



Vbrick Encoder

vbrick encoder v4.7

Admin Guide



Copyright

© 2018 Vbrick Systems, Inc. (d/b/a Vbrick), all rights reserved.

This publication contains confidential, proprietary and trade secret information. No part of this document may be copied, altered or shared without prior written permission from Vbrick. This document is subject to change without notice. Vbrick, the Vbrick logo, Rev, and all Vbrick products are trademarks of Vbrick. All other trademarks are the property of their respective owners.

FCC Part 15

This equipment has been tested and found to comply with the limits for Class A digital device, pursuant to Part 15 of the FCC rules, Class A for OC-3C Interface, Class A for the SDI Interface. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their own expense. This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. Cet appareil numérique de la Classe A respecte toutes les exigences du règlement sur le matériel brouilleur du Canada.



Vbrick declares that this product conforms to the following certificate standards for electromagnetic emissions when installed according to the manufacturer's specifications: EN 55022:2006; EN 55024:1998, A1:2001, A2:2003; EN 61000-3-2:2005; EN 61000-3-3:1995, A1:2001, A2:2005.

Contents

Vbrick Encoder v4.7 Admin Guide

Welcome	vii
Chapter and Topic Organization.....	vii
1. Introduction	
Vbrick Encoder Overview.....	1
VAdmin Overview.....	1
Login.....	2
Home Page	3
Home Page LEDs.....	4
Configuration Menu	5
Dashboard.....	5
Edit Mode.....	6
Apply, Revert, Default, and Clone Buttons.....	8
Logout.....	8
Online Help.....	8
Install Online Help to a Local Web Server.....	9
Optimize System Performance	9
Step-by-Step Initial Set Up Overview	10
Video/Audio Rates	11
Programs.....	11
Streams	11
Transmitters.....	11
Servers.....	12
Decoders.....	12
Archivers.....	12
2. System Configuration	
Network.....	13
Domain Name Server Settings	16
Network Time Synchronization Settings.....	16
Shared Archivers External FTP/SFTP Server Settings.....	17
General.....	18
System Identification Settings.....	18
System Time Settings	19
Additional System Settings	19
System Reset	20
Front Panel Settings	21
Link the Encoder to Vbrick Rev.....	22
Usernames & Passwords	23
Manage Configuration	24
Reset System Configuration	24

Read System Configuration	25
Restore System Configuration	26
Auto Configuration	27
Advanced Configurations	28
Management SAP	29
Security	30
SSL Certificates	33
Verify the Currently Installed Certificate and Generate a Self-Signed Certificate	33
Generate a Certificate Signing Request (CSR) to Use with a Certificate Authority (CA)	35
Upload and Install a Certificate Authority (CA) Certificate and Keys	37
Encryption	39
Logging	43
Event Triggering	44
Passthrough	46
SNMPv3 Passwords	49
SNMP Traps	50

3. Encoder Configuration

Global	56
Announce Settings	58
Transmitter Settings	59
Server Settings	61
Video	61
Video Template Settings	68
Video Rate Settings	69
Clone Video Input	74
Audio	75
Audio Rate Settings	78
Clone Audio Input	80
Programs	81
Add a Program Override	83
Streams	84
Flash Multicast Stream Settings	87
Transport Stream Settings	89
Enable Forward Error Correction (FEC) on a Stream	91
Transport Stream PIDs	93
Transmitters	94
SDP Files	94
Manifest Files	95
Announcements	96
RTMP Transmitter	98
Auto Unicast Transmitter Mode	100
Enable Forward Error Correction (FEC) on a Transmitter	102
Smooth Streaming Transport Type	103
Transmitter Announce Settings	105
Transmitter External Announce Settings	106

Vbrick Rev Transmitter Settings	107
Servers	108
Servers Announce Settings	110
Servers External Announce Settings	110
Archivers	111
Enable Batch Mode and Archive a Batch File.	112
Use an External (USB) Device to Archive a Stream	113
Enable Rev Metadata (JSON)	117
4. Receiver Configuration	
Receivers	119
Announce Receive Settings	121
RTSP URLS	121
Configure a New RTSP URL	122
5. Presentation Features	
Presentation Features Overview	125
Presenter Mode Login	125
Disable Presenter Mode Access from the Login Screen.	126
Presentation Features Interface	127
Presenter Mode Status Bar	127
Access Presenter Mode and Controls	128
Presenter Encoder Dashboard	129
Presenter Encoder Video Input	129
Presenter Encoder Video Encode.	130
Presenter Encoder Video Encoder Status Video Monitoring	131
Customize Presenter Mode Layouts.	132
Manage Layout Images	136
6. Decoder Configuration	
Receivers	139
Announce Receive Settings	141
Video Output.	141
Audio Output.	143
Latency and Quality Tuning	144
7. Monitor	
Monitor the System	147
Monitor System Information	148
Monitor Storage Information	150
Monitor Manufacturing Information	151
Monitor System Restarts	152
Monitor the Network.	152
Monitor the Network Time Synchronization Fields	154
Monitor the System Logs.	154

Monitor Encoder Status	155
Monitor Video Input Fields	155
Monitor Video Rate	156
Monitor Audio Input Fields	157
Monitor Audio Rate	158
Monitor Global & Streams	158
Monitor Transmitters	160
Monitor Servers	162
Monitor Archivers	163
Monitor Decoder Status	165
Monitor Receivers/Video/Audio	165
8. Troubleshoot	
Ping Test	171
Ping Test Result	172
Ping Test Setting	172
TraceRoute Test	172
Trace Route Test Result	172
Trace Route Test Configuration	173
Device Tests	173
Operational Modes	174
Avoiding Overload Conditions	175
9. Key Length Value (KLV) Metadata	
Inserting KLV Metadata	177
Exploitation Support Data (ESD) to Local Data Set (LDS)	177
Local Data Sets (LDS) Passthrough	178
Cursor on Target (CoT) to Local Data Set (LDS)	179
MISB Timestamps	180
10. Advanced Transport Stream Settings	
Transport Stream Overview	181
Overhead and PTS-PCR Gap	181
Variable Mode	181
Custom Mode	182
Automatic Latency Control	182
Forward Error Correction (FEC) Theory of Operation	183
11. Advanced MBR Configuration	
Advanced MBR Configuration Rules	187

Vbrick Encoder v4.7 Admin Guide

Welcome

This document explains how to configure a Vbrick Encoder. It provides detailed information about all configurable encoder options and parameters. The VAdmin management application is used for all configuration tasks. VAdmin is a browser-based application that makes it easy to configure your encoder and to optimize performance and get the best video. The [Getting Started Guide](#) explains how to quickly set up the encoder and provides an overview of VAdmin.

Note: When viewing the images in Online help, keep in mind that many of the configuration options for the encoder are mutually exclusive. This means that, depending on which options you select, you may see new fields or you may not see previously existing fields. Although the images may not always show all options, they are fully explained in the text.

Further, Admin topics are not written for casual users. It is assumed that readers will have a working knowledge of network addressing, communication protocols, and configuration concepts, as well as hands-on experience working with streaming video products.

Chapter and Topic Organization

This Online help system provides access to the Vbrick Encoder documentation. Topics may be used as reference material or as how-to materials for specific use cases.

For best results, please take a few moments to familiarize yourself with the way the information is organized. If you find errors or omissions, click the e-mail icon in the upper-right corner of this window or send your feedback to documentation@vbrick.com

Introduction	Provides an overview of the encoder and explains how to login and get help.
System Configuration	These pages explain in detail how to configure system-level parameters such as IP address and host name.
Encoder Configuration	These pages describe audio and video input parameters and explain how to use the pre-built templates for best results.
Receiver Configuration	Explains how to enable and configure network streams (via SAP and custom RTSP URLs) for use with encoders that have Presentation Features enabled.
Presentation Features	Covers all the functionality and interface differences between a Presenter encoder and a standard encoder.
Decoder Configuration	These pages describe available receiver configurations as well as video and audio output recommendation templates.
Monitor	Explains various monitoring pages including network, video/audio, status logs and program status.
Troubleshoot	This page explains how to use standard troubleshooting tools to run network, device, and traceroute tests.

Key Length Value (KLV) Metadata	Explains how to insert global positioning or telemetry metadata into video feeds for specialized applications.
Advanced Transport Stream Settings	Explains how to use advanced settings when configuring transport streams for Mode and Forward Error Correction.

Introduction

Vbrick Encoder Overview

The Vbrick Encoder supports high definition video resolutions up to 1080p for incredible quality video at bandwidths of 1 Mbps and up. Vbrick encoders also support a wide variety of standard definition resolutions for lower bandwidth applications, such as streaming to wireless and mobile devices. Vbrick decoders (where applicable on some units) deliver high-quality, low latency video with exceptional performance, ease-of-use, and flexibility. The Vbrick decoder is fully compatible with 7000/9000 encoders and supports video resolutions up to 1080p.

Vbrick's H.264 streaming video is supported by a number of players including Adobe Flash, Apple QuickTime, Microsoft Windows Media Player (with Vbrick plug-in), and embedded players for multiple browsers and operating systems. Recorded files can be sent to a Video On-Demand Server or Vbrick's Distributed Media Engine (DME). Each encoder can deliver streaming video via multicast directly to the IP network, serve live unicast streams via RTSP for up to 200 clients, or push a unicast stream to 25 destinations.

Note: Windows Media Player will play streams from the 9000 if both H.264 codec (for video) and AAC codec (for audio) are installed. Currently, Vbrick does not provide this codec.



VBAdmin Overview

The encoder has an integrated management interface (VBAdmin) that lets you manage Vbrick configuration from an external browser. This allows network managers to remotely configure and monitor the encoders from virtually anywhere. As shown in the table below you can launch VBAdmin in Internet Explorer or Firefox (other browsers are not supported by Vbrick). You connect to VBAdmin by pointing to the IP Address (for example: **http://192.168.5.5**) of the Vbrick encoder and logging in with a user name and password. VBAdmin is one of several ways you can manage the encoder. You can also access the Command Line Interface (CLI) using Telnet, SSH, or the serial port (see the [Getting Started Guide](#) for more

information about the CLI). Note that some changes to the configuration will initiate an automatic reboot. When this happens, wait approximately 60 seconds, then refresh the page and log back in with your user name and password.

Note: VBAAdmin has a read-only **View** mode and an interactive **Edit** mode where you can actually make configuration changes. *All VBAAdmin screens in this document are shown in Edit mode.*

Table 1. Supported Browsers (VBAAdmin) †

Browser	Version
Microsoft Internet Explorer	9.0 or higher
Mozilla Firefox	26.0 or higher
Chrome	31.0 or higher
Safari	6.1 (mac) or higher

† For best results Vbrick recommends using the latest version of a supported browser. You must have session cookies and active scripting enabled in your browser to use VBAAdmin.

Login

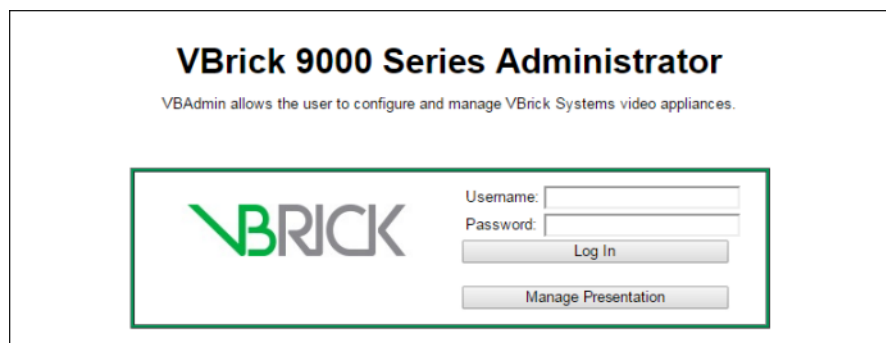
▼ To login to an encoder:

1. Open a browser and enter the IP address of the encoder in the address bar.
2. Login to VBAAdmin with a valid user name and password (case-sensitive), and then click the **Log In** button. (The default user name and password is **admin:admin**)

It is highly recommended that you use the **Maintenance** pages in VBAAdmin to change the default user name and password. The user name and password cannot exceed 20 characters. It may include any combination of alphanumeric characters and only the following special characters:

~ ! # \$ ^ * + & [] { } | < > -

3. If using an encoder with presenter features enabled, view: Presenter Mode Login for additional log-in options.



VBrick 9000 Series Administrator
VBAAdmin allows the user to configure and manage VBrick Systems video appliances.

VBRICK

Username:

Password:

Log In

Manage Presentation

End User License Agreement (EULA)

The first time you launch VBAAdmin you will need to page down and click on **Accept License Agreement**. The application will not run if you decline to accept the EULA.

After accepting the EULA, VAdmin will be in **Edit** mode. Note that the EULA is not shown when using Telnet or SSH and is reset when you apply a **Factory Default** (System Configuration > Manage Configuration) reset or upgrade the encoder's software.

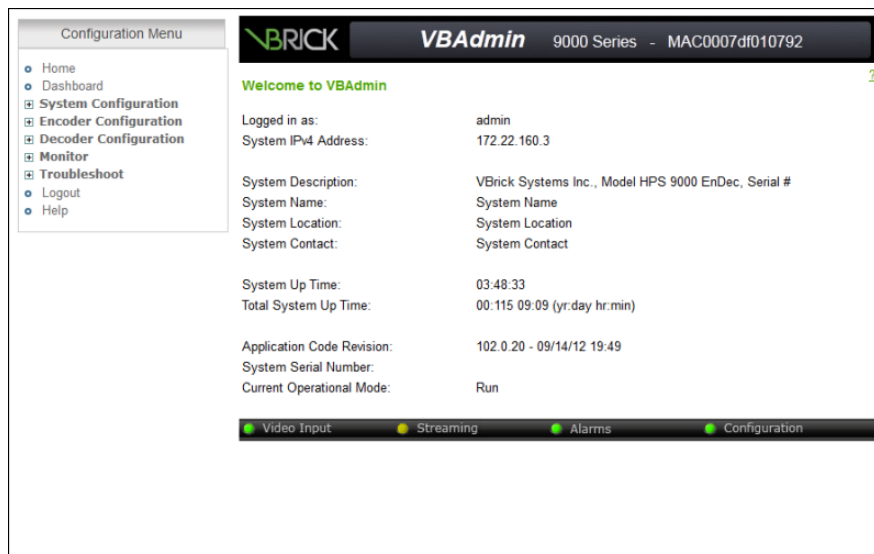
To view the EULA after it has been accepted, get the following file via FTP:

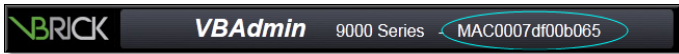
C:\AcceptedEula.txt

Home Page

The **Home** page provides a snapshot of the current status of the encoder. All text fields are read-only and there are no editable fields on this page.

The colored LED indicators in the bottom middle of the page give you a quick snapshot of the health and status of the encoder. See the Home Page LEDs topic for an explanation of what they mean.



Field	Description
Header Panel	To quickly identify the unit, this panel shows the Host Name (from the System Configuration > Network page). The default Host Name is the MAC Address (circled below). 
Logged in as	The user who is currently logged in.
System IPv4 Address	Read from the System Configuration > Network page.
System Resolved IPv6 Address	Read from the System Configuration > Network page.
System Description	Read from the Monitor > Monitor the System page.
System Name	Read from the System Configuration > General page.
System Location	Read from the System Configuration > General page.
System Contact	Read from the System Configuration > General page.

Field	Description
System Up Time	Read from the Monitor > Monitor the System page. Refreshed every 60 seconds.
Total System Up Time	Read from the Monitor > Monitor the System page. Refreshed every 60 seconds.
Application Code Revision	Read from the Monitor > Monitor the System page.
System Serial Number	Read from the Monitor > Monitor the System page.
Current Operational Mode	<p>Indicates the current operational mode of the Vbrick. The following modes are supported. See the troubleshooting topic on Operational Modes for more information.</p> <ul style="list-style-type: none"> • Run – Normal operation. • Diagnostics – User selected mode for running certain Vbrick diagnostics. • Maintenance – Automatically launched (not selectable) when the software does not load. • Limited Run – Limited operational mode (not selectable). Normally occurs if a hardware problem exists within the Vbrick but it can still partially operate. • Overloaded – Limited operational mode (not selectable). This mode occurs when the Vbrick is configured to handle more video than its operational capacity. If this occurs, the Vbrick needs to be reconfigured to reduce the number of streams and/or data rates. Under this condition, the encoder temporarily reduces video traffic in order to maintain VAdmin functionality.

Home Page LEDs

The colored LEDs in the bottom middle of the **Home** page give you a quick snapshot of the health and status of the encoder. These indicators are dynamically refreshed every five seconds and give you an up-to-the-minute snapshot of the current status. *Video input and streaming LEDs are not shown when managing a decoder-only appliance.*



LED	Status
Video Input †	<ul style="list-style-type: none"> • Green – Running. • Red – Video Input problem (with any enabled stream).
Streaming †	<ul style="list-style-type: none"> • Green – at least one transmitter or server client is streaming. • Yellow – no transmitters or server clients are streaming.
Alarms	<ul style="list-style-type: none"> • Green – no alarms are present. • Red – one or more alarms are present.
Configuration	<ul style="list-style-type: none"> • Green – no configuration errors are present. • Yellow – one or more configuration errors are present.

