WyreStorm®

NETWORK HD

■ **WyreStorm® NetworkHD™ HD Over IP Control Interface**

Part Number NHD-IP-CTL

WyreStorm HD over IP Solutions

FullHD 1080P

HDCP COMPLIANT

Instruction Manual

RoHS CE FC

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

Contents

1. Introduction

WyreStorm NetworkHD is our highest quality HDMI over IP network AV extender set with powerful KVM and video wall functionality. NetworkHD's fully modular system architecture removes the limitations of fixed number of input and output matrix system without compromising quality and reliability.

Configuring the network switches takes minutes and additional transmitters and receivers can be added in seconds whilst Bonjour technology automatically discovers system components to make setup a breeze.

The innovative NHD-IP-CTL controller creates a simple, single interface to configure, manage and control the entire NetworkHD system.

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

2. Features

- HDMI Pass-through
- RS232 control of connected devices
- IP control API & PC software control suite
- HDMI 1.4a compliant
- Extend the transmission distance to at least 100 meters from the sources at 1080p
- USB signal transmission, Support USB 2.0
- HDCP compliant
- Bonjour automatic discovery of system components
- Web based configuration
- Compatible with any Layer 2 Smart switch

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 NHD-IP-CTL
- 1 x 5V/2A Power Supply
- 1 x Serial Port Cable
- 5 x Label

5. Specifications

I/O Connections	1 x RJ45 Port 1 x RS232 - (service)
LED	LED indication for Power and Activity
Button	1 x Reset Button
Power Supply	5V/2A DC, 5.5mm
Power Consumption	1.4 Watts
Control Method	Web Telnet Third Party control system - including WyreStorm Enado
System Requirements	Industry Standard Cat5e/6 Cables
Supported TX/RX	NHD-IP-TX & NHD-IP-RX

| Operating Temperature	32°F to 95°F (0°C to 35°C) 10% to 90%, non-condensing
Storage Temperature	-4°F to 140°F (-20°C to 70°C) 10% to 90%, non-condensing
ESD Protection	±8kV (air-gap discharge) ±4kV (contact discharge)
Surge Protection	Voltage: ±1000 V (Tested ten times respectively for positive/negative voltages)
Dimensions (HxWxD)	26mm x 141mm × 115mm / 1" x 5.6" × 4.5"
Weight	0.42kg / 0.92lbs (without accessories)
Certification	RoHS, WEE, CE, FCC

6i. Panel Display - Front

1 Power - Lit red when device is powered on.

2 Active - Lit blue when device is functioning correctly - lit red when device is rebooting.

3 Reset - Restore to factory default settings by pressing and holding button for 5 seconds when device is turned on.

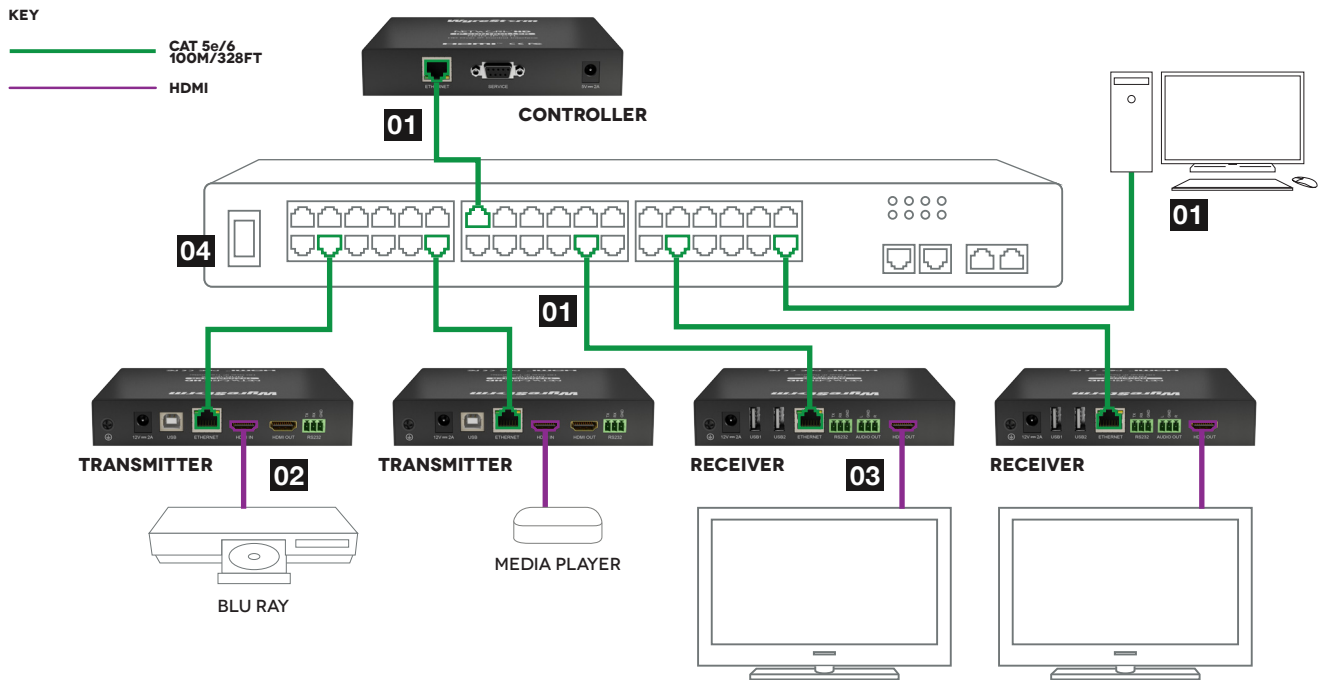**4** IP Address Label - Insert label here to display IP address of device

