

## EX-HDU HDMI, AUDIO & USB EXTENSION

CUSTOMER  
SUPPORT  
INFORMATION

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## Contents

<b>1.</b>	<b>SOFTWARE INSTALLATION.....</b>	<b>3</b>
1.1.	General .....	3
1.2.	Software Installation Prerequisites.....	3
1.3.	Software Installation .....	3
<b>2.</b>	<b>USING THE SOFTWARE .....</b>	<b>4</b>
2.1.	General .....	4
2.2.	USB Device Detection .....	4
2.3.	Tool Bar Menu.....	5
2.4.	Device Name .....	5
2.5.	Status Bar .....	6
2.6.	Status Group.....	6
2.7.	Control Tab .....	7
2.8.	Buttons Tab .....	10
2.9.	Actions Tab.....	11
2.10.	Webpage Interface .....	13
2.11.	EDID Tab.....	13
2.12.	Telnet/Serial Commands .....	14

## 1. Software Installation

### 1.1. General

The EX-HDU is configurable via free Windows® based software available on the Hall Research website. All of the device features, and more, are accessible and controllable from the GUI.

### 1.2. Software Installation Prerequisites

- A PC with Windows XP® OS or later
- USB port
- Microsoft® .NET Framework 3.5 or later (most recent OS including Windows 8 and later include this software and no action is required). When .NET Framework 3.5 or later is not installed on your PC, the Microsoft™ website has free downloads available.

### 1.3. Software Installation

If an earlier version of this particular software was previously installed, UNINSTALL the program first from either the Add/Remove Programs section of the control panel or by running the previous installation's SETUP.EXE and selecting "remove application".

- Install the software by executing the SETUP.EXE program from the installation source directory
- Accept the default settings, but if you want to specify a particular installation directory other than the default, you may do so.
- Once the EX-HDU-R software installation has completed, either click the desktop icon or navigate the Start Menu to

Start -> Programs -> Hall Research -> EX-HDU-R

## 2. Using the Software

### 2.1. General

Most installations may only need to use it once to configure the system or possibly not at all, if the default features suit the installation. The software GUI allows the user to customize the EX-HDU features.

You can use the software to export EDID files from the device.

It is possible to connect more than one EX-HDU-R to the PC (using several USB ports of the PC). The same software GUI detects all connected devices and allows control from the same application.

### 2.2. USB Device Detection

The EX-HDU software uses standard Windows® drivers, which automatically configure the USB port after connection and do not require the installation of any special USB drivers.

The first time you connect the EX-HDU to the PC, you may experience a short delay and a windows notification pop-up message may be shown.

The new device detection and driver auto installation typically only occurs once. Thereafter, reconnected devices are detected with no delay or message.

**2.2.1.** The software GUI scans the EX-HDU settings continuously in real time and reflects device changes.

**2.2.2.** If no EX-HDU device is attached to the system, the on-screen fields are disabled (grayed out).

**2.2.3.** Only one instance of the software GUI can run at a time. Attempting to execute the application more than once will result in a warning message.



## 2.3. Tool Bar Menu

### 2.3.1.EXIT



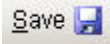
Exits the application

### 2.3.2.RESTORE



Restore previously saved configuration files

### 2.3.3.SAVE



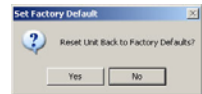
Save the current configuration file.

### 2.3.4.TOOLS



#### Factory Defaults

Restore the device to factory default settings.  
The user must confirm the action.



#### Export EDID

Save the current EDID as a 256-byte binary file  
This file can be edited using third party software and used for other purposes. The EX-HDU has a fixed EDID and can not be modified.

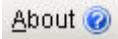
#### Firmware Update

Allows users to field upgrade the device application firmware.  
**Only valid firmware files can upload into the EX-HDU.**

#### LAN Update

Allows users to field upgrade the device LAN firmware.

### 2.3.5.ABOUT



Displays screen with software versions, website link, legal disclaimer and copyright information.  
The Serial # information displayed is a time/date stamp referenced to GMT (Greenwich Mean Time) and has no reference to the serial number sticker on the actual device.



