

X-Series HDBaseT Switchers Configuration, Control & Diagnostic Web Interface

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1. Overview

This document explains how to take advantage of powerful diagnostics that are built into all of RTI’s new generation HDBaseT matrix switch solutions. The X-Series include the following models:

- VDX-14x | 1x4 HDBaseT Class B Splitter
- VHD-4x | 4x4 HDBaseT Class B Matrix Switcher
- VHD-8x | 4x4 HDBaseT Class B Matrix Switcher
- VHU-8x | 8x10 HDBaseT Class C Matrix Switcher

While the features and technical specifications may be different per model, all diagnostics and the information contained in this tech bulletin is consistent for all of the above products. Please refer to the model specification sheets for a list of the technical specifications for the product line and all included HDBaseT receivers.

2. CEC Control

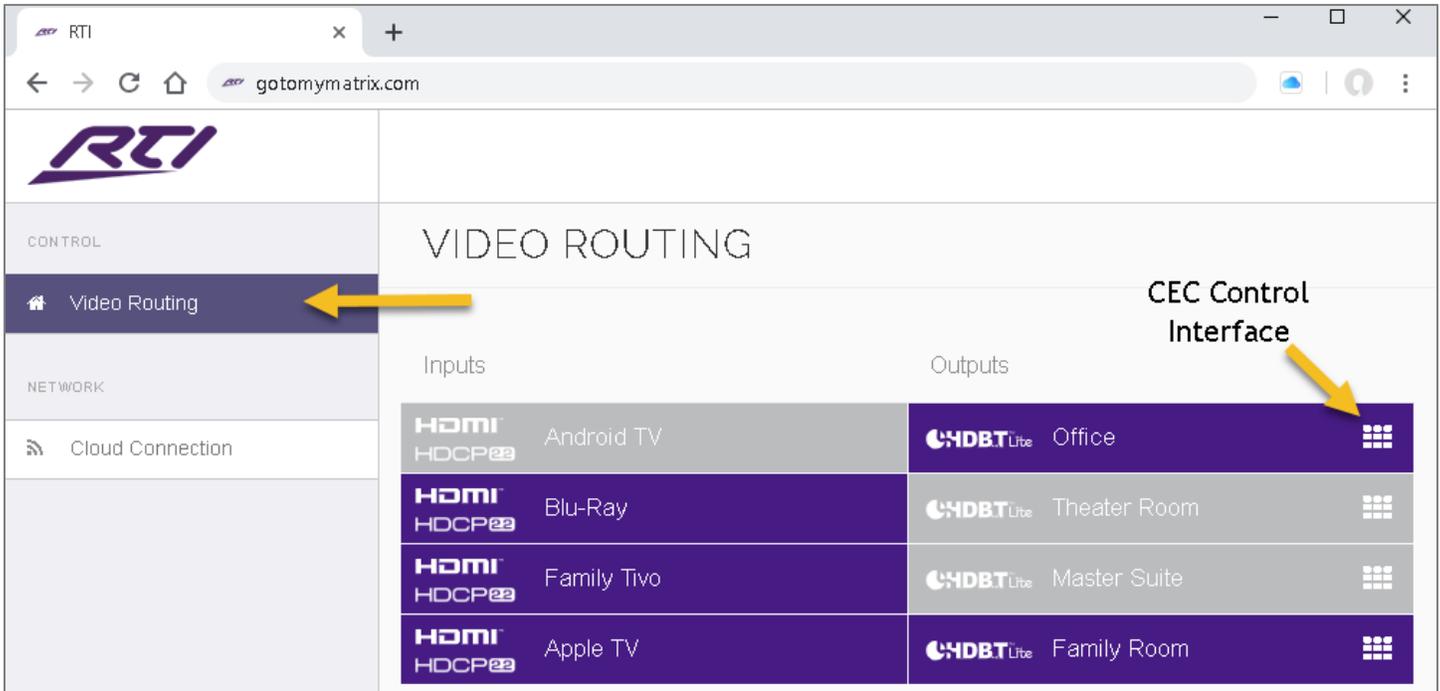
The X-Series all utilize CEC technology. Consumer Electronic Control often referred to simply as CEC, is a feature that is part of the HDMI standard. CEC is designed to allow one device to control up to 15 other connected CEC-enabled devices using HDMI. Most manufacturers support CEC such as Samsung's Anynet+, Sharp's Aquos Link, Sony's BRAVIA Link, and BRAVIA Sync, and Panasonic's VIERA Link. Despite these copyrighted names, all of these systems are implementations of the CEC standard. If a manufacturer wishes to employ CEC control, they must do so on pin 13 of a HDMI cable. Typically CEC has two forms of control – user initiated and device initiated. Device-initiated CEC control has irritated control system installers over the years because it can be unpredictable and override the control options set forth by the installer. However, CEC has been harnessed properly by the new S-Series and can carry many powerful advantages. Through CEC, the client can utilize the web interface, factory remote, phone or tablet, or control system to control devices where control is not possible through conventional means. An example of this would be an Amazon Firestick, and the dealer can set up CEC control through the matrix, allowing the end user to send CEC commands to source devices on the other end, without the need for emitter, serial cable, or driver. Another distinct advantage of CEC control is the client can utilize several control options to switch the matrix switcher and control the connected source devices without the need for a dedicated room controller. The X-Series with CEC will auto-discover all the source devices and output displays that are connected to the switcher. It is recommended to enable CEC control on all applicable components prior to configuration. If CEC options are not desired, this feature can easily be defeated in the installer settings after setup.