† Not shown on decoder-only models.

Configuration Menu



The options on the **Configuration Menu** are explained below. This menu provides access to all configurable features and functions on the encoder. It also provides access to the online help system.

Use the (plus and minus) tree controls in the menu to expand or collapse the selectable options and note that many pages have additional links to hide or show less frequently used settings.

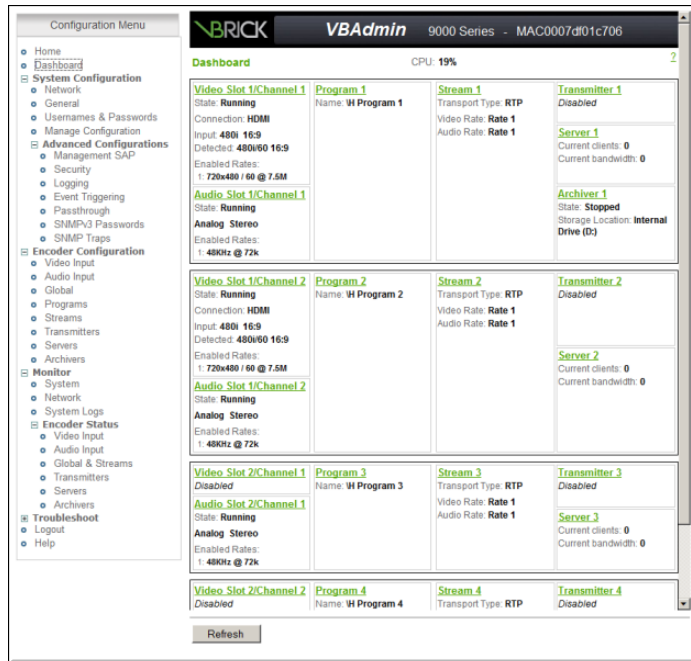
Menu Option	Description
Home	Provides a quick snapshot of encoder health and status
Dashboard	Shows a high-level overview of the entire unit. This includes the configured values for each slot and channel, the streams associated with each program, and the transmitters and servers associated with each stream.
System Configuration	Used to configure "system" settings such as IP address and host name as well as user names and passwords. Also allows you to read, reset, or restore the system configuration. Advanced Configurations are used for security, logging, event triggering and other less frequently used options.
Encoder Configuration	Used to set video and audio parameters for the encoder.
Decoder Configuration	Used to set video and audio parameters for the decoder. Only on decoder units.
Monitor	Lets you view system, network, and audio/video data as well as the various system logs. Program Status lets you view the status of programs, transmitters, and servers.
Troubleshoot	Lets you troubleshoots operational problems by running network tests and devices tests.
Logout	Logs you out of the system.
Help	Launches the Online help system main page. Use the ? icon in the upper right corner of each page to launch contextual help for that specific page.

Dashboard

The **Dashboard** is a critical tool for managing and configuring your encoder. The Dashboard makes it easy to see—at a glance—how the unit is configured and operating and is dynamically refreshed once every second. It has hyperlinks that let you quickly navigate to the configuration pages for each major component (e.g. a server or transmitter) associated with a slot and channel.

It shows all of the slots and channels available and the specific video and audio configuration settings for each one. This includes **Program** and **Stream** information as well as the current status of each configured **Transmitter**, **Server**, and **Archiver**.

The Dashboard shows the status of up to two slots and four channels (depending on the hardware you purchased) as well as the **CPU** utilization for the entire unit. For best results, the **CPU** utilization should not exceed 90% (See the Optimize System Performance topic for details).



Note: If you are working with an encoder that has presentation features enabled, your interface or functionality may differ slightly for this section with the ability to see Presenter Mode status on the Dashboard. See the Presenter Encoder Dashboard topic if you need more information.

Edit Mode

In order to change configuration settings in the Vbrick encoder, you must click the **Edit** button to become the active editor so that multiple users cannot be changing parameters at the same time. After clicking **Edit**, the button changes to **Finish Edit**, and the message **Edit Session In Progress** is displayed on the front panel of the encoder. *Only one user can be in Edit mode at any time.* Any user can end the current editing session of any other user regardless of login level—admin or operator. As a best practice, you should click **Edit**, make any necessary changes and then click **Save** and **Finish Edit** to avoid interfering with other users.

Note: All configuration screens have a **View** mode and an **Edit** mode. Most screens in Online help are shown in **Edit** mode, that is *after* you have clicked the **Edit** button.

How is Video Connected?	Component
Video Input Enable	Enabled
Video Format	1080i/60
Video Aspect Ratio	16:9 <small>Detected Format: 0</small>
KLV	Disabled
Show advanced settings	
Video Rate 1 Template Settings	
Video Rate	Enabled
Template	750Kbps, SDp30/25 (Parameters Match)
Profile	Baseline
Resolution	656x368
Target Bit Rate (bit/sec)	750,000
Target Frame Rate (frames/sec)	30
Hide advanced settings	
IDR Frame Interval (sec)	4
Rate Control Setting	5: Best Quality
Entropy Coding	CAVLC

Edit

Figure 1. Begin Edit

Be aware that some parameters, menu items, and fields are not shown unless you are in edit mode.

Click the **Edit** button to see all fields, parameters, and buttons. VBAAdmin validates most user entries. If you select and apply invalid settings or mismatched parameters, it will display error messages in red showing the valid range of values or a description of the conflicting parameters. When this happens, try again with different values or parameters and press **Apply**.

Choose Input	Slot 1/Channel 1*	Slot 1/Channel 2	Slot 2/Channel 1	Slot 2/Channel 2
How is Video Connected?	HDMI			
Video Input Enable	<input checked="" type="checkbox"/> Enabled			
Video Format	720p/60			
Video Aspect Ratio	16:9 <small>Detected Format: 720p/60 16:9</small>			
KLV	Disabled			
Show advanced settings				
Video Rate 1 Template Settings Load Template				
Video Rate	Enabled			
Template	750Kbps, SDp30/25 (Parameters Do Not Match)			
Profile	Baseline			
Resolution	1280x720			
Target Bit Rate (bit/sec)	2147483647			
Target Frame Rate (frames/sec)	60			
Show advanced settings				
<input type="button" value="Apply"/> <input type="button" value="Revert"/> <input type="button" value="Default"/> <input type="button" value="Clone Input"/> <input type="button" value="Save"/> <input type="button" value="Finish Edit"/>				

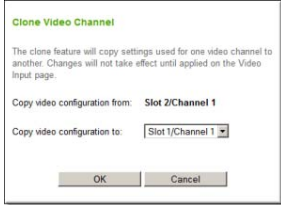
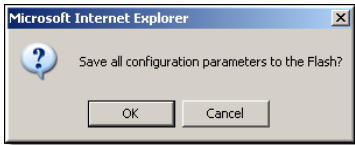
Value out of range. Range is 32000 to 2000000.

Figure 2. Finish Edit

If the browser is closed after entering Edit mode, editing will not be ended. Therefore, a second user can't know if the first user has simply forgotten to log off or is still engaged in editing. After an hour of inactivity, Edit mode times out, whether the browser is open on the desktop or closed without ending the Edit session. In VBAAdmin, the **Logout** button on the left side of the menu bar ends editing and logs you out of the application.

Apply, Revert, Default, and Clone Buttons

Depending on screen resolution, it may be necessary to scroll down the page to see additional information and fields. The **Apply**, **Revert** and **Default** buttons however, are always shown at the bottom of the page when appropriate. You may also see **Clone**, **Refresh**, **Reset Counters**, and other buttons depending on what page you are on.

Button	Description
Apply	Applies the changes made on the screen to the encoder. Note that these changes will not be stored in the encoder's flash memory until you click Save . This means if the encoder is powered down the changes will be lost. Don't forget to save the configuration.
Revert	Aborts all changes made on the screen and returns to the values that were present prior to the first change that was made. Note that this only applies to changes made prior to the last "apply."
Default	Returns to the default settings for all parameters on the page. You must still click Apply for the settings to take effect.
Clone	 <p>When configuring the Video Input on multi-channel encoders, this button lets you apply one set of configuration parameters to one or more of the other channels.</p>
Finish Edit	Ends the editing session and displays View mode.
End Other Edit Session	End an edit session currently in progress by another user. Use with care; any unsaved changes made by that user will be lost.
Save	 <p>Writes all applied changes to Flash memory. If you do not click Save after editing, any changes you made are lost if the encoder loses power or is reset.</p>

Logout

Click **Logout** on the Configuration Menu to exit VBAAdmin and automatically end any editing sessions. After logging out of VBAAdmin, it is a good idea to close the window and exit your browser.

Online Help

A link to the Online help system is available from the **Configuration Menu** on the left side of the VBAAdmin page. This help system has a powerful full-text search engine that can quickly find the information you need.

You may also click on the question mark hyperlink in the upper-right corner of each page to get context-sensitive help for that specific page. If a page has several fields or areas of interest that may not fit on one page, the topics will be linked at the bottom of the page.

Note: The encoder's Online help system requires an Internet connection but can be configured to run on your local Web server. See [Install Online Help to a Local Web Server](#) for instructions.



Install Online Help to a Local Web Server

The Online help system points to a Vbrick Web server and requires an Internet connection. In some cases it may be preferable (and faster) to put the help files on your local Web server. To do this you will need to edit two MIB variables using the Command Line Interface or a MIB browser. You will also need a copy of the help files to place on your Web server. Contact Vbrick Support Services to obtain a copy of the help files.

- ▼ To install the help files and point to a local server:
 1. Open the CLI using Telnet or HyperTerminal. (For more about using the CLI, see the "Command Line Interface" chapter in the [Getting Started Guide](#).)
 2. Begin an edit session and set the following Vbrick parameters as shown below. When done, be sure to apply, save, and reset as shown below. Note that all commands are case-sensitive.
 3. Replace **web_server_ip_address** with the complete path to the Default Web Site > Home Directory on your local Web server. (Note: Use the **optional_folder_name** parameter only if you need to distinguish between multiple help systems.)

```
SVAR vbrickEditName=
SVAR vbrickEditName=admin
SVAR vbrickSysConfigurableHelpLinksEnable=2
SVAR "vbrickSysConfigurableHelpLinksURL=http://<web_server_ip_address/>
optional_folder_name>
SVAR vbrickSysApplySet=2
SVAR vbrickSysSaveConfiguration=2
RESET
```

4. Copy and paste the folder **Vbrick_H264Help** (obtained from Vbrick Support Services) into the path you specified in Step 3 above.

Optimize System Performance

Vbrick encoders are designed to accommodate a variety of configurations. Vbrick configuration choices enable the widest range of features and capabilities and are designed to provide the user with a high degree of flexibility. In some extreme cases, users can create

configurations that exceed the normal processing capacity of the unit causing it to not perform optimally. Corrective action usually involves reducing a video rate or disabling a stream or transmitter. In general, video quality improves when video rate is increased toward the maximum of 20 Mbps. In short, video quality is subjective and relates to other components such as the response of the human eye, the quality of the original content and signal, and the quality of the decoder and monitor.

As a general rule, use the lowest video rate that best suits the application. When configuring Vbrick devices, pay close attention to the total bit rate of all streams exiting the unit. The sum of all streaming traffic should be closely monitored and kept to a minimum whenever possible. Once you have selected and applied a configuration to the unit, you can check the status of the processor and device load using VAdmin or CLI. The CPU utilization and overloaded status variables are an excellent indication on the unit's overall health. If the CPU utilization is high or an overloaded condition is occurring, you can simply reduce bit rates; reduce the number of streams, transmitters, or served clients; and re-run the test. As a part of regular maintenance, you should periodically check the **CPU utilization** and the **Overloaded Count** (on the Monitor > Monitor the System page) to ensure the unit remains within normal operating limits.

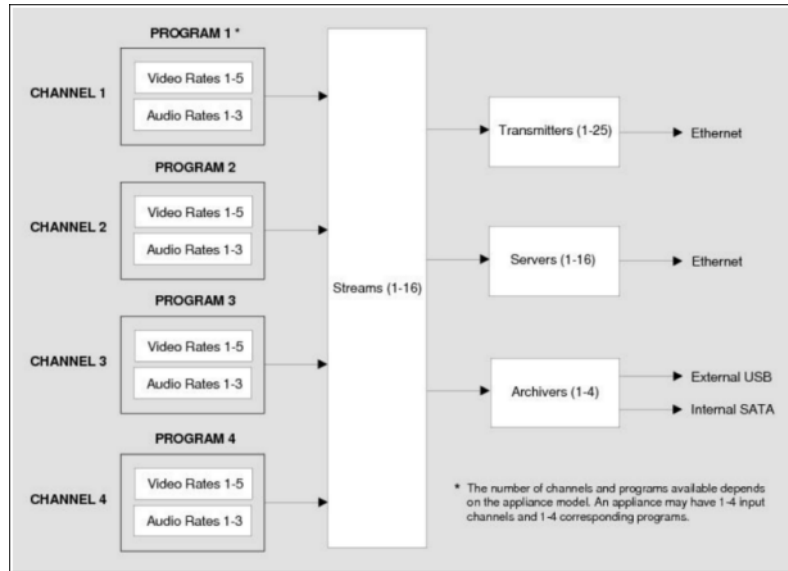
Step-by-Step Initial Set Up Overview

This section gives a quick overview of the steps you would typically need to perform to configure a Vbrick Encoder. As shown in the figure below, the encoder supports up to four video input streams (two in each slot) and four audio input streams (two in each slot). It also support a fixed number (shown in parentheses) of programs, streams, transmitters, and servers.

Keep in mind that the encoder you actually purchase comes in a variety of models with different connectors and slot configurations.

▼ To quickly configure an encoder:

1. Set up the encoder and connect a video source. See: [Getting Started Guide](#).
2. Configure the Video and Audio sources.
3. Configure the Programs associated with each stream.
4. Configure the Streams for the programs.
5. Configure the Transmitters for the streams.
6. Configure the Servers for the streams.
7. Configure the Archivers for the streams.
8. If you complete the above steps successfully, the encoder will be configured.



Video/Audio Rates

Use the Video/Audio Configuration pages to define the video and audio sources. You can also use the pre-configured templates to control a single video or a single audio rate. Templates are part of the rate configuration for each audio or video source. The **Load Template** button launches a pop-up window showing the available templates with preconfigured values. See Encoder Configuration for more information.

Programs

Each program corresponds to one **Video** and **Audio Input**. For example if you have two video and audio inputs (i.e. two "channels"), you can configure two programs. Each stream you subsequently configure must be associated with a program. See Programs for more information.

Streams

There are 16 **Streams** available for configuration. A "stream" is a bundled group of resources that describes the characteristics of the video and audio. A stream specifies the **Program**, **Video Rate**, **Audio Rate**, and **Transport Type** and can be transmitted, served, encrypted, or archived. Once a stream is defined, it can be used by any combination of transmitters, servers, and archivers. With most "transport types" there is no automatic rate selection: each transmitter and server must be configured with a specific stream and rate. With "smooth streaming," multiple video rates are delivered in one stream and IIS determines which rate to serve. See Streams more for information.

Transmitters

There are 25 **Transmitters** available for configuration. Each references a **Stream** that can be pushed and each is selectable as unicast or multicast (RTP and transport streams only). The configuration parameters are divided into a common section (on the Encoder Configuration > Global page) and another section (on the Encoder Configuration > Transmitters page) which configures each individual destination. See Transmitters more for information.

Servers

There are 16 **Servers** available for configuration. Each references a stream that can be served. The configuration parameters are divided into one common section (on the Global page) and another section (on the Servers page) which are used to configure an individual server. The encoder is a streaming server that can be controlled by a remote decoder client via RTSP and RTCP protocols. In server mode, a served program does not become active on the network until requested by a client. The client, for example, could be a software player like StreamPlayer or QuickTime, or a set top box. See Servers more for information.

Decoders

Vbrick decoders deliver high-quality, low latency video with exceptional performance, ease-of-use, and flexibility. The decoder is fully compatible with 7000/9000 Series encoders and supports video resolutions up to 1080p. The Vbrick decoder is designed to deliver the highest video quality with low latency. The embedded operating system and the dedicated decoding hardware provide the highest reliability for mission-critical applications.

Archivers

There are four **Archivers** available for configuration. An **Archiver** is used to store a local copy of a stream on existing internal or external hard drives. (Only transport streams can be archived.) Each archiver references a transport stream which is basically comprised of a Video Rate, an Audio Rate, and a Transport Type. Archiving can be controlled locally or it can be controlled from VEMS. VEMS can start and stop an archive and FTP files to and from the encoder. See Archivers more for information.

System Configuration

Network

- ▼ To access the Network fields:
 1. Navigate to **System Configuration > Network**.

