NetworkHD™ 200 Series AV Over IP H.264 Multiview Decoder

NHD-220-RX

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.

4K ULTRA HD   **H.264**   **HDMI®**   **PoE**

⚠ IMPORTANT! Installation Requirements!

- Visit the product page to download the latest firmware, document versions, and the WyreStorm Maintenance Suite configuration tools.

- Install the latest firmware onto all NetworkHD devices in the system.

- NetworkHD requires a Layer 2 managed switch network with support for Multicast & IGMP snooping enabled.

- NetworkHD uses AutoIP to assign IP addresses in the range of 169.254.x.x to encoders and decoders out of the box. The use of DHCP addresses is not recommended. Errors in static IP settings can result in a complicated reset procedure.

- WyreStorm highly recommends using our recommended switch manufacturers. Configure all network switches to the exact specification of the guides at wyrestorm.com prior to connecting any NetworkHD devices.

- Due to the way H.264 compression encodes the video, interlaced video sources are not recommended. Please use progressive scan sources for best video quality - even at lower resolutions.

- WyreStorm recommends the use of the NHD-000-RACK for installations containing multiple NetworkHD devices. Use of this product provides an enclosure to mount and secure all NetworkHD devices in a rack.

In the Box

1 x NHD-200-RX Main Unit
1 x Power Adapter (12V 1A DC)
3 x 3-pin Phoenix Connectors
2 x Mounting Brackets
1 x Quickstart guide (This Document)

Additional Information

The following information can be found on the WyreStorm website under the NHD-220-RX Product Page.

- NetworkHD 100-200 Series Firmware
- NetworkHD 200 Series Installation Guide
- NetworkHD Switch Recommendations
- NetworkHD IP Switch Mapping Worksheet
- NetworkHD Switch Configuration Guides
- Drivers for Popular Control Systems

Basic Wiring Diagram

The following diagram is provided to illustrate a typical basic system containing the NHD-220-RX.

North America: 518-289-1294 | EMEA/ROW: 44 (0) 1793 230 343
support@wyrestorm.com
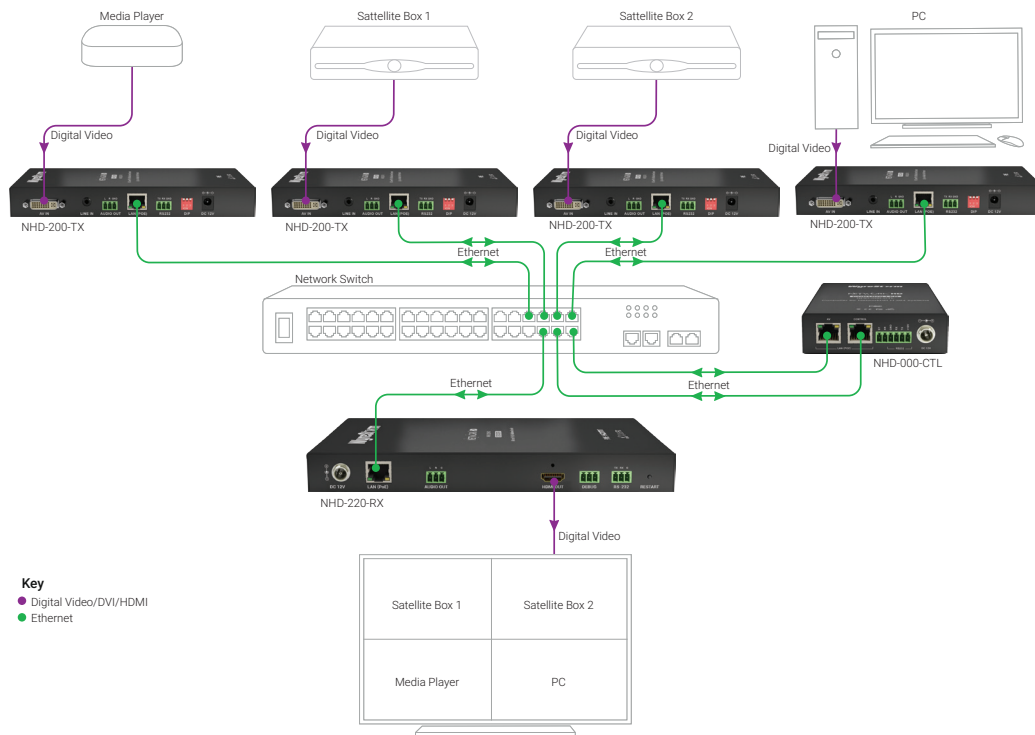
Front Panel

|		
A	Power Button	On − Device is On Off − Device is Off
B	Link LED	On − Device is operating and in a normal working state. Off − Device is not in a normal state and may experience incorrect operation.
C	ID	Displays the decoder and encoder MAC addresses onscreen.

Rear Panel

A	Power Input	5.5mm Screw Down Barrel Jack Connect to the included 18V DC 1A power supply when not powering via PoE from the switch
B	LAN (PoE)	8-pin RJ-45 female | 10/100 Mbps auto-negotiating Connect to the same network switch that the NetworkHD encoders are connected to.
C	Audio Out	3-pin Phoenix Connector Provides 2ch stereo audio from the currently playing stream
D	HDMI Out	19-pin type A HDMI female Supports HDMI and DVI/D with adapter
E	Debug	3-pin Phoenix Connector Connect to a PCs serial port for debugging the device.
F	RS-232	3-pin Phoenix Connector Provides RS-232 pass-through of commands from the NHD-000-CTL to control the display device.