3. Getting Started

RTI's X-Series can be configured, controlled and monitored with a web configuration page. It is important to know that the web configuration page will have an interface for end-user use, and an installer-based view with installation tools and the ability to run diagnostics and monitor key statistics on the health of the system. This 2 interfaces are separated by a password that the installer can choose. Start by connecting all the outputs to the matrix, using the included VHR-1 HDBaseT receivers and high-quality short HDMI cables. The receivers use POH (Power over HDBaseT) along with a category cable with RJ-45 connection, so no local power supply is needed. While shielded category 6 or above is recommended to safeguard against issues, the HDBaseT specification can accommodate unshielded category 5e or above wire. Be sure to terminate properly using the 568B standard for best results, observing the wire distance which can differ by product. Last, keep wiring away from any high-voltage or elements that may cause interference and damage to the cable.

Once all the matrix-connected devices are installed and connected, power on each device during the initial process. CEC will auto-discover each attached source device, and the matrix switch will obtain proper EDID settings per device, allowing the source to display in the intended resolution. Next, open a web browser on a computer or notebook and type in the following address: <http://gotomymatrix.com>. You may bookmark this address as this will be used to access the system on the local area connection going forward.

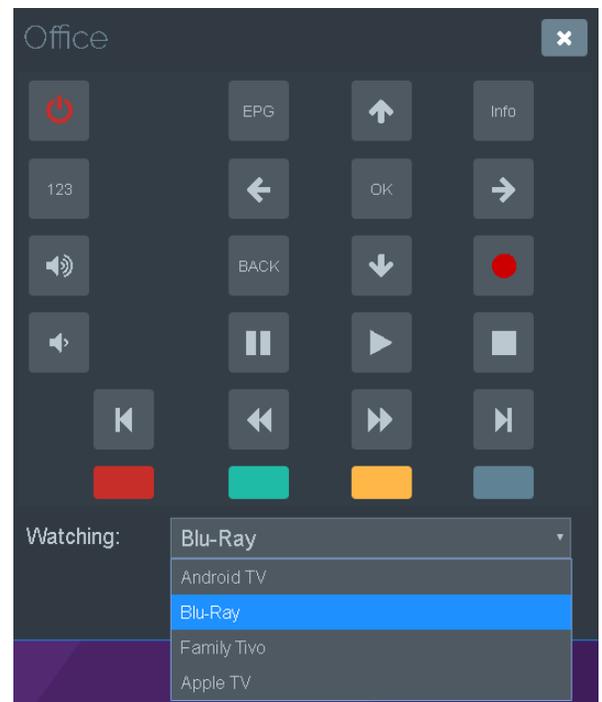
4. The End-User Interface



You will be taken immediately to the video routing, end-user interface that will allow the client to control the source switching on each output display by dragging and dropping the inputs on the right side to the outputs on the right side.

 Click on the keypad icon located next to each input on the screen to access the user interface. You may notice that some sources and output displays are not identified or named properly. These names can always be changed or updated through the installer screen which will be reviewed later. Also, any inputs or outputs shaded in grey could indicate the device is off. By selecting the remote control icon on the right side of each output, this will overlay a CEC control interface, allowing the end-user to control source devices and switch inputs for the output selected.

Note that <http://gotomymatrix.com> may be accessed with a phone or tablet as well, allowing end users to control the devices through CEC without any third-party control system, or dedicated control products in a specific video zone. While an RTI control system is highly recommended to offer the most optimal user experience, it is not a mandatory requirement. The