System Configuration --> Network

Network

IPv4 DHCP Enabled

IPv4 Address

IPv4 Subnet Mask

IPv4 Gateway Address

Host Name

Management IP Version

[Hide advanced settings](#)

DHCP Retry Interval

Network Interface Speed

Network Interface Type

Maximum Transmission Unit Size

Field	Description
IPv4 DHCP	Default = Enabled . Dynamic Host Configuration Protocol. If DHCP is enabled, the encoder gets its IP Address, Subnet Mask, and Gateway from the DHCP server. If the DHCP server supplies the DNS server address, these parameters will replace the user-entered DNS settings. If DHCP is enabled and the encoder cannot obtain an IP address from the server, it will start in limited run mode after 90 seconds, using its default IP Address of 172.17.5.5 . After 15 minutes, it will automatically reset and again attempt to acquire an address. The LCD screen on the front of the encoder will indicate a DHCP failed message. Note: The Vbrick encoder requires a minimum DHCP lease length of 8 minutes to work, however it is recommended to extend the lease time to what is maximally available via the network to avoid disruptions.
IPv4 Address	This is either a static or a DHCP-enabled IPv4 IP address.
IPv4 Subnet Mask	Subnet mask for the encoder address.
IPv4 Gateway Address	Gateway IP Address for communicating across different network segments.

Field	Description
Host Name	The Host Name defaults to the Media Access Control (MAC) address, a hardware address that uniquely identifies each node of a network. DHCP servers can optionally be configured to provide a Host Name so when DHCP is enabled the encoder will automatically use the Host Name from DHCP if one is provided. The encoder Host Name identifies the encoder to various network applications including DHCP, SNMP and Vbrick application tools. <i>The Host Name can be a maximum of 18 characters; the first character must be a letter and the rest can be letters, numbers, or hyphens.</i>
Management IP Version	<ul style="list-style-type: none"> • IPv4 Only – Use an IPv4 address. Default. • IPv4 and IPv6 – Use both IPv4 and IPv6 addresses. Complete additional fields that are then displayed for IPv6 as required.
IPv6 Configuration Method	Displayed if Management IP Version above is IPv4 and IPv6 . Select the IPv6 Configuration Method. Note that IPv6 is supported on VAdmin, Web Services, SNMP, and Telnet. Ipv6 is not supported on SNMP notifications, Announcements, Management SAPs, and Streaming. <ul style="list-style-type: none"> • Auto Config – The device will auto-configure the IPv6 address using the (NDP) MAC-based address. Default • DHCPv6 – The device will use an external IPv6 DHCP server. • Static Assignment – Use to manually set IP address.
IPv6 Resolved Address	Displayed if IPv6 Configuration Method above is Auto Config or DHCPv6 .
IPv6 Address	Static Assignment only. Manually enter an IP address.
IPv6 Network Prefix Length	Static Assignment only. Manually enter the network prefix length.
IPv6 Gateway Address	Static Assignment only. Manually enter the Gateway Address.
DHCP Retry Interval	Displayed when Show advanced settings clicked. See above. Use to adjust the time (in minutes) before the encoder will reset and attempt to acquire an IP address. Range 3–15. Default = 15.

Field	Description
Network Interface Speed	<p>Displayed when Show advanced settings clicked. Automatic, Auto 100 Mbps, 100 Mbps, or 10Mbps. This allows the Ethernet interface of the encoder to be manually forced to 10 or 100 Mbps. Automatic is the default and recommended setting. Automatic enables auto negotiation and the encoder will automatically match its speed setting to the speed of the switch or hub to which it is attached. Automatic can resolve up to 1GB depending on your network. Auto 100 Mbps is similar to Automatic except the encoder does not advertise 1GB.</p> <p>The settings for Network Interface Speed and Network Interface Type are interdependent. They must both be set to Automatic or they must both be set manually. Manual settings should be used only in the rare case when the encoder is attached to network equipment that does not support auto negotiation. The encoder's capabilities will be limited when its Ethernet link is at 10 Mbps and/or Half Duplex. If auto negotiation fails, the encoder defaults to 100 Mbps, Full Duplex, and attempts "parallel detection," an alternative way to sense speed. Status parameters are available on the Monitor > Monitor the Network page to indicate the state of the link and the current configuration of the Ethernet hardware. In auto mode, they reflect the results of the negotiation and in manual mode they follow the configuration options.</p>
Network Interface Type	<p>Displayed when Show advanced settings clicked. Half Duplex, Full-Duplex, or Automatic. This allows the Ethernet interface of the encoder to be manually forced to Half or Full Duplex. The default setting is Automatic which enables auto negotiation in the encoder so it will automatically match its duplex setting to that of the switch or hub that it is attached to. Automatic is the default and recommended setting. The settings for Network Interface Speed and Network Interface Type are interdependent. See the description of Network Interface Speed above.</p>
Maximum Transmission Unit Size	<p>Displayed when Show advanced settings clicked. Range 1024–1500 (default = 1500). The MTU is used for all network traffic from the encoder and defines the largest network packet size that will be transmitted. A higher MTU brings higher bandwidth efficiency and Vbrick recommends using the default. However you may wish to reduce MTU size to meet the requirements of some networks with VPN or other security tunnels that cannot tolerate 1500-byte packets.</p>

Network

Domain Name Server Settings

Network Time Synchronization Settings

Shared Archivers External FTP/SFTP Server Settings

Domain Name Server Settings

▼ To access the Domain Name Server fields:

1. Navigate to **System Configuration > Network > Domain Name Server** section.

Domain Name Server	
Primary Server IP Address	<input type="text" value="172.16.0.11"/>
Secondary Server IP Address	<input type="text" value="172.16.0.12"/>
Default Domain Extension	<input type="text" value="com"/>

Field	Description
Primary Server IP Address	This is the primary server used for DNS.
Secondary Server IP Address	This is the secondary server used for DNS.
Default Domain Extension	This is the domain name used for DNS.

Note: If DHCP is enabled, then all DNS entries will be provided by DHCP and overwrite any customization. If DHCP is disabled, DNS customization is allowed. A reboot is necessary to apply non-DHCP changes.

Network

Domain Name Server Settings

Network Time Synchronization Settings

Shared Archivers External FTP/SFTP Server Settings

Network Time Synchronization Settings

▼ To access the Network Time Synchronization fields:

1. Navigate to **System Configuration > Network > Network Time Synchronization** section.

Network Time Synchronization	
Network Time Protocol	<input type="checkbox"/> Enabled
Primary Server IP Address	<input type="text" value="172.16.0.11"/>
Secondary Server IP Address	<input type="text" value="172.16.0.12"/>

These fields are used to synchronize network time using the host name or IP address of a known server to provide a synchronized time for all encoders in the network. Note that Network Time Synchronization is disabled by default and will auto reboot the unit if enabled. If enabled, and the NTP time is four minutes greater than or less than the current system time, the unit will reboot twice.

Field	Description
Network Time Protocol	Check to enable network time synchronization. Default = Disabled.

Field	Description
Primary Server IP Address	Primary host name (Vbrick Host Name or DNS Host Name) or IP address of valid SNTP server providing time synchronization. A blank field indicates the server address will be acquired via the DHCP server only if the Network DHCP field above is checked.
Secondary Server IP Address	Secondary host name (Vbrick Host Name or DNS Host Name) or IP address of valid SNTP server providing time synchronization. A blank field indicates the server address will be acquired via the DHCP server only if the Network DHCP field above is checked.

Note: DHCP Option 4 (TIME) and Option 42 (NTP) are requested from the DHCP server to obtain SNTP server addresses. One or both of these options must be enabled in the DHCP server for these addresses to be returned to the encoder. If both are returned, the encoder will use the NTP server address. If the DHCP server configuration is unknown, it is recommended that the address(es) be manually entered since the DHCP server-supplied address will always override a manually-entered address.

Network

Domain Name Server Settings

Network Time Synchronization Settings

Shared Archivers External FTP/SFTP Server Settings

Shared Archivers External FTP/SFTP Server Settings

▼ To access the Shared Archivers External FTP/SFTP Server fields:

1. Navigate to **System Configuration > Network > Shared Archivers External FTP/SFTP Server** section.

Shared Archivers External FTP/SFTP Server	
Server Type	FTP
Server Destination	127.0.0.1
Server Username	vbrick
Server Password	****
Server Directory	/

An external server can be used with an Archiver in order to FTP/SFTP recorded streams to a remote server. See the Archivers topic for more about this functionality.

The **Server User Name** and **Password** must be set up properly on the remote server. If they are not entered the same as what is set up on the server, the encoder will be unable to connect and perform the transfer.

Field	Description
Server Type	Specify FTP or SFTP.
Server Destination	The host name or IP address for the server. It accepts up to 20 characters.
Server Username	The server user's account name. Anonymous FTP/SFTP is supported. Default = <code>vbrick</code> .
Server Password	Optional. The password required to access the server. Accepts up to 20 characters. Default = <code>vbrick</code> .
Server Directory	Optional. This object allows a manager to switch to a different directory within the server after login. Accepts up to 64 characters. Default = <code>/</code>

Network

Domain Name Server Settings

Network Time Synchronization Settings

Shared Archivers External FTP/SFTP Server Settings

General

▼ To access the General fields:

1. Navigate to **System Configuration** > **General**.

System Identification Settings

The screenshot shows a web interface titled "System Configuration --> General". Under the "System Identification" section, there are four fields: "System Description" (read-only, showing "VBrick Systems Inc., Model HPS 9000 Encoder, Serial #"), "System Name" (text input), "System Location" (text input), and "System Contact" (text input).

The **Name**, **Location**, and **Contact** fields are used to identify the encoder. They *are not* changed when you click **Default**. (They *are* changed when you reset to the defaults on the **Manage Configuration** page.)

Field	Description
System Description	Read-only. Company name, encoder model number, and serial number.
System Name	User-defined. System name, for example Biology Dept.
System Location	User-defined. System location, for example West Campus.
System Contact	User-defined. Contact person, for example Jane Doe.

System Identification Settings

System Time Settings

Additional System Settings

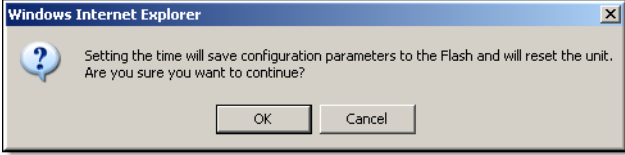
System Reset
 Front Panel Settings
 Link the Encoder to Vbrick Rev

System Time Settings

▼ To access the System Time fields:

1. Navigate to **System Configuration** > **General** > **System Time** section.

System Time	
System Date & Time (mm/dd/yyyy hh:mm)	6/12/2015 11:38 <input type="button" value="Set Time"/>
Time Zone	(GMT-05) Eastern Time ▼
Daylight Saving Time	<input checked="" type="checkbox"/> Enabled

Field	Description
System Date & Time	 <p>Sets system date and time in mm/dd/yyyy hh:mm format. The encoder will reset when you click Set Time.</p>
Time Zone	Select from list: (GMT-12) Eniwetok – (GMT +12) Auckland.
Daylight Saving Time	U.S. only. Check this box and the encoder will automatically adjust for Daylight Savings Time. This is particularly useful when monitoring the System Logs.


System Identification Settings
 System Time Settings
 Additional System Settings
 System Reset
 Front Panel Settings
 Link the Encoder to Vbrick Rev

Additional System Settings

▼ To access the Additional System Settings fields:

1. Navigate to **System Configuration** > **General** > **Additional System Settings** section.

Additional System Settings	
Operational Mode	Run
Login Message	<center>Today's System Message: Welcome to VBrick</center>

Field	Description
Operational Mode	<p>Indicates the configured operational mode of the encoder. The Current Operational Mode is shown on the Monitor > Monitor the System page. The following modes are supported. See "Operational Modes" on page 174 for more information.</p> <ul style="list-style-type: none"> • Run – Normal operation. • Diagnostics – User selected mode for running certain Vbrick diagnostics.
Presenter Mode Enabled	<p>Not displayed if presentation features have already been enabled. Enables Presenter Mode and presentation features on the encoder. Enabling Presenter Mode will reboot the encoder. This reboot will also reset a number of settings, referred to as "Default All". Parameters such as video, streams, transmitters, and servers will be reset. Non-streaming parameters such as networking and passwords will not be reset.</p> <p>See: Presentation Features Overview for details on how to use Presenter encoder features.</p>
Login Message	 <p>Enter up to 300 characters of alphanumeric text and special characters (except quotation marks) that will be displayed on the login page. It will be displayed in the highlighted area above.</p>

System Identification Settings

System Time Settings

Additional System Settings

System Reset

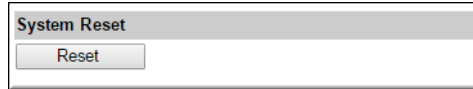
Front Panel Settings

Link the Encoder to Vbrick Rev

System Reset

▼ To access the Reset button:

1. Navigate to **System Configuration > General > System Reset** section.



Field	Description
Reset	Resets (i.e. reboots) the encoder. A reset does not change, save, or reset any configuration parameters. You must be in edit mode to perform a system reset.

System Identification Settings

System Time Settings

Additional System Settings

System Reset

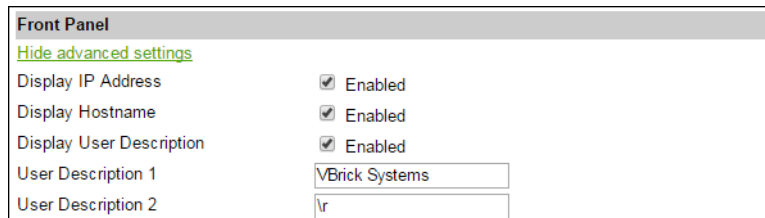
Front Panel Settings

Link the Encoder to Vbrick Rev

Front Panel Settings

▼ To access the Front Panel fields:

1. Navigate to **System Configuration > General > Front Panel** section.



You can enable/disable user-defined text (typically the host name and IP address) that is shown on the encoder's front panel LCD display.

For more information about the front panel see the Front Panel LCD Display Messages topic in the [Getting Started Guide](#).

Field	Description
Display IP Address	Check to display the encoder IPv4 address. Default = enabled.
Display Hostname	Check to display the encoder host name. If host name is not configured (on System Configuration > Network page) the MAC address is used. Default = enabled.
Display User Description	Check to display the user-defined text. Default = enabled. See "Front Panel LCD Display" topic in <i>Getting Started Guide</i> .
User Description 1	Enter user-defined text (20 chars. max.) that will be displayed on first line of LCD panel. Default = Vbrick Systems
User Description 2	Enter user-defined text (20 chars. max.) that will be displayed on second line of LCD panel. Default = \r (Release x.x.x)

- System Identification Settings
- System Time Settings
- Additional System Settings
- System Reset
- Front Panel Settings
- Link the Encoder to Vbrick Rev

Link the Encoder to Vbrick Rev

▼ To access the Vbrick Rev Interface fields:

1. Navigate to **System Configuration > General > Vbrick Rev Interface** section.

Vbrick Rev Interface	
Vbrick Rev Interface Enable	Disabled
Rev Server URL:	
API Key	
Rev Proxy Server Enable	Disabled
Rev Proxy Server URL:	
Rev Proxy Server Port	8080
Rev Proxy Server Username	
Rev Proxy Server Password	
Rev Connection Status	Disabled

Before you may link an encoder with Vbrick Rev so that it may be used as a video source, you must enable and configure it to recognize Rev in the **System Configuration** menu. If you do not complete these fields before you add your encoder as a device in Rev, your encoder will not function and link correctly with Rev.

Field	Description
Vbrick Rev Interface Enable	Check to enable so that the encoder may be used with Rev.
Host	Enter the URL for your Rev host.
API Key	An API key is created in Rev for your encoder. Enter that key in this field.
Rev Proxy Server Enable	Enables or disables http proxy use in Rev communications. Default is Disabled.
Rev Proxy Server URL	The network address of the proxy server in the form http://host name or IP address. Default is empty string.
Rev Proxy Port	Port to use for proxy communications. Default is 8080.
Rev Proxy Server Username	Username to use when authentication is needed to communicate with the proxy. Default is empty string.
Rev Proxy Server Password	Password to use when authentication is needed to communicate with the proxy. Default is empty string.

Field	Description
Rev Connection Status	<p>Displays details about the connection to the Vbrick Rev host. This may include:</p> <ul style="list-style-type: none"> • The last HTTP status and timestamp, or • The reason why this encoder failed to connect (if applicable) and the reason why it failed (as best can be determined), or • “Disabled” if the Rev interface has not been enabled. • This status will update with each "heartbeat" with Rev, generally at 15 second intervals.

System Identification Settings

System Time Settings

Additional System Settings

System Reset

Front Panel Settings

Link the Encoder to Vbrick Rev

Username & Passwords

▼ To access the Usernames & Passwords fields:

1. Navigate to **System Configuration > Usernames & Passwords**.

Use this page to define user names and passwords and their corresponding permissions with respect to the encoder. (Table 2 below shows the default user names, passwords, and permissions.)

You may also assign a Pin number to the encoder that will allow direct access to the keypad and functions on the encoder front panel (if the encoder is configured with a front panel).