6ii. Panel Display - Rear

1 Ethernet - RJ45 Port

2 Service - RS232 Debug Only

3 Power - 5V / 2A DC power supply unit

7. Connection

KEY
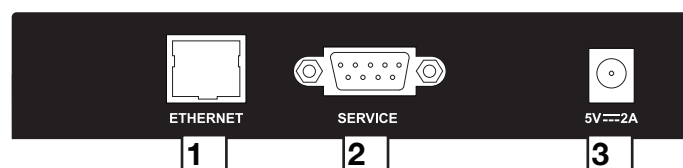
1 Connect a PC/Mac to NHD-IP-CTL, NHD-IP-TX transmitter and NHD-IP-RX receiver to a Switch via good quality, well-terminated Cat5e/6 cable with an RJ45 connector wired to 568B standard at both ends. Transmission distance between should not exceed 100m/328ft.

Attention **Although all WyreStorm products are tested using Cat5e as standard, we suggest using Cat6 as the preferred cable due to its improved distribution capabilities.**

2 Connect an HDMI Source to the NHD-IP-TX with a good quality HDMI cable, ensuring firm port connection.

3 Connect an HDMI sink device, such as a TV, display, digital projector, to the NHD-IP-RX.

4 Power on the Switch then power on all the NHD-IP devices.

Attention **The serial port on the NHD-IP-CTL is for service only, NetworkHD and can only be controlled by telnet API commands, not RS232.**

The included power supplies for NHD-IP-TX & RX are different to the power supply for the NHD-IP-CTL. Ensure connection of the correct voltage. Failure to do so may result in damage to you device.

NHD-IP-CTL cannot be powered by POE, where as RX & TX devices can be powered by suitable POE switches. Please ensure your switch can supply enough power for the number of devices you require.

8. Accessing the NHD-IP-CTL Web Interface

Follow steps below to access the web interface of the NHD-IP-CTL.

1 Enter **192.168.11.243** into a web browser. For optimal performance, we recommend use of the latest versions of Firefox, Opera, Safari, Internet Explorer 11 or Chrome.

Attention **The default IP address of the NHD-IP-CTL is 192.168.11.243. To connect you must have a network configured that allows this subnet or must set your PC to a 192.168.11.xxx address to connect. The IP address of the IP Control Box can be changed through the System Settings page.**
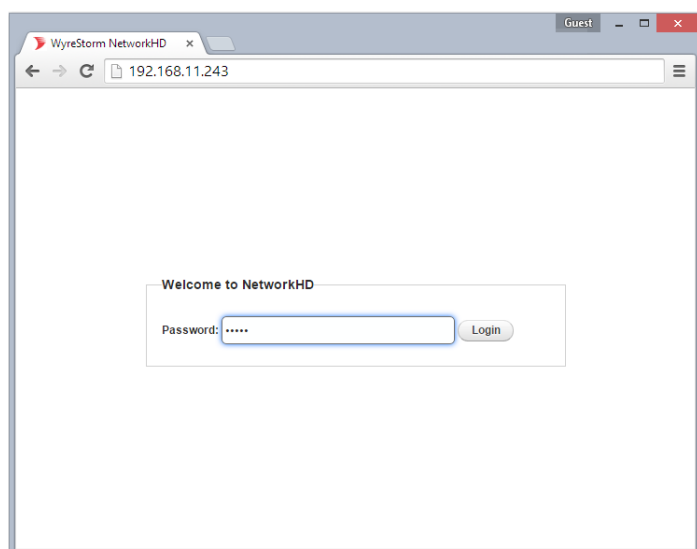