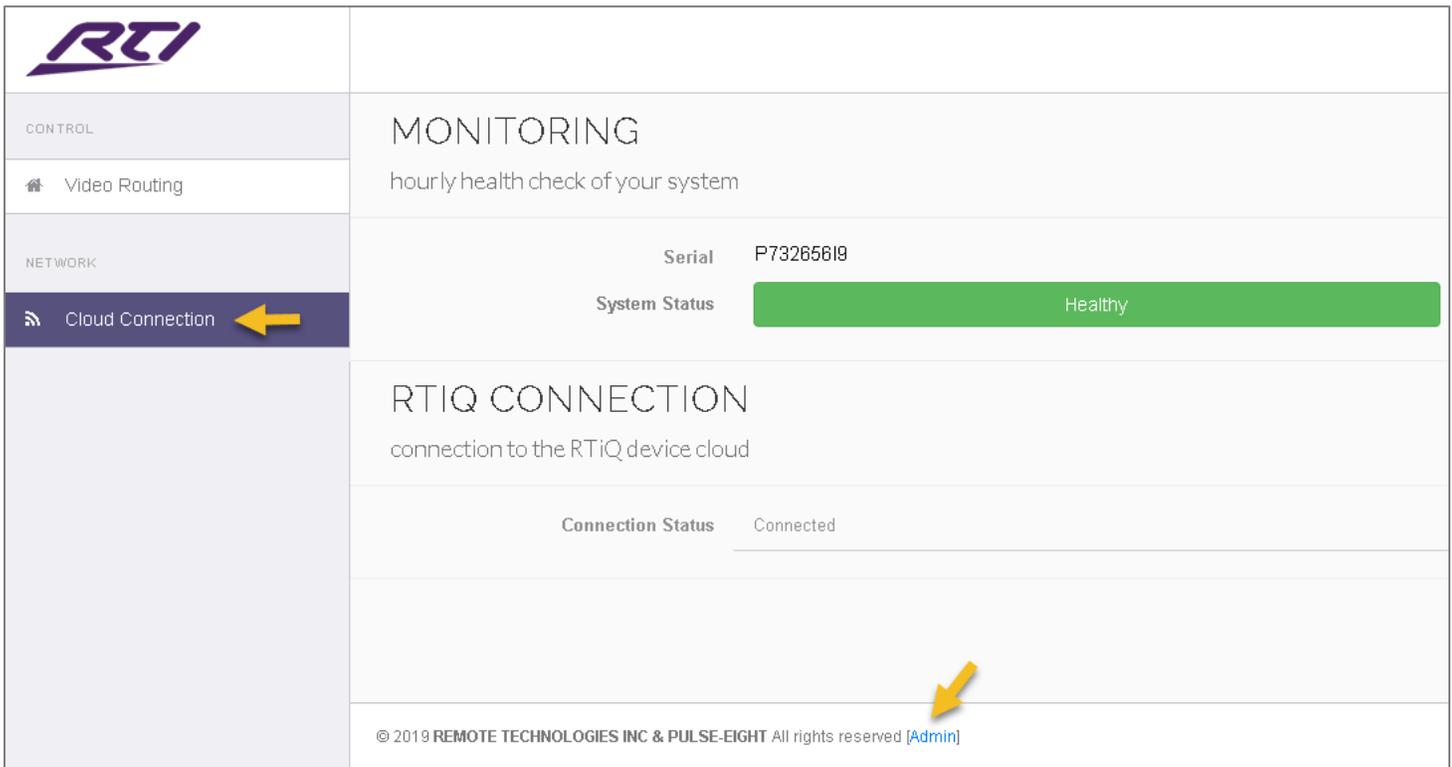


user may exit the CEC control interface by selecting the “X” in the upper right of the interface. This will take them back to the video routing interface.

Directly below the video routing option, the end-user may select the .“cloud connection.” This will display an hourly update status on the health of the system, serial number of the unit, as well as the connection status to the RTIQ system.

Note: As of the release of this technical bulletin, X-Series diagnostics have not been fully implemented into the RTIQ monitoring service. This will be provided in a future update.

This view can be helpful to direct the end-user to should there be any system issues. The user can determine if the system is exhibiting any issues should an interruption occur and relay that information to an installer that is unable to access the diagnostics at the moment. In many instances, if a cable is accidentally unplugged, this will indicate an issue, and most times a truck roll can be avoided as well as extended periods of video interruption.



Towards the bottom of the screen, there is an [Admin] link to the installer interface. The first time this is selected it will allow the administrator password of the control interface to be changed. It is highly recommended the installer access this option when configuring the system for the first time to avoid any end-user interaction.

5. The Installer Interface

The installer menu may be accessed on the local area network by going to <http://mymatrix.com> and selecting the “Cloud Connection” section on the left menu panel. This will provide the serial number, overall system health which is updated hourly, and RTIQ connection status. Towards the bottom of the screen, the installer may access the configuration and diagnostic interface by selecting the [Admin] option on the bottom of the screen and entering in the password that was changed from the default admin password.

Once logged into the installer configuration and diagnostic menu the installer will be taken to the video routing section which is the first among a list of different sections on the left side of the screen.

6. Video Routing

Inputs	Outputs
HDMI HDCP2.3 Source 1 > Android TV	HDBaseT Lite Display 1 > Office
HDMI HDCP2.3 Source 2 > Blu-Ray	HDBaseT Lite Display 2 > Theater Room
HDMI HDCP2.3 Source 3 > Family Tivo	HDBaseT Lite Display 3 > Master Suite
HDMI HDCP2.3 Source 4 > Apple TV	HDBaseT Lite Display 4 > Family Room
	HDMI HDCP2.3 Mirror Display 1 > Mirror 1 (Mirroring Output 1)
	HDMI HDCP2.3 Mirror Display 2 > Mirror 2 (Mirroring Output 2)

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The video routing screen will allow the installer to switch inputs for each output display by dragging and dropping the source on the designated output display, including any available mirrored outputs available on the matrix switcher. However, this screen was designed to provide the ability to switch sources in order to set options and review settings and diagnostics. The installer may return to the user menu by selecting the [User] link on the bottom of the screen or may change the administrator password for the installer interface at any time by selecting the [Admin] link.

 Each input will have a source icon to the right of each of the available sources. By selecting the source icon for a specific source device, a pop-up window will display with the source properties.

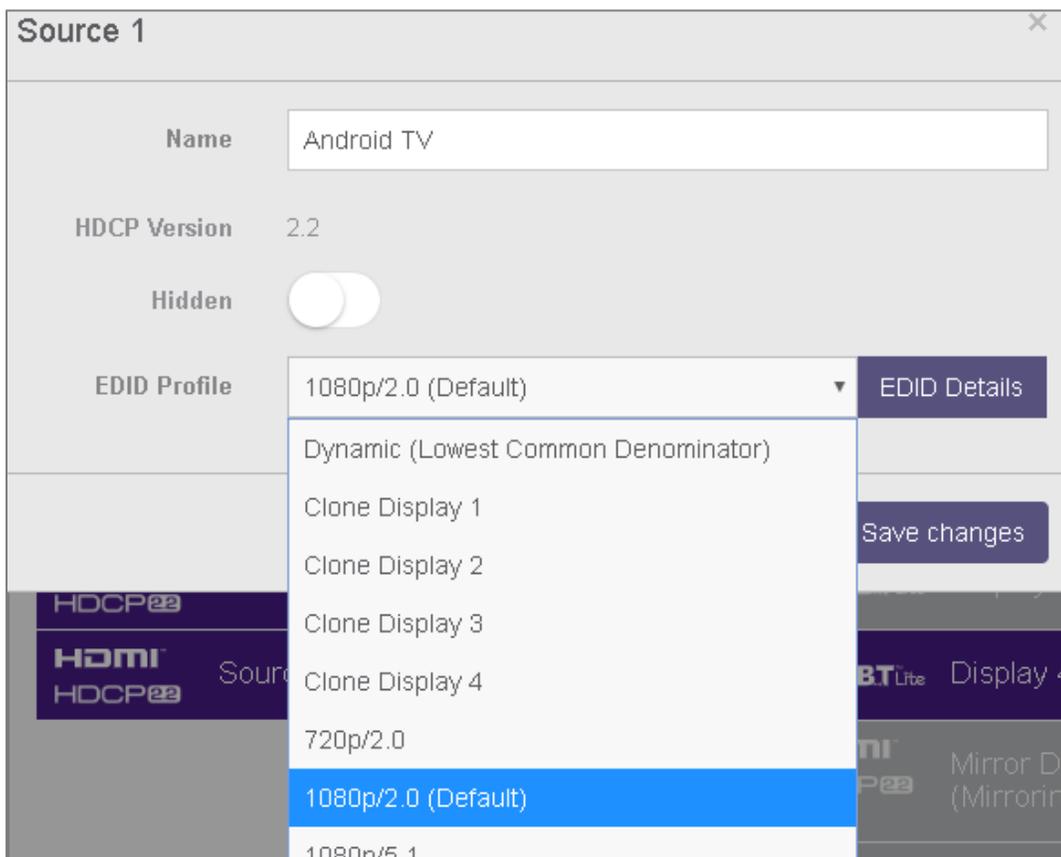
NAME: The installer may change the name if any, that was auto-discovered. There is a character limit, so keep names short and descriptive.