Administrator	
Username	<input type="text" value="admin"/>
Password	<input type="password" value="****"/>
Confirm	<input type="password"/>
Operator	
Username	<input type="text" value="operator"/>
Password	<input type="password" value="****"/>
Confirm	<input type="password"/>
Diagnostics	
Username	<input type="text" value="diagnostics"/>
Password	<input type="password" value="****"/>
Confirm	<input type="password"/>
Public	
Username	<input type="text" value="public"/>
Password	<input type="password" value="****"/>
Confirm	<input type="password"/>
Front Panel	
Pin	<input type="password" value="****"/>
Confirm	<input type="password"/>

Table 1. User Name and Password Field Attributes

User Name	Enter desired user name. Cannot be blank or exceed 20 characters. It may include any combination of alphanumeric characters and only the following special characters: ~ ! # \$ ^ * + & [] { } - < > See Table 2 below for defaults.
Password	Enter password. Cannot be blank or exceed 20 characters. May include any combination of alphanumeric characters but only the following special characters: ~ ! # \$ ^ * + & [] { } - < > See Table 2 below for defaults.
Confirm	Confirm new password entry. The encoder will then display a user message and reboot.

Table 2. Default User Names, Passwords, and Access Level

User Level	Default User Name	Default Password	Access Level
Administrator	admin	admin	Read, diagnostics, edit, passwords.
Operator	operator	operator	Read, diagnostics, edit.
Diagnostics	diagnostics	diagnostics	Read, diagnostics.
Public	public	public	Read
Front Panel	NA	NA	Front panel encoders only. Allows direct access to keypad functions on encoder front panel if set.

Manage Configuration

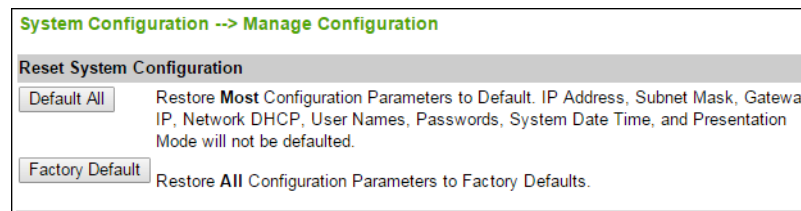
This **Manage Configuration** page lets you reset some or all of the parameters in the encoder configuration. It also lets you read and save the current configuration to an .xml file and restore that configuration if necessary.

Reset System Configuration

▼ To access the Reset System Configuration fields:

1. Navigate to **System Configuration > Manage Configuration > Reset System Configuration** section.

This menu lets you default some or all encoder configuration parameters.



Button	Description
Default All	Sets all parameters <i>except</i> Network DHCP, IP Address, Subnet Mask, Gateway IP, User Names, Passwords and System Date & Time.

Button	Description
Factory Default	Sets <i>all</i> parameters (including EULA acceptance) to factory defaults with the exception of System Date and Time.

Reset System Configuration

Read System Configuration

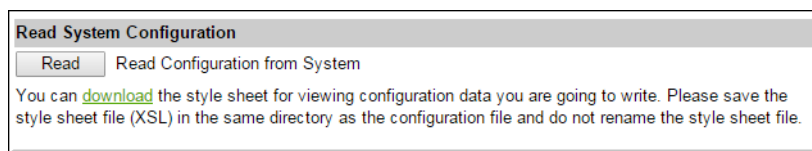
Restore System Configuration

Auto Configuration

Read System Configuration

▼ To access the Read System Configuration fields:

1. Navigate to **System Configuration > Manage Configuration > Read System Configuration** section.



This function lets you read configuration parameters from the encoder to a file, as well as write configuration parameters from a file to the encoder. The file is an .xml file and Internet Explorer is the assumed browser. Note that encoder the .xml file is read *from*, and the encoder that the .xml file is written *to*, should be running the same version of code. Mismatched versions may work but are not supported or guaranteed.

Notes:

XML configuration files from 6000 and 7000 Series encoders are not compatible with 9000 Series models. Do not try to run 6000 or 7000 Series configuration files on 9000 Series encoders.

When restoring a 9000 Series configuration, be sure that the encoder/decoder model (i.e. the slot and channel configuration) you are restoring from matches the model you are restoring to.

For security reasons, encryption keys cannot be restored via a saved XML file. If you are restoring a configuration with encryption, use the following procedure:

Enter the encryption keys manually. They must be entered in the same order and using the same **Key ID** and **Key Values** as the original configuration.

After entering the encryption keys manually, restore the saved XML configuration.

Use any text editor, preferably an .xml editor to make changes to the file. You can change the "values" field as well as delete objects as necessary. Make sure the right data types are used. For example if a parameter takes integer values, do not enter a string. Also IP Address parameters must have the right IP syntax. Enter "0.0.0.0" to enter a null IP address. Blanks and null strings are not valid IP Addresses.

You can read the configuration parameters from the encoder by clicking the **Read** button on the page. After clicking on the button, follow the browser's instruction on saving the file to your PC. The configuration is saved as `cfgdata.xml` but can be renamed. See the image below for an example of the file. To view this file, you may need to **download** the style sheet to the same directory as the saved file. Do not change the name of the style sheet. It should always be saved as `cfgdata.xsl` and the first line at the top of the configuration file must always be: `<?xml-stylesheet type="text/xsl" href="cfgdata.xsl"?>`

VBrick Configuration Data		
System Information		
1	System Model	HPS 9000 Encoder
2	Application Code Revision	103.0.13
3	XML File Creation Date	5/30/2013 10:21
4	User Information Version	User Info 1.0
5	Part Number	9312-1212-0000
6	System Serial Number	
7	MAC Address	00:07:df:01:c4:20
8	Installed Feature Licenses	0x00000000
Dogtag Slot_1 Configuration		
1	User Information Version	User Info 1.0
2	Board Assembly Number	6106-0030-xxxx
3	This Board Serial Number	5051100479
Dogtag Slot_2 Configuration		
1	User Information Version	
2	Board Assembly Number	
3	This Board Serial Number	
Dogtag Slot_3 Configuration		
1	User Information Version	Hardware NA
2	Board Assembly Number	Hardware NA
3	This Board Serial Number	Hardware NA
Dogtag Slot_4 Configuration		
1	User Information Version	User Info 1.0
2	Board Assembly Number	6106-0030-010B
3	This Board Serial Number	5101100791
Dogtag Slot_5 Configuration		
1	User Information Version	Hardware NA
2	Board Assembly Number	Hardware NA
3	This Board Serial Number	Hardware NA

- Reset System Configuration
- Read System Configuration
- Restore System Configuration
- Auto Configuration

Restore System Configuration

- ▼ To access the Restore System Configuration fields:
 1. Navigate to **System Configuration > Manage Configuration > Restore System Configuration** section.

Restore System Configuration

File: No file chosen

Restore full or partial configuration from a previously saved XML file.

This function lets you write configuration parameters from an .xml file to the Vbrick encoder. On a successful restore, all parameters will be saved to flash and the encoder will reboot. Only administrator-level users and above have "write" privileges. Note that the

Vbrick encoder that the configuration file is read *from*, and Vbrick encoder that the configuration file is written *to* should be running the same version of code. Mismatched versions may work but are not supported or guaranteed.

- ▼ To restore the system configuration from an .xml file:
 1. Click the **Choose File** button and navigate to the configuration file you want to write to the encoder.
 2. Click on the **Restore** button to write the selected file to the Vbrick encoder. If there are no validation errors the configuration parameters will be saved to flash memory and the encoder will reset.
 3. If the configuration has validation errors, the file is rejected and the errors are displayed. You will need to correct the errors and create a valid .xml "read" file as explained above.

Caution: If you create a system configuration for an encoder that utilizes uploaded images (either used as backgrounds in the Presenter or within customized layouts), those images *must* be on the encoder (with the same names) if/when the configuration is restored.

Please refrain from removing the images or re-upload the images before re-applying the configuration.

Reset System Configuration

Read System Configuration

Restore System Configuration

Auto Configuration

Auto Configuration

- ▼ To access the Auto Configuration fields:
 1. Navigate to **System Configuration > Manage Configuration > Auto Configuration** section.

Auto Configuration	
URL	<input type="text"/>
Poll Rate (minutes)	<input type="text" value="0"/>
Auto Config Status	Script Never Run
Script Control	<input type="button" value="Run Script"/>

Auto Configuration lets you perform a configuration via a URL script file. It is typically used for remote configuration and troubleshooting or to configure encoders behind a firewall. To configure a parameter on an encoder (or more likely a set of parameters) you simply point the URL to a server with an .xml configuration file. This is useful, for example, to set the audio and video rates when the Vbrick encoder is behind a firewall and cannot be accessed remotely.

The encoder reads the URL field (e.g. **www.myserver.com/config.xml**) via HTTP protocol and executes the script depending on the **VBEXECUTE** tag. If a **VBEXECUTEFORCE** tag is present in the .xml file (see example below), the script runs every time at the poll interval even if it has not changed. If a **VBEXECUTEIFDIF** tag is present the script runs only if it is different from the last executed file. **One of these tags is required.**

If the encoder is in **Edit** mode, the script file will not run until the edit session is ended. The auto config script will run *before* any external event scripts. In **Edit** mode, you can press **Run Script** to execute the script on demand. After a reboot, the encoder checks for a script URL and will run the script immediately, regardless of the **VBEXECUTE** tag value.

Field	Description
URL	Valid path to a URL script file, for example: www.myserver.com/config.xml . Default = blank.
Poll Rate (minutes)	The rate at which the encoder checks the config file. 0–1440 minutes. Default = 0.
Auto Config Status	Shows auto config status including when the script was last run, URL connection errors, etc.
Run Script	Edit mode only. Run the script now.

Sample Auto Config Script

The auto config script file (**config.xml**) is an .xml file with the following syntax. It can set any encoder parameters and force an "apply" as needed. This example shows how to set various recorder parameters. Note that a **VBEXECUTE** tag is required and all commands must be preceded by an **svar** (set variable) command.

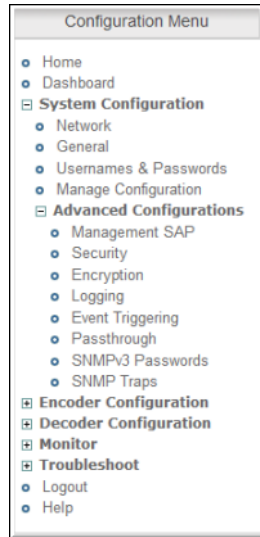
```
<?xml version="1.0"?>
<?VBEXECUTEFORCE?>
<VBRICK>
    SVAR vbrickEncoderVideoCommonAspectRatio.1=2
    SVAR vbrickEncoderVideoH264Resolution.1.1=15
    SVAR vbrickEncoderVideoH264TargetBitRate.1.1=5000000
    SVAR vbrickEncoderVideoCommonApplySet.1=2
</VBRICK>
```

Note: The script file must have DOS/Windows style line endings. Text files created on Windows machines have different line endings than those created on Unix or Linux machines. Windows machines use a carriage return and line feed (**\r\n**) whereas Unix machines use line feed (**\n**) only.

- Reset System Configuration
- Read System Configuration
- Restore System Configuration
- Auto Configuration

Advanced Configurations

The functions in the **Advanced Configurations** menu are generally used by system administrators to configure management parameters. These parameters should not be changed except by knowledgeable systems administrators.



Management SAP

Security

Encryption

Logging

Event Triggering

Passthrough

SNMPv3 Passwords

SNMP Traps

Management SAP

▼ To access the Management SAP fields:

1. Navigate to **System Configuration > Advanced Configurations > Management SAP**.

These parameters define information used in the management SAPs (session announcements) emitted by the Vbrick encoder. These SAP announcements are received by the VBDirectory management tool and the VEMS Portal Server. See the *VBDirectory User Guide* for more information.

System Configuration --> Advanced Configurations --> Management SAP

Transmit Enable	<input checked="" type="checkbox"/> Enabled
Group Name	<input type="text"/>
Unit Number	<input type="text" value="1"/>
SAP Timeout	<input type="text" value="90"/>
Retransmit Time	<input type="text" value="10"/>
Time To Live	<input type="text" value="32"/>
Type of Service	<input type="text" value="0"/>
IP Address	<input type="text" value="224.2.133.134"/>
Port	<input type="text" value="9876"/>

Field	Description
Transmit Enable	Controls the transmission of the Management SAPs (Enable or Disable).
Group Name	Optional. This parameter defines the Group Name. It is included in the Management SAPs used by VBDirectory. It is used for organizing encoders into groups to simplify use of VBDirectory.
Unit Number	Optional. The encoder unit number (range 0–2147483647) is used to identify each encoder in a group.
SAP Timeout	Provides a configurable timeout, in seconds, for received management SAPs. If no SAP is received within the timeout period, the entry is removed. Default = 90 sec.
Retransmit Time	Defines the Management SAP Retransmit Time.
Time To Live	The number of hops (between routers) for which a Management SAP is valid on the network.
Type of Service	The TOS (Type of Service) can be configured in the IP header to establish packet priority in the network.
IP Address	Defines the Destination IP Address for Management SAPs.
Port	Defines the Destination Port for Management SAPs.

Security

▼ To access the Security fields:

1. Navigate to **System Configuration > Advanced Configurations > Security**.

System Configuration --> Advanced Configurations --> Security

External Telnet Server	<input checked="" type="checkbox"/> Enabled
External FTP Server	<input checked="" type="checkbox"/> Enabled
External VAdmin	<input type="text" value="Enabled"/> ▼
External SNMP	<input checked="" type="checkbox"/> Enabled
External SNMPv1 and SNMPv2 Access	<input checked="" type="checkbox"/> Enabled
External SSH Server	<input type="text" value="SSH-2 Only"/> ▼
No Login for Viewer Files	<input checked="" type="checkbox"/> Enabled
Remote Support Poll	<input type="checkbox"/> Enabled
RTSP Server Port	<input type="text" value="554"/>
VAdmin Server Port	<input type="text" value="80"/>
Secure VAdmin Server Port	<input type="text" value="443"/>
H.264 Tunnelling Port	<input type="text" value="8080"/>

Note: If you disable Telnet, VAdmin, the Front Panel, and SNMP, the only way to manage (and re-enable) these parameters is to connect a PC to the serial port on the encoder and use the Command Line Interface. You should never disable all the network management interfaces if you are using both COM ports for passthrough.

Field	Description
External Telnet Server	Default = Enabled. Disabled will prevent Telnet sessions to the Vbrick encoder.
External FTP Server	Default = Enabled. Disabled will prevent FTP sessions to the Vbrick encoder. Note that this feature must be enabled to upgrade the encoder firmware using VBDownload.
External VAdmin	<ul style="list-style-type: none"> • Enabled – Default. Lets you manage the encoder from a web browser using the VAdmin management application. Supports HTTP or HTTPS. • Disabled – Prevents you from managing the encoder using VAdmin. • HTTPS Only – Encrypts and secures the VAdmin pages using HTTPS.
External SNMP	Default = Enabled. Disabled will prevent you from using an external MIB browser to view or write parameters.
External SNMPv1 and SNMPv2 Access	Default = Enabled. You can use both SNMP v1/v2, and v3. For tightest security, set parameter to Disabled and use SNMPv3 only.
External SSH Server	<p>SSH – Secure Shell is a replacement for Telnet. It allows data to pass between two networked devices using a secure channel. SSH-1 and SSH-2 are supported.</p> <ul style="list-style-type: none"> • Disabled - Prevents you from managing the encoder using SSH. • Enabled - Allows SSH-1 and SSH-2 clients. • SSH-2 Only – Default.
No Login For Viewer Files	Default = Enabled. If enabled the encoder will serve a transmitter's SDP file without requiring a login with username and password. This allows any device (players, decoders, etc.) to acquire the SDP file directly from the encoder. If disabled you may need to provide another method for delivering the SDP file to the receiving device, such as copying the file to another server.
Remote Support Poll	Default = Disabled. The default enables continuous polling through the firewall. If desired, you can enable polling only when you need to establish a remote connection. <i>This will not reboot the encoder.</i> Remote Support Polling enables a unique built-in mechanism that allows Vbrick Support Services to help configure or troubleshoot an encoder—even if it's behind a firewall. When this feature is enabled (and you provide the user name and password), Support Services can establish a secure, tunneled connection to the VAdmin interface of the encoder.
RTSP Server Port	Default = 554. Sets the RTSP server port.

Field	Description
VAdmin Server Port	Specifies the listener port for management and HTTP connections. Default = 80. When the remote VAdmin user (client) specifies the http syntax, the port value is generally omitted. Typically port 80 is the default value used by browsers. As a matter of consistency, the encoder default VAdmin Server Port value is also defaulted to 80. To access a different HTTP port, the remote VAdmin client user would specify the URL as follows: <code>http://IPaddress:port</code> where <code>IPaddress</code> = encoder IP address or hostname, and port. This feature is often useful for a system where HTTP is used to traverse firewalls. The VAdmin server port is moved to another location (for example 8080) and the HTTP Tunneling port is set to 80.
Secure VAdmin Server Port	Specifies the listener port for management and HTTPS connections. Default = 443. When the remote VAdmin user (client) specifies the HTTPS syntax, the port value is generally omitted. Typically port 443 is the default value used by browsers. As a matter of consistency, the encoder default Secure VAdmin Server Port value is also defaulted to 443. To access a different HTTPS port, the remote VAdmin client user would specify the URL as follows: <code>https://IPaddress:port</code> where <code>IPaddress</code> = encoder IP address or hostname, and port.
H.264 Tunneling Port	Sets the port to be used to serve tunneled H.264 HTTP streams. Default is 8080 but if you are streaming HTTP directly from a Vbrick via the Internet, it is common practice to change this to 80 and to set the VAdmin server port to something other than 80.

