

# 4K UHD IP JPEG2000 Streaming Encoder and Decoder

## NHD-400-TX | NHD-400-RX v1

**!** WyreStorm recommends reading through this document in its entirety to become familiar with the product's features prior to starting the installation process.



### **!** IMPORTANT! Installation Requirements!

- Visit the NetworkHD product pages download section at [wyrestorm.com](http://wyrestorm.com) to check for the latest firmware, document versions, and WyreStorm Management Suite configuration tools.
- Install the latest firmware onto all encoders and decoders using the Maintenance Tool found in the Management Suite and via the NHD-000-CTL web interface. Full firmware update instructions are included with the firmware download.
- NetworkHD requires a Layer 2 managed switch network with support for Multicast & IGMP snooping enabled.
- WyreStorm highly recommends using network switches listed in the [NetworkHD Switch Recommendation Guide](#). These switches have been verified by WyreStorm to meet the requirements of a NetworkHD system.
- Configure all network switches to the exact specification of the guides at [wyrestorm.com](http://wyrestorm.com) prior to connecting any NetworkHD devices.
- NetworkHD uses AutoIP to assign IP addresses in the range of 169.254.x.x to encoders and decoders out of the box. Your PC must be set to an address in this range in order to discover the encoders, decoders and NHD-000-CTL.
- WyreStorm recommends the use of the NHD-000-RACK2 for installations containing multiple NetworkHD devices. Use of this product provides an enclosure to mount and secure all NetworkHD devices in a rack.
- If using a mix of HD & UHD resolution displays with differing HDCP versions and for HDMI 1.4/HDCP 1.4 displays – Ensure the decoder is set to HDCP 1.x by right clicking the unit in the NetworkHD Console and opening the video settings option.

### In the Box

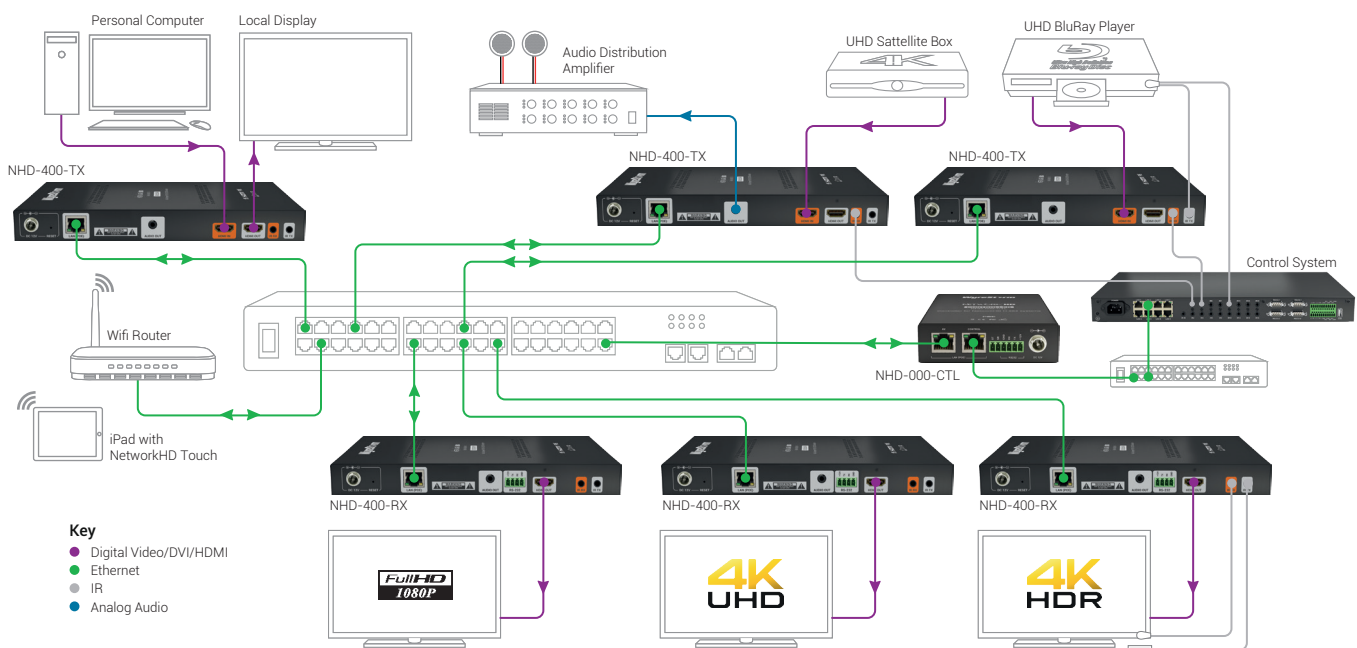
- 1x NHD-400-TX or NHD-400-RX
- 1x 12V DC 1A Power Supply
- 1x Wide-band IR Emitter
- 1x Wide-band IR Receiver (30-50KHz)
- 1x 4-pin Phoenix Connector
- 2x Mounting Brackets
- 1x Quick Start Guide (This Document)

### Additional Information

More information and required software can be found within the Download section of the product page on [wyrestorm.com](http://wyrestorm.com).