2 Enter a password ("admin" by default) and click Login to access the device.

Ensure all NetworkHD components are connected to the network and powered up correctly.

Attention **If you receive a 'server unavailable' system message after entering this address into your browser, ensure your PC is on the same subnet as the CTL box by following these steps:**

1 Click **Start** menu, go to **Control Panel > Network and Sharing center > Change Adapter Settings > Local Area Connection.** Right click and choose **Properties.**
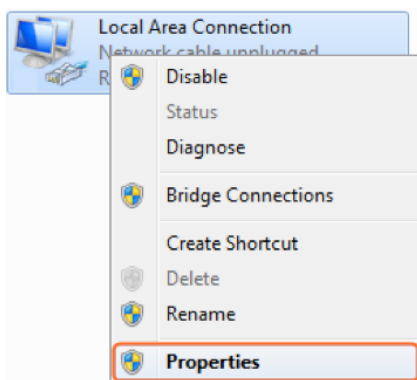
2 Highlight **Internet Protocol Version 4 (TCP/IPv4)** then click **Properties**
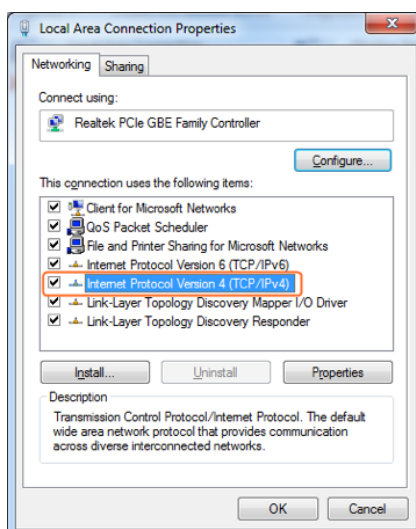
3 Check **Use the following IP address**, for the **IP address** enter **192.168.11.x** (if unsure use **192.168.11.5**) Enter **subnet mask** number **255.255.0.0** Click **OK**, then click **OK** again.
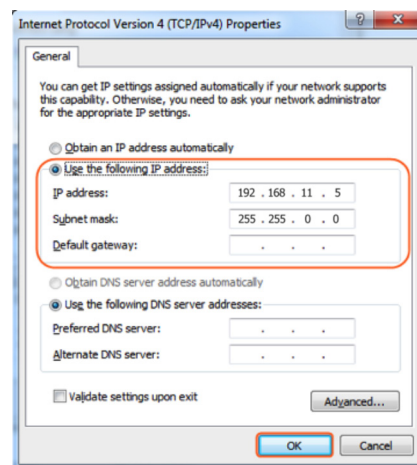
4 Return to your browser and try entering the default IP again (192.168.11.243)

