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FHD264 User Manual

Dynamic Virtual Matrix™, HDMI Distribution and Switching over LAN with RS-232 & IR Extension



FHD264-S



FHD264-R

Distribute up to 64 individual HDMI video sources to 250 displays or mor

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FCC RADIO FREQUENCY INTERFERENCE STATEMENT

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer’s instructions, may cause interference to radio communication. It has been designed to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are intended to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.



1.0 Introduction

1.1 General

The FHD264 is a family of HDMI over LAN Senders (encoders) and Receivers (decoders). They utilize advanced video encoding techniques and can distribute up to 64 Full-HD video signals to hundreds of displays on a simple 1 Gigabit local area network (LAN). Senders and Receivers can also extend IR remote control signals and Full duplex Serial RS-232 communications.

Each device provides a two-line front panel LCD that can be used to easily configure or monitor parameters such as IP settings, multicast group selection, assignment of device names, and more. This eliminates the usual installation challenges of finding and configuring devices on the network for the first time. With the front panel LCD, users can see and assign configuration parameters with ease.

HDMI Audio is extracted and available as convenient 3.5mm stereo analog output on both the FHD264 Sender as well as the Receiver. The FHD264-S Sender also provides local HDMI output.

The RS-232 serial port on each device can be used in SoIP mode (Serial over IP) allowing IP controllers on the network to communicate with and control peripheral equipment such as Display and projector using Serial Commands.

All devices support IEEE 802.3af PoE (Power over Ethernet). When connected to a network switch with PoE, no external power supply is required. A power supply is included for customers that may not have PoE on their network.

The FHD264-R Receivers can decode the video from any Sender on the LAN. It is easy to switch the Receiver between Senders. This can be done in several ways:

- Using front panel LCD and push buttons
- Using supplied IR Remote Control
- Browsing to the WebGUI in each unit
- Telnet Commands (ideal for third-party control of switching)
- Windows™ PC running DVM Manager Tool software (free download)
- CNT-IP-264 (Optional Network Controller module that can globally control all FHD devices and third party devices on the network)



Receivers include an IR remote controller for switching among Sender channels (multicast groups). In installations such as sports bars,

users can easily switch the monitor to another source using this IR remote. In addition, since the FHD264 extends IR signals, users can control sources such as video players using that device's original IR remote. In other words, from the Receiver location (at the TV), you use the included IR remote to switch the video to a different Sender, then you can use the IR remote of whatever source is connected to the sender.



Receivers also offer Fail-Safe automatic video routing and redundancy. So if the receiver is not detecting any video on its currently assigned channel, it will switch to a user defined alternate channel. It can also automatically switch back to the original multicast channel if video is detected again.

Senders are available as a stand-alone box. Rack mount hardware is also available for housing up to 12 senders in 4U rack space.

FHD264 applications include digital signage, meeting rooms, classrooms, bus & metro stations, airports, home theater, and more.

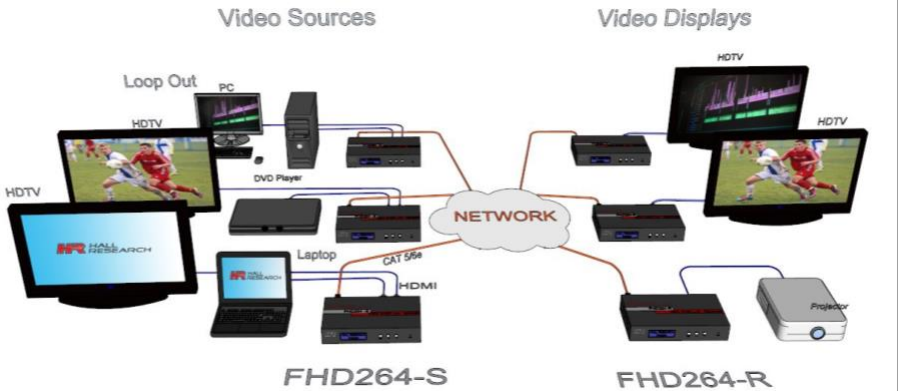


Figure 1 - Block Diagram

Showing Senders on the left with local monitors connected and Receivers on the right

1.2 Features

- Create a virtual video matrix with up to 64 Senders and 256 Receivers
- Works on affordable 1Gig network infrastructure
- Front panel LCD for configuration of IP parameters, and status indication
- HDMI loop output connector on FHD264-S Sender

- HDMI Audio extraction at both Sender and Receiver with convenient L/R stereo analog 3.5mm outputs
- PoE enabled. Does not require power supply connection if plugged to the PoE switch
- Fail-Safe video routing to create automatic AV system redundancy
- Video Scaler in Sender to manage bandwidth
- Bi-directional RS-232 extension from sender to all receivers in same group
- IR (infrared) extension from receivers to paired sender
- Serial Over IP(SoIP) to control companion serial devices
- IR Remote Control for pass through and local control
- HDMI audio extraction at both Sender and Receiver end
- Front Panel with LCD and buttons to display device information and change IP configuration
- Easy to use WebGUI in each unit, accessible from any browser
- Free Windows™ DVM Manager Tool software (for system-wide configuration and video switching from one GUI)
- Each device can have a user-definable name (e.g. Lobby Display, Projector)
- Low power consumption (less than 3 W)
- Supports SD, HD and Full-HD (1080p@60 Hz) resolutions
- HDCP 1.4 compliant

2.0 Package Contents

- (1) Model FHD264 (-S, -R)
- (1) 5V DC Power Supply with universal plug adapter kit
- (1) IR Emitter Cable with Senders
- (1) IR Detector Cable with Receivers
- (1) IR Remote Controller with Receivers
- (1) Set of L-bracket mounting hardware (-S and -R)
- (1) User's Manual

3.0 Installation

For installations having multiple Senders and Receivers, a dedicated Gigabit (1000 BaseT) network with PoE and IGMPV2 Support is required. The H.264 encoding scheme allows user-definable bit rates to give users control over bandwidth used for each video stream. Use CAT5e/6 cables to extend up to 394 ft (120 meters).