Note: If you are working with a Presenter encoder, your interface or functionality may differ slightly for this section with the ability to disable Presenter Mode access. See the topic on Disable Presenter Mode Access from the Login Screen if you need more information.

Improving Security

You can improve security by (1) blocking unauthorized attempts to login and access a device and (2) by reducing exposure to malicious software attacks. The most common vulnerability is related to user accounts and passwords. After a successful installation, you should immediately change the default passwords. Many attacks come from within an organization and this helps to minimize the risk. The VAdmin login is generally secure since it utilizes encryption techniques to hide usernames and passwords from network spyware.

Malicious software sometimes covertly attaches itself to unsuspecting devices. These programs are generally designed to compromise personal information or to create system havoc. Since the Vbrick encoder uses an industrial-grade, embedded operating system, it is less susceptible to malicious software and unlikely to be a target of programs designed to attack PC-based systems like Microsoft, Linux, and others. However, you can still take additional steps to minimize risk. Vbrick tries to make installation as simple and quick installation and many features are automatically enabled by default even though you may not need them. You can selectively disable unneeded features to reduce vulnerability. Another common problem is Denial of Service (DoS) attacks. A DoS sends floods of packets to an

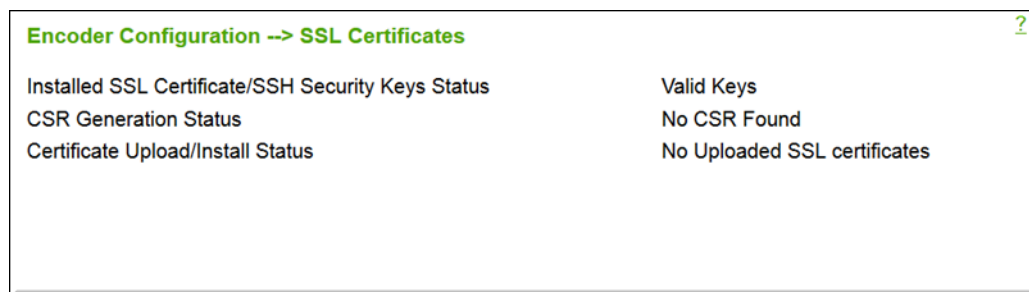
unsuspecting remote system in an attempt to disrupt or stop normal operation. These unsuspecting remote systems are typically discovered using ICMP or Ping. It is standard industry practice to block all ICMP and Ping requests from off-net foreign hosts. This is typically done in a centralized location using router/firewall technology which is more successful and cost effective than resolving the issue at each host.

Security Feature	Support Level
SSH	v1.2
SSH-2	v2.x
HTTPS	TLS v1.0 (SSL replacement)
Security Keys	RSA/DSA algorithms generating 2048-bit security keys. See: Upload and Install a Certificate Authority (CA) Certificate and Keys

SSL Certificates

▼ To access the SSL Certificate fields:

1. Navigate to **System Configuration > Advanced Configurations > SSL Certificates**.
2. Click the **Edit** button to generate a new certificate request.



Note: You must be in **Edit** mode to generate a new **SSL Certificate** request. In non-edit mode, displayed above, the **SSL Certificates** page will display the current status of a previously installed certificate or lack thereof on the 9000.

Verify the Currently Installed Certificate and Generate a Self-Signed Certificate

Generate a Certificate Signing Request (CSR) to Use with a Certificate Authority (CA)

Upload and Install a Certificate Authority (CA) Certificate and Keys

Verify the Currently Installed Certificate and Generate a Self-Signed Certificate

Notice in the image below that the **Currently Installed Certificate** is detailed at the top of the form once the **Edit** button is clicked. This ensures the admin that the correct certificate has been installed and also contains security key information and encoded certificate information.

The status string indicates if the certificate is valid and also if a system reset needs to be performed before the certificate is to take effect.

Currently Installed Certificate

Generate Self-signed SSL Certificate/SSH Security Keys Generate

SSL Certificate/SSH Security Keys Status Valid Keys

SSL Certificate Verify Status String self signed certificate

Certificate:
Data:
Version: 3 (0x2)
Serial Number:
ed:32:bf:2e:4d:2f:6e:9e
Signature Algorithm: sha1WithRSAEncryption
Issuer: C=US, O=VBrick Systems, Inc., CN=MAC0007df00dcb0
Validity
Not Before: May 7 17:01:07 2014 GMT
Not After : Sep 22 17:01:07 2041 GMT
Subject: C=US, O=VBrick Systems, Inc., CN=MAC0007df00dcb0

Click the **Generate** button to generate a new self-signed certificate and RSA/DSA keys. Key generation is CPU-intensive and should only be performed when the encoder is idle. It will take 3–5 minutes if the encoder is idle (or much longer if the encoder is in use).

Keep in mind:

- Installing a self-signed certificate will overwrite any trusted certificate and associated keys that may be currently installed.
- The **SSL Certificate/SSH Security Keys Status** field reflects the status of the currently installed certificates/keys and updates when the **Generate** button is pressed, at boot time, and when the **Install** button is pressed in the Upload and Install a Certificate Authority (CA) Certificate and Keys section. The following status states may be reflected in this field:
 - a. **Valid Keys:** The installed SSL certificate and keys are valid and have passed Vbrick and openSSL verification.
 - b. **Missing Keys:** There are no RSA and/or DSA keys present in the SSL install directory.
 - c. **Generating Keys:** The firmware is actively generating the keys or self-signed certificate.
 - d. **Reboot Required:** The 9000 requires a reboot before the installed certificate, either trusted or self-signed, will take effect.
 - e. **SSL Cert Invalid:** The installed certificate has failed Vbrick and openSSL verification.

Tip: Vbrick verification means that the configured 9000 host name is valid for the installed SSL certificate.

- The **SSL Certificate Verify Status String** field represents error strings returned by the openSSL verify command. Please see [openSSL documentation](#) for specific error code meanings. This field is updated during the same conditions as the previous field.
- The 9000 will automatically generate a self-signed certificate and security keys if it detects that no certificate is currently installed. As a result, the **Generate** button need never be pressed unless the admin *specifically* wants to override the existing certificate.

SSL Certificates

Generate a Certificate Signing Request (CSR) to Use with a Certificate Authority (CA)

Upload and Install a Certificate Authority (CA) Certificate and Keys

Generate a Certificate Signing Request (CSR) to Use with a Certificate Authority (CA)

If an organization elects to use a certificate from an authority, a PEM formatted certificate from the authority is necessary. This section will generate the Certificate Signing Request (CSR) which may be downloaded and given to the Certificate Authority (CA) to then request a trusted SSL certificate.

▼ The process for obtaining a CA trusted SSL certificate is:

1. Generate a CSR by completing the fields in the **Certificate Signing Request (CSR)** section of the **SSL Certificates** form, described below. (You must click the **Edit** button for these fields to be visible.)

Field	Description
Country	Information only. Country of certificate holder. Default value is US.
State (or Province)	Information only. State or Province of certificate holder. Default value is Connecticut.
City	Information only. City of certificate holder. Referred to as locality name by openssl. Default value is Wallingford.
Organization	Information only. Company of certificate holder. Default value is Vbrick Systems, Inc.
Department	Information only. Department of certificate holder. Referred to as Organizational Unit Name (e.g. section) by openssl. Default value is Sales.
Fully Qualified Domain Name	The fully qualified domain named. Referred to as common name by openssl. The value of this field must match the host name of the 9000 plus the domain in which the 9000 will reside. The address must also be publicly verifiable. As of 11/1/2015, certificates will not be issues to private addresses. The default address of this field is sales-9000.vbrick.com where "sales-9000" represents the host name of the 9000 and vbrick.com is the domain where the 9000 will operate.
Contact Email Address	Information only. Email address of the certificate holder. Default is sales@vbrick.com
Generate CSR File	Click the Generate button once all fields above are complete and correct. This generates the CSR and its associated private key; both will stored on the 9000 for later use. Note: Only one CSR and associated key may be stored on the 9000 at a time. Pressing this button multiple times will overwrite a previous request.

Field	Description
CSR Generation Status	<p>The status of the CSR. Status states may be as follows:</p> <ul style="list-style-type: none"> • Valid CSR: CSR was generated successfully. • CSR Private Key Missing: The private RSA key failed to create when the Generate button was pressed. • Generating CSR: CSR generation is in progress. • Validating CSR: The CSR has been generated and is being validated through openssl. • CSR Error: There was an error during the generation process. • No CSR Found: There are no CSRs found in the file system.
CSR File (Click to Save)	<p>If a valid CSR is generated, a hyperlink is created that allows the admin to open or download the CSR request. Otherwise, this field will be empty.</p>
Generated CSR	<p>Where the generated certificate request text will appear for verification purposes only. Use the CSR File save link above to download or save the CSR file to request the actual certificate.</p> <p>Note: As long as a CSR file is generated, even if it is determined to be not valid, this text box will contain the human readable version of it so that it may be validated that the CSR was created with the appropriate text fields completed.</p>

Certificate Signing Request (CSR)

This section will help you create a Certificate Signing Request (CSR) which you can use at a Certificate Authority (CA) to obtain a trusted SSL certificate for this encoder. You must ensure that the Fully Qualified Domain Name exactly matches the hostname of this encoder plus the domain name of the domain on which this encoder will be located. Once you have created and validated the CSR you can save it using the link provided below. The private key and generated CSR will be saved on this encoder as well. The private key will be needed when you receive the trusted certificate. Only one CSR and associated key will be saved on this encoder if you generate another CSR the previously generated CSR and key will be overwritten. Once you receive the certificate from your CA the section below will help you install that certificate.

Country:

State (or Province):

City:

Organization:

Department:

Fully Qualified Domain Name:

Contact Email Address:

Generate CSR File:

CSR Generation Status: No CSR Found

CSR File (click to save):

Generated CSR:

No CSR found

SSL Certificates

Verify the Currently Installed Certificate and Generate a Self-Signed Certificate

Upload and Install a Certificate Authority (CA) Certificate and Keys

Upload and Install a Certificate Authority (CA) Certificate and Keys

If an organization generates a CSR and receives validated certificate files from a CA, the **Upload and Install Certificates and Keys** section of the **SSL Certificates** form easily allows installation of the granted certificate. The 9000 will accept certificate files and private keys in PEM format only. If the SSL package received from the CA contains multiple files, they will need to be combined into a single PEM format file before it may be installed. The instructions below will facilitate this process.

Note: In the case of some wildcard certificates, the private key needs to be prepended to the certificate. It is expected that if the private key needs to be prepended to the certificate that this will already have been done before the upload (the 9000 will not perform this step).

Uploading of the private key will *only* allow the installation of the private key to the SSL install direction and verification that they key matches the certificate.

- ▼ To upload and install a certificate, complete the following steps:
 1. Configure the file(s) you are to upload by selecting **File Type**. The following file types are available:
 - a. **Primary Certificate:** The SSL certificate that specifically refers to the protected domain name (i.e., contains the FQDN as in the example above sales-9000.vbrick.com). If a wildcard certificate is being uploaded, this should be selected.
 - b. **Intermediate Certificate:** Sometimes referred to as the CA bundle or certificate chain. If the CA certificate package contains two certificates, more than likely one of the certificates is the CA bundle. For example, a certificate package received from GoDaddy.com will contain a Primary Certificate named with a random string of numbers and letters and will also contain a CA bundle file named similar to gd_bundle_g2_g1.crt. Another way to distinguish the Intermediate Certificate from the primary is that the common name of the Primary Certificate will contain a domain name or set of domain names and the Intermediate Certificate will contain "Go Daddy Secure Certificate Authority" or something similar.
 - c. **Root Certificate:** Generally speaking, the trusted Root Certificate is what is installed in the Web browsers and the Intermediate Certificate is distributed with the Primary Certificate to provide a chain of trust that bridges the gap between the Primary Certificate served by a Web server and the trusted root contained in the browser. However, some CAs will distribute more than two certificates. For example, the CA DigiCert may respond to a certificate request with three files. The Primary Certificate named similar to "your domain name.crt", a file named "DigiCertCA.crt", which is the Intermediate Certificate and a file named "TrustedRoot.crt" which is the trusted Root Certificate. The top most certificate in the chain is the Root Certificate. It contains the digital signature that identifies a particular CA. Another way to identify the root certificate is to double click on it in a Windows environment. This should pop up a dialog box containing several tabs, one of which is named certification path. If the certification path has only one certificate in the list that means this is the Root Certificate. If the path contains more than one entry then it is not the Root Certificate.

-
- d. **Private Key:** A private key file can be identified if it is in PEM format by the fact that it starts with -----BEGIN RSA PRIVATE KEY-----.
 - e. **CA Host ID File:** Once the CA receives the CSR generated by the 9000, one of the things that the CA will have to do is verify that the organization requesting the trusted certificate owns the domain listed in the FQDN described above. There are several ways that the CA can do this from requesting the organization provide company validation documents to the CA accessing the "Whois" record for the organization. One of the methods used to validate the domain is to provide the requesting organization with a file to upload to its Web server which can be served to the CA upon their request. This selection for file type allows the admin to upload the validation file to the 9000. In general, the CA will allow the server to name the file whatever it wants and load it in the root directory. The 9000 has some security restrictions that will not allow it to serve unnamed files from the root directory. Thus, the admin should inform the CA that when trying to access the ID file it should use the following format: http(s)://hostname or ip address of 9000/csr/"ID file name". The 9000 will server this file as an attachment that the CA will be prompted to choose to open or save. It will not be served as a Web page. Since this file is strictly for use by the CA, there is not format restriction for this file.
2. Select a **File Format** (PEM). As noted, only PEM format may be used at this time.
 3. After selecting the file's attributes, click the **Browse** button to select the file and then click the **Upload** button to perform the upload to the 9000.

Note: As mentioned, if multiple files have been received, the configuration and upload process may need to be completed several times before you install the files.

4. Once all file uploads are complete, click the **Install** button to install the certificate. Select the **Use Private Key Generated With Last CSR** checkbox to save the private key associated with the CSR. If this box is not checked, any private key uploaded during the file upload process will be used instead. The 9000 will perform any combination of the certificate files that is necessary. The new combined certificate will be verified to ensure that the proper host name is populated in the certificate, the private key matches the certificate (if necessary) and, finally, the openssl verify command will be performed on the new certificate. Once validated, the new cert and key will be transferred to the 9000 SSL install directory and validated once more. The 9000 should then be rebooted to use the new certificate.
5. Verify the certificate install in the **Currently Installed Certificate** section at the top of the form.
6. The **Certificate Upload/Install Status** field is updated throughout the upload and installation process and at boot time.
7. The **Certificate Install Verify Status String** field is only updated with an error string in cases where an uploaded certificate fails openssl verification.
8. If you mistakenly overwrite a certificate, click the **Restore** button to restore the last successfully installed certificate files to the upload directory. Once the files have been restored, the **Install** button can be clicked to reinstall the certificate. Note that if the install fails for any reason, the uploaded files will be deleted from the system and the admin will need to start over with a new upload and install.

Upload and Install Certificates and Keys

This section will help you upload and install certificates received from a CA or other SSL certificates and keys. This encoder will only accept keys and certificates in the PEM format. It will automatically combine primary, intermediate, and root certificates into a single certificate in PEM format as long as the file uploads were configured properly. In many cases you will receive two certificates from your CA. One will be your primary certificate and the other will be a ca bundle file which is your intermediate certificate. In the case of a wildcard or self-signed certificate you will need to upload a private key associated with the certificate which will be installed with the certificate. For the case where you are installing a certificate obtained using a CSR generated with this encoder check the box that says "Use Private Key Generated With Last CSR" and that private key will be installed with the uploaded certificate(s). A reboot of the system will be required in order for the newly installed certificate to take effect.

It is recommended that you test HTTPS access to this encoder before configuring External VBAAdmin for HTTPS Only on the Security configuration page.

Install Uploaded Certificate Use Private Key Generated With Last CSR

Certificate Upload/Install Status No Uploaded SSL certificates

Certificate Install Verify Status String

Last Uploaded Certificate

No Uploaded SSL file found

Configure File Upload:

File Type

File Format

Upload Certificate or Private Key

File: No file selected.

Restore Last Installed Certificate To Upload Directory

SSL Certificates

Verify the Currently Installed Certificate and Generate a Self-Signed Certificate

Generate a Certificate Signing Request (CSR) to Use with a Certificate Authority (CA)

Encryption

▼ To access the Encryption fields:

1. Navigate to **System Configuration > Advanced Configurations > Encryption.**

End-to-end Advanced Encryption Standard (AES) encryption of audio and video data may be enabled on the device based on secure key management. Key management includes the ability to generate, read, and save keys in either 128-bit or 256-bit size. There are 3 steps to setting up and enabling the encryption process. They are:

- Define Encoder Key IDs and Key Values (Encoder side)
- Enable Encryption on a Stream and Choose a Key ID (Encoder side)
- Define Key IDs and Key Values to Match the Encoder (Decoder side)

As you can see, step one and two take place from the encoder while step three takes place in the decoder.