9. Basic Operation

i. Matrix Switching Commands

Tabs at the top of the Home Screen page are used to access settings for Matrix, TX/RX Settings and System Settings. All pages display Telnet API boxes where commands can be entered from the NetworkHD API.
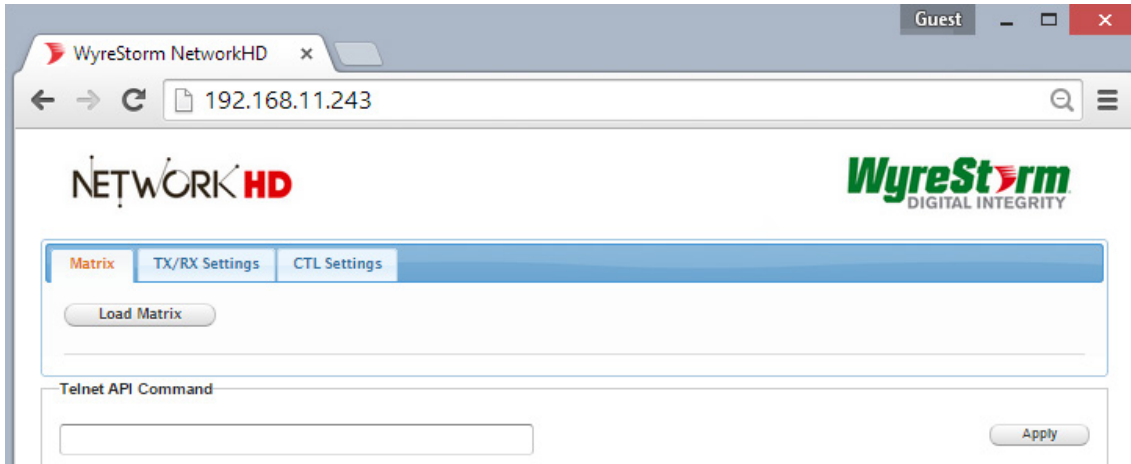
1 Click the Load Matrix button, and the table of devices will appear with TX units across the top and the RX down the left hand side.

2 Press the box that links each TX & RX to test switching of the video to each RX. Devices who's names starts with EX131 are transmitters where as devices that start EX141 are receivers

Device **online**

Device **offline**

A **green bar** represents corresponding TX and RX are **connected.**
Clicking the green bar changes colour to **clear** to signify the corresponding TX and RX are **disconnected.**

A **red bar** denotes TX/RX connection is being processed

A clear bar signifies corresponding TX and RX are not connected. Click to connect.

Attention To remove unwanted TX or RX units from the matrix either reset the device or use the API command: **config set device remove** name (name is the alias or the device number). Please note resetting the device will clear the alias names of all devices on the CTL.

ii. TX/RX Settings

The TX/RX Settings section enables IP settings and alias of each TX and RX to be configured as well as rebooting the system and factory resetting the devices.

Get started by selecting the device to be configured from the list displayed and configure options as below:
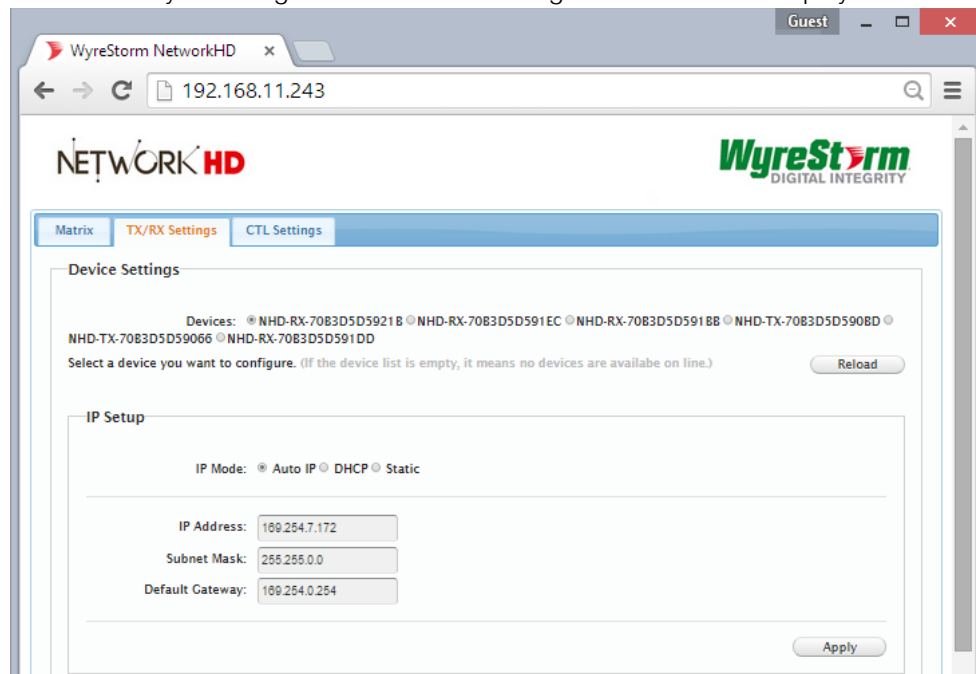
GUI Element	Description
Auto IP	Obtain IP address automatically
DHCP	IP address assigned by DHCP server
Static	IP address manually configured
IP Address	IP address of TX/RX
Subnet Mask	Subnet mask of TX/RX
Default Gateway	Default gateway of TX/RX.

iii. Alias

Attention Changing the IP address of TX/RX devices requires a restart for the settings to take affect. Please use the reboot button at the bottom of TX/RX Settings page

Alias' can be used to make identification of system components easier e.g. TV12 or Bluray1. They can also be used instead of device identifiers in API commands.