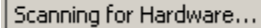
## 2.4. Device Name

Assigns a descriptive name to be given to the EX-HDU device that is a maximum 8 characters long.  
The user is not allowed to change the device name with multiple devices connected.  
The FACTORY DEFAULT name is **USBDEVHR**.

## 2.5. Status Bar

The bottom bar of the screen shows the current USB status as follows:

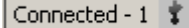
“Scanning for Hardware...”



The GUI software is looking for EX-HDU devices.

Screen controls are unusable until a valid EX-HDU device attached.

“Connected – XX”



Where XX is the number of EX-HDU devices connected to the PC.

## 2.6. Status Group

### Video/HDCP

#### No Video

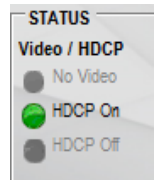
Indicates the system is not receiving an INPUT video signal.

#### HDCP On

Indicates video received has HDCP Encryption enabled.

#### HDCP Off

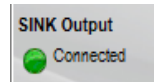
Indicates video received has HDCP Encryption disabled.



### SINK Output

#### Connected or Disconnected

Indicates the state of the device connected to the EX-HDU-R HDMI OUTPUT.



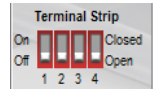
When a HPD signal is detected, the indicator will be green and the word **Connected** will be shown next to it.

When no display is detected (or the display is not sending an HPD signal), then the on screen indicator changes to a dark red color and the word **Disconnected** will be shown next to it.

### Terminal Strip

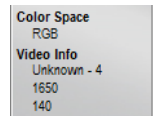
Represents the state of the EX-HDU-R HDMI I/O Terminal Strip.

Clicking on one of the graphic switches will force that I/O to the opposite, overriding the actual terminal strip I/O state.



### Color Space and Video Info

Represents the current Color Space and Video information for the video being processed



## 2.7. Control Tab

### Master Mode /Slave Mode

Normally the RS-232 port on this model acts as a “master” issuing commands to external devices, but this port can also control the EX-HDU-R from an external controller when in “slave” mode.

As shipped from the factory, the unit is an RS-232 master.

To control the EX-HDU-R from the serial port, you must first put the unit in slave mode.

To turn on slave mode, you must send: “HRT-EXHDUR<CR>” to the serial port or change this control in the GUI.

The unit will remain in Slave Mode even after power cycle.

To exit Slave Mode send the command “OM0<CR>”

### Status Polling

When checked, forces the system to update the video status at a ~5 second rate. Factory default is OFF.

### Color Space

This setting represents the desired color space. The choices are RGB (factory default), 4:4:4 or 4:2:2.

### I/O Configuration

These settings represent how each of the four I/O on the terminal strip are configured.

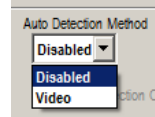
In “Input” mode, an external contact being opened or closed triggers the I/O line.

In “Power” mode, an external voltage being applied or removed triggers the I/O line.  
(Maximum 5-24 vDC)

In “Output” mode, the system can output 0-5vDC on the I/O line.

### Auto Detection Method

The *Auto Detection Method* control field shows whether Auto Detection is active or not and the detection method to be used. Factory Default is **DISABLED**.

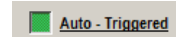
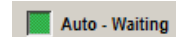


- **Disabled**
  - Auto Detection is disabled
  - The **Off Delay** control is disabled in this mode.
- **Video**
  - The video source must actually send video in order to be detected.
  - When video is received on the currently selected Input, the RS232 string associated with the AUTO ON function will be processed.
  - When the video is no longer active, the RS232 string associated with AUTO OFF will be processed after the programmed Off Delay time has elapsed.
  - The **Off Delay** control is enabled in this mode.

### Auto Detection

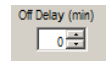
The Auto Detection Active/Inactive button shows the device current setting as well as being able to control whether an active source will be detected or not.