- Management Suite v1.1.0 or Higher
- NetworkHD Switch Recommendations
- NetworkHD Switch Mapping Worksheet
- NetworkHD Switch Configuration Guides
- NetworkHD Touch Installation Guide
- NetworkHD Touch User Guide
- Drivers for Popular Control Systems

### Basic Wiring Diagram



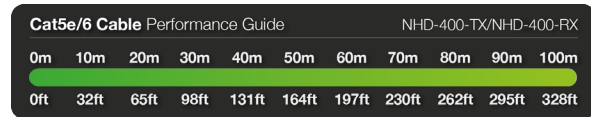
## Wiring and Connections

WyreStorm recommends that all wiring for the installation is run and terminated prior to making connections to the switcher. Read through this section in its entirety before running or terminating the wires to ensure proper operation and to avoid damaging equipment.

### HDMI / Cat5e/6 Wiring

#### ⚠️ IMPORTANT! Wiring Guidelines

- The use of patch panels, wall plates, cable extenders, kinks in cables, and electrical or environmental interference will have an adverse effect on HDMI and Ethernet transmission limiting performance. Steps should be taken to minimize or remove these factors completely during installation for best results.



■ 4K Transmission

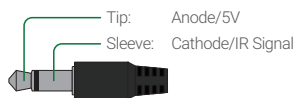
### HDMI Wiring

WyreStorm recommends using pre-terminated HDMI cables due to the complexity of these connector types. Using pre-terminated cables will ensure that these connections are accurate and will not interfere with the performance of the product.

### Control Wiring

#### IR TX (Emitter) Wiring

Connection for IR TX (transmit) uses a 3.5mm (1/8in) mono plug.



#### IR RX (Receiver) Wiring

Connection for IR RX (receive) uses a 3.5mm (1/8in) stereo jack that outputs +5V DC to power the included IR receiver.

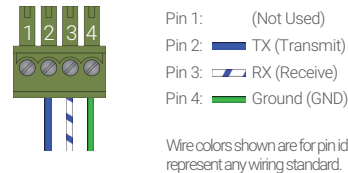


#### ⚠️ IMPORTANT! IR TX Connection Guidelines

- 3rd party IR receivers may require a different voltage, refer to the documentation provided with the IR receiver before making any connections to avoid damaging the device.
- When connecting to an IR control system use the WyreStorm CAB-IR-LINK cable. This cable compensates for differences between the WyreStorm RX and the control systems TX connection. Visit the [CAB-IR-LINK](#) product page for details.

#### RS-232 and Debug Wiring

Most control systems and computers are DTE where pin 2 is RX, this can vary from device to device. Refer to the documentation for the connected device for pin functionality to ensure that the correct connections can be made.







#### Audio Out Wiring

The audio connections use a 3.5mm (1/8in) TRS Stereo Jack.



## Setup and Configuration

### Installation and Connections

-  Do not connect the power supply or power on the PoE switch until all NetworkHD device network connections are made.
-  In order for NetworkHD encoders and decoders to be controlled by the NHD-000-CTL, the AV port on the CTL MUST be connected to the same LAN/VLAN as the NHD encoders and decoders.
-  In order for the devices in the system to be controlled via a 3rd party controller, the CONTROL port MUST be connected to the same LAN/VLAN as the control system.
-  The NHD-000-CTL's two Ethernet ports are designed to be used in different Networks or VLANs. When using a single Network or VLAN for example when using NetworkHD Touch – do not connect both ports – only use the AV port of the CTL.

1. Install NHD devices to allow airflow through the product, for encoders it is recommended to use the NHD-000-RACK. The install location should be dry, well ventilated, and out of direct sunlight.
2. Connect sources to the NetworkHD encoders using an HDMI cable from a quality brand such as [WyreStorm Express](#) ensuring a firm port connection.
3. Connect the HDMI display to the NetworkHD decoders using an HDMI cable from a quality brand such as [WyreStorm Express](#) ensuring a firm port connection.
4. Connect NetworkHD encoders, decoders, and CTL to the network switch using well terminated and tested category cable of no more than 100m/328ft.
5. Connect the decoders RS-232 port to the display following the pinout in the [RS-232 and Debug Wiring](#) section.
6. Connect the Audio Out to an amplifier with analog audio in following the pinout in the [Audio Out Wiring](#) section.

