection – It may seem obvious but double check all UTP, HDMI, power and IR cables are connected to the correct ports.

NOTE Even a fraction off can be the difference between a perfect picture and a blank screen. Double check all connections are firmly made in the correct ports.

7) Cable wired to 568B standard? Is the cable wired and terminated correctly and are those terminations connected to the correct ports? Incorrect wiring and termination will result in unstable operation or a blank screen.

8) Electrical interference – HDBaseT is less susceptible to interference compared to regular transmissions but the location of cables and devices should be considered - could any form of interference be generated? If so, attempt to remove the source of electrical interference or move the cable run to decrease the effects of the interference.

9) Is a picture achieved when connecting the source directly to the display? If not then the problem could lie with the input or output device rather than the means of distribution i.e. the cable, receiver or matrix itself.

10) HDMI lead condition and quality – HDMI cables and connectors are delicate and can be damaged much easier than component or coax cable. Furthermore, lead quality varies dramatically, particularly in lower price brackets. Swap HDMI leads and check operation – damage to or quality of your leads could be the problem. If in doubt, swap them over. Always take care inserting and extracting your HDMI from matrix ports so as not to damage the connectors or ports.

11) Picture speckles/HD 'noise' – represents a poorly established signal that may be caused by poor quality or excessive HDMI cable lengths. Try swapping the display adaptors from a location that is functioning properly or swapping the outputs of the matrix switch used. If the problem remains on the same screen this may be caused by a connection problem between matrix and display – turn off all equipment and swap the signal carrying cables at both ends to ascertain if the cable or termination is at fault.

HD Noise (NO image) may be an HDCP Issue between the source and display but poor cabling can also cause this due to poor communication.

12) Blu-ray: 3D – is the equipment used 3D enabled/compatible? Is a 3D disc being played in a 3D enabled Blu-ray player or through a compatible AV receiver?

16) Colour distortion – a pink or green screen indicates an incompatibility between colour spacing formats – the commonly used RGB or YUV used by older displays. Some sources allow switching between RGB and YUV which may solve any colour problems. If not, try changing the HDMI cable between the source and the matrix to rule out defective cabling.

No Sound or Poor Quality Audio

Audio is transmitted within the video signal – there is no separate audio track – so generally a problem with sound will be accompanied by a problem with picture. However, if technical issues with audio are experienced, the cause is typically communication between sources, displays and/or AV receiver settings.

1) Have specific speaker sets or zones been enabled? Some AV receivers allow individual speaker selections assigned to specific zones in the set up so check the speakers used are fully connected to the amplifier and correctly assigned within the system set up. It may be an EDID issue in that the source reads the audio EDID from the display and only requests two channel

audio and EDID copy from the AVR may be required or use an embedded EDID in the AMP or Matrix.

NOTE If problems are experienced when an AV receiver is used, the cause is usually the settings of the AVR itself.

Refer to the AVR manufacturer's guidelines on the correct settings to use for your requirements.

2) Consistency of audio output between devices – Is there any discrepancy between the audio output of the source, the audio or zonal settings of the AV receiver and the speaker configuration used needed for successful audio replication? If outputting 7.1, make sure all devices connected are also outputting 7.1

NOTE Occasionally with some sources, the device settings allow the specification of audio output through a TV or an HDMI port. If using an AV receiver, check the HDMI output option is selected.

3) Do all the local sources work through the AV receiver?

Check the operation of each source individually.

Bandwidth

1) If using a graphics-based source (such as a PC/Mac/media server), make sure the source resolution is set to a maximum of 1080p, 50Hz. Higher resolutions available for graphics-based systems require higher bandwidth that may affect transmission of signals as well as incompatibility with devices.

IR

1) Check emitters at the IR TX transmitter end and receivers at the IR RX receiver end – are they connected to the correct ports on the matrix and display receiver.

2) Is the emitter correctly positioned on the source? Fix the emitter directly over the infrared sensor of the source and attach using the adhesive backing.

NOTE Locate the infrared source sensor by using a flashlight to find the sensor within the fascia of the source display. If necessary, secure the emitter over the sensor with a small amount of contact adhesive.

3) Is the remote handset powered and sending a signal?

IR is invisible to the naked eye, so use a digital camera/ phone camera to check the remote signal – point the camera at the remote control when pressing a button. The remote transmitter can be seen flashing to indicate a signal being sent. Replace batteries if flashing is not seen on the digital camera screen.

4) UTP Termination Issues – ensure cables and RJ45 terminations are correct and in good condition at both transmitter and receiver ends to see if control is established. If so, a possible re-termination of the cable could remedy the problem.

5) Are WyreStorm emitters and receivers being used? The use of third party products/magic eyes may not be compatible. Always use WyreStorm components included with your purchase or check compatibility of third party control systems with your WyreStorm dealer.

6) IR dropout issues - these can be due to exterior influences emitting infrared radiation that can interrupt IR signals. Ensure emitters and receivers are away from the following causes of IR interference.