- **Auto Detection Off**
  - No action is taken.
  - Factory default is **OFF**.
- **Auto – Triggered or Waiting**
  - When the *Auto Detection Method* control is **NOT OFF**, the device will process the RS232 ON and OFF strings associated with the AUTO function whenever the specified event (Video) occurs.
  - **Waiting** signifies that the device is still waiting for the specified event to occur.
  - **Triggered** signifies that the device has detected the specified event.



### Off Delay (min)

The *Off Delay (min)* control field shows the device current off delay value as well as being able to set that value. Factory Default is 3 minutes.

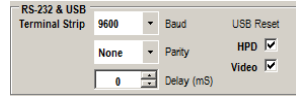


- The Off Delay control disables when the *Auto Detection Method* is **Disabled**.
- When set to 0 minutes and '*Auto Detection Method*' is set for '**Video**' the RS232 string associated with the AUTO OFF Function is output immediately.
- When set to any value between 1 and 240 minutes, the RS232 string associated with the AUTO OFF Function will be processed after the specified programmed delay has elapsed.



**Baud**

The Baud controls show the device baud rate setting for the serial port. Factory default is 9600



**Parity**

The Parity controls show the device parity setting for the available serial ports. Factory default is NONE

**Delay (mS)**

The Delay is available to add time between characters for slower systems to respond (or to support multiple stop bits). Factory default is 0 mS

**USB Reset**

If the HPD or Video items are checked, the device will perform a USB reset on the **RECEIVER** hub when a HDMI Output HPD is detected and/or if Video comes on the HDMI wallplate input. (Compatible receiver hardware required).

**Local Area Network**

**IP Address**

This control shows either the current IP address on the network or the users static IP address when DHCP mode is OFF.



**Subnet Mask**

This control shows either the current subnet mask on the network or the users static subnet mask when DHCP mode is OFF.

**Gateway**

This control shows either the current gateway address on the network or the users static gateway address when DHCP mode is OFF.

When DHCP mode is ON, the user's network DHCP router assigns the IP address, subnet mask and gateway address.

When DHCP mode is OFF, the user may manually assign the IP address, subnet mask and gateway address. Click the UPDATE control for the changes to take affect.

## 2.8. Buttons Tab

This model has the ability for eight programmable virtual buttons.

### Name

The name that appears on the WEBGUI interface for the assigned button. 8 characters maximum.

### Function

The EX-HDU system function associated with the button. When pressed, buttons will execute the assigned function. The functions available are AUTO and I/O 1 thru I/O 4.

AUTO functionality can be used to detect the loss and reception of the Video signal and then output RS-232 strings.

IOx functionality can be used to send RS-232 strings when a specific IO line changes state.

### Type

Buttons can be Momentary or Toggle action.

Toggle buttons have two 'states', ON and OFF with RS-232 associated with each state. Toggle buttons have an 'LED' shown on the WEBGUI interface.

Momentary buttons have one 'state' with one RS-232 string associated (ON only). Momentary buttons do not have an 'LED' shown on the WEBGUI interface.

### Group

Buttons can be grouped like 'radio buttons'.

Multiple buttons can be assigned to the same group #.

Only one button in the group can be active at one time (only one ON and all others OFF).

When buttons are grouped, the 'TYPE' of button determines whether the OFF actions are processed or not.

### Enable?

Buttons are enabled or disabled.

Disabled buttons do not respond to commands and the button is removed from the WEBGUI interface.



## 2.9. Actions Tab

### Command Configuration

#### Button Action

The Button Action control field shows the individual ON or OFF strings for the 8 programmable virtual buttons.



#### Function

The Function control field shows one of the following values.

- **Serial**
  - Send RS232 to Serial Port
- **Serial (UI)**
  - Send RS232 to the SW3-UI serial port (when installed)
- **Delay**
  - Time delay from 1 to 6 seconds
- **Command**
  - Send any valid command to the device
- **IR**
  - Send known IR codes in various supported formats:
  - Formats supported: NEC, JVC, Sharp, RCA, RC5, Sony, NEC Extended and Samsung
  - The user must know the IR HEX codes required in order to use this functionality.