3.1 Configuration

FHD264 system supports multiple configurations: point-to-point (one Sender connected to one Receiver without network switch), point-to-many (one Sender to many Receivers like a video splitter), and many-to-many (matrix operation). Typically, both point-to-many and many-to-many configuration requires a network switch.

3.1.1 Point-to-Point

Point-to-Point is the straightforward configuration of FHD system without involving a network switch. An external power supply is required to supply power to both Sender and Receiver. The only requirement is that the TX and RX should have **unique** IP address (Static) and need to be in the same group.

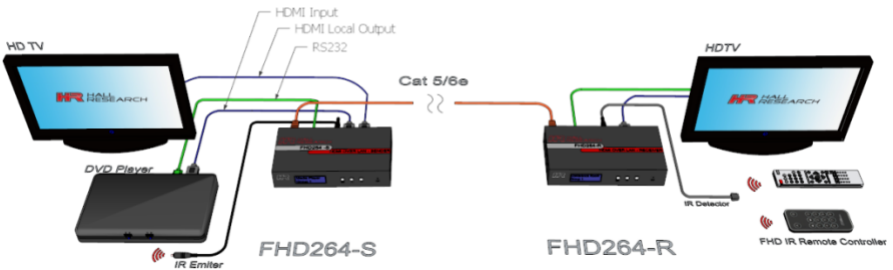


Figure 2 - Example: Point-to-Point

3.1.2 Point-to-Many (Splitter) and Many-to-Many (Matrix)

Start by setting a **unique** IP address (if not using DHCP) and Multicast Group channel for each of the Senders (see the front panel operation in [Section 4.2.](#)) Duplicate IP addresses and Multiple Senders on the same Group will cause conflicts. Receivers must also have unique IP addresses, but can point to the same Group channel.

Receivers with the same group number as a Sender will show the video from that Sender, and RS-232 and IR are routed between them. To use a broadcast TV analogy, Multicast Group numbers are like TV channel numbers. Only one station can broadcast on a given channel, but many Receivers can be tuned to that same channel.

As shipped, each device is configured for DHCP. In this mode, when powered up each box gets its IP address from the DHCP server on the network. Alternately, the IP addresses can be assigned manually and set to Static from the front panel. To change IP address using the PC-GUI, connect a Windows™ PC or laptop to the network and run the free DVM Manager Tool.

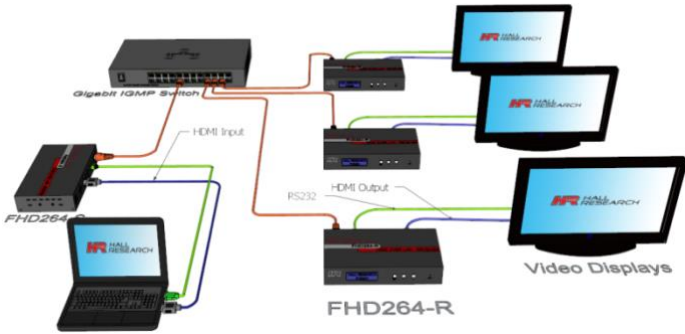


Figure 3 - Example: Point-to-Many

NOTE

A Gigabit(1000BaseT) Switch with DHCP server, IGMPV2 and PoE is recommended. When there is more than one Sender on the network in a matrix configuration (multipoint-to-multipoint) the Ethernet Switch MUST support IGMP to prevent network flooding.

Hall Research recommends using the Cisco SG300 Series of gigabit Ethernet Switches.

3.1.3 Setup

1. To get started, use a Gigabit Switch with DHCP server and IGMPV2 Support (Recommended)
2. If the switch does not support PoE, use the power supply included in the package (-S and -R) to power the FHD.
3. By default, DHCP is **enabled** in both Sender and Receiver. The default IP address of the Sender is **192.168.1.11** and Receiver is **192.168.1.12**. (See Section 5.11 Factory Defaults for more details.)
4. If the switch supports DHCP, connect the Senders(s) using CAT5e/6 cable.
5. If the switch does not support DHCP, connect the Sender(s) (one at a time) using CAT5e/6 cable and assign unique static IP address to each device by turning OFF DHCP. (See Section 4.2.1 Changing IP address from Front panel). Repeat the same step for all the Receiver(s).
6. Make sure each Sender has a unique Group ID. Note that, two Senders cannot reside in the same Group ID. This will cause conflicts.
7. Connect HDMI source(s) to the HDMI input of the Senders(s).

