400 Series In-Wall 4K AV over IP JPEG 2000 Encoder
NHD-400-TX-IW

WyreStorm®
Quickstart Guide

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

NETWORK HD   HDMI®   HDCP 2.2   PoE

⚠ **IMPORTANT! Installation Requirements**

- Visit the NetworkHD product pages download section at 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+ or Layer 3 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 prior to connecting any NetworkHD devices.

- NetworkHD uses stateless address autoconfiguration (auto-IP) to assign link-local 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-RACK4 for installations containing multiple NetworkHD devices. Use of this product provides an enclosure to mount and secure all NetworkHD devices in a standard 19-inch rack frame (EIA-310).
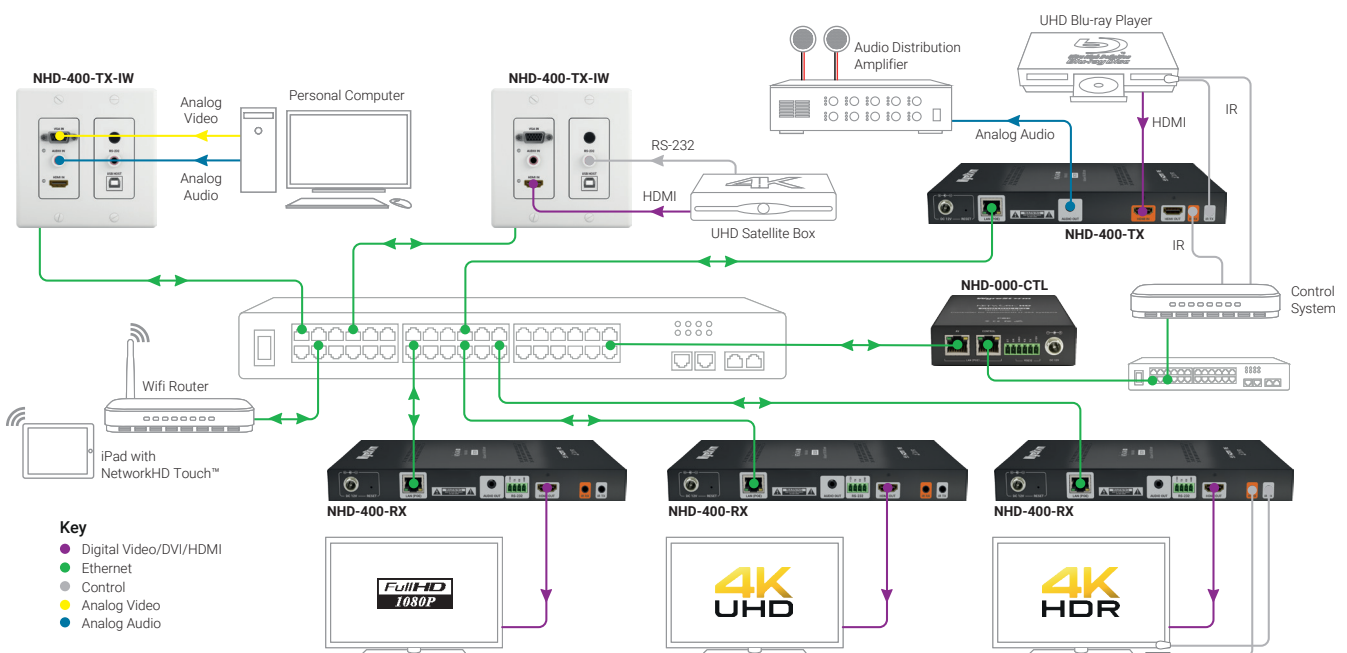
Box Contents
1x NHD-400-TX-IW Encoder
1x 12V DC Power Supply (US | UK | EU)
1x 2-Pin Terminal Block
1x 3.5mm Stereo TRS Plug to 3-pin Terminal Block RS-232 Adapter
1x White Decorative Plate with 4 Screws
1x Quick Start Guide (This Document)

Additional Information
More information and required software can be found within the Download section of the product page on wyrestorm.com.