- Direct sunlight, Fluorescent lighting (on cold start up)
- Halogen lighting
- Plasma screens

If problems persist, swap out the IR emitters and receivers to rule out faults with the units themselves. Use emitters you know are fully operational to test working condition.

Reactivate the IR call-back function on your matrix and swap IR ports on the matrix to rule out a fault with the matrix or connection ports.

Should IR remain unresponsive, turn off and disconnect all cables from the matrix and reconnect zones one at a time to assess if one location in particular is the problem. If so, run new cables directly to the display – if this fixes the problem, it is likely that electromagnetic interference / damage to the cable somewhere along the run is causing the IR signal to drop out. Investigate and remove EM interference from the run or replace damaged UTP cable.

18. FAQ

Cat5e or 6?

While our equipment is tested and graded to Cat5e cable standard; tests have shown that better results are achieved when using Cat6 cable. The lower AWG (American Wire Gauge) uses thicker copper cores ensure better signal transfer/Transmission rates. Newly installed cabling should always conform to Part P Regulation and BS 7671 (17th Edition), and should be terminated to 568B standard.

Can I use a single Cat 5e/Cat 6 cable?

HDBaseT technology only requires a single cable; all features associated with twin cable are supported with the added benefit of RS-232 control and Ethernet on 100m/328ft HDBaseT products, with 70m/230ft HDBaseT products removing Ethernet passthrough functionality.

How far can the signal travel?

Under perfect transmission conditions our HDBaseT receivers will operate at 50m, 70m or 100m (@1080p) depending on the model used. Perfect conditions means no electrical interference, straight cable runs with no bends or kinks and no patch panels or wall outlets.

If some of the above are factors in your installation then signal strength and bandwidth can be compromised. If a cable run is reaching the upper limit of the receiver's capabilities, then the signal can be boosted by way of an AMP-001-010 as an in-line repeater up to 7 times (490m) using HDBaseT technology.

What about 3D?

The RX-70-IR-POH, all of our matrix switches and most of our extender products will pass-through a 3D Blu-ray signal (frame packing - Blu-Ray & Stereoscopic - satellite/cable).

How do I control the sources?

All of our HDMI distribution products support IR pass-through from point-to-point extender sets to AMP and HDBaseT matrices. Most of the range now supports wideband IR meaning it is compatible with any IR device available on the market.

Our PP and HDBaseT matrix range (Cat 5e/Cat6) has IR pass-through from each of the outputs and has discrete IR outputs at the switch end, meaning you can have multiple identical sources yet the IR would be routed only to the applicable source.

Do I need power at the TV end?

No. Our RX-70-IR-POH HD display adaptors require no power supply at the TV end. To operate, the PoH receivers draw the power from an PoH matrix or PoH Transmitter. NON PoH devices require 5v. It's important that these are powered locally and do not receive remote power from the rack as there can be issues resulting from voltage drop along the length of cable.

For non-PoH products, our USB to 5v power cables overcome the problem of having a second mains outlet behind the TV. These useful leads draw power from the USB port of the display to power the receiver, this also means that the receiver is only powered when the display is on making the system more energy efficient and environmentally friendly.

Are WyreStorm products compatible with HDMI 1.4?

HDMI 1.4 refers to a list of 'features' that a device is capable of supporting, including Ethernet channel, return audio channel, 3D etc. Due to the continuously evolving nature of the technology, HDMI Licensing LLC have now decided to simplify terminology by testing and referring to cable in terms of STANDARD or HIGH-SPEED rather than in generations 1.3, 1.4 etc.

- STANDARD (or "category 1") HDMI cables perform at speeds of 75Mhz or up to 6.75Gbps, which is the equivalent to a 720p/1080i signal – These HDMI cables are NOT recommended.
- All WyreStorm equipment support HIGH-SPEED (or "category 2") HDMI cables that have been tested to perform at speeds of 340Mhz or up to 10.2Gbps, which is the highest bandwidth currently utilised over an HDMI cable and can successfully handle 1080p signals including those at increased colour depths and/or increased refresh rates from the Source. High-Speed cables are also able to accommodate higher resolution displays, such as WQXGA cinema monitors (resolution of 2560 x 1600).

What about screens with different resolution capabilities?

When sending a signal point to point a TV will communicate it's capabilities to the source, then the source will output a suitable signal that compatible (i.e. 1080p Stereo audio).

If you were to use a matrix switch with three 1080p screens and one 1080i screen, the resultant image would be 1080i across all screens. The matrix switches do not scale per output but instead negotiate with the source a signal that all screens are capable of supporting.

How does the Matrix cope with HDCP?

HDCP (High Definition Copyright Protection) is a feature built in to HDMI devices to prevent theft of or illegal distribution of HD content.

Unlike competing products, WyreStorm matrix switches are legal and comply with HDCP regulations. They do this by assigning a "key" to every display connected to the switch. HDCP "keys" are assigned to a display when connected to a HDMI device normally. This doesn't change when connected to a switch; it just assigns more of them.