▼ Step 1: Define Encoder Key IDs and Key Values

Your first step is to define your Key IDs and Key Values. Use the **Encryption** interface under **System Configuration > Advanced Configurations** to define Key IDs and Key Values. Click the **Edit** button to gain edit access to the fields.

System Configuration --> Advanced Configurations --> Encryption

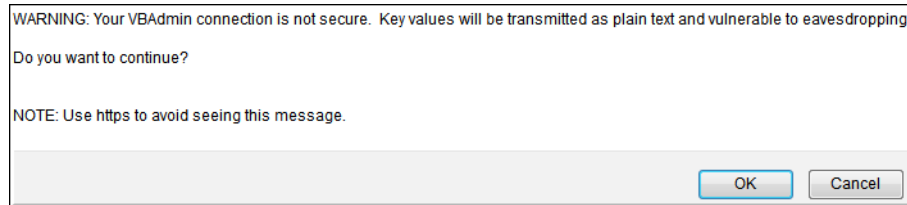
Keys

Number of Keys

Key	Key ID	Key Value	Display Keys
1	Stream1Camera1Back	*****	<input type="button" value="Create 128-Bit Key"/> <input type="button" value="Create 256-Bit Key"/>
2	Stream2OverheadCam	*****	<input type="button" value="Create 128-Bit Key"/> <input type="button" value="Create 256-Bit Key"/>
3	KeyID3		<input type="button" value="Create 128-Bit Key"/> <input type="button" value="Create 256-Bit Key"/>
4	KeyID4		<input type="button" value="Create 128-Bit Key"/> <input type="button" value="Create 256-Bit Key"/>

Field	Description
Number of Keys	Used to set the number of encryption keys you want to create. Up to 64 keys and associated Key IDs may be configured on each device.
Key	The key number. Created by the system and automatically applied. Not editable.
Key ID	The Key ID field is used to create a unique name for each encryption key you create. This is a string field and is defaulted to KeyID1, KeyID2, and so forth. However, it is recommended that you create your own logical names for each key since they are used to program key association(s) from the encoder to the decoder along with the Key Value field(s).
Key Value	This field contains a generated encryption key value or one you create yourself. You may display those values by clicking the Display Keys button. They will change from asterisks (*) to the hexadecimal values that have been generated or created. Note: You may enter your own value in this field but it must follow hexadecimal rules. That is digits 0-9 and characters A-F.
Display Keys	Use this button to change the Key Value field from asterisks (*) to plain text so that the value may be copied and pasted.

Note: Keys may be entered and generated via insecure interfaces such as HTTP, telnet, SNMPv1 and SNMP v2 but it is not advised since these are vulnerable to eavesdropping. Keys should only be entered and retrieved over a secure interface (HTTPS). If you choose to proceed with an insecure interface, the device will allow this but you will be warned with a pop-up message such as seen below each time you try to modify, view, or save an encryption key.



Button	Description
Create 128-Bit Key	Automatically generates a 128-Bit Hexadecimal key for you and places the value in the Key Value field.
Create 256-Bit Key	Automatically generates a 256-Bit Hexadecimal key for you and places the value in the Key Value field.

Once you have created your encryption keys, you must enable encryption and point the keys you just created to various output streams on your encoder. This is accomplished in encoder configuration.

▼ Step 2: Enable Encryption on a Stream and Choose a Key ID

As noted, once you have created your encryption keys, you must enable encryption on a stream and choose a Key ID. This also takes place in the encoder.

Note: At this time, only RTP transport types may be encrypted.

Streams are managed as part of the **Encoder Configuration** interface. View the topic on [Streams](#) on page 84 for more details on how to complete this step.

▼ Step 3: Define Key IDs and Key Values to Match the Encoder

Once you have created your encryption keys and assigned them to your output streams, you must then define the same Key IDs and Key Values to match the encoder.

This process is accomplished in the exact same manner as used in step one of the encryption process now on the **Decoder Receiver** page in that if you select the encrypted program you defined in step 2 of the encryption process it will automatically decrypt and play it.

View the topic on [Receivers](#) for details.

Additional Notes on Encryption

- Keys will be kept alongside passwords with the same rights and security. Further, they may be saved and restored after a system reboot but they cannot be XML write restored or moved to another system with the XML read/write feature. For more details, view the notes on [Read System Configuration](#).
- The **Dashboard** will be updated to display which streams are encrypted along with the encryption Key ID that has been assigned. In addition, if a Receiver is streaming an encrypted stream, this will also be noted on the Dashboard along with the Key ID of that stream.
- Multiple streams from a single encoder or from multiple encoders may be configured with the exact same Key ID and associated key. However, it is more secure to assign unique keys and unique Key IDs per stream on your network. Note that if the keys are different on two encoders on your network then you must configure the Key IDs to be unique as well. Further, any decoder that will play any of the streams on your network must be configured with each unique key and Key ID as well.

-
- Archiving of encrypted streams is not permitted.
 - As noted, RTP is the only supported streaming protocol that may be encrypted.
 - Closed Captioning is not supported while a stream is encrypted.
 - RTP servers are not allowed with encrypted streams.
 - Enabling encryption on two streams using the same video or audio rate is not permitted.
 - Encryption is not currently supported by VEMS Mystro, StreamPlayer, 7000 series Decoders, or Vbrick Set Top Boxes. Only the 9000 series Decoder is able to play encrypted streams. Newer versions of Mystro and StreamPlayer will not show programs (SAPs) for encrypted streams but older version may show the programs even though they will not play.

Logging

▼ To access the Logging fields:

1. Navigate to **System Configuration > Advanced Configurations > Logging**.

Logging of certain events can be stored both locally (within the Vbrick device) or externally (for example on a server). Local logs are stored in volatile memory. For preservation of information, it is recommended that remote logging be utilized. Remote servers generally offer ample storage and offer the additional benefit of collecting log information from several Vbricks simultaneously. When logging externally, specify either the IP address or hostname of the actual server using the **Remote Event Log Destination** field. If remote logging is enabled, the log information is sent via SNMP traps. When you enable logging, be sure to set the system date and time (See: System Time Settings) or select a network time server in order to get accurate time stamps in the logs.

The screenshot shows the 'Logging' configuration page. It includes the following fields and their states:

- Log Time Zone: Local (dropdown)
- Trap Log Local: Enabled
- Trap Log Remote: Enabled
- General Config Log Local: Enabled
- General Config Log Remote: Enabled
- Script Config Log Local: Enabled
- Script Config Log Remote: Enabled
- System Event Log Local: Enabled
- System Event Log Remote: Enabled
- Remote Event Log Destination:

Field	Description
Log Time Zone	The time for each logged event will be recorded in either Local time or GMT time.
Trap Log Local	Stores logs locally within the unit. The log file will wrap after 20 events.
Trap Log Remote	Sends log file to an external server.
General Config Log Local	Stores the log of user initiated configuration changes traps locally within the unit. The log file will wrap after 20 events.
General Config Log Remote	Sends the log of user initiated configuration changes to an external server.
Script Config Log Local	Stores the log of script generated configuration changes locally within the unit. The log file will wrap after 20 events.
Script Config Log Remote	Sends the log of the log of script generated configuration changes to an external server.
System Event Log Local	Stores the log of system events locally within the unit. The log file will wrap after 20 events.
System Event Log Remote	Logs systems events to an external server.
Remote Event Log Destination	Unicast IP address of remote event log server.

Event Triggering

▼ To access the Event Triggering fields:

1. Navigate to **System Configuration > Advanced Configurations > Event Triggering**.

You can create and run scripts to activate certain functions on a Vbrick encoder. There are multiple ways to run scripts on an encoder.

- You can run scripts for test purposes using the **Run Script** button in VAdmin as explained below; there are four event trigger scripts, with fixed names, that can be created and stored in flash memory in the **/scripts** folder. You write your own scripts and associate them with the file names shown below.
- You can use an external event trigger.
- You can use the iPhone application (the last two options are explained in the *Getting Started Guide*.)

The Vbrick encoder can be set up to use serial (COM) Pins 7 and 8 as input events to trigger the encoder to run scripts. The script files execute a subset of the CLI commands (**SVAR** and **WAIT**) in order to activate specific functions on the Vbrick encoder. As shown in the **Event Triggers** table below, there are a total of four possible input events associated with four different scripts.

Note: The event pins and script file names differ from those on earlier 7000 Series encoders. The script file names cannot be changed.

Table 1. Event Triggers

Script Name	Input Event
event1Script.txt	COM1 pin7 High to Low
event2Script.txt	COM1 pin7 Low to High
event3Script.txt	COM2 pin7 High to Low
event4Script.txt	COM2 pin7 Low to High

Run Scripts Using VAdmin

You can run scripts using the **Run Script** button in VAdmin. This button is only available in **Edit** mode and is basically used for test purposes. See the Sample Script below. Note that you cannot execute a script using an event trigger if VAdmin is currently running in **Edit** mode. If you run a script directly from VAdmin, it automatically exits **Edit** mode and terminates the active editing session.

System Configuration --> Advanced Configurations --> Event Triggering

Maintenance

Refresh Count and Status

Reset Counts

Read or Write Script Files

Event1 Com1 Pin7 Low: event1Script.txt

Event Enable Enabled

Event Stable Time

Event Count

Event Script Status

Event Script Control

Event2 Com1 Pin7 High: event2Script.txt

Event Enable Enabled

Event Stable Time

Event Count

Event Script Status

Event Script Control

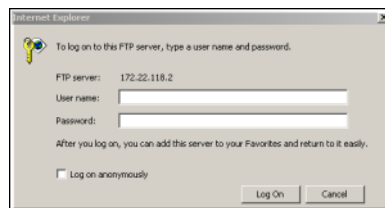
Event3 Com2 Pin7 Low: event3Script.txt

Event Enable Enabled

Event Stable Time

Event Count

Field/Button	Description
Refresh Count and Status	Refresh entire page including Event Counts and Event Script Status.
Reset Counts	Reset Event Counts only.
Read or Write Script Files	Click the FTP Scripts button to login to the encoder via FTP and manage script files. Requires a valid user name and password (default = admin admin). Script files have explicit, predefined names as explained above. Note: If you have problems logging into the FTP server, use the following command to login to the scripts folder in Windows Explorer. ftp://admin:admin@<encoder_ip_address>/scripts
Event Enable	Allows the user to Enable/Disable Event Triggering for each input event.
Event Stable Time	Allows the user to enter the amount of time in milliseconds that each input event has to be stable at the active level before the script will be executed.
Event Count	Displays the number of times each input event has occurred.
Event Script Status	Displays current status information for each event script.
Event Script Control	The Run Script buttons lets you run each script without needing the input event. Use this method to test the script.



Run Scripts Using Event Triggers

The event triggering feature lets you use an external switch or power source to control the functions of the Vbrick encoder. See "Event Triggering" in the *Getting Started Guide* for more information.

Run Scripts Using the iPhone App

Vbrick provides an iPhone app which you can use to monitor the status of 7000/9000 Series H.264 devices. This app lets you perform basic configuration tasks by running predefined scripts. You cannot modify configuration parameters except by running a script. See "Vbrick iPhone App" in the *Getting Started Guide* for more information.

Sample Script

The following script sets the video bit rate for channel 1 rate 1 then waits 1 second. The extension `.1.1` refers to the first channel and the first rate.

```
SVAR vbrickEncoderVideoH264TargetBitRate.1.1=4000000
//The Apply is common for all rates in channel 1
SVAR vbrickEncoderVideoCommonApplySet.1=2
//
//blank lines are not allowed
//
WAIT 1000
```

Scripting Syntax

- Script commands must start in column 1.
- **svar** (set variable) must precede the variable name.
- Wait time is defined milliseconds. A value of 1000 = 1 second.
- Most variable changes require an **ApplySet**.
- There is no clear command.
- There is no chaining of scripts.
- Comments are not allowed on the same line as a command.
- Comments start with `//` in column 1.
- Blank lines are not allowed.
- All scripts are executed in a strictly serial manner by a single task.
- While executing a script it is possible to miss a double change of any event.

Passthrough

▼ To access the Passthrough fields:

1. Navigate to **System Configuration > Advanced Configurations > Passthrough**.

The TCP/IP network can serve as an intermediary between two Vbrick encoders and their serial ports or between a PC application sending IP packets and an encoder's serial port. This feature supports a wide range of serial applications. End-to-end control is initiated by enabling or disabling Passthrough. For more about passthrough, and how it can be used, see the *Encoder Getting Started Guide*.

System Configuration --> Advanced Configurations --> Passthrough

Choose Passthrough Port

Passthrough State

Operational State

Field	Description
Choose Passthrough Port	Select COM1 or COM2 from the dropdown. When you enable or disable COM1 Passthrough, the unit will save and reboot. When COM1 Passthrough is enabled, the management port and CLI are not available.
Passthrough State	Used to enable/disable Passthrough. You must be the Active Editor to enter a Passthrough state. Three states are possible: <ul style="list-style-type: none"> • Disabled – The encoder will neither initiate nor respond to Passthrough setup requests. • Responder – In this case the encoder will accept a connection request (up to 64 connection requests). • Initiator – In this case it will continuously attempt to automatically initiate a Passthrough connection to the remote destination. This mode also offers metadata destination options.
Operational State	Describes the current status of a Passthrough connection, including error conditions, if any. Refer to the Monitor > Monitor the Network page. This will display "Active" if in Passthrough mode.

Passthrough State: Responder

System Configuration --> Advanced Configurations --> Passthrough

Choose Passthrough Port

Passthrough State

Port

Baud Rate

Stop Bits

Parity

Com Interface Type

RTS Control

DTR Control

Operational State

Field	Description
Passthrough State	Responder – In this case the encoder will accept a connection request (up to 64 connection requests).
Port	Read-only. COM2 Passthrough will accept connections on port 4439. COM1 uses port 4414. These values cannot be edited.

Field	Description
Baud Rate	Rate of Passthrough port. Rate can be set to the following (Default = 9600): 110, 300, 600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 57600, 115200.
Stop Bits	Number of stop bits for Passthrough port (1 or 2).
Parity	None, Even, Odd.
COM Interface Type	Describes the COM interface connector. <ul style="list-style-type: none"> RS232 – standard RS-232 serial port connector. RS422/485 – RS-422/485 4-wire serial port connector.
RTS Control	Force Off, Force On or Automatic. If automatic, the control will be on when Passthrough is active. Under no conditions are RTS or DTR controls passed through end-to-end. All control handling is local. When using a Vbrick VCC-3 or VCC-4 camera, set this control to Automatic; when using a Vbrick VCC-50i camera, set this control to Force On.
DTR Control	Force Off, Force On or Automatic. If automatic, the control will be On when Passthrough is active. Under no conditions are RTS or DTR controls passed through end-to-end. All control handling is local. When using a Vbrick VCC-3 or VCC-4 camera, set this control to Automatic; when using a Vbrick VCC-50i camera, set this control to Force On.
Operational State	Describes the current status of a Passthrough connection, including error conditions, if any. Refer to the Monitor > Monitor the Network page. This will display "Active" if in Passthrough mode.

Passthrough State: Initiator

The screenshot shows the 'System Configuration --> Advanced Configurations --> Passthrough' settings page. The 'Choose Passthrough Port' is set to 'COM2'. The 'Passthrough State' is set to 'Initiator'. Other settings include: Destination: Dedicated; Dedicated Destination: IP Address; Dedicated Port: 4439; Baud Rate: 9600; Stop Bits: 1; Parity: None; Com Interface Type: RS232; RTS Control: Automatic; DTR Control: Automatic; Operational State: Disabled.

Field	Description
Passthrough State	Initiator – In this case it will continuously attempt to automatically initiate a Passthrough connection to the remote destination. This mode also offers metadata destination options.

Field	Description
Destination	<ul style="list-style-type: none"> Dedicated – Use when the destination is a dedicated network destination such as another Vbrick encoder. Enter Host Name or IP Address in Dedicated Destination field below. KLV – The serial port accepts LDS (Local Dataset Packets) or CoT (Cursor on Target) metadata. For more about this topic, see "Key Length Value (KLV) Metadata" on page 177.
Dedicated Destination	Shown if Dedicated is selected above. The Vbrick encoder (whose serial port is the destination of this COM port) can be configured and identified using either an IP address or a Host Name. If Host Name is used, the Resolved Destination IP Address field shows the read-only IP address of the Vbrick encoder.
Dedicated Port	<ul style="list-style-type: none"> COM1 – Default = 4414 COM2 – Default = 4439
Baud Rate	Rate of Passthrough port. Rate can be set to the following (Default = 9600): 110, 300, 600, 1200, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 57600, 115200.
Stop Bits	Number of stop bits for Passthrough port (1 or 2).
Parity	None, Even, Odd.
COM Interface Type	Describes the COM interface connector. <ul style="list-style-type: none"> RS232 – standard RS-232 serial port connector. RS422/485 – RS-422/485 4-wire serial port connector.
RTS Control	Force Off, Force On or Automatic. If automatic, the control will be on when Passthrough is active. Note: DTR and RTS are not available for COM. Under no conditions are RTS or DTR controls passed through end-to-end. All control handling is local.
DTR Control	Force Off, Force On or Automatic. If automatic, the control will be On when Passthrough is active. See note above.
Operational State	Describes the current status of a Passthrough connection, including error conditions, if any. Refer to the Monitor > Monitor the Network page. This will display "Active" if in Passthrough mode.