HDCP VERSION: Indicates the HDCP (High Definition Copy Protection) version the underlying source device is utilizing.

HIDDEN: Allows the installer to hide a source device on the matrix, so it is not accessible by the end-user for switching.

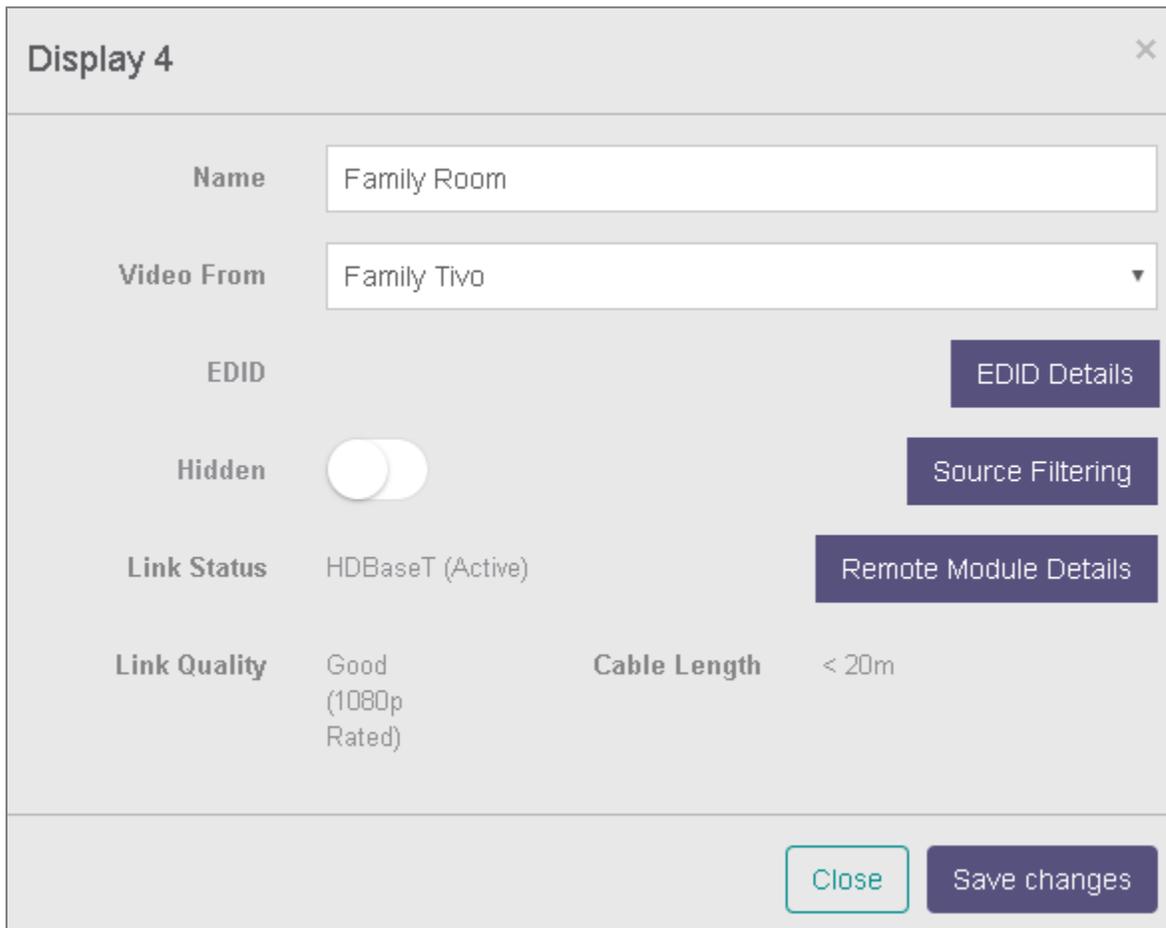
EDID PROFILE: Extended Display Identification Data (EDID) shows the profile that was negotiated by the video display to the source device. You can use this option to force an EDID and clone displays from any output or set the profile to another setting if there are video issues.

EDID DETAILS: Provides EDID metadata for a display device which describes their capabilities to a video source. This information would require an expensive EDID reader and can be instrumental in determining why a video source is not properly displaying on an output display.



Once changes have been made, please remember to select “Save Changes” to ensure that settings are properly assigned. Click the “X” button on the upper right to exit the popup display. Repeat this review for all the other source devices that are attached to the matrix. Note, if a source is greyed out, it could be that it is turned off and no longer broadcasting. Once a source is dragged and dropped to an output if CEC is enabled it should turn on automatically.

 Similar to the input source devices, there are also TV icons next to each output display. Pressing the TV icon will pop-up a display with the output display properties.