GUI Element	Description
Alias	Rename TX/RX alias for easier identification and use from API commands

Attention **Alias cannot contain any of the following symbols or combinations of letters/numbers: ',' ';' '_' '@', '*', '&', 'EX131', 'EX363', 'EX373', 'EX383', 'EX393', 'TX', 'EX141', 'EX403', 'RX", ' ', 'NHD'.**

iv. Commands

GUI Element	Description
Factory Default	Restore TX/RX to factory default settings
Reboot	Reboot TX/RX

1. CTL Settings contains the settings for the IP control box itself, comprising of two separate network connections for communication with RX/TX devices and communication to the PC/control system.

2. Each setting must be on the same subnet as other devices to enable communication between all devices.

3. The default Auto IP setting is recommended for RX & TX communication - devices will use Bonjour to discover each other.

v. CTL Settings

vii. IP Setup (TX and RX communication)

GUI Element	Description
IP Address	IP address for TX and RX communication
Subnet Mask	Subnet mask for TX and RX communication
Default Gateway	Default gateway for TX and RX communication

viii. IP Setup (Telnet/Browser communication)

GUI Element	Description
IP Address	IP address for Telnet client and web
Subnet Mask	Subnet mask for Telnet client and web
Default Gateway	Default gateway for Telnet client and web

ix. Web Password

GUI Element	Description
Web Password	Login password for Web UI management page
Default password	"admin" can be used to restore to factory settings if the user password is unknown

x. Debug Log

Attention **Debug files can only be used with the guidance of WyreStorm support.**

10.   Additional Information

Further information about NetworkHD including system configuration guides and Enado templates can be found at **wyrestorm.com**

11.   NetworkHD Control Protocol

The Telnet protocol can be used to send configuration settings, matrix switching and video wall commands to the NetworkHD system.

Commands can only be issued to the NHD-IP-CTL by IP using **port 23.**
The default IP address of the NHD-IP-CTL is **192.168.11.243** – in default configuration commands should be sent to this IP address.

Matrix Switching Control

Command	matrix set TX1 RX1 RX2, TX2 RX3 RX4,...
Return	matrix set: TX1 RX1 RX2, TX2 RX3 RX4,...
Note	Route one or Multiple TX on one or Multiple RX. Each individual TX and its routed RX or RX's compose a re-cord, and should be separated by a commas. Use NULL after a TX and any RX units from this TX will discon-nect. Matrix commands cannot be sent when an RX is in video wall mode, first remove the RX from the video wall or use the vw change command E.g.: "matrix set Source1 Screen1 Screen2" sends TX with alias Source1 to RX's with alias' Screen1 & Screen2

Command	matrix get
Return	the connected TX/RX information with below format matrix information: TX1 RX1 TX2 RX3 TX2 RX4 ....
Note	Obtain matrix information. Based on current TX/RX in the network, re-construct the network topology and feedback to the third-party controller.

Video-Wall

Command	vw add vw-name layout n m TX RX11 RX12 RX13 RX1m RX21 ... RXnm
Return	videowall vw-name layout n m tx rx11 rx12 rx13 rx1m rx21 ... rxnm
Note	Add a video wall layout n rows and m columns, subsequently the RX are automatically assigned positions in the video wall in order. The Parameter RX could be a '0', indicating there is no change to the corresponding RX. E.g.: "vw add wall1 layout 2 2 Source1 Screen1 Screen2 Screen3 Screen4" Note this is a faster way to con-figure a video wall as it does not require a vw add command previously but is not as flexible as the previous command.