8. Connect the HDMI loop output of the Sender(s) to local HDMI display(s) if desired.
9. Connect the HDMI display(s) to the Receiver(s) output and change the Group ID of the Receiver(s) as required. To receive the video, both Sender and Receiver must be in the same group. (If there is any problem with the video, see FAQ Q2: No picture on the display.)
10. If using IR, connect the IR emitter cable into "IR OUT" port of the Sender, and connect the IR detector cable into "IR IN" port of the Receiver.
11. If using RS-232, connect an RS-232 cable from the PC or automation system to the supplied phoenix connector, and then connect it to the RS-232 port on the Sender. Repeat the same process between the Receiver and the device to be controlled. Note that the baud rate is selectable and should be the same at both Sender and Receiver end. (See Section 4.1 Front Panel Operation for more details.)
12. Once the Senders and Receivers are configured properly on the network, they will be discoverable by Hall Technologies' DVM Manager Tool. Simply plug a laptop or PC into the same router/switch and run the free Windows™ DVM Manager Tool. You can easily assign user-friendly names to each device and change the Group routings.
13. To use the DVM Manager Tool to control video routing, first scan for the devices. Note that if the switch does not support DHCP, then the IP address of the PC also needs to be changed to static (See FAQ Q3: How to Change the IP address of the PC?)
14. To access the internal WebGUI of FHD264, type the IP address into the address bar of any standard browser. By default, as shipped from the factory, no login is required to access the internal WebGUI. If login is enabled, the default user name/password is *admin/admin*.

4.0 Front and Rear panel



Figure 4 - Sender Front and Rear Panels



Figure 5- Receiver Front and Rear Panel

MENU: To view or change the system Configuration

▲▼ NAV Keys: Navigation keys

RESET (RST): Press and release to reboot (same as power cycle). Press and hold for 10 seconds to restore factory defaults.

5V DC: Plug the supplied 5V DC power supply to the unit, if PoE is unavailable.

HDMI OUT: This is a local HDMI loop out for a local display.

HDMI IN: Connect to the HDMI source such as a DVD or Blu-ray player.

IR OUT: Connect to the supplied IR emitter cable.

AUDIO OUT: HDMI audio extraction

RS-232: Connect to PC/Serial Controller or displays with phoenix adaptor

1000BT: Connect to a gigabit network router/switch or a Receiver using CAT5e/6 cable. The green LINK LED illuminates to show the link from Receiver is established.

IR IN: Connect the supplied IR detector

4.1 Font Panel Operation

Use the front panel to change the Group ID, IP Configuration and RS-232 Baud Rate. By default, after the FHD264 gets initialized, it shows the home screen with Device ID and Group ID. To see the system configuration, click the MENU Button and use the NAVIGATION (NAV) keys to view various settings. To change the settings, hold the MENU button until the setting name starts blinking. Use NAV keys to change the parameters of the setting and click MENU to apply setting or Hold MENU to discard setting. Follow the messages on the LCD for further instructions.

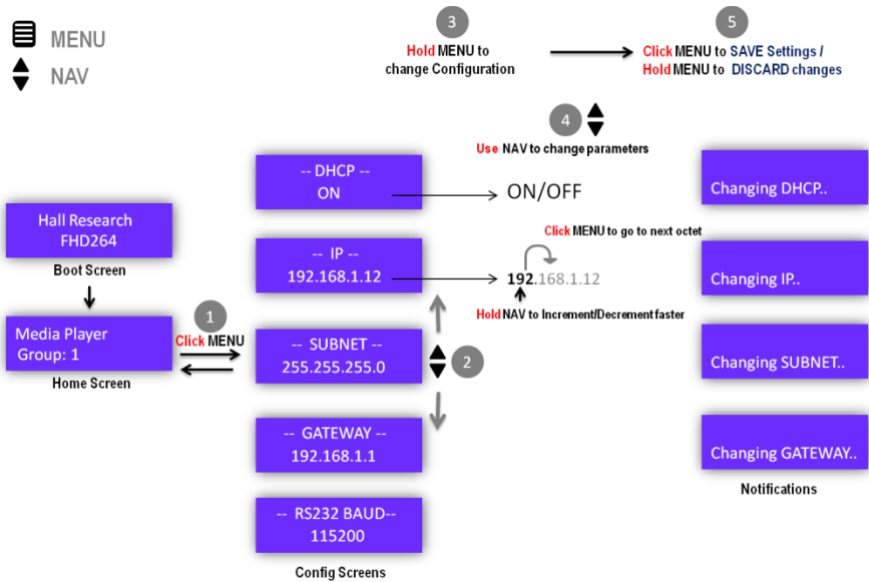


Figure 6 - Front panel operation

4.1.1 Changing IP address from Front panel

To change the IP address from the front panel, make sure DHCP is turned OFF. The steps are as follows

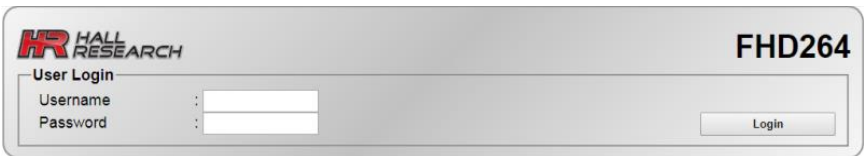
1. From Home Screen push MENU
2. NAV to IP configuration ("-- IP--")
3. Hold MENU until setting name ("--IP--") starts blinking
4. By default, the first octet in the IP address starts blinking
5. Use NAV keys to change the octet parameter or click MENU to move to the next octet
6. After the reaching the 4th octet, click MENU to change the IP address.
7. At any point time, if the setting name is blinking, hold MENU to discard the changes

4.2 WebGUI

The WebGUI can be used to change the following configuration settings:

- Device Info -- Device ID, Group ID
- Password -- Enable Login, Change Password
- RS-232 Baud Rate
- Firmware Upgrade
- Network Settings
- Scaler Settings (only for Sender)
- Encoder Settings (only for Sender)
- System Settings (only for Receiver) -- Fail-Safe, OSD, Debug (for troubleshooting)

Both encoders and decoders can be password protected with a User Login, which is enabled from the WebGUI.