#### Command (when Function is set for Serial or Serial (UI))

The Command control field is where the user enters the desired RS232 string.

The RS232 values can be entered as ASCII text and/or hex byte values formatted in &hXX format.

**Any extra spaces or other characters entered are transmitted.**

Where "XX" is the desired HEX byte value.

Any character from 0x00 to 0xFF can be entered in this format.

#### Delay (sec) (when Function set for Delay)

The Delay (sec) control field is where the user enters the desired time delay in seconds. The limit is from 1 to 6 seconds.

### INSERT

The *INSERT* control appends a new command. If the new command exceeds the maximum length allowed, a window will be displayed. (32 characters maximum). Each Function uses a different number of characters over and above any fixed characters that are required.



### CLEAR

The *CLEAR* control is clicked to erase the entire pre-programmed command sequence.

### UPDATE

The *Update* control is clicked to save the existing programmed command. This control is only visible when an unsaved change has been made to the configuration.

#### EXAMPLE CONFIGURATION

To send the RS232 string "PWR ON" followed by a Carriage Return character out then Serial Port and then wait 5 seconds.

Select the desired Button Action for this command. (le... Which button should be used to send this command?)

Select Serial from the Function control.

Enter the characters PWR ON&h0D into the 'COMMAND' field and click 'INSERT'.

Select Delay from the Function control.

Set the Delay (sec) to 5 and click 'INSERT'.

Click 'UPDATE' to save the command.

## 2.10. Webpage Interface

A webpage is available to control the EX-HDU at the IP address set in the configuration. If the configuration is set for DHCP, you can use the Hall Research Device Finder software to find the EX-HDU-R on the users compatible LAN network.

Only buttons that are 'enabled' are shown in the web page.

The button names are specified in the PC GUI on the BUTTON tab. The 'dipswitch' graphic represents the I/O terminal strip states.

Buttons of 'Toggle' type have an LED which illuminates when the button is active. 'Momentary' buttons do not have an LED.



## 2.11. EDID Tab

### EDID Data Display

The table shows the EDID from the attached SINK.

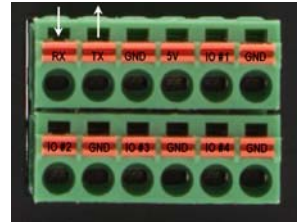
This EDID WILL NOT be passed upstream to the video SOURCE.

Invalid checksum byte(s) are highlighted in RED.

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	FF	FF	FF	FF	FF	FF	00	22	49	00	02	00	00	00	00
01	00	78	01	03	00	00	00	0C	1A	1E	31	A2	54	4C	00	26
02	0F	50	54	2F	C2	00	01	03	0A	19	00	49	06	00	A8	43
03	03	00	01	03	01	03	1E	10	00	51	00	1C	20	40	00	00
04	05	00	00	00	00	00	1E	00	00	00	00	31	20	1F	30	00
05	41	00	26	00	00	00	00	00	00	00	00	07	3F	40	30	62
06	21	40	20	00	00	00	00	00	00	00	00	1A	20	00	00	20
07	42	7A	27	40	00	00	00	00	00	00	00	00	1A	01	FF	00
08	00	00	00	02	00	00	00	00	00	00	00	00	00	00	00	00
09	07	50	26	06	03	03	1F	00	00	08	03	0C	00	00	00	00
0A	00	40	00	2C	45	00	00	00	00	00	00	1E	00	5A	00	00
0B	72	38	20	40	00	2C	45	00	00	00	00	00	00	00	01	10
0C	00	00	00	1E	01	10	00	72	13	00	1E	20	00	00	00	00
0D	00	00	00	00	1E	01	10	00	8C	32	00	1E	20	00	00	00
0E	35	40	00	00	00	00	1E	00	00	00	00	00	00	00	00	00
0F	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