Display 4 [X]

Name Family Room

Video From Family Tivo

EDID [EDID Details]

Hidden [Source Filtering]

Link Status HDBaseT (Active) [Remote Module Details]

Link Quality Good (1080p Rated) **Cable Length** < 20m

[Close] [Save changes]

NAME: The name of the output device, which can be a Television, Projector, AVR, etc. The discovered name can be changed. There is a character limit, so keep names as short and descriptive as possible.

VIDEO FROM: Shows the current source being viewed on the output display and can be changed using the drop-down menu arrow on the right side.

EDID DETAILS: Extended Display Identification Data (EDID) shows the metadata that is provided by that output display. Without this feature, an EDID reader would be required to obtain this information.

HIDDEN: This will hide the output display, making it impossible for the end-user to send source switching to this display.

SOURCE FILTERING: Allows the installer to hide specific sources for a specific output display. May be used as an alternative to parental guidance settings, which might not be feasible.

LINK STATUS: Reports the status and type of video signal.

REMOTE MODULE DETAILS: Reports vital information such as HDBase Type (Pro, Lite or Ultra,) Link Type, Operation Mode, Firmware version, HPD (Hot Plug Detection) status, and HDMI status.

CABLE LENGTH: The length of the category cable (meters.)

LINK QUALITY: Indicates a GOOD or POOR rating based on the quality of the connection, as well as the maximum resolution. Hovering over this description will display the signal levels of each twisted pair on the category cable.

Link Quality	Good (1080p Rated)	Cable Length	< 20m
Channel A: -21dB, Channel B: -21dB, Channel C: -21dB, Channel D: -21dB			

7. System Health

The screenshot displays the 'System Health' interface. On the left is a navigation menu with items: Video Routing, System Health (selected), Cloud Connection, Network Settings, Routing Control, Front Panel, and Hardware Details. The main content area is titled 'how your hardware is performing' and lists several system indicators, each with a green status bar:

- System Status: Healthy
- Power Supply: Present & Healthy
- Inputs: All Present & Healthy
- Outputs: All Present & Healthy
- Network Connectivity: Healthy
- Temperature Sensor: 55° degrees

Below this is the 'ADVANCED DIAGNOSTICS' section, which includes:

- IR Noise**: This test will check to see if any IR data is being received over a sustained period of time, failing this test would indicate that the IR receiver is picking up noise. This could be from a Plasma TV or a faulty light fitting. A 'Start Test' button is present.
- HDBaseT™ Link Quality**: This test will check to see the HDBaseT link is stable over a sustained period of time. A 'Start Test' button is present.

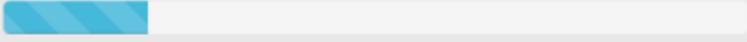
The System Health screen will provide colored condition alerts on key system indicators such as overall system status, the power supply, Inputs, Outputs, Network Connection, and the temperature of the matrix switcher as installed. A warning will indicate in yellow, and a system failure will report a red status. Details of the issue will be provided next to the issue category, alerting the installer to the problem.

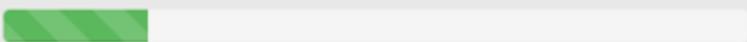
There are also advanced diagnostics that allow an installer to run a comprehensive test on IR Noise and HDBaseT Link Quality. By selecting “Start Test,” the installer will be taken to a separate diagnostic screen that will run the selected test and provide results that can be evaluated.

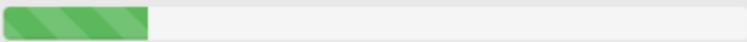
The “IR Noise” test will check to see if any installed IR receiver is picking up signal noise which may cause communication issues. A negative result could be caused by certain components or faulty wiring. Begin the test by selected “Start Test,” and a separate screen will display. The test will take about 3 minutes to complete and report any issues. Once the test completes, you may rerun the test, or select “close” to exit the window. Below illustrates an example of an error with the IR receiver attached to output display 1.

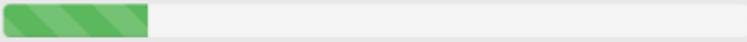
IR Noise Test

Test Time Remaining: 00:02:25

Output 1 
The IR receiver connected to this port is occasionally picking up stray IR messages, this may occasionally interrupt IR communication to the connected source device and/or control system, if you repeat this test and it remains in this state, you may find it is tollerable, but we recommend relocating the IR emitter anyway.