I can get 1080i but not 1080p at a TV location

Firstly ensure that both the source is capable of outputting 1080p and that the TV is Full HD 1080p screen. If this is the case then the AMP, display receiver or PP Matrix may require EDID management setting up using the DIP switches. This useful feature provides a successful "send and receive" to ensure swift and stable EDID negotiation between the source and display. See Troubleshooting section for more tips on problem solving.

I cannot get a signal from my A/V receiver along a Cat 5e extender set

Check to ensure that the A/V Receiver isn't adding CEC (HDMI Control Protocol) to the outgoing signal, this can sometimes have an effect on the HDMI signal.

19. Maintenance

Clean this unit with a soft, dry cloth only. Never use alcohol, paint thinner or other harsh chemicals.

20. Provided Service

- 1. Damage requiring service:** This unit should be serviced by a qualified service personnel if:
 - The DC power supply or AC adaptor has been damaged.
 - Objects or liquid have gotten into the unit.
 - The unit has been exposed to rain.
 - The unit does not operate normally or exhibits a marked change in performance.
 - The unit has been dropped or the cabinet damaged.
- 2. Servicing Personnel:** Do not attempt to service the unit beyond that described in these operating instructions. Refer all other servicing to authorised servicing personnel.
- 3. Replacement Parts:** When parts need replacing, ensure parts approved by the manufacturer are used – either those specified by the manufacturer or parts possessing the same characteristics as the original parts. Be aware – unauthorised substitutes may result in fire, electric shock, or other hazards and will invalidate your warranty.
- 4. Safety Check:** After repairs or service, ask the service personnel to perform safety checks to confirm the unit is in proper working condition.

21. Mail-in-service

When shipping the unit, carefully pack and send it prepaid, with adequate insurance and preferably in the original packaging.

Please include a document or letter detailing the reason for return and include a daytime telephone number and/or email address where you can be contacted.

If repair is required during the limited warranty period, the purchaser will be required to provide a sales receipt or other proof of purchase, indicating date and location of purchase as well as the price paid for the product. The customer will be charged for the repair of any unit received unless such information is provided.

22. Warranty

Should you feel your product does not function adequately due to defects in materials or workmanship, we (referred to as “the warrantor”) will, for the length of the period indicated below (starting from the original date of purchase) either:

- a) Repair the product with new or refurbished parts.
- or
- b) Replace it with a new or refurbished product.

Limited warranty period:

All WyreStorm products are covered by a 3 year PARTS and LABOUR warranty. During this period there will be no charge for unit repair, replacement of unit components or replacement of product if necessary.

The decision to repair or replace will be made by the warrantor. The purchaser must mail-in the product during the warranty period. This limited warranty only covers the product purchased as new and is extended to the original purchaser only. It is non-transferable to subsequent owners, even during the warranty period.

A purchase receipt or other proof of original purchase date is required for the limited warranty service.

23. Warranty Limits & Exclusions

1. This Limited Warranty ONLY COVERS failures due to defects in materials or workmanship and DOES NOT COVER normal wear and tear or cosmetic damage.

The limited warranty also DOES NOT COVER damage that occurs in shipment or failures caused by products not supplied by the warrantor, failures resulting from accident, misuse, abuse, neglect, mishandling, misapplication, alteration, incorrect installation, set-up adjustment, implementation of/to consumer controls, improper maintenance, power line surge, lightening damage, modification, service by anyone other than a manufacturer-approved service centre or factory-authorised personnel, or damage attributable to acts of God.

2. There are no express warranties except as listed under “limited warranty coverage.” The warrantor is not liable for incidental or consequential damage resulting from the use of this product or arising out of any breach of this warranty.

For example: damages for lost time, the cost of having a person/persons remove or re-install previously installed equipment, travel to and from service location, loss of or damage to media, images, data or other recorded/stored content. The items listed here are not exclusive, but are for illustration only.

Parts and service not covered by this limited warranty are not the responsibility of the warrantor and should be considered the responsibility of the individual.

24. Disclaimer

WYRESTORM PUBLICATION DISCLAIMER

The material contained in this document consists of information that is the sole property of WyreStorm. This document is intended to provide information to allow interfacing to the relevant WyreStorm equipment by third party products.

WYRESTORM IS NOT RESPONSIBLE FOR MALFUNCTIONS AND/OR THE IN-OPERABILITY WHICH MAY BE CAUSED BY THE APPLICATION OF THIS INFORMATION, WHETHER EXPECTED OR NOT.

WyreStorm reserves the right to change software, control codes and specifications without notice.

WyreStorm will not be liable for any use of this information or any changes it may make to those products. The use of this information constitutes an agreement by the user to these limitations and exclusions.

25. Installation Reference Log

i. Input Reference Log

OUTPUT				
Output number on Matrix	Output Location	Display Details	Display Resolution & Audio Settings	Cable Number
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
12				
13				
14				
15				
16				

ii. Output Reference Log

OUTPUT				
Output number on Matrix	Output Location	Display Details	Display Resolution & Audio Settings	Cable Number
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
12				
13				
14				
15				
16				



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