## 2.12. Telnet/Serial Commands

- The following table lists the Telnet/RS-232 commands available to the user in SLAVE MODE:
  - When the EX-HDU-R is connected to a compatible LAN network, port 6324 of the units IP address is available for control via a telnet interface.
  - A single carriage return character (0x0D) must terminate each command.
  - Invalid input, spaces and line feed characters (0x0A) are ignored.
  - To active SLAVE mode, you must send: "HRT-EXHDUR<CR>" to the serial port or change the control in the GUI interface.
    - The unit will remain in Slave Mode even after power cycle.
    - To exit Slave Mode send the command "OM0<CR>"
- RS-232 communication at the rear connector is:
  - Configurable, **factory default is 9600 bps, 8 Bit, No Parity, 1 Stop bit.**
  - The baud rate and parity are configurable via Software GUI or via the "XBx" and "XPx" commands. Changing the baud rate or parity affects all serial commands, incoming and outgoing.
- <CR> in the table below refers to a single carriage return character (0x0D)
- "Error – Invalid Command" is sent in response to invalid RS-232 commands
- "Error" is sent in response to invalid command parameters



### 5.1 Serial Connections

- RX Input, TX Output and GND

Command	Response	Function and Example
FW	FWx.y<CR>	Current firmware version. X and Y represent the firmware version numbers. (e.g., FW1.1<CR>)
FD	FD<CR>	Resets device to Factory Defaults Unit will reboot
ST	System status	Queries system status ST<CR> – Query the current system status Current Status for the commands below: FW?, BS?, BE?, BT?, XB?, XP? and IO?
XBx	XBx<CR>	Controls the RS-232 Out Baud Rate XB?<CR> – Query current Output Baud Rate Setting XB4<CR> – Set Baud Rate to 9600 ( <b>Factory Default</b> ) <ul style="list-style-type: none"> <li>• The baud rate can be set to any of the following: XB1 = 1200, XB2 = 2400, XB3 = 4800 XB4 = 9600, XB5 = 19200, XB6 = 38400 XB7 = 57600, XB8 = 115200</li> </ul>

Command	Response	Function and Example
XPx	XPx<CR>	Controls the RS-232 Out Parity XP?<CR> – Query current Output Parity Setting XP0<CR> – Set Parity to 'NONE' (Factory Default) XP1<CR> – Set Parity to 'EVEN' XP2<CR> – Set Parity to 'ODD'
BPx or BPx,y	BPx<CR> BPx,y<CR>	Controls transmission of stored serial commands 'x' is from 0 to 7, 'y' is either 1 (on) or 0 (off) BP?<CR> – Query current Button Press Status BP0<CR> – Simulates pressing button #0 BP1,0<CR> – Simulates turning button #1 off
AUx	AUx<CR>	Controls AUTO DETECT Mode AU?<CR> – Query current Auto Detect Mode Status AU1<CR> – Auto Detect Mode Active AU0<CR> – Auto Detect Mode In-Active (Factory Default)
ATx	ATx<CR>	Controls the Auto Detection Method Settings AT?<CR> – Query current Auto Detection setting AT0<CR> – Auto Detection Disabled (Factory Default) AT1<CR> – Video on HDMI INPUT Auto Detect must be active (AU1) for a Trigger to occur. Disabling Auto Detection will turn off Auto Detect (AU0).
BNx,y	BNx,y<CR>  BNx?<CR> BN?<CR>	Sets or displays the names for the WEB Page buttons. BNx 'x' is the button number from 0 to 7 'y' is desired button name (8 characters maximum) (Any invalid characters are removed)
IP? or  IPx	IPxxx.xxx.xxx.xxx<CR>	Controls IP Address setting IP?<CR> – Query current IP Address   IP192.168.001.100<CR> (note use of " " in the command) - Set IP Address to 192.168.001.100
SB? or  SBx	SBxxx.xxx.xxx.xxx<CR>	Controls Subnet Mask setting SB?<CR> – Query current Subnet Mask   SB255.255.255.000<CR> (note use of " " in the command) - Set the Subnet Mask to 255.255.255.000
		Note: Setting takes effect when Gateway address is set