 Download the **NetworkHD Switch Mapping Worksheet** from any NetworkHD product page to keep track of Mac addresses, device and alias names for later reference. This will aid in any reconfiguration or troubleshooting.

### NetworkHD 000 Series Console Configuration

In addition to the steps below more information on configuration can be found in the NetworkHD 100-200-400 Series Installation Guide.

1. Connect a PC to the same LAN/VLAN as the NetworkHD components and ensure it is within the same subnet/IP range as the components default 169.254.x.x IP addresses. The NHD-000-CTL is set to a static address of 169.254.1.1 by default – do not choose this address for your PC.
2. Power On the NHD devices by connecting the included power supplies to the **Power Input** or by powering On the PoE switch.
3. Open the WyreStorm Management Suite (Available from the [WyreStorm](#) website) and launch the **NetworkHD 000 Series Console** and press **Search**.

**Note:** If a no devices are discovered, verify that the CTL and PC are on the same LAN/VLAN and that the IP address of the PC is within the same subnet/IP range as the CTLs default 192.168.11.243 IP address and disable or create an exception for the **NetworkHD Console** in the **Windows Firewall**.

4. Configure the system as per the instructions in the User Reference Guide (Available from the NHD-400-TX/RX Product Pages.) Right Click on the NHD-400-RX in the RX section to see its available options, including setting the devices IP address and setting an Alias name. You will also find other configuration options under the **Batch Settings window**.

**Note:** If a 3rd Party control system with a WyreStorm driver for NetworkHD is going to be used, the encoders must use the names Input1, Input2, etc. This also applies to decoders, Output1, Output2, etc.

5. Upload to the configuration to the NHD-000-CTL by right clicking the CTL in the **Other Devices** section and selecting Upload.
6. Configure the scaling, HDCP values of each decoder based on the requirements of the content and display using the **JPEG2000** settings found in the **Video** tab in the **Batch Settings** screen.

### Using NetworkHD

After installing and configuring NetworkHD switching of encoders and decoders can be performed using multiple methods.

### NetworkHD Touch

For fast and easy switching of encoders to decoders download and install NetworkHD Touch on an iPad from the [App Store](#). This award winning app provide one touch operation to send the output of a source to a display or video wall and does not require an external control system.

Refer to the [NetworkHD Touch Installation Guide](#) for configuration located on [wyrestorm.com](#) for operation once installed.

### Enado or 3rd Party Control Systems

In addition to NetworkHD Touch for one touch switching an Enado or 3rd party control system expands the capability of the system by providing control of sources for changing channels or switching inputs. Control of sources using an Enado is easily accessible right from the NetworkHD Touch app.

Enado templates are downloadable from within the configuration and 3rd party drivers for popular control system are available on [wyrestorm.com](#).