SNMPv3 Passwords

▼ To access the SNMPv3 Passwords fields:

1. Navigate to **System Configuration > Advanced Configurations > SNMPv3 Passwords**.

Use this page to manage SNMP passwords. The same fields are used to define passwords for all users.

The screenshot shows the 'SNMPv3 Passwords' configuration page. It is divided into four sections, each representing a different user role:

- Administrator:** Username: admin, Authentication Password: [masked], Authentication Protocol: HMAC-MD5, Privacy Password: [masked], Security Level: No Authentication, No Privacy.
- Operator:** Username: operator, Authentication Password: [masked], Authentication Protocol: HMAC-MD5, Privacy Password: [masked], Security Level: No Authentication, No Privacy.
- Diagnostics:** Username: diagnostics, Authentication Password: [masked], Authentication Protocol: HMAC-MD5, Privacy Password: [masked], Security Level: No Authentication, No Privacy.
- Public:** Username: public.

Field	Description
User Name	Read-only. Set user name on Usernames & Passwords page.
Authentication Password	Enter password. Cannot exceed 20 characters. May include any combination of alphanumeric characters but only the following special characters: ~ ! # \$ ^ * + & [] { } < > See Table 2 on the Usernames & Passwords topic for default values.
Authentication Protocol	Select protocol: HMAC-MD5 or HMAC-SHA.
Privacy Password	Required.
Security Level	<ul style="list-style-type: none"> No Authentication, No Privacy (Default). Authentication. No Privacy. Authentication and Privacy (CBC-DES)

SNMP Traps

▼ To access the SNMP Traps fields:

1. Navigate to **System Configuration > Advanced Configurations > SNMP Traps**.

Vbrick supports SNMP v2 and SNMP v3 traps. SNMP traps are a subset of the SNMP management component of the encoder. Use of any element of the SNMP management system requires use of an SNMP browser or SNMP manager application (not supplied). The SNMP MIB, which formally defines the SNMP interface to the encoder, is contained within the install directory of the Vbrick release or from the [Downloads](#) page on the Vbrick website. The SNMP MIB is located in **vbrickSystem.mib** and the default installation directory is:

Program Files\Vbrick\Vbrick 7000-8000-9000\download\ReleaseVx_x_xx

Traps are SNMP base messages used by SNMP elements to report changes in status or alarm conditions to remote SNMP management entities. Traps are generally used to alert network

administrators of potential equipment problems or other noteworthy events. Two types of information are conveyed in the trap mechanism: Events and Alarms. Events Traps are sent every time the monitored event occurs. Events have only one state. Alarms are events having two states, Active and Clear. When the alarm condition is first detected, an alarm active trap is emitted. Alarms are considered active until the condition cleared and the alarm clear trap is emitted.

System Configuration --> Advanced Configurations --> SNMP Traps

Trap Destination 1	
Trap Destination	<input type="text"/>
SNMP Trap Version	Version 2 ▾
Trap User Name	vbTrap1
Authentication Password	vbTrap1
Authentication Protocol	HMAC-MD5 ▾
Privacy Password	vbTrap1
Security Level	No Authentication, No Privacy ▾
Trap Destination 2	
Trap Destination	<input type="text"/>
SNMP Trap Version	Version 2 ▾
Trap User Name	vbTrap2
Authentication Password	vbTrap2
Authentication Protocol	HMAC-MD5 ▾
Privacy Password	vbTrap2
Security Level	No Authentication, No Privacy ▾
Trap Destination 3	
Trap Destination	<input type="text"/>
SNMP Trap Version	Version 2 ▾
Trap User Name	vbTrap3

Field	Description
Trap Destination (1–4)	The IP Addresses of SNMP management stations to which traps are to be sent. The SNMP management application should be active on these stations in order to receive a number of SNMP Traps, which are supported by the encoder. Enterprise-specific traps listed in order of trap identification number are shown in the Trap Summary table below.
SNMP Trap Version	Select Version 2 or Version 3.
Trap User Name	User defined string
Authentication Password	Enter password. Cannot exceed 20 characters. May include any combination of alphanumeric characters but only the following special characters: ~ ! # \$ ^ * + & [] { } < >
Authentication Protocol	Select protocol: MD5 or SHA to validate the transaction between a given host and client
Privacy Password	Required. Hides traffic using DES encryption.
Security Level	<ul style="list-style-type: none"> No Authentication, No Privacy (default). No Privacy. Authentication and Privacy.

Table 1. Trap Summary

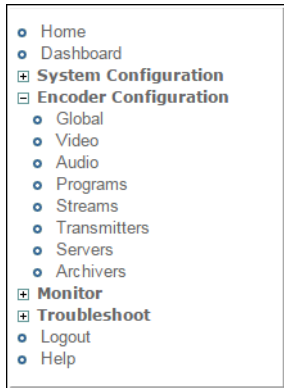
No.	Message	Description
1	Group	Sent whenever a significant event occurs within the encoder. Each event provides details via the vbrickSysRemoteEventLogType , and vbrickSysRemoteEventLogText objects
2	StartUpRunMode	The encoder has started up in Run mode.
3	StartUpDiagnosticsMode	The encoder has started in Diagnostics mode.
4	StartUpLimitedRunMode	The encoder has started in Limited Run mode.
5	UserInitiatedReset	The encoder has received a reset request from an administrator.
6	TemperatureOutOfRangeActive	The encoder temperature is out of range.
7	TemperatureOutOfRangeCleared	The out of range encoder temperature is recovered.
8	UnitOverloadedActive	The encoder is configured to transmit and receive video streams beyond its capability.
9	UnitOverloadedCleared	The overloaded encoder is recovered to normal.
10	PostFailure	The Power On Self Test (POST) failed.
11	NetworkTimeProtocolServerDown	There is loss of connection to the Network Time Protocol servers.
12	NetworkTimeProtocolServerUp	There is a connection available now to the Network Time Protocol servers.
13	Video1InputAlarmActive	Input #1 has a loss of video.
14	Video1InputAlarmClear	The loss of video on input #1 is recovered.
15	FanFailureActive	The fan failed.
16	FanFailureCleared	The fan failure is recovered.
17	Audio1InputAlarmActive	Input #1 has a loss of digital audio.
18	Audio1InputAlarmClear	The loss of digital audio on input #1 is recovered.
19	InitFailure	The system could not be initialized.
20	Video1ProtectedAlarmActive	Input #1 has protected video.
21	Video1ProtectedAlarmClear	The video on input #1 is no longer protected.
22	IntHddLowSpaceAlarmActive	Free space on the internal hard drive has fallen below 15%.
23	IntHddLowSpaceAlarmClear	Free space on the internal hard drive has risen above 15%.
24	ExtHddLowSpaceAlarmActive	Free space on the external hard drive has fallen below 15%.
25	ExtHddLowSpaceAlarmClear	Free space on the external hard drive has risen above 15%.
26	MemoryLowSpaceAlarmActive	There is no free space in memory.

No.	Message	Description
27	MemoryLowSpaceAlarmClear	There is free space in memory.
28	Video2InputAlarmActive	Input #2 has a loss of video.
29	Video2InputAlarmClear	The loss of video on input #2 is recovered.
30	Video3InputAlarmActive	Input #3 has a loss of video.
31	Video3InputAlarmClear	The loss of video on input #3 is recovered.
32	Video4InputAlarmActive	Input #4 has a loss of video.
33	Video4InputAlarmClear	The loss of video on input #4 is recovered.
34	Audio2InputAlarmActive	Input #2 has a loss of digital audio.
35	Audio2InputAlarmClear	The loss of digital audio on input #2 is recovered.
36	Audio3InputAlarmActive	Input #3 has a loss of digital audio.
37	Audio3InputAlarmClear	The loss of digital audio on input #3 is recovered.
38	Audio4InputAlarmActive	Input #4 has a loss of digital audio.
39	Audio4InputAlarmClear	The loss of digital audio on input #4 is recovered.



Encoder Configuration

The options in the **Encoder Configuration** menu are used by system administrators to configure encoder video and audio parameters. These parameters should not be changed except by knowledgeable systems administrators.



Keep in mind:

- Vbriick Admin has a read-only **View** mode and an interactive **Edit** mode where you can make configuration changes.
- When viewing the images in Online Help, many of the configuration options for the encoder are mutually exclusive. This means that depending on which options you select, you may see new fields or you may not see previously visible fields. All options, however, are fully explained in the text.
- Any video/audio configuration change will take approximately 20 seconds after you click the **Apply** button. If you see the message *Previous Apply has not finished, try again*, wait 15 seconds then click **Apply**.
- Be aware that some video and audio configuration changes can cause a 15 to 20 second interruption on all channels every time you click **Apply**. To avoid intermittent disruptions on units with multiple slots and channels, wait until you have configured changes on all slots and channels, and *then* click **Apply**.

Global

Video

Audio

Programs

Streams

Transmitters

Servers

Archivers

Global

▼ To access the Global fields:

1. Navigate to **Encoder Configuration > Global**.

The **Global** page is used to configure global parameters for the encoder. This includes the number of streams, transmitters, servers, and archivers that will be available for configuration.

Encoder Configuration --> Global

Number of Programs Available	1	
Number of Streams	12	<input type="button" value="⌵"/>
Number of Transmitters	4	<input type="text"/>
Number of Servers	4	<input type="text"/>
Number of Archivers	4	<input type="text"/>
Global Override	No Override	<input type="button" value="▼"/>
Max Packet Size	1452	<input type="text"/>
Shutdown on Video Input Problem	<input type="checkbox"/> Enabled	
Closed Caption AUs per RTP Packet	8	<input type="text"/>
Maximum RTSP Clients	200	<input type="text"/>
Maximum RTSP Bandwidth	200000000	<input type="text"/>
Enable UDP Checksums	<input type="checkbox"/> Enabled	
Presenter Broadcast On Startup	<input checked="" type="checkbox"/> Enabled	
Enable		

Field	Description
Number of Programs Available	Read-only. 1, 2, or 4. Vbrick 9000 Series encoders currently include models with 1, 2, or 4 channels. There will be one program available for each channel. Presenter Mode only has 1 program available regardless of the number of inputs.
Number of Streams	1–16. Default = 1-4. You can define up to 16 streams. Default depends on model.
Number of Transmitters	0–25. Default = 1-4. You can define up to 25 transmitters. Default depends on model.
Number of Servers	0–16. Default = 1-4. You can define up to 16 servers. Default depends on model.
Number of Archivers	0–4. Default = 1. You can define up to 4 archivers.

Field	Description
Global Override	<p>This option overrides all individual transmitter and server "enable" settings. Use to quickly shutdown transmitters and/or servers.</p> <ul style="list-style-type: none"> • No Override – default. • Disable All – disable transmitters and servers. • Disable Transmitters – disable transmitters only. • Disable Servers – disable servers only.
Max Packet Size	<p>248–8000. Default = 1452. Max Packet Size is used by all transport types except Smooth Streaming. For Transport Stream the UDP packet always contains an integral number of 188-byte Transport Stream packets. This number of 188-byte packets will equal the Max Packet Size divided by 188, rounded down to the nearest integral number. For example, if Max Packet Size = 1452, the number of Transport Stream packets in a UDP packet is 7: $1452 / 188 = 7.732$. Max Packet Size is also used for RTMP Chunk Size.</p> <p>Note: If FEC is enabled (on the Encoder Configuration > Streams page) the Max Packet Size allowed will be 1500 bytes in order to prevent fragmentation on the network.</p> <p>Note: When streaming to Quicktime players, a maximum packet size less than 1000 may cause audio dropouts. For optimum performance when using an AmiNET130 Transport Stream, Max Packet Size should not exceed 1480.</p> <p>Note: reducing the default size will increase the CPU loading especially for Transport Stream. If CPU load approaches 100% the unit will go into Overloaded Mode (see the Avoiding Overload Conditions topic for more information).</p>
Shutdown on Video Input Problem	<p>If enabled, streaming is stopped when a video input problem is detected. Default = Disabled.</p>
Closed Caption AUs Per RTP Packet	<p>0–30. Default = 8. The number of closed caption frames (Access Units) placed in each RTP packet. Closed caption frames are small and multiple AUs can be placed in one RTP packet to improve bandwidth efficiency—at the cost of additional latency.</p>
Maximum RTSP Clients	<p>0–202. Default = 200.</p>
Maximum RTSP Bandwidth	<p>0–1000000000. Default = 200000000.</p>
Enable UDP Checksums	<p>This option is typically used with Enable Forward Error Correction (FEC) on a Stream. It enables calculation of checksums for all transmitted UDP packets—but can also consume network bandwidth. Any change to this parameter will reset the encoder. Default = disabled.</p>

Field	Description
Presenter Broadcast on Startup Enable	When enabled, on start up the presenter will automatically broadcast with the selected layout from the “Manage Presentation” page at the last time the configuration was saved. (Normally, this will be the settings of your last broadcast.) If no saved configuration exists, the default settings are used.

Global

Announce Settings

Transmitter Settings

Server Settings

Announce Settings

▼ To access the Announce Settings fields:

1. Navigate to **Encoder Configuration > Global > Announce Settings** section.

Announce Settings	
IP Address for Transmitters	<input type="text" value="224.2.127.254"/>
IP Address for Servers	<input type="text" value="255.255.255.255"/>
Port	<input type="text" value="9875"/>
Hide advanced settings	
Transmit Interval	<input type="text" value="10"/>
IP Multicast Time to Live (TTL)	<input type="text" value="64"/>
IP Unicast Time to Live (TTL)	<input type="text" value="64"/>
IP Type of Service (TOS)	<input type="text" value="0"/>

Field	Description
IP Address for Transmitters	Default IP address to which transmitter announcements are sent. This global announcement IP address is inherited by all other transmitters. Default = 224.2.127.254.
IP Address for Servers	Default IP address to which server announcements are sent. This global announcement IP address is inherited by all other servers. Default = 255.255.255.255.
Port	Default = 9875.
Transmit Interval	1–9999. Default = 10. Determines how often the announcement is transmitted.
IP Multicast Time to Live (TTL)	1–255. Default = 64.
IP Unicast Time to Live (TTL)	1–255. Default = 64.

Field	Description
IP Type of Service (TOS)	<p>The second byte in an IP packet header can be used in some networks to control the Quality of Service (QOS) that the network applies to the packet. In older networks this byte and the definition of bits and specific values in the byte are called TOS (Type of Service) and in newer networks the same byte is reused for a newer standard of bits and values called DiffServ (Differentiated Services). The TOS setting in the Vbrick encoder allows you to configure any value for that byte in the packet header, so you can utilize any QOS scheme on any network. The Vbrick setting is a decimal value from 0 (where all bits of the header byte are 0) to 255 (all bits of the byte are 1). You can refer to your network documentation or the relevant RFCs to determine the bit settings to get the desired QOS from your network and then convert the bit settings to a decimal number for the Vbrick setting. For example, if you would like the packets to contain a DiffServ codepoint of '001010' (DSCP name AF11) and ECN of '00' you would convert the binary value of '00101000' to decimal value 40 for the Vbrick TOS parameter setting. Or for an older network TOS example you might want the Precedence bits to be '000' for normal and the TOS bits to be '0100' for max throughput so you would convert binary '00001000' to decimal 16 for the Vbrick TOS parameter setting.</p>

Global

Announce Settings

Transmitter Settings

Server Settings

Transmitter Settings

▼ To access the Transmitter Settings fields:

1. Navigate to **Encoder Configuration > Global > Transmitter Settings** section (under advanced settings).

The transmitter settings defined here are used for all streams associated with a program.

Transmitter Settings	
IP Multicast Time to Live (TTL)	<input type="text" value="63"/>
IP Unicast Time to Live (TTL)	<input type="text" value="63"/>
IP Multicast Type of Service (TOS)	<input type="text" value="0"/>
IP Unicast Type of Service (TOS)	<input type="text" value="0"/>
Join Own Multicast	<input checked="" type="checkbox"/> Enabled
Unicast Ping	<input checked="" type="checkbox"/> Enabled
Metadata Carriage Type	<input type="text" value="Synchronous"/>

Field	Description
IP Multicast Time to Live (TTL)	The number of hops (between routers) for which transmitter packets are valid on the network.
IP Unicast Time to Live (TTL)	The number of hops (between routers) for which transmitter packets are valid on the network.
IP Multicast Type of Service (TOS)	The TOS (Type of Service) can be configured in the IP header to establish packet priority in the network. See IP Type of Service (TOS) defined under Announce Settings.
IP Unicast Type of Service (TOS)	The TOS (Type of Service) can be configured in the IP header to establish packet priority in the network. See IP Type of Service (TOS) defined under Announce Settings.
Join Own Multicast	Some network equipment requires that a Multicast source (such as a Vbrick encoder) join its own Multicast group. This feature is enabled by default and has no adverse affect on equipment that is fully Multicast-compliant.
Unicast Ping	<p>This parameter is used to instruct the encoder to ping the unicast destination periodically to test connectivity before sending the stream. If Unicast Ping is not enabled, and the destination goes offline, the unicast stream may be broadcast to all destinations on the network, flooding the network. Default = Enabled. This feature should only be disabled if the network has a particular requirement that makes it unworkable. This parameter is also used with Auto Unicast Transmitter Mode to monitor a connection with TCP keep alive so that a stream is restored in the event of a failure.</p> <p>If you change this setting on your Transmitter, please <i>stop</i> and <i>restart</i> the Transmitter.</p>
Metadata Carriage Type	<p>Specifies whether the Transport Stream carriage of metadata is synchronous (default) or asynchronous.</p> <ul style="list-style-type: none"> • Synchronous – use MISB 0604 Section 6.2. • Asynchronous – use MISB 0604 Section 6.1.