The image shows a web interface for a device. At the top left is the logo for 'HR HALL RESEARCH'. At the top right is the device model 'FHD264'. Below the logo is a section titled 'User Login'. This section contains two rows: 'Username : [input field]' and 'Password : [input field]'. To the right of the password input field is a button labeled 'Login'.

Figure 7 – FHD264 Login Page

Default Username is **admin** and password is **admin**

HALL RESEARCH **FHD264-S**
v1.1

Device Info

Model Name : FHD264-S Update Device Info

Device ID : HRTV_TX

Group ID : Group 00239 255 42 42

MAC Address : 48-52-50-54-00-68

FW Version : 4.0 0 0 u 02072019

EN Version : 7.1 2 0 11.20161025

Network Settings

Enable DHCP : LogOut

Static IP : 0 0 0 0

SubNetmask : 255 255 0 0

Gateway : 169 254 1 254

Update Settings

Password

Enable Login : Update Password

Old Password : _____

New Password : _____

Confirm Password : _____

RS232

Baud Rate : 115200 Update RS232

SOIP Mode : Passthrough

Upgrade

FW Filename : Choose File No file chosen Update Firmware

EN Filename : Choose File No file chosen Update Encoder

Encoder Reset

Reboot Factory Default

Scaler Settings

Scale Full HD To : FHD Update Scaler

Scale HD To : HD

Encoder Settings

Full HD Bit Rate : 15000 Kb/S Update Encoder

HD Bit Rate : 12000 Kb/S

SD Bit Rate : 4000 Kb/S

Video Information

Input Resolution : Unknown

Input Frame Rate : Unknown (fps)

Figure 8 - Sender WebGUI

Note: Changing IP configuration settings via WebGUI requires a Reboot in order to take effect.

HALL RESEARCH **FHD264-R**
v1.0

Device Info

Model Name : FHD264-R Update Device Info

Device ID : HRTV_RX

Group ID : Group 01239 255 42 43

MAC Address : 00-CC-1D-15-8F-45

FW Version : 0.5 0 0 20180307

Network Settings

Enable DHCP : Update Settings

Static IP : 192 168 1 12

SubNetmask : 255 255 255 0

Gateway : 192 168 1 1

RS232 Baud Rate

Baud Rate : 115200 Update RS232

Upgrade

FW Filename : Choose File No file chosen Update Firmware

Reboot Factory Default

Password

Enable Login : Update Password

Old Password : _____

New Password : _____

Confirm Password : _____

LogOut

System Settings

Enable Debug : Apply Settings

Fail Safe :

FS Group ID : Group 00239 255 42 42

OSD : ON

Figure 9 - Receiver WebGUI

4.3 Telnet Control

FHD264 offers an extensive telnet control instruction set to provide full control of the system. The default telnet port is **9999**. When connected, the following prompt will be displayed on the terminal:

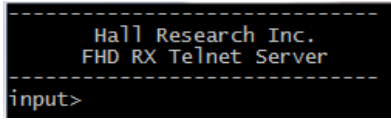


Figure 10 - Telnet terminal message

Note:

- Commands are case sensitive - use lowercase characters as shown.
- Invalid commands result in **“Unknown Input Command !!!”**
- The “list <CR>” command displays the list of available commands.

All Commands are Terminated by <CR><LF> (or Hex 0D 0A)	Response	Function
set_group_id n where n=0-1023	OK – Success Error – Fail	Set Group ID
get_group_id	n where ‘n’ returns the group ID	Query the current group ID status
set_dhcp	OK – Success Error – Fail	Set to DHCP mode
get_dhcp	On – DHCP Off – No DHCP	Query the DHCP status
Set_uart_baudrate n Where n = 2400, 4800, 9600, 19200, 28800, 28400, 57600, 115200	OK – Success Error – Fail	Set the baud rate for the RS-232 on the unit
get_uart_baudrate	n where n = baud rate	Query the current baud rate setting in the unit
set_static_ip ip [ip(n.n.n.n)] netmask [ip(n.n.n.n)] gateway [ip(n.n.n.n)] Where: ip [ip(n.n.n.n)] =IP xxx. xxx. xxx. xxx netmask[ip(n.n.n.n)] =netmask 255.255.xxx.xxx gateway [ip(n.n.n.n)] = gateway xxx. xxx. xxx. xxx	OK – Success Error – Fail	Set the static IP configuration for the unit
get_static_ip	IP: 192.168.1.xx Netmask: 255.255.0.0 Gateway: 192.168.1.1	Returns the current static IP configuration
get_mac_address	XX: XX:XX:XX:XX:XX	Query the MAC address of the unit
get_lan_status	Link_Up/Link_Down	Query LAN Status whether device is UP and connected to the switch
get_ip_config	IP: xxx.xxx.xxx.xxx Netmask: xxx.xxx.xxx.xxx Gateway: xxx.xxx.xxx.xxx	Shows IP Configuration settings