## Specifications

<b>Audio and Video</b>	
<b>Inputs</b>	<b>TX:</b> 1x HDMI In: 19-pin HDMI type A female <b>RX:</b> 1x 8-pin RJ-45 female - 10/100/1000 Mbps auto-negotiating
<b>Outputs</b>	<b>TX:</b> 1x HDMI Out: 19-pin HDMI type A female   <b>TX/RX:</b> 1x Audio Out: 3.5mm (1/8in) TRS Stereo Jack
<b>Output Video Encoding</b>	JPEG2000
<b>Encoding Data Rate</b>	Max: 850Mbps - Typical: 150~300Mbps
<b>End to End Latency (Max)</b>	1 frame latency 720p @60fps: 16ms   1080i @30fps: 33ms   1080p @60fps: 16ms   2160p @30fps: 33ms
<b>Audio Formats</b>	2ch PCM   Multichannel: LPCM and Up to DTS-X and Dolby Atmos
<b>Video Resolutions (Max)</b>	<b>HDMI</b> 640x480i @60Hz 8bit (15m/50ft) 1280x720p @60Hz 10bit (15m/50ft) 1920x1080i @60Hz 12bit (15m/50ft)   1920x1080p @60Hz 12bit (15m/50ft) Input: 3840x2160p @60Hz 4:2:0/4:4:4 8bit (7m/23ft)   @24Hz 4:2:0 HDR 10bit (3m/9.8ft) Output: 3840x2160p @30Hz 4:4:4 8bit (7m/23ft)   @24Hz 4:2:0 HDR 10bit (3m/9.8ft) <b>Using Cat6/6a/7</b> 640x480i @60Hz 8bit (100m/328ft Point to Point) 1280x720p @60Hz 10bit (100m/328ft Point to Point) 1920x1080i @60Hz 12bit   1920x1080p @60Hz 12bit (100m/328ft Point to Point) Input: 3840x2160p @60Hz 4:2:0/4:4:4 8bit   @24Hz 4:2:0 HDR 10bit (100m/328ft Point to Point) Output: 3840x2160p @30Hz 4:4:4 8bit   @24Hz 4:2:0 HDR 10bit (100m/328ft Point to Point)
<b>Color Depth</b>	1080p: 16bit   4K UHD: 8bit   HDR @24p: 4:2:0 10bit BT.2020
<b>Maximum Pixel Clock</b>	300 MHz
<b>3D</b>	HDMI 1.4b 3D: TnB, SbS, F,P
<b>Communication and Control</b>	
<b>HDMI</b>	HDCP 2.2   CEC
<b>Ethernet</b>	1x LAN (PoE): 8-pin RJ-45 female 10/100/1000Mbps
<b>IR</b>	1x IR TX: 3.5mm (1/8in) TS Mono Jack   1x IR RX: 3.5mm (1/8in) TRS Stereo Jack   Bidirectional Over Ethernet
<b>RS-232</b>	1x RS-232: 4-pin Phoenix Connector   2 Way (RX only)
<b>Power</b>	
<b>Power Supply</b>	12V DC 1A
<b>PoH</b>	Standard
<b>Max Power Consumption</b>	15W
<b>Environmental</b>	
<b>Operating Temperature</b>	32°F ~ 113°F (0°C ~ 45°C)   10% ~ 90%, non-condensing
<b>Storage Temperature</b>	-4°F to ~ 158°F (-20°C ~ +70°C)   10% ~ 90%, non-condensing
<b>Maximum BTU</b>	51.18 BTU/hr
<b>Dimensions and Weight</b>	
<b>Rack Units/Wall Box</b>	0.56U Flat on Shelf   6U when rack mounted in NHD-000-RACK2
<b>Height With   Without Feet</b>	N/A   25mm/0.99in
<b>Width With   Without Brackets</b>	250mm/9.85in   220mm/8.67in
<b>Depth With   Without Handles</b>	N/A   130.4mm/5.14in
<b>Weight</b>	0.75kg/1.65lbs
<b>Regulatory</b>	
<b>Safety and Emission</b>	CE   FCC   RoHS

## Troubleshooting

### Before Performing any of the Following Troubleshooting Steps

- Verify that all NHD devices contain the latest version of firmware. This will ensure that all devices are up to date and working at their highest performance level.

### NetworkHD Software fails to locate TX/RX/CTL Devices

- Verify that all NHD and Network devices are powered On.
- Adjust Windows Firewall Settings – Create an exception for **Configuration Tool for WyreStorm NetworkHD 000 Series** or disable completely.
- Verify that the PC, the CTL, and NHD encoders and decoders are on the same LAN/VLAN.
- Verify that all network switches share the same VLAN configuration.
- Reboot all system components including the NHD-000-CTL and the PC/Mac.
- Ensure that only one CTL port is connected per LAN/VLAN. If only one LAN/VLAN exists only use the AV port.

### Warranty Information

This product is covered by a 3 year limited parts and labor warranty. During this period there will be no charge for unit repair, component replacement or complete product replacement in the event of malfunction. The decision to repair or replace will be made by the manufacturer. This limited warranty only covers defects in materials or workmanship and excludes normal wear and tear or cosmetic damage. Visit the product page located at [wyrestorm.com](http://wyrestorm.com) for additional information on this product including important technical information not provided in this document and warranty terms & conditions.

### Failure to Connect to CTL Controller

- Follow the previous steps for failing to connect to devices. If these are unsuccessful, press and hold the reset button on the front of the CTL for 5 seconds.
- After a reboot the CTL will be returned to the default IP address of 192.168.11.243 for the control port and 169.254.1.1 for the AV port.

### No Image Appearing on Displays

- Verify that all NHD, Network, Source, and Display devices are powered On.
- Test sources and displays by connecting them directly together.
- Swap out the HDMI cable
- Connect the power supply to the component rather than using PoE.
- If the display is only HDMI 1.4/HDCP 1.4 – Ensure the decoder is set to HDCP 1.x by right clicking the unit in the NetworkHD Console and opening the video settings option.