Output 2 

Output 3 

Output 4 

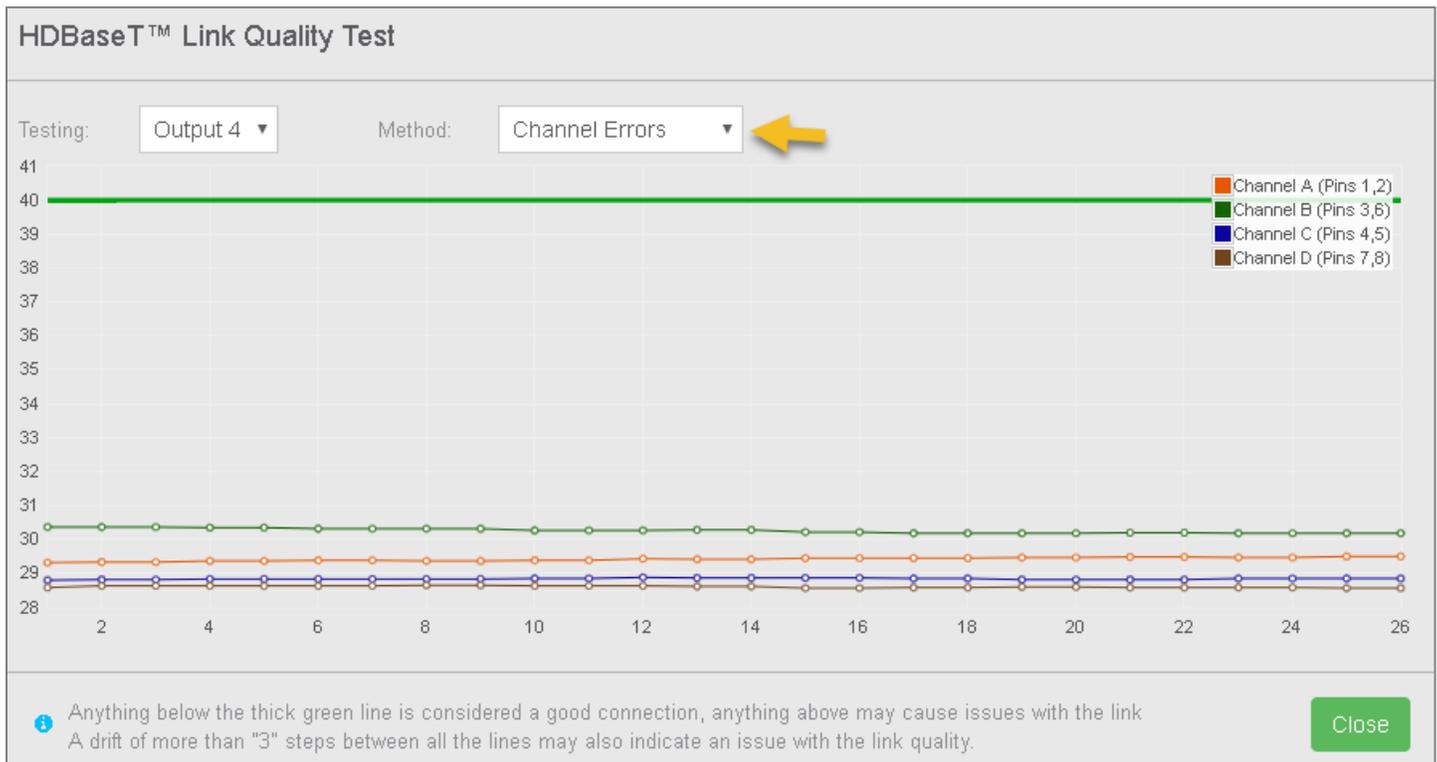
[Cancel](#)

The HDBaseT link quality test is designed to test the signal to see if there is good link quality. Once the test is initiated, it will begin evaluating the cable connection and twisted pairs.



You may test each output, using the “Mean Square Error” one at a time. Anything below the green line is considered a good connection, and more than three steps between lines could indicate an issue with the quality of the link. A legend of each twisted pair that corresponds to the tests are indicated in the upper right. If there is a line above the green line or distance of more than 3 steps, re-terminating the cable or evaluation of the cable is in order.

The installer may also select the “Channel Errors” report. This report will detect any high voltage or other external influences affecting the cable run. It uses the same error checks to determine if there are issues.



These tests take all the guesswork out of the installation and can save an installer time, money and ensuring the client is happy with the overall quality and performance of the system.

It is very important to note that in addition to having an internal diagnostic that will determine link quality, each matrix and VHR-1 receiver have an HDBaseT link quality light that will blink should the signal indicate a poor quality, or if the length of the cable run surpasses the specifications. The link indicator is available on the back of the matrix on each HDBaseT output, as well as on the LITE extender series. However, the diagnostics perform pin-point precision and could provide additional information that could be easily corrected.

8. Cloud Connection

The Cloud Connection screen is almost identical to the end-user version, with some minor differences. Should an installer purchase a X-Series product without an RTI control system, they could obtain an installer ID from Pulse-Eight, allowing them to monitor the system using Pulse-Eight diagnostics. Please contact Pulse-Eight for more information on obtaining an installer ID. Once an installer ID is secured and entered into the application, details of the installation will report to Pulse-Eight cloud monitoring, and the installer can send a monitoring pulse diagnostic to Pulse-Eight for review.

However, RTIQ will be used as an alternative to the installer ID, and once the diagnostics are available via RTIQ, RTI's cloud platform will be the best way to monitor and RTI control system that includes a X-Series HDBaseT matrix switch. It will monitor all the diagnostics as discussed in this tech bulletin, as well as other RTI devices that exist in the project.

The Cloud Connection will also indicate the overall system health of the system and alert the installer to any issues.

RTI

ADMINISTRATION

- Video Routing
- System Health
- Cloud Connection**
- Network Settings
- Routing Control
- Front Panel
- Hardware Details

MONITORING

keep your system up to date and get notified automatically if a problem occurs

System Status Healthy

Last Monitoring Pulse Sent Sat Feb 16 2019 06:29:53 GMT-0500 (Eastern Standard Time)