All Commands are Terminated by <CR><LF> (or Hex 0D 0A)	Response	Function
get_hdcp_status	On/Off Where On - Input Video with HDCP Off- Input Video without HDCP	Query the HDCP status of the video input
get_video_lock	Lock Unlock Where Lock – Stable Input Signal Unlock - No input video or unstable	Query the video stability status
set_session_key [0xhhhh(1~32)]	OK-Success Error-Fail Where [0xhhhhh(1~32)]=0x000000~0xffff	Set session key for encryption
set_screen off/on (Receiver ONLY) Where off=blank on=unblank	OK – Success Error – Fail	Set video blank/unblank the screen
get_screen (Receiver ONLY)	on off	Query the device output status
set_page_login [string(off/on)] where off = Disable login for the web page session (default) on= Enable login for theweb page.	OK – Success Error – Fail	Set the login page for the WebGUI
get_page_login	on off	Query the webpage” login enable” status
set_video_bitrate (Sender ONLY) [string(fhd hd sd)][n(2000~18000)] Where: string(fhd hd sd)][n(100~25000)] can be fhd, hd, sd and 12000 For example: set_video_bitrate fhd 12000	OK – Success Error – Fail	Set the max bit rate for the TX to sender over the network. Limits apply see Section 10
get_video_bitrate [string(fhd hd sd)] (Sender ONLY)	xxxx	Query the bit rate for the TX
set_downscale_mode string(fhd hd sd)] to string(fhd hd sd)]	OK – Success Error – Fail	Scale down the input video to lower resolution
get_downscale_mode string(fhd hd sd)] (Sender ONLY)	string(fhd hd sd)]	Get the downscale mode status
set_video_out_mode string(both_on loopthrough network both_off)] (Sender ONLY)	OK – Success Error – Fail	Enable the HDMI output and network output
get_video_out_mode (Sender ONLY)	string(both_on loopthrough network both_off)]	Query the Loop and network output status
set_osd [string(auto on off)] Auto= OSD will turn off when there is an input signal detected. On or Off – OSD Stays on or off forever	OK – Success Error – Fail	Set OSD mode of the system
get_osd	Auto On Off	Query the OSD mode status

All Commands are Terminated by <CR><LF> (or Hex 0D 0A)	Response	Function
set_device_name [string (1~30)] Where string can be 30 characters long	OK – Success Error – Fail	Set the device name
get_device_name	[string (1~30)]	Query the device name
get_fw_version	Tx/Rx Firmware : x.x.x.x.xxxxxxx Returns the firmware version	Query the firmware version
factory_reset	Processing factory reset! System will reboot after few sec!	Factory reset the device
Reboot	System will reboot after few sec!	To reboot the unit
get_company_id	xxx	Query the company ID
set_streaming_mode [string(unicast multicast)]	OK – Success Error – Fail	Set the streaming mode of the device
get_streaming_mode [string(unicast multicast)]	[string(unicast multicast)] where unicast means one-one configuration and multicast means one to many and many-to-many configuration	Query streaming mode status
master_get	xxx.xxx.xxx.xxx (IP Address) [Blank]	Return the IP address of registered 3rd party controller for SolP
master_set [string(xxx.xxx.xxx.xxx)]	Master Set	Registers the IP address as 3rd party controller. All the responses from the serial device connected to RS-232 port will be sent to the server on port #5050 at this IP address
rs_out [string(up to 100 char)]	SolP Sent	Outputs the string the string via RS-232
get_failsafe (Receiver ONLY)	on off	Returns the fail safe status
set_failsafe [string(on off)] (Receiver ONLY)	Ok -- Successes Error -- Fail	Set the fail safe status
set_fs_group n where n = 0 to 63 (Receiver ONLY)	Ok -- Successes Error -- Fail	Set the fail safe group number
get_fs_group (Receiver ONLY)	Number in range 0 to 63	Returns the fail safe group number
Exit		Exits the telnet session

4.4 Dynamic Virtual Matrix Manager Tool

- The free Hall Research Windows™ Dynamic Virtual Matrix Manager Tool can locate all the FHD264 devices on the network.
- It will list all the devices found by User-defined names, IP addresses, and Multicast Group channels.

- Columns can be sorted (for example you can sort by device name). Senders are listed on the left and Receivers on the right.
- Click the “Update” button after making any changes.
- Click the “Reboot” button to reboot the device.

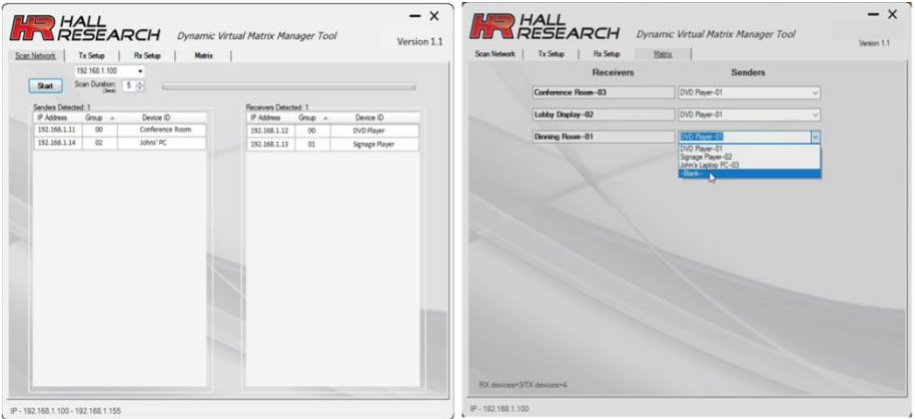


Figure 11 - PC GUI

4.5 CNT-IP-264

The CNT-IP-264 is a powerful networking module designed to manage Models FHD264 and HHD264 - HDMI over LAN Senders and Receivers. Users can access the web application using any computing device (PC, Smart phone or Tablet) that runs a standard browser. CNT-IP-264 has following features:

- Embedded WEB Server with Graphical User Interface
- Monitors FHD264/HHD264 video routing and status
- Controls External Devices over Serial (SoIP), Telnet or TCP
- Create custom control for external devices
- Real time event scheduling with Real-Time clock
- Compatible with Hall Technologies Device Finder utility
- Supports DHCP



Figure 12 - CNT-IP-264

5.0 Features

5.1 Device ID

Each FHD264 Sender and Receiver can store a custom name of up to **31** alphanumeric characters. Naming the device is very useful in managing large installations. The Device ID will be displayed on the front panel home screen, OSD, WebGUI and FHD software applications. The default Sender name is **HRTVTX** and Receiver is **HRTVRX**.

5.2 Group ID

A Group ID is a number range from 0 to 63, which the Sender uses to multicast its video and data to a group of Receivers on the network. Each group ID is linked to a multicast IP address. You can have a maximum of 64 sources (Senders) in the network. Note that there is no limitation on the number of Receivers that can connect to a Group if they have a different IP address.




5.3 OSD Menu



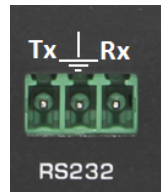
Figure 13 - OSD (Receiver ONLY)

The FHD264 Receiver shows the following information as an On Screen Display (OSD). The OSD can be configured as Auto (Default), ON, OFF.

RX Name	This is Receiver's user defined name
RX IP	This is Receiver's IP address
TX Name	This is Sender's user-defined name to which the receiver is connected
TX IP	This is Sender's IP address
Group ID	This is Receiver's multicast group
Status	<p>"Waiting for connection ..." -- if there is no TX available in its group</p> <p>"Connected" -- TX found and receiving video</p> <p>If the Receiver is connected and there is no HDMI source at the Sender end, the following video will be generated by the Sender by default.</p> 

5.4 RS-232

RS-232 communication in the FHD264 is bi-directional and it is achieved using Serial Over IP(SoIP) Protocol. The controller or the controlled device can be either at the Sender's or the Receiver's end. Note that the Sender and Receiver should have matching baud rate for communication. The baud rate for the TX and RX can be configured from Front Panel, WebGUI, or the Windows™ GUI.



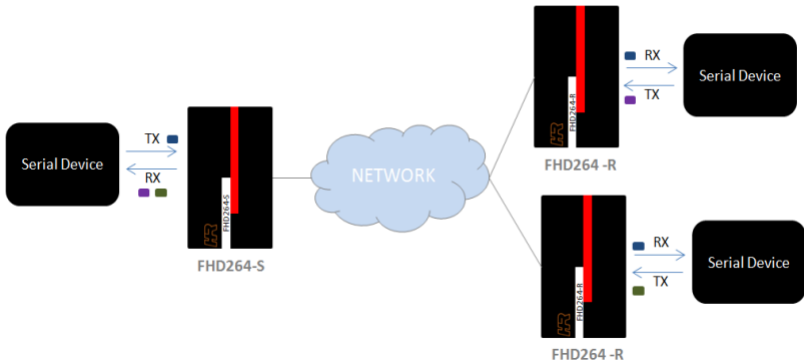


Figure 14 - RS-232 Communication

5.4.1 Working

When a serial device connected to the sender transmits data, it is received by all the receivers in that group. If a serial device connected to the Receiver transmits data, it will be received only by the Sender in that group. While receiving data from multiple Receivers, the Sender receives the data on a first come, first served basis and the receiver might not send all the data in single IP Packet. To effectively parse the response from multiple serial devices connected to the sender, enable **Packet Mode** at the Sender (FHD264-S) and add **Message Complete Delay (MCD)** at the Receiver (FHD264-R).

Packet Mode at the Sender will append a SOIP header for each chunk of data received from the receiver. To avoid the fragmentation of SOIP messages from the receiver use Message Complete Delay (MCD) at the Receiver end. MCD tells the receiver to buffer the bytes received from the serial device locally for certain period of time, until Serial device stops transmitting or Buffer is full.

See *Application Notes on Packet Mode & Message Completion Delay* for more information.

5.5 Serial Over IP (SoIP) from External Devices

Serial devices connected to the RS-232 port on FHD264 units can be controlled over the IP network. SoIP commands can be issued via Telnet, which is simple (See the telnet command "**rs_out**" in telnet control).

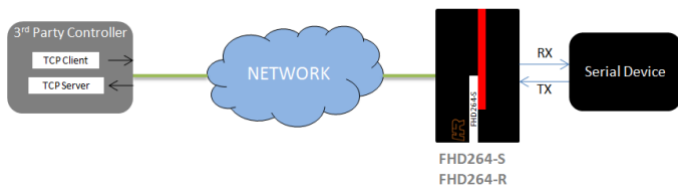


Figure 15 - Serial Over IP

To allow Full duplex communication with Serial device, each FHD264 has a dedicated TCP server and client. See the *FHD SoIP application notes* for more details and examples.

5.6 Fail-Safe (FS) Video Routing

Fail-Safe is a recovery system for the Receiver in case of a loss of video at the Sender end. When FS is activated, the Receiver will automatically switch to the assigned backup source (FS Group ID) if video is lost in the current group. The Receiver switches back to its original group when the video signal is restored. This powerful feature provides an additional layer of protection for systems that need built-in video redundancy.