- Management Suite v1.4 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

Key
- Digital Video/DVI/HDMI
- Ethernet
- Control
- Analog Video
- Analog Audio

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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 this entirety before running or terminating the wires to ensure proper operation and to avoid damaging equipment.

⚠️ **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 signal transmission which may limit performance. Steps should be taken to minimize or remove these factors completely during installation for best results.
- WyreStorm recommends using pre-terminated HDMI and DP 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.

LAN Port Wiring

The NetworkHD 400 Series LAN port is a 1GbE link for connection to a 1000BASE-T Ethernet device port. Refer to IEEE 802.3ab for official guidance on the Ethernet link. Cables must be tested to 100MHz across the entire link. 1000BASE-T uses the IEC 60603-7 8P8C modular connector.

RS-232 Wiring

The NHD-400-TX-IW uses a 3-pin Terminal Block to 3.5mm Stereo TRS adapter with no hardware flow control. 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 functionally to ensure that the correct connections can be made.
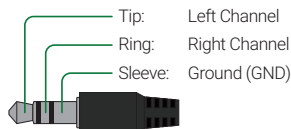
Pinouts for Terminal Block on Adapter

WyreStorm Connector			3rd Party Device
Pin 1	TX (Transmit)	---> To --->	RX (Receive)
Pin 2	RX (Receive)	---> To --->	TX (Transmit)
Pin 3	G (Ground)	---> To --->	G (Ground)
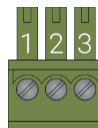
Audio Wiring

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

Tip: Left Channel
Ring: Right Channel
Sleeve: Ground (GND)

Setup and Configuration

⚠️ **IMPORTANT! Installation Guidlines**

- Do not connect the power supply until all NetworkHD devices are connected to the network switch.
- NetworkHD 400 Series uses stateless address autoconfiguration (auto-IP) to assign link-local 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.
- In order to configure the NetworkHD encoders and decoders, the AV port on the NHD-000-CTL MUST be connected to the same LAN/VLAN and Subnet as the NHD encoders and decoders.
- In order for the devices in the system to be controlled via a 3rd party controller on a different VLAN, the CONTROL port MUST be connected to the same LAN/VLAN and Subnet 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.

Installation and Connections

1. Install NHD devices to allow airflow through the product - WyreStorm recommend using the NHD-000-RACK4. The install location should be dry, well ventilated and guaranteed to maintain the mandatory operating temperature range of the product.
2. Connect sources to the NetworkHD encoders using a 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, whilst ensuring compliance with IEEE 802.3ab (for CTL, encoder, and decoder 1GbE ports).
5. Optionally connect the decoders RS-232 port to equipment following the RS-232 pinout section in the appropriate Quickstart Guide..

💡 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 the setup process in NetworkHD Console and help with any reconfiguration or troubleshooting.

NetworkHD Console Configuration

In addition to the steps below more information on configuration can be found in the NetworkHD Installation Guide.

1. Connect a computer running Windows™ to the same LAN/VLAN as the NetworkHD components and ensure its IP is within the same subnet as the NetworkHD default 169.254.x.x IP addresses. The NHD-000-CTL AV port 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.**
3. Open the WyreStorm Management Suite (Available from the WyreStorm website) and launch the **NetworkHD Console** software and press **Search.**

Note: If a no devices are discovered, verify that encoders/decoders, CTL and PC are within the same subnet scope and within the same range of the CTLs AV Port and disable or create an exception for the **NetworkHD Console** in the **Windows Firewall.**

4. Configure the system as per the instructions in the NetworkHD Installation Guide. Right Click on the NHD-400-TX/RX to see its available options, including setting the device's 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 Alias prefix IN1, IN2, etc. This also applies to decoders, OUT1, OUT2, etc. For example, **IN1-Satellite Receiver 1**

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 and HDCP values of each decoder based on the requirements of the content and display using the settings found in the **Video** tab in the **Batch Settings** screen.

