

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



**!** IMPORTANT! Installation Requirements

**WyreStorm Documentation and Firmware**

Download the following items from the product page on [wyrestorm.com](http://wyrestorm.com). They are essential for accurate configuration and use of the NetworkHD system.

- Latest NetworkHD Firmware
- Management Suite v1.3 or Higher
- NetworkHD Installation Guide
- NetworkHD Technical Reference Guide
- NetworkHD Switch Recommendations
- NetworkHD Switch Configuration Guides
- NetworkHD Switch Mapping Worksheet
- 3rd Party Control System Drivers

**Installation and Configuration**

- 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 600 Series uses DHCP to assign IP addresses by default. In the absence of a DHCP server an AutoIP address will be assigned in the subnet 169.254.0.0/16. Ensure the PC being used for configuration obtains an IP via DHCP or is set to an address in the AutoIP range prior to starting the configuration process.
- WyreStorm recommends the use of the NHD-000-RACK3 for installations containing multiple NetworkHD 600 Series devices.
- Use of this product provides an enclosure to mount and secure all NetworkHD devices in an AV/IT 19" equipment rack.

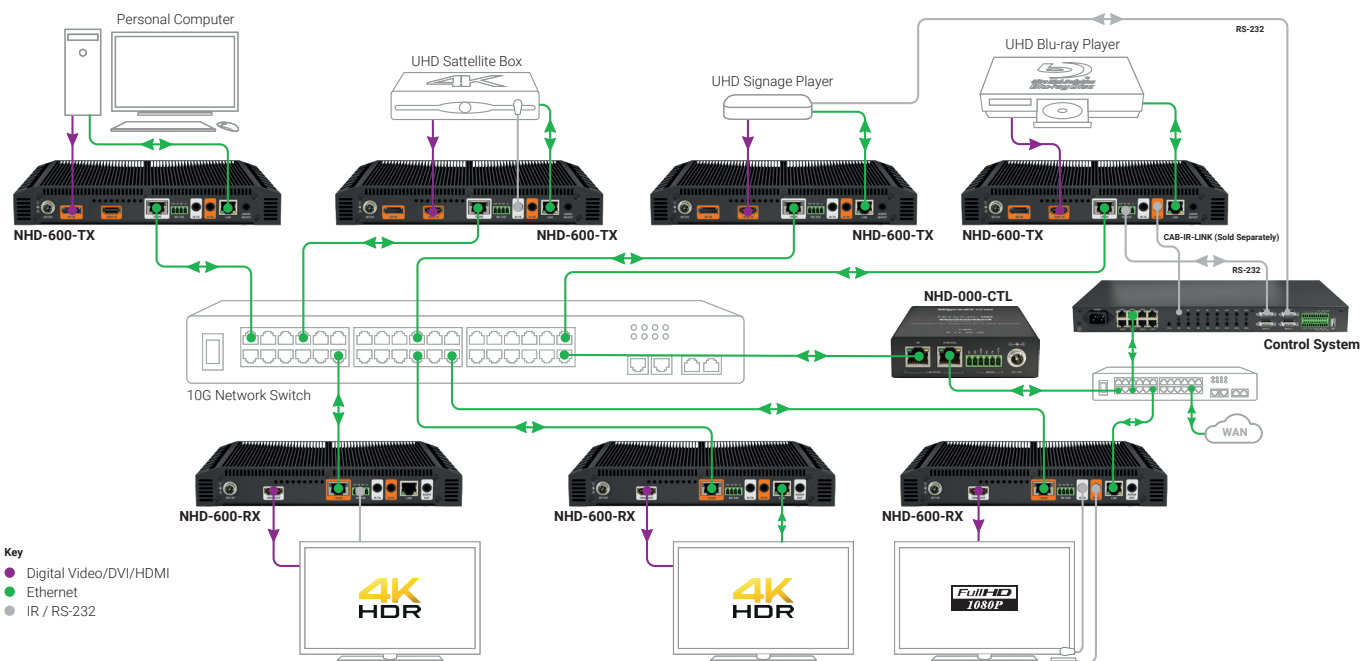
**Network Switch Requirements**

- WyreStorm highly recommends the use of switches listed in the [NetworkHD Switch Recommendation Guide](#). These switches have been verified by WyreStorm to meet the requirements of a NetworkHD system.
- NetworkHD requires a Layer 2+ / Layer 3 managed switch network with support for Multicast & IGMP Snooping. Ensure that the switch being used supports these features and that they are configured prior to connecting the NetworkHD system.
- Configure all network switches to the exact specifications contained in the WyreStorm Switch Configurations Guides prior to connecting the NetworkHD system. This will ensure proper operation from startup.