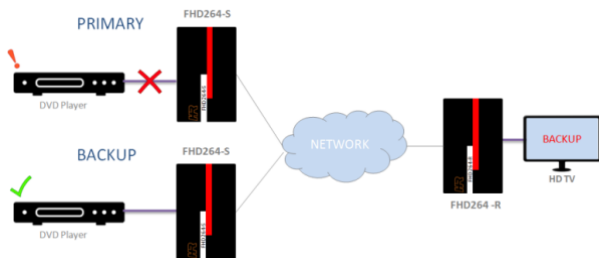


Figure 16 – Fail-Safe

Fail-Safe in the Receiver can be configured using the WebGUI or Telnet. If a Receiver is displaying video from its Fail-Safe group, the following messages will be displayed on the front panel LCD, OSD, and WebGUI.

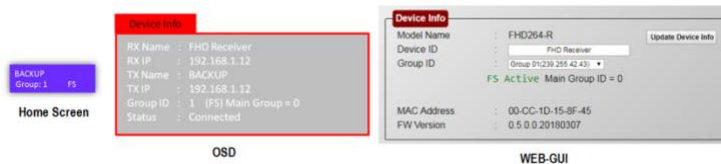


Figure 17 -Fail safe notifications

Note: The **FS Group ID** cannot be same as the **Main Group ID** of the Receiver.

5.7 IR

FHD264 Supports both **IR pass through** and **IR Control** using a single wideband IR detector. Any IR signal received in the range of 32-56 KHz at the Receiver will be sent to the Sender in the group. The Sender can receive IR signals from multiple receivers on a first come, first served basis. This allows the user to control the IR devices at the Sender end from multiple Receiver locations. Note that to send an IR signal to a device at the Sender end, the Receiver must be in the same group as the Sender.

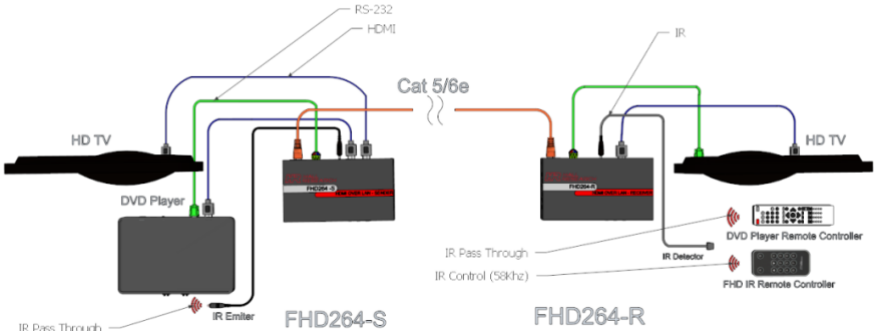


Figure 18 – IR

Additionally, each FHD264-R comes with an IR Remote control that works at a frequency of 56 KHz. The IR Remote can be used to quickly change Receiver groups:

- Use ▲▼NAV keys to increment or decrement the group by one
- Use NUM pad to go to any group in the range of 0 to 63
- Keys A and B are reserved for future use



Figure 19- IR Remote Controller

5.8 Video Scaling and Bit Rate Control

The FHD264-S (Sender) has internal video scaling capabilities. The user can control the bit rate and scaling feature depending on the network bandwidth. The user can change the settings in three ways – WebGUI, Telnet, or PC GUI. Please consider the following if you decide to change settings from default:

- The input of the sender is the source video fed into the sender.

- The output of the sender is the network stream.
- Reducing the bit rate will decrease the occupied bandwidth on the network.
- By default, these settings are optimized for the best image possible without undue burden on the network.

5.8.1 Scaler and Encoder Settings

If you are using a source with 1080p resolution, then use “Scale Full HD to :” option to either transmit the video at the same resolution on the network, or to first downscale the video from Full HD to HD (or SD) and then transmit the lower resolution image on the network. By doing so you will force the unit to use the bit rate for HD instead of Full-HD, which is typically much lower. This lowers the resolution for each Receiver from 1080p/60 to 720p/60. But, if the video has a lot of motion and action, there will be less compression, resulting in a clearer overall picture, while using less bandwidth.

However, if you have a Full HD (1080p) source video where the amount of motion on the screen image is limited (such as a slide show), you can skip scaling it down and just reduce the bit rate for Full HD. That way you are not sacrificing any resolution of the original image.

If you are using a 720p source resolution, the use “Scale HD to:” option to downscale the video to Standard Definition (SD) to transmit in the network. Click “Update Scaler” to confirm the settings.

Once the Scaling Settings are confirmed, select the Full HD, HD and SD bit rate in the Encoder Settings section and click “Update Encoder”.

Resolution	Bit Rate – Range (Kbps)
1080p (FHD)	10000-18000
720p, 1080i (HD)	8000-16000
480p, 480i, 576p, 576i (SD)	2000-8000

5.9 EDID

The FHD264 offers EDID management. The user can program a custom EDID table into the HDMI input of the Sender, FHD264-S. Hall Technologies’ EMX-HD-AUD Audio Extractor and EDID Manager are recommended for this task.