Command	vw change rx tx
Return	videowall config change: rxhostname moved from vw-name and connect to txhostname
Note	Set RX to full-screen display of TX. Used for matrix switching in configurations that use video wall mode or to remove an individual RX from the video wall and display a different or identical TX. E.g.: "vw change Screen1 Source4"

Command	vw change vw-name tx-name
Return	videowall vw-name tx connect to txhostname
Note	Set all RX in the video wall to display another TX. E.g.: "vw change wall1 input1

Command	vw bezelgap vw-name ow oh vw vh
Return	videowall vw-name's bezelgap: xx xx xx xx
Note	Set the size of TV frame (video edge) to correct for large bezel screens. units are in mm (0.1cm). ow & oh = overall width & height of display including the bezel, vw & vh = screen width and height. E.g.: "vw bezelgap wall1 16100 9100 16000 9000"

Command	vw pictureparam vw-name h-shift v-shift h-scale v-scale tearing-delay rx1 rx2 rx3 ...
Return	set videowall vw-name's pictureparam: xx xx xx xx xx to rx1 rx2 rx3 ...
Note	Configure the rx1/rx2/rx3 ... image shift. 1 unit = 8 pixels, a negative number indicates to move left or up). Scale units = 1 Row or Columns / tearing delay units: µs, values between 10000~16000). If a parameter is 0 it will not be changed. E.g.: "vw pictureparam wall1 2 1 3 3 12500 Screen3 Screen4" will shift the image on screen 3 and 4 16 pixels down, 8 pixels right, whilst over-scaling by 3 rows and 3 columns and setting the tearing delay to 12500 µs.

Command	vw get
Return	video wall information: vw-name1 TX1 row-number1 RX11 RX12.. row-number2 RX21RX22 ... ... vw-name2 TX2 row-number1 RX11 RX12... ...
Note	Obtain video wall information and feedback video wall configurations.

Video-Wall 2

The vw2 is a special command set used for multi-host mode if the tearing delay command fails to resolve the tearing on a video wall.

Command	vw2 add vw-name layout n m TX1 RX11 RX12 ... RXnm TX2 RX21 RX22 ... RXnm
Return	videowall2 vw-name layout n*m tx1 rx11 rx12 ... rxnm rx1 tx2 rx21 ... rxnm
Note	Add a video wall layout n*m, subsequently the RX based on display order. The Parameter Rx could be character '0', indicates no need to change the corresponding RX. E.g.: "vw2 add wall1 layout 2 2 Source1 Screen1 Screen2 Source2 Screen3 Screen4" Creates a 2x2 video wall using TX1 for row 1 and TX2 for row 2.

Command	vw2 rm vw-name
Return	videowall2 item vw-name removed
Note	Remove a video wall configuration E.g.: "vw2 rm wall1" removes wall1 configuration from the TX

Command	vw2 rm vw-name rx1 rx2 rx3
Return	videowall2 config change:remove rx1 rx2 rx3 hostname from vw-name
Note	Remove one or multiple rx from video wall. E.g.: "vw2 rm wall1 Screen1" removes Screen1 from the video wall

Command	vw2 change vw-name tx1 tx2 tx3 txn
Return	videowall2 vw-name config change: row1 tx1 row2 tx2
Note	Change the selected input or inputs of a video wall, replacing a tx alias with 0 means no change. E.g.: "vw2 change wall1 Source1 0 Source3" Changes Wall1 inputs for row1 & row3 to rx1 & rx3

Command	vw2 reset tx
Return	videowall2 reset tx
Note	Remove the video wall configuration of this tx and display a complete picture. (If this tx is in video wall mode, it will only display part of the picture.)

Command	vw2 bezelgap vw-name ow oh vw vh [TX/RX1 TX/RX2 ...]
Return	videowall2 vw-name's bezelgap: xx xx xx xx TX/RX1 TX/RX2 ...
Note	Set the size of TV frame (video edge). TX/RX1, TX/RX2 are optional, if null, the whole video wall is corrected, otherwise individual one or a selection TX/RX units are corrected. E.g.: "vw bezelgap wall1 16100 9100 16000 9000"

Command	w2 pictureparam vw-name h-shift v-shift h-scale v-scale [TX/RX1 TX/RX2 ...]
Return	set videowall2 vw-name's pictureparam: xx xx xx xx TX/RX1 TX/RX2 ...
Note	Configure the rx1/rx2/rx3 ... image shift. 1 unit = 8 pixels, a negative number indicates to move left or up). Scale units = 1 Row or Columns / tearing delay units: μs, values between 10000~16000). If a parameter is 0 it will not be changed. TX/RX1, TX/RX2 are optional, if null, the whole video wall is corrected, otherwise individual one or a selection TX/RX units are corrected. E.g.: "vw2 pictureparam wall1 2 1 3 3 12500 Screen3 Screen4" will shift the image on screen 3 and 4 16 pixels down, 8 pixels right, whilst over-scaling by 3 rows and 3 columns and setting the tearing delay to 12500 μs.