**In the Box**

- 1x NHD-600-TX or NHD-600-RX
- 1x 12v DC Power Supply (US | EU | UK)
- 1x IR Emitter
- 1x IR Receiver
- 1x 4-Pin Male Phoenix Connector
- 2x Wall Mounting Bracket
- 4x Feet for Shelf Mounting
- 1x Quickstart Guide (This Document)

**Basic Wiring Diagram**



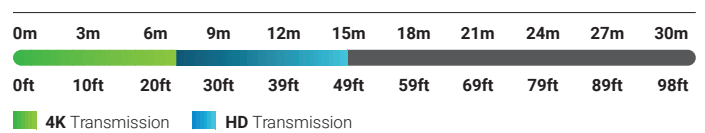
## Wiring and Connections

WyreStorm recommends that all wiring for the installation is run and terminated prior to making connections to the switcher. Read through this section in 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.

### HDMI Cable Performance Guide



## SDVoE Wiring

The NetworkHD 600 Series utilize a 10GbE link connection to a 10GBASE-T Ethernet switch port. Please refer to IEEE 802.3an for official guidance on the Ethernet link. Cables must be tested to 500MHz across the entire link.

10GBASE-T uses the IEC 60603-7 8P8C modular connector.

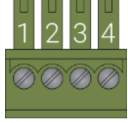
## LAN Port Wiring

The NetworkHD 600 Series LAN port is a 1GbE link for connection to a 1000BASE-T Ethernet device port. Please 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 NetworkHD 600 Series uses 3-pin RS-232 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 functionality to ensure that the correct connections can be made.

	WyreStorm Connector		3rd Party Device
	Pin 1	12V DC Out	---> To ---> Reserved
	Pin 2	TX (Transmit)	---> To ---> RX (Receive)
	Pin 3	RX (Receive)	---> To ---> TX (Transmit)
	Pin 4	G (Ground)	---> To ---> G (Ground)

### IMPORTANT! IR TX/RX Guidelines

- Using WyreStorm infrared emitters and receivers is the best way to ensure that most IR coding formats are transmitted and received by the NetworkHD system. Other 3rd party emitters and receivers can be used; however, these devices must operate in the same manner as the WyreStorm devices.
- On the 100/200/400 series the IR data modulation (carrier) frequency is passed through NetworkHD from the receiver to the emitter, however on the 600 series the carrier frequency is fixed at 38kHz when used in pass-through mode. When using the API the carrier frequency can be defined for greater compatibility.
- Due to differences in IR across 3rd party control systems their IR ports should never be connected directly to a NetworkHD system as an incompatibility may exist. WyreStorm offers a cable that compensates for voltage differences as well adjusts for differences in the pins used within the port. Refer to the [CAB-IR-LINK](#) product page for more information.

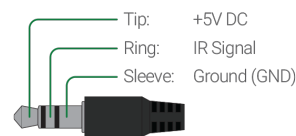
## IR TX Port Pinout

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



## IR RX Port Pinout

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



## Audio Wiring

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



## Setup and Configuration



### IMPORTANT! Installation Guidelines

- Do not connect the power supply until all NetworkHD devices are connected to the network switch.
- NetworkHD 600 Series uses DHCP to assign IP addresses by default. In the absence of a DHCP server an AutoIP address will be assigned in the subnet 169.254.0.0/16. Ensure the PC being used for configuration obtains an IP via DHCP or is set to an address in the AutoIP range prior to starting the configuration process.
- 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-RACK3. 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 DisplayPort or 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 802.3an (10GbE encoder/decoder port) or IEEE 802.3ab (for CTL, encoder, and decoder 1GbE ports).
5. Optionally connect the LAN port to equipment following the guidance in the [LAN Port Wiring](#) section.
6. Optionally connect the encoder/decoder RS-232 port to equipment following the pinout in the [RS-232 Wiring](#) section.
7. Optionally connect the Audio In or Out to an audio device following the pinout in the [Audio 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 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 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 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-600-TX/RX 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 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, 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.