NOTE

Factory resetting the FHD264 will restore the default Hall Technologies EDID to the device. The user must confirm the action and take all necessary precautions to prevent loss of data. Hall Technologies is not responsible for any damage that may occur from the user attempting to modify the EDID

5.10 Power over Ethernet (PoE)

FHD264 Senders and Receivers utilize Power Over Ethernet (PoE), eliminating the need to connect a power supply to the unit. The device gets its power from the PSE (Power Sourcing Equipment) port in the Gigabit PoE switch. An external power supply is included with each FHD264 if PoE is not available.

6.0 Firmware Upgrade

The firmware upgrade on FHD264 can be completed using the **WebGUI**. Contact Hall Technologies for more details.

6.1 Factory Default

Factory default will reset all the parameters (including network settings). There are 4 ways to set factory default:

1. Press the RESET button on the unit for 10 seconds.
2. Use telnet command "factory reset<CR>"
3. Factory Default is available on the Software GUI. Wait for 10 seconds for the device to reboot and activate.
4. The WebGUI also offers factory resetting the device.

Setting Name	Value
Device ID	HRTVTX -- Sender HRTVRX -- Receiver
Group ID	0 (239.254.42.42)
(Sender ONLY)	
SOIP Mode	Passthrough
Set Full HD to	FHD
Set HD to	HD
Full HD Bit Rate	15000 Kb/S
HD Bit Rate	12000 Kb/S
SD Bit Rate	4000 Kb/S
(Receiver ONLY)	
Fail-Safe	Disabled
FS Group ID	0
OSD	Auto
MCD	0
Login	Disabled
Username	admin
Password	admin
DHCP	Enabled
IP	192.168.1.11 -- Sender 192.168.1.12-- Receiver
Subnet	255.255.255.0
Gateway	192.168.1.1
Baud Rate	115200

7.0 FAQ & Troubleshooting

There are no field serviceable parts or circuits in the device. If you think the device is malfunctioning (or you have no video output), please try to use the following methods to obtain a picture.

Q1. What is "Stream Not Found"?

A "Stream Not Found" message is shown on a remote display if there is no video source detected at the Sender end. This video is generated by the Sender in the absence of a source.



Q2. No picture on the display

- Verify the Cat 5e/6 cables are connected to the FHD264 and the gigabit switch/router
- Verify the display is ON.
- Verify no two Senders are broadcasting in the same group.
- Verify the Receiver is set to the correct Sender group.
- Turn ON the OSD to check whether the Receiver is **connected** to the Sender.
- Verify all FHD units and computers in the network have unique IP addresses.
- In a large installation, verify IGMP and JUMBO frames are enabled in your network switch. We recommend *Cisco SG300 Series* switches.
- Quickly press the RESET button on the unit's panel to reboot, or power cycle the device.
- If still there is no video, try factory resetting both the Sender and Receiver by holding the RESET button on the panel for 10 seconds, or reset from the WebGUI. All settings will be erased and set to factory default.
- In a large installation, isolate the Receiver units from the network, and connect them point-to-point with a Sender to check for possible hardware problems.
- If the video works in a point-to-point configuration, then there is a network problem. Check the network and IP configuration of all the units.
- In a one-to-many and many-to-many configuration, if there are displays with different native resolutions, then it is highly recommended to use the "Scaler Settings" in the TX's WebGUI to the highest common denominator.
- For example, if a 1080p HDMI source is connected to the Sender and one of the Receivers is connected to an HD 720p display, change the settings of the Scaler to "Full HD to HD" in the Sender WebGUI so that all the monitors get a resolution of HD 720p video.

Q3. How to Change the IP address of the PC?

In Windows™, it is typically located under Start → Control Panel → Network Sharing center → Change adapter settings → Properties → Internet Protocol Version4 (TCP/IPv4).

For example, change the IP address field to 192.168.1.100 (0-255, except 11 or 12) and press "OK" to save the configuration.



7.1 Contacting Hall Technologies

If you determine that your FHD264 is malfunctioning, do not attempt to repair the unit. Instead, contact Hall Technologies Technical Support at **714-641-6607**. To return the unit to Hall Technologies you must first get a Return Authorization (RMA) number. Package the unit carefully when returning. We recommend that you use the original container.

8.0 Specifications

Input Resolution Video Encoding Streaming Protocol Casting Control Interface Video Latency	VGA or 480p thru Full HD 1080p@60 H.264 RTP/MPEG-TS/UDP Unicast/Multicast Telnet, Embedded Web Server 250-400 ms, dependant on Bit Rate and network congestion
Sender Input Ports Output Ports	1 x HDMI 1 x RJ45, 1 x HDMI, 1 x IR, 1 x L/R AUDIO, 1 x RS-232
Receiver Input Ports Output Ports	1 x RJ45, 1 x IR 1 x HDMI, 1 x L/R AUDIO, 1 x RS-232
RS-232 Baud Rate	Bidirectional, pass thru: 2400 – 115200 bps
Audio	HDMI Stereo 2-channel LPCM 2 Channel up to 48 KHz
IR Frequency	38 -56 KHZ pass-thru modulated 56 KHZ (IR Remote Controller)
Video Sources	Up to 64
Video Displays	Up to 250+
Recommended Network Switch/Router	Gigabit LAN IGMPv2 and DHCP support

Operating Temp	+32 to +113°F (0 to +45 °C) 20%~90%, non-condensing
Power consumption	Max. 3 W
Mounting Option Dimensions	Mounting Brackets (included) 5.40"(137 mm) W x 3.14"(80.0 mm) D x 1.38" (35 mm) H
Net Weight	TX (Unit) : 0.75 lbs (0.34 KG) RX (Unit): 0.75 lbs (0.34 KG)



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