Command	vw2 get
Return	videowall2 information is: vw-name1 row-number1 TX1 RX11 RX12 ... row-number2 TX2 RX21 RX22 ... ... vw-name2 row-number1 TX3 RX11 RX12 ...
Note	Obtain video wall information from IP Control Box.

Serial
Pass-through the serial command.

Command	serial -b param –r {on|off} "command-string" hostname1 hostname2 ...
Return	serial command received: <cr> serial -b param –r {on|off} "command-string" hostname1 hostname2 ...
Note	Configure devices hostname1, hostname2 to pass through serial command. Command-strings cannot contain " & ". -b param, configure the RS232 format of TX/RX and connected peripherals, including Baud rate, Data bits, Parity and Stop bits. E.g.: -b 115200-8n1. -r {on|off}, to turn on & off Carriage Return following the command-string. hostname1 hostname2 ..., indicates the destination, could be multiple. E.g.: "serial –b 9600-8n1 –r on "PWR01" Screen1 Screen2 Screen3" Sends the command "PWR01" to Screens 1, 2 & 3 with a carriage return at 9600 baud – 8 data bits, No parity, 1 Stop bit.

Notification commands send by the NHD-IP-CTL
Notification of.

Command	N/A
Return	notify endpoint {+ | -} tx/rx tx/rx {- | +} tx/rx tx/rx ...
Note	Notify the third-party controller if any TX/RX is dropped out or added.

12. Troubleshooting

1) If you are unable to connect to the web interface of the NHD-IP-CTL:

• Ensure that the Ethernet switch is configured as per the switch configuration guides at **wyrestorm.com** (You may need to disconnect all TX devices from the switch in order to regain network connection.)

• Ensure that you computer IP address is in the same subnet as the NHD-IP-CTL **(by default 192.168.11.xxx)**

2) If no devices appear in the Matrix or TX/RX Settings page:

• Ensure devices are powered up and connected to the same network

• Ensure that the network settings in the router are correct for those set in the RX/TX units

• Refresh the browser

• Reboot all system components including the NHD-IP-CTL

• Perform a reset on the NHD-IP-CTL by holding down the reset button on the front of the device.

3) If you do not see an image on the display:

• Screen message shows "waiting for Transmitter" or "waiting for video source" - the transmitter is offline or the source has turned off/entered standby. Check TX or source device is powered and switched on

• Screen is completely blank - check display is on and correct input is selected, ensure the RX is powered and the lights are stable on the front. Replace the HDMI cable for a cable tested fully working

• Only part of the Image is displayed - the device is in "video wall mode". Send a command to exit the device from video

4) If you cannot set a device 'Alias':

• A device has previously been connected to the NHD-IP-CTL with that same Alias. Perform a factory reset for the CTL it to lose that alias. Note: be aware of alias conflicts if devices are still connected but powered down.

5) If the IP address settings of the NHD-IP-TX & RX devices are not taking please reboot them after making the settings.

6) If the video or audio is distorted please reboot both the source device and the transmitter.

13. FAQs

What compression technology is utilised in NetworkHD?
NetworkHD utilises high quality JPEG2000 compression algorithm to produce very high quality images that are indistinguishable from the original at normal viewing distances. Audio is compressed using the high quality JPAC algorithm for lossless audio quality.

What resolution audio & Video does NetworkHD?
NetworkHD supports up to full HD 1080P HDMI video inputs and high quality stereo audio.

How many RX & TX units can I use in a NetworkHD system?
NetworkHD is a highly scalable system tested with up to 1000 TX/RX devices

14. Maintenance

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

15. Product 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. 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.

16. 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.

17i. 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.

17ii. 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

18.   Installation Reference Log

#	IP ADDRESS	ALIAS	MAC ADDRESS
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WyreStorm

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WyreStorm Technologies reserve the right to change physical appearance or technical specification of this product at any time.

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