Installer Id 123456 **Save Changes**

Send Monitoring Pulse Now

RTIQ CONNECTION

connection to the RTiQ cloud

Connection Status Connected

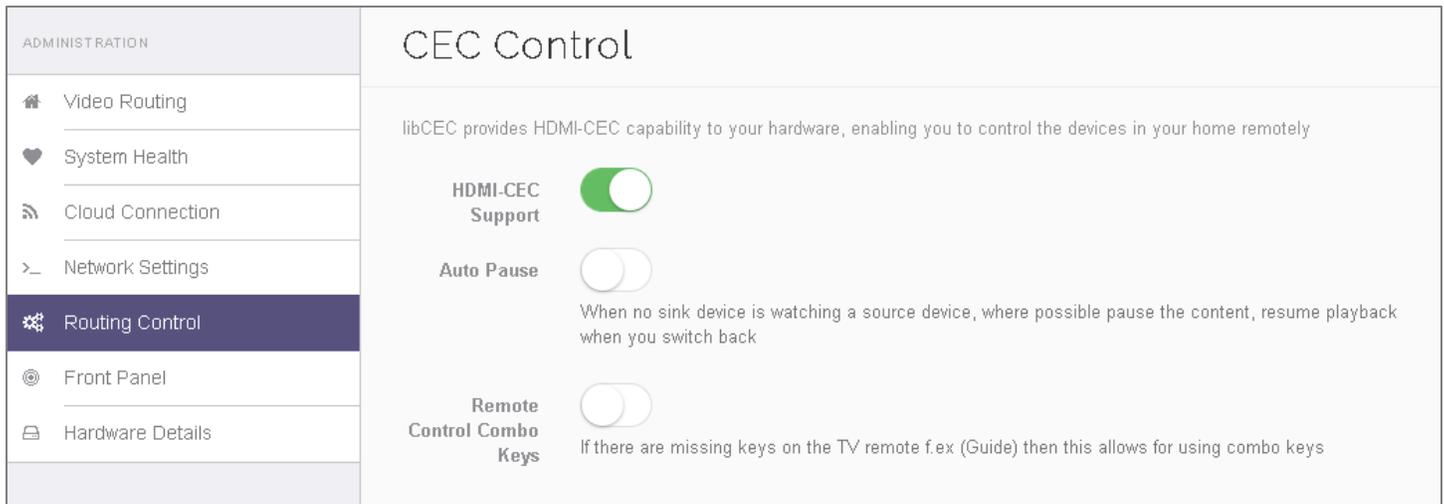
9. Network Settings

The Network Settings diagnostic will monitor the network connection of the unit with a color status and description. It will also allow the installer to set a static IP as units are shipped with DHCP by default. The user may elect to use a DHCP or MAC reservation, or assign a static IP in network managed applications. Note that the RTI driver is currently using an IP-based control protocol, so if you are utilizing RTI for control it is important the IP address remains the same.

The screenshot shows the RTI Network Settings web interface. On the left is a navigation menu under the heading 'ADMINISTRATION' with the following items: Video Routing, System Health, Cloud Connection, Network Settings (highlighted), Routing Control, Front Panel, and Hardware Details. The main content area is titled 'NETWORK SETTINGS' with the subtitle 'how your hardware connects to the internet and the rest of your control systems'. The 'Network Connectivity' status is shown as 'Healthy' in a green box. Below this are several configuration fields: 'Mode' is a dropdown menu set to 'Static'; 'IP Address' is 192.168.27.127; 'Subnet Address' is 255.255.255.0; 'Gateway Address' is 192.168.27.1; 'Primary DNS Server' is 192.168.27.1; and 'Secondary DNS Server' is 0.0.0.0. A 'Save Settings' button is located at the bottom of the configuration area.

10. Routing Control

Routing control is separated by two categories, CEC control, and IR control. It is here where you can activate CEC and underlying features, and determine how to map certain IR commands to CEC control codes.



HDMI-CEC SUPPORT: Toggle on and off the option to utilize CEC control. Installers who do not wish to take advantage of any of the CEC features may shut this option off, which will disable the end user's ability to control the matrix switcher and underlying sources without a dedicated RTI controller.

AUTO-PAUSE: If HDMI-CEC support is enabled, it will prevent the system to use CEC to turn off source equipment when an underlying video zone is turned off. Instead, it will pause the movie or program, allowing the end-user to continue where they left off on another source device — for example, starting a movie in the Living Room and finishing it in the Master Bedroom without having to find your place.

REMOTE COMBO KEYS: Since certain commands such as “Guide” or “EPG” (Electronic Program Guide) are not available on the CEC remote, activating this option will initiate special shortcuts that can allow access to these functions by pressing some of the color Teletext buttons simultaneously. For example, holding down the yellow and green buttons will send a “Guide” command via CEC. A list of these commands and functions will be provided by Pulse-Eight if needed.

The IR control interface contains some diagnostic features and learning tools.

The IR Activity graph is a useful diagnostic tool that will let the installer know if IR is being transmitted from his remote control and is hitting the IR board in the matrix. As the end-user sends a signal to the IR receiver on the fourth output display, it is measured by the IR activity tool as indicated below.



This can confirm operation of the IR receiver and determine if there is anything impeding the IR transmission.

The IR routing section allows the installer to learn in certain buttons on a designated factory remote that will be assigned to controlling the matrix input source selections for that output display. For example, if an end-user is using a Blu-Ray factory remote to control his sources through CEC, he may also determine what keys on that remote control will switch the matrix to each source. Typically, the Red, Green, Yellow and Blue functions are used for a 4x4 matrix, but any keys may be used.

IR Routing by default listens to commands from the supplied remote control, you can use alternative manufacturer profiles for integrating into existing systems or backwards compatibility

Global Default IR Profile	Default ▾	
	Each output port can be configured to use a different IR profile, if "Default" is set, this is the profile used	
Output 1 IR Profile	Custom ▾	Edit Custom Profile
Output 2 IR Profile	Custom ▾	Edit Custom Profile
Output 3 IR Profile	Use Global Default ▾	
Output 4 IR Profile	Use Global Default ▾	

The installer may specify the default layout to use normal CEC operation, or he may select a custom code set to learn in. Once the custom selection has been set, the user will select "Edit Custom Profile." He will then learn in a code for each of the source inputs for that display output. The user will aim the factory remote at the IR receiver, and hold down the key that will determine the switching, starting with input 1.