Audio Out Wiring

The decoder contains an **Audio Out** that can be used to distribute the audio throughout the room by connecting to an audio pre-amplifier or powered speaker. This connection uses a 3-pin phoenix connector (supplied).
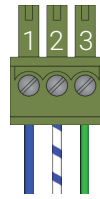
Pin 1: Left Positive (+)
Pin 2: Right Positive (+)
Pin 3: Ground (GND)

Wire colors shown are for pin identificaiton only and do not represent any wiring standard.

RS-232 and Debug Wiring

Connection Guidelines

The following wiring diagram shows the pinouts for the decoder. While not shown, connect the TX (transmit) to RX (receive) pins at the controlled device or PC side of the cable.

Most controllable devices are DCE where pin 2 is TX, 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.
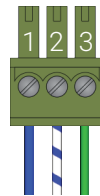
Pin 1: TX (Transmit)
Pin 2: RX (Receive)
Pin 3: Ground (GND)

Wire colors shown follow EIA-561 standard.

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Setup and Installation

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 NetworkHD 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.

1. Install NetworkHD 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.
7. If using the NHD-200-TX, configure the dipswitches in the NetworkHD encoder for the correct video source type. HDMI, DVI, VGA, or Component.

💡 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 configuration or troubleshooting.

NetworkHD 000 Series Console Configuration

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.
2. Power **On** the NetworkHD 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 **Configuration Tool for WyreStorm NetworkHD 000 Series** in the **Windows Firewall**.

4. Configure the system as per the instructions in the User Reference Guide (Available from the NHD-220-RX Product Page.) Right Click on the NHD-220-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 encoding values of each encoder based on the requirements of the content.

Recommended Encoder Settings
The following encoder settings are recommended to provide the highest quality video and instant switching.

Rate Control:	CBR
Avg bitrate:	35000
Profile:	H.264 High Profile
GOP.	60
FPS:	60
Transport Type:	RAW

Specifications

Audio and Video	
Inputs	1x LAN (PoE) 8-pin RJ-45 female | 10/100 Mbps auto-negotiating
Outputs	1x HDMI Out 19-pin type A
Audio Formats	2ch PCM
Output Video Type	H.264/MPEG-4 AVC
Output Video Resolutions	640x480p @60Hz~3840x2160p @60Hz
Encoding Data Rate	Up to 40 Mbps, configurable
End to End Latency	Low Latency Mode: 60~90ms | High Latency Mode: 250~300ms

Communication and Control	
HDMI	Max Cable Run: 15m | DVI/D supported with adapter (not included)
Ethernet	1x 8-pin RJ-45 female | 10/100 Mbps auto-negotiating
RS-232	1x RS-232 3-pin Phoenix Connector | 1x Debug 3-pin Phoenix Connector

Power	
Power Supply	Input: 100~240V AC 50/60Hz | Output: 18V DC 1A
PoE	>15.4W 802.3.AF
Max Power Consumption	7.2W

Environmental	
Operating Temperature	32°F ~ 113°F (0°C ~ 45°C) 10% ~ 90%, non-condensing
Storage Temperature	-4°F ~ 158°F (-20°C ~ +70°C) 10% ~ 90%, non-condensing
Maximum BTU	60 BTU/hr

Dimensions and Weight	
Rack Units/Wall Box	1U
Height	25mm/0.99in
Width	220mm/8.67in
Depth	130.2mm/5.13in
Weight	0.77kg/1.70lbs

Regulatory	
Safety and Emission	CE | FCC | RoHS

Troubleshooting

⚠ Before Performing any of the Following Troubleshooting Steps

- Verify that all NetworkHD devices contain the latest version of firmware. This will ensure that all devices are up to date and working at their highest performance level.
- Verify that the latest version of the WyreStorm Management Suite is installed on your PC.

Download the latest version of the WyreStorm Management Suite and NetworkHD firmware from the WyreStorm website

NetworkHD Software and/or NHD-000-CTL fail to locate NetworkHD Devices

- Verify that all NetworkHD and Network devices are powered On.
- Adjust Windows Firewall Settings – Create an exception for **Configuration Tool for WyreStorm NetworkHD 000 Series** or disable it completely.
- Verify that the PC, the CTL, and NetworkHD encoders and decoders are on the same LAN/VLAN.
- Verify that the Bonjour SDK is properly installed.
- Press and hold the reset button on the NHD-220-RX to return it to its default configuration.
- Reboot all system components including the NHD-000-CTL and the PC/Mac.

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.

Note:

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. All alias settings for the encoders and decoders will be reset to default settings and will require reconfiguration.

No Image Appearing on Displays

- Verify that all NetworkHD, 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.

Decoder Continuously Reboots

- Decoder may be set to DHCP and cannot locate the DHCP server. Connect the decoder to a DHCP server and reconfigure the IP settings using the **NetworkHD 000 Series Console**.

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** for additional information on this product including important technical information not provided in this document and warranty terms & conditions.