## Specifications

Audio and Video		
	NHD-600-TX	NHD-600-RX
<b>Inputs</b>	1x DP In: DisplayPort 20-pin 1x HDMI In: 19-pin type A 1x Audio In/Out: 3.5mm (1/8in) TRS Stereo	1x 10GbE: 8-pin RJ-45 Female
<b>Outputs</b>	1x 10GbE: 8-pin RJ-45 Female 1x Audio In/Out: 3.5mm (1/8in) TRS Stereo	1x HDMI Out: 19-pin type A 1x Audio Out: 3.5mm (1/8in) TRS Stereo
<b>Output Video Encoding</b>	SDVoE	
<b>Encoding Data Rate</b>	Max: 10Gb/s	
<b>End to End Latency (Max)</b>	Genlock Mode: Uncompressed = 30us, Compressed <120us Fast Switch Mode: 1~2 video frames = min. between 16.7 – 33.4ms @ 60fps	
<b>Audio Formats</b>	2ch PCM   Multichannel: LPCM and Up to Dolby Atmos and DTS-X	
<b>Video Resolutions (Max)</b>	2160p @60Hz 8bit 4:4:4   2160p @60Hz 12bit 4:2:2	
<b>Color Depth</b>	1080p: 12bit   2160p: 12bit 4:2:2 / 8bit 4:4:4	
<b>Maximum Pixel Clock</b>	595 MHz	
<b>3D</b>	HDMI 1.4b 3D: TnB, Sbs, F.P	
Communication and Control		
<b>HDMI</b>	HDMI   HDCP 2.2	
<b>Ethernet</b>	1x 10GbE SDVoE: 8-pin RJ-45 Female 10GBASE-T   1x LAN: 8-pin RJ-45 Female 1000BASE-T	
<b>IR</b>	1x IR TX: 3.5mm (1/8in) TS Mono Jack   2 Way   Broadcast   Routed   API Programmable 1x IR RX: 3.5mm (1/8in) TRS Stereo Jack 2 Way   Broadcast   Routed   API Programmable	
<b>RS-232</b>	1x RS-232: 4-pin Phoenix Connector   2 Way   Broadcast   Routed   API Programmable	
Power		
<b>Power Supply</b>	12V DC 3A	
<b>Max Power Consumption</b>	TX: 15.24W   RX: 18.64W	
Environmental		
<b>Operating Temperature</b>	0 to + 45°C (32 to + 113 °F), 10% to 90%, non-condensing	
<b>Storage Temperature</b>	-20 to +70°C (-4 to + 158 °F), 10% to 90%, non-condensing	
<b>Maximum BTU</b>	TX: 52 BTU/hr   RX: 63.6 BTU/hr	
Dimensions and Weight		
<b>Rack Units/Wall Box</b>	<1U	
<b>Height With   Without Feet</b>	45mm/1.78in   35mm/1.38in	
<b>Width With   Without Brackets</b>	263.6mm/10.38in   230mm/9.06in	
<b>Depth With   Without Handles</b>	139mm/5.48in	
<b>Weight</b>	1.52kg/3.34lbs	
Regulatory		
<b>Safety and Emission</b>	CE   FCC   RoHS	

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

## Troubleshooting

 Verify all NHD devices contain the latest version of firmware. This ensures 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.
- Verify that the configuration in NetworkHD Console is correct based on system layout and components used.
- Test sources and displays by connecting them directly together.
- Swap out the HDMI cable.

## Warranty Information

WyreStorm Technologies LLC warrants that its products to be free from defects in material and workmanship under normal use for a period of five (5) years from the date of purchase. Refer to the Product Warranty page on [wyrestorm.com](http://wyrestorm.com) for more details on our limited product warranty.