Received IR History

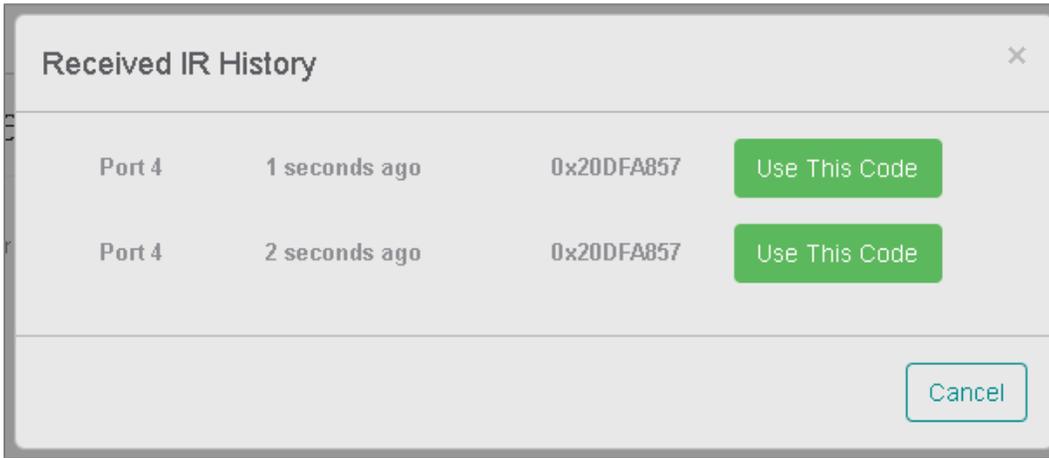
No IR History, press a key to get started

Cancel

Input 1	0x20DF4EB1	Edit
Input 2	0x00000000	Edit
Input 3	0x00000000	Edit
Input 4	0x00000000	Edit

Back to Routing Control

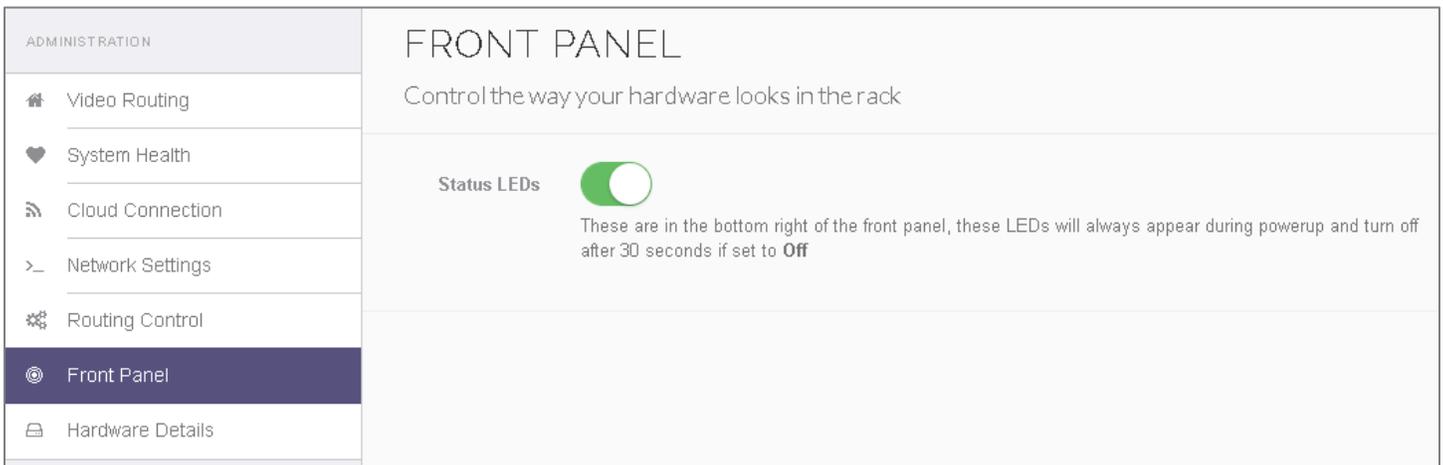
The installer may select from a list of commands that are learned in which one to use for that input selection.



Once the first input is selected, the installer will learn the remaining input selections. Now the end-user can use the factory remote to control the source devices and switch the matrix switcher, providing a full-service option in rooms that do not warrant an RTI controller.

11. Front Panel

This option will allow the installer to control the LED display on the front of the unit. They will always appear during a power start but will shut off after 30 seconds if this option is set to off. Leaving this option set will ensure the LED will always display when the unit is powered on.



12. Hardware Details

Hardware details provide important information and diagnostical information on any extenders (built-in transmitters and included receivers.)

Information such as Model, Serial, Hardware Revision, and software version, as well as a way to reboot the system, should the need revise.

On the lower portion, under “Firmware Versions,” the built-in diagnostics will always ensure the HDBaseT transmitters and receivers are up-to-date and working properly.

The screenshot displays the web interface for an HDBaseT Switcher. On the left is a navigation sidebar with the following menu items: ADMINISTRATION, Video Routing, System Health, Cloud Connection, Network Settings, Routing Control, Front Panel, and Hardware Details (which is currently selected). The main content area is titled "HARDWARE DETAILS" and includes a sub-header "Manufacturing information about your product, you may be asked for this information if you request help or support". Below this, the following information is displayed: Model: FFMS44, Serial: [blurred], MAC: [blurred], Hardware Revision: 2, and Firmware Version: 2.9.2-1. A red "Reboot System" button is located below the firmware version. The second section is titled "FIRMWARE VERSIONS" with the sub-header "Keep your system up to date, various sub systems within your matrix can be updated independently". This section is divided into two columns: "HDBaseT Transmitters" and "HDBaseT Receivers". Each column contains a table of four entries, each with the HDBaseT Lite logo, the output name, and the current firmware version.

HDBaseT Transmitters		HDBaseT Receivers	
Output (Transmitter) 1 Current Firmware Version: 2.3141.9	Output (Receiver) 1 Current Firmware Version: 2.3131.5		
Output (Transmitter) 2 Current Firmware Version: 2.3141.9	Output (Receiver) 2 Current Firmware Version: 2.3131.5		
Output (Transmitter) 3 Current Firmware Version: 2.3141.9	Output (Receiver) 3 Current Firmware Version: 2.3131.5		
Output (Transmitter) 4 Current Firmware Version: 2.3141.9	Output (Receiver) 4 Current Firmware Version: 2.3131.5		