## HDMI, AUDIO & USB EXTENSION

Command	Response	Function and Example
GW? or  GWx	GWxxx.xxx.xxx.xxx<CR> >	Controls Gateway address setting GW?<CR> – Query current Gateway address   GW192.168.001.001<CR> (note use of " " in the command) - Set the Gateway address to 192.168.1.1
DHCPx	DHCPx<CR>	Controls the DHCP status on LAN Enabled Versions DHCP?<CR> – Query current DHCP Setting DHCP1<CR> -- Turn on DHCP (Factory Default) DHCP0<CR> -- Turn off DHCP (STATIC Addressing)
OMx	OMx<CR>  OM?	Operation Mode Use "HRT-EXHDUR<CR>" to enable SLAVE mode if unit is in MASTER mode. OM0 = Master Mode OM1 = Slave Mode
BPx or BPx,y	BPx<CR> BPx,y<CR>	Controls transmission of stored serial commands 'x' is from 0 to 7, 'y' is either 1 (on) or 0 (off) BP?<CR> – Query current Button Press Status BP0<CR> – Simulates pressing button #0 BP1,0<CR> – Simulates turning button #1 off
BSx	BSx<CR> BS?<CR>	Shows state of all 8 virtual buttons. Each button represents one bit of the 'x' value (in decimal). Button 0 is the least significant bit. Button 7 is the most significant bit.
BEx	BEx<CR> BE?<CR>	Button Enable Each button represents one bit of the 'x' value (in decimal). Button 0 is the least significant bit. Button 7 is the most significant bit.
BTx	BTx<CR> BT?<CR>	Button Type Buttons can be Toggle (0) or Momentary (1) Each button represents one bit of the 'x' value (in decimal). Button 0 is the least significant bit. Button 7 is the most significant bit.
BGx	BGx<CR> BG?<CR>	Button Groups 'x' is from 0 to 7 and represents 1 of the 8 virtual buttons. Buttons can be assigned to either be independent ('NONE') or assigned to 8 different groups of buttons All buttons within the same group interact with each other. Activating a button in a specific group will cause all the other buttons in that group to deactivate. When a button activates, the pre-programmed ON string is sent from the RS-232 port. If the button in a group is of the 'Toggle' type, its OFF string will be sent when deactivated. 'Momentary' type buttons do not transmit the OFF string.



Command	Response	Function and Example
BFx	BFx<CR> BF?<CR>	<p>Button Functions</p> <p>'x' is from 0 to 7 and represents 1 of the 8 virtual buttons in order.</p> <p>Buttons can be assigned to be either independent ('NONE') or up to 5 functions relating to the I/O inputs or 'AUTO'.</p> <p>For each of the I/O 1 thru I/O 4 functions, the ON string is sent when the input is closed or active (ie... closed) and the OFF string is sent when the input is open or in-active.</p> <p>For the 'AUTO' function, the ON string is sent when video is being transmitted from the receiver and the OFF string is sent when video is no longer being transmitted and the programmed delay has elapsed.</p>
IOx	IO?<CR>	<p>Query or Set IO Status</p> <p>IO?&lt;CR&gt; – Query current IO State for IO lines #1 thru #4 The value returned may have a value from 0 to 15 which represents all the 4 I/O lines possible states (<math>2^4=16</math>)</p>
	IO1?<CR>	<p>IO1?&lt;CR&gt; – Query current IO State for IO line #1 The value returned is in the form of IOx,y&lt;CR&gt; 'x' represents the I/O line from 1 to 4 'y' is either 0 (on) or 1 (off)</p>
	IO1,0<CR>	<p>IO1,0&lt;CR&gt; – Set IO line #1 to the 'on' state (0) The value returned is in the form of IOx,y&lt;CR&gt; 'x' represents the I/O line from 1 to 4 'y' is either 0 (on) or 1 (off)</p>
	IOx,y<CR> IOx	
CLx	CLx,y<CR> CL?<CR> CLx?<CR>	<p>Set the configuration of each I/O line</p> <p>x = 1 thru 4, representing the I/O line</p> <p>y = 0 = INPUT y = 1 = POWER y = 2 = OUTPUT</p>







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