Troubleshooting

⚠️ 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 NetworkHD Console.
- Verify that the PC, CTL AV Port, and NHD encoders and decoders are on the same LAN/VLAN/Subnet.
- Verify that all network switches share the same VLAN configuration.
- Reboot all system components including the NHD-000-CTL and the PC.
- Ensure that only one CTL port is connected per LAN/VLAN. If only one LAN/VLAN exists only use the AV port.
- Ensure the network switch is fully configured per the appropriate switch configuration guide.

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.

Specifications

Audio and Video	
Inputs	1x HDMI In: 19-pin HDMI Type A 1x VGA In: 15-pin DE-15 Female 1x Audio In: 3.5mm (1/8in) TRS Stereo (VGA only)
Outputs	1x 8-pin RJ-45 (Transmission to RX)
Output Video Encoding	JPEG 2000
Encoding Data Rate	Max: 850Mb/s
End to End Latency (Max)	1 video frame latency (pass-through mode) 16ms @60fps | 2 video frames latency (scaler/VW mode) 33ms @60fps
Audio Formats	2ch LPCM | Multichannel: LPCM Up to 7.1 and Up to DTS:X and Dolby Atmos (HDMI Only)
Video Resolutions (Max)	**HDMI Input** 1280x720p @50/59.94/60Hz 12bit 4:4:4 RGB 1920x1080i @29.97/30Hz 12bit 4:4:4 RGB 1920x1080p @23.98/24/25/29.97/30/50/59.94/60Hz 12bit 4:4:4/RGB 3840x2160p @23.98/24/25/29.97/30Hz 10/12bit 4:2:2/4:2:0 HDR-10 3840x2160p @23.98/24/25/29.97/30Hz 8bit 4:4:4 RGB 3840x2160p @50/59.94/60Hz 8bit 4:2:0 720x480p @59.94/60Hz 12bit 4:4:4 RGB 720x576p @50Hz 12bit 4:4:4 RGB 60fps Progressive 4:4:4/RGB: 640x480 | 800x600 | 1024x768 | 1280x800 | 1280x960 | 1280x1024 | 1360x768 | 1366x768 | 1400x1050 | 1440x900 | 1600x1200 | 1680x1050 | 1920x1200 **VGA Input** RGB @60Hz Progressive: 640x480 | 800x600 | 1024x768 | 1280x720 | 1280x768 | 1280x800 | 1280x960 | 1280x1024 | 1360x768 | 1366x768 | 1400x1050 | 1440x900 | 1600x900 | 1600x1200 | 1680x1250 | 1920x1080 | 1920x1200
Maximum Pixel Clock	300 MHz
3D	HDMI 1.4b 3D: TnB, SbS, F.P
Communication and Control	
HDMI	HDCP 2.2
Ethernet	1x LAN (PoE): 8-pin RJ-45 ANSI/TIA-568 8P8C, 1000Base-T, PoE PD (IEEE 802.3af)
USB	1x USB Host: USB Type B
RS-232	1x RS-232: 3.5mm (1/8in) TRS Stereo | 2 Way
Power	
Power Supply	12V DC
PoE	IEEE 802.3af (15.4W at PSE)
Max Power Consumption	5.7W (with PSU)
Environmental	
Operating Temperature	0 to + 45°C (32 to + 113 °F), 10% to 90%, non-condensing
Storage Temperature	-20 to +70°C (-4 to + 158 °F), 10% to 90%, non-condensing
Maximum BTU	19.45 BTU/hr
Dimensions and Weight	
Rack Units/Wall Box	2-gang US J-Box
Height	107.2mm/4.2in (without decorative plate)
Width	91mm/3.6in (without decorative plate)
Depth	45.5mm/1.8in (without decorative plate)
Weight	0.37kg/0.81lbs
Regulatory	
Safety and Emission	CE | FCC | RCM | RoHS

Note: WyreStorm reserves the right to change product specification, appearance or dimensions of this product at any time without prior notice.

Warranty Information