Global

Announce Settings

Transmitter Settings

Server Settings

Server Settings

▼ To access the Server Settings fields:

1. Navigate to **Encoder Configuration > Global > Server Settings** section (under advanced settings).

The server settings defined here are used for all streams associated with a program.

Server Settings	
RTCP Client Timeout	<input type="text" value="60"/>
Time to Live (TTL)	<input type="text" value="64"/>
Type of Service (TOS)	<input type="text" value="0"/>

Field	Description
RTCP Client Timeout	This is the number of seconds that the encoder will wait before it decides that an H.264 player that was playing its video or audio is no longer viewing or listening. Zero means wait forever—no timeout. 0–99999. Default = 60.
Time To Live (TTL)	The number of hops (between routers) for which an IP packet is valid on the network.
Type of Service (TOS)	The TOS (Type of Service) can be configured in the IP header to establish packet priority in the network. See IP Type of Service (TOS) defined under Announce Settings.

Global

Announce Settings

Transmitter Settings

Server Settings

Video

▼ To access the Video fields:

1. Navigate to **Encoder Configuration > Video**.

The Vbrick 9000 encoder supports the **Baseline**, **Main**, and **High** profiles and provides superior performance under a wide variety of network and application environments. H.264 video compression will typically provide the same quality as MPEG-2 at half of the bit rate or less, especially in high bit rate and high resolution environments. For more information about 9000 Series encoders and decoders, go to the www.Vbrick.com/products page on the Vbrick website.

When making configuration changes, the slot shown in bold (see Figure 1 below) is the currently selected slot, an asterisk (*) next to the Slot/Channel header near the top of the

page indicates there are pending changes to the configuration which have not yet been "applied," and a red exclamation point indicates a configuration error in that slot.

Encoder Configuration --> Video

Choose Input: Slot 1/Channel 1* Slot 1/Channel 2 Slot 2/Channel 1 Slot 2/Channel 2

How is Video Connected? HDMI

Video Input Enable: Enabled

Video Input Name: Slot 1/Channel 1

Video Format Auto-Detect: Enabled
Detected Format: 720p/60 16:9

Closed Caption: Disabled

KLV: Network LDS Passthrough

KLV PTS: Capture Time

KLV Multicast Source: Enabled

KLV IP Address: 0.0.0.0

KLV Port: 7777

Hide advanced settings

Insert Metadata String: [] Insert

Color Space: Auto

Brightness (0~100): 50

Contrast (0~100): 50

Saturation (0~127): 64

Tint (-50~50 degrees): 0

Figure 1. Video Configuration: Part 1 – Video Input

Keep in mind that any currently active streams will be momentarily disrupted every time you click **Apply**. To avoid intermittent disruptions on units with multiple slots and channels, wait until you have configured changes on all slots and channels, and then click **Apply**. This behavior only applies to the **Encoder Configuration > Video** and **Audio** pages. On all other pages you must click **Apply** before you exit the page.



Figure 2. Quad Channel Encoder (no SDI)



Figure 3. Dual Channel Encoder (with SDI)

Field	Description
Choose Video Input	<p>Choose the video input to configure. Your encoder may be configured with one slot or two slots, with one or two channels in each slot. Figure 3 shows an encoder with two slots (and four channels). As shown in the graphic (at the right side on back of unit) Slot 1 is physically on the right; Slot 2 is on the left.</p> <ul style="list-style-type: none"> • Slot1/Channel 1 • Slot1/Channel 2 • Slot2/Channel 1 • Slot2/Channel 2
How is Video connected?	<p>Figure 3 shows the High Definition video input connectors on the rear panel. The A/V connector on the unit is used with the Vbrick-supplied "breakout" cable which has both Composite and Component video inputs. Select the option from the dropdown that matches your video input.</p> <ul style="list-style-type: none"> • Composite – one connector (labeled COMP IN) on breakout cable. Use the Micro DB-15 connector (located between the two HDMI ports). • Component – three connectors (labeled Y, Pb, Pr) on breakout cable. Use the Micro DB-15 connector (located between the two HDMI ports). • HDMI – High Definition Multimedia Interface that transmits uncompressed digital data. • SDI – supports both SD-SDI typically used for broadcast-grade video (meets SMPTE 259M) or HD/3G-SDI which processes 1080p at bit rates of 2.97 Gbits/sec (meets SMPTE 424M). • VGA – supports most of the common analog output videos from a PC or laptop.
Video Input Enable	Use to Enable Disable the selected Video Input. All video inputs are enabled by default.
Video Input Name	Used to provide a meaningful name to the video input source such as "Camera 1" or "Rear Camera". The default value of the field is useful to understand the physical connection while renaming the field will convey what video source will be visible.
Video Format Auto Detect	Used to auto detect the format being used. If a supported format is in use, video format and aspect ratio will be auto-detected and used. The drop-down menus for those values will not appear as a result.

Field	Description
Video Format	<p>This field is displayed if Video Format Auto Detect is not enabled and is used to configure the Video Format on the encoder so that it exactly matches the video source connected to the encoder. As an aid, the encoder can sense the input format and report it in the Detected Video Format read-only field. The options for Video Format shown below vary depending on how the input video is connected.</p> <ul style="list-style-type: none"> • Composite – NTSC. PAL. • Component – 1080p/60/30, 1080i/60/50, 720p/60/50, 576p/i, 480p/i, 1400x1050/60, 1280x1024/60, 1366x768/60, 1360x768/60, 1280x768/60, 1024x768/60, 800x600/60 • HDMI – 1080p/60/50/30, 1080i/60/50, 720p/60/50, 576p/i, 480p/i, 1280x1024, 1024x768, 800x600, 640x480 • SD-SDI – 576i, 480i • HD/3G-SDI – 1080p/60/50/30, 1080i/60/50, 720p/60/50 • VGA - 1600x1200/60, 1680x1050/60, 1400x1050/60, 1280x1024/60, 1366x768/60, 1360x768/60, 1280x768/60, 1024x768/60, 800x600/60, 640x480/60
Video Aspect Ratio	<p>Video Aspect Ratio is the ratio of the width of the image to the height of the image. High Definition video generally uses 16:9; Standard Definition uses 4:3. This field is not displayed and automatically detected if Video Format Auto Detect is enabled.</p>
Closed Caption	<p>Use to enable closed captions or inserted user-inserted text. Note that closed caption availability and functionality varies depending on the video input type (see Table 1 for details). User-inserted text is supported for all inputs.</p> <p>Note: Closed Captioning is <i>not</i> supported for Presenter Mode.</p> <ul style="list-style-type: none"> • Disabled – Default. Related Closed Caption fields not shown. • Inserted CC Enabled – Inserts the user-defined text set in the closed caption text field.
Closed Caption Insertion Text	<p>Defines the text inserted into the closed caption field of the encoded stream (default is \h \d \t.) when Inserted CC Enabled is selected for Closed Caption above. Enter any string up to a maximum of 32 characters (including the Host Name, Date, and Time). No double quotes, less than <, or greater than > symbols are allowed. Special codes can be substituted for the text as follows:</p> <ul style="list-style-type: none"> • \h or \H – Host Name. • \d or \D – Current Date. • \t or \T – Current Time. • \c# or \C# – Set Color (where # = the number corresponding to color). 0 = White, 1 = Green, 2 = Blue, 3 = Cyan, 4 = Red, 5 = Yellow, 6 = Magenta

Field	Description
Closed Caption Insertion Display Row	Displayed when Inserted CC Enabled is set. Sets the position on the screen where the text defined in the Closed Caption Text field will appear in the decoded video. Can be set from 1 through 15, where 1 indicates the top of the screen and 15 indicates the bottom of the screen (default is 15), when Inserted CC is enabled.
Closed Caption Insertion Update Rate	Sets the rate at which the closed captioning field is updated (default = Medium) when you select Inserted CC Enabled (see above). <ul style="list-style-type: none"> • Slow – Inserted closed caption field updated every 10 seconds. • Medium – Inserted closed caption field updated every 5 seconds. • Fast – Inserted closed captioning field updated every second.
Detected Format	Shows the detected Video Format (see Figure 1) and Aspect Ratio that is actually connected.
KLV	KLV metadata is supported on the serial port(s) and on the network port. If you are using the serial ports on a device with multiple channels, only the first two channels support KLV metadata in the stream: Channel 1 uses COM2 and Channel 2 uses COM1. If you are receiving KLV or CoT into the encoder over the network, only one metadata feed can come in this way, although a second KLV or CoT feed can come in over the serial port. For more information about this topic see Key Length Value (KLV) Metadata. <ul style="list-style-type: none"> • Disabled – KLV metadata is not embedded in the stream. • ESD to LDS – Available on any interface that supports (CC in line 21) closed captions. These include Composite NTSC, Component 480i, and SD-SDI 480i. • Serial LDS Passthrough – LDS metadata is provided via the serial port and embedded into the transport stream. • SDI LDS Passthrough – LDS packets will be received over the Vertical Ancillary Data Space (VANC) as per MISB RP 0605.2. • Network LDS Passthrough – LDS metadata is provided via the specified IP network port and embedded into the transport stream. • Serial CoT to LDS – CoT (Cursor on Target) data is provided via the serial port and is converted to LDS and embedded into the transport stream. • Network CoT to LDS – CoT data is provided via an IP network port and is converted to LDS and embedded into the transport stream.
KLV PTS	Used if KLV data source is Serial, SDI, or Network LDS Passthrough. Select the Presentation Time Stamp method: <ul style="list-style-type: none"> • Capture Time – Uses the time of data reception to generate the metadata stream PTS. Defaults = System Time. • LDS Time – Uses the timestamp extracted from the LDS packets to generate the metadata stream PTS.
KLV Multicast Source	Used with Network LDS Passthrough or Network CoT to LDS.

Field	Description
KLV IP Address	Used with Network LDS Passthrough or Network CoT to LDS. The IP address used to listen for KLV data.
KLV Port	Used with Network LDS Passthrough or Network CoT to LDS. The port used to listen for KLV data.
Insert Metadata String	(Advanced Setting) Typically used with VEMS presentations. Click Insert Now to insert up to 213 characters of metadata into the stream.
Color Space	<p>(Advanced Setting) HDMI/Component. Override the default Color Space. Useful if connecting DVI from a PC over HDMI. The encoder autodetects and supports both YCrCb (commonly used by cameras or video players) and RGB (commonly used by computers) on the HDMI and Component inputs.</p> <ul style="list-style-type: none"> • Auto – Default. • RGB – represents the color space as red, green and blue. • YCrCb – represents the color space as luminance (Y) and color difference signals (R-Y) and (B-Y). <p>In most situations and with most video devices, the default setting to Auto detect the Color Space is recommended. However with some types of video equipment like DVI-to-HDMI convertors and general purpose image scalers, the encoder's automatic setting may not be able to choose correctly. If you see a pink or green tint on the encoded video there is a good chance the color space of your source and the encoder do not match.</p>
Brightness	(Advanced Setting) 0–100. Default = 50. Brightness is information about the varying light intensity of an image which is best described as brightness. It only affects the luminance (Y) component of the color space.
Contrast	(Advanced Setting) 0–100. Default = 50. The contrast is the range of light-to-dark values of an image that are proportional to the voltage differences between the black and white levels of the signal.
Saturation	(Advanced Setting) 0–127. Default = 64. Saturation is the spectral intensity of a color. It operates on the PbPr (CbCr) chroma components of the color space by increasing or decreasing both components by the same percentage.
Tint	(Advanced Setting) +50/-50 degrees. Default = 0. Tint (or Hue) is the attribute by which a color may be identified in the visible spectrum and refers to the chromaticity of the image. Adding or subtracting Tint changes the color (Hue) of the video. The numbers actually relate to the vector phase of the color spectrum in degrees of a total of ± 180 degrees.
Blackout Top	(Advanced Setting) 0–2. Default = 0. Available with 480i and 576i inputs only. Some video signals include additional information that results in undesirable artifacts on some sides of the video frame. This option blacks out an area near the top of player window—not a specific number of lines. Be sure to test your results when using this option.

Table 1. Closed Caption Support by Video Input

	Composite	Component	SD-SDI	HD/3G-SDI	HDMI
CC in line 21	NTSC only	480i only	480i only		
CC in VANC			x	x	
Inserted CC	x†	x	x	x	x

† An x indicates that closed captions are supported for the specified video input type.

Note: If you are working with an encoder with presentation features enabled, your interface or functionality may differ slightly for this section in that video input and video encode settings are two separate menu options under **Encoder Configuration**. See the Presenter Encoder Video Input topic if you need more information on the differences.

Video Template Settings

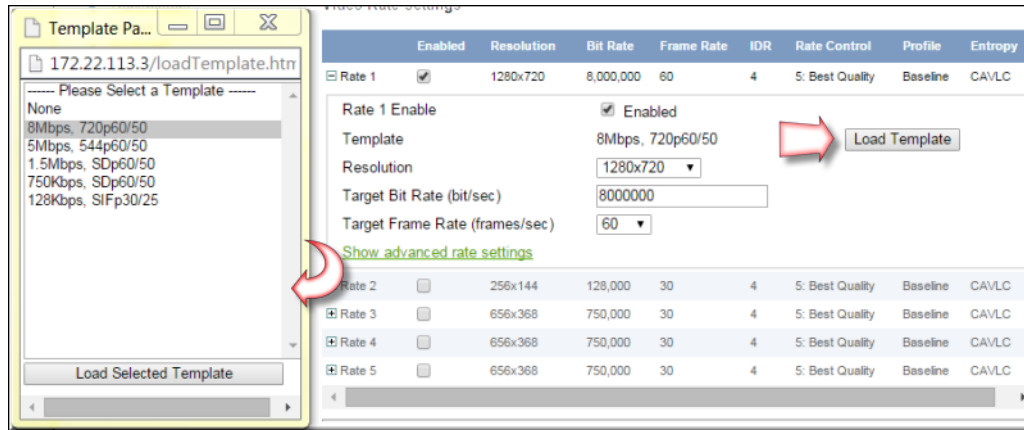
Video Rate Settings

Clone Video Input

Video Template Settings

- ▼ To access the Load Template button:
 1. Navigate to **Encoder Configuration > Video > Video Rate Settings** section.
 2. Click the (+) expand icon to access additional fields and settings and advanced rate setting fields per setting.
 3. Click the **Load Template** button to load a template for a specific setting.

Use the **Load Template** button to populate the Video Template Settings with preconfigured video values (or select **None**). *The templates available when you click Load Template will vary depending on your encoder model (1, 2, or 4 channels).*



The screenshot shows the 'Video Rate Settings' interface. On the left, a 'Template Pa...' dialog box is open, displaying a list of templates: 'None', '8Mbps, 720p60/50', '5Mbps, 544p60/50', '1.5Mbps, SDp60/50', '750Kbps, SDp60/50', and '128Kbps, SIFp30/25'. A red arrow points to the 'Load Selected Template' button at the bottom of the dialog. The main interface shows a table of rate settings with columns: Enabled, Resolution, Bit Rate, Frame Rate, IDR, Rate Control, Profile, and Entropy. The first row, 'Rate 1', is expanded to show detailed settings: 'Rate 1 Enable' (checked), 'Template' (8Mbps, 720p60/50), 'Resolution' (1280x720), 'Target Bit Rate (bit/sec)' (8000000), and 'Target Frame Rate (frames/sec)' (60). A red arrow points to the 'Load Template' button next to the template field. Below the table, there is a link 'Show advanced rate settings'.

Enabled	Resolution	Bit Rate	Frame Rate	IDR	Rate Control	Profile	Entropy
<input checked="" type="checkbox"/>	1280x720	8,000,000	60	4	5: Best Quality	Baseline	CAVLC
Rate 1 Enable <input checked="" type="checkbox"/> Enabled							
Template 8Mbps, 720p60/50							
Resolution 1280x720							
Target Bit Rate (bit/sec) 8000000							
Target Frame Rate (frames/sec) 60							
Show advanced rate settings							
<input type="checkbox"/>	256x144	128,000	30	4	5: Best Quality	Baseline	CAVLC
<input type="checkbox"/>	656x368	750,000	30	4	5: Best Quality	Baseline	CAVLC
<input type="checkbox"/>	656x368	750,000	30	4	5: Best Quality	Baseline	CAVLC
<input type="checkbox"/>	656x368	750,000	30	4	5: Best Quality	Baseline	CAVLC

Choose a template based on motion and bandwidth. **750Kbps, SDp60/50** is the default template for a single or dual unit. Quad is **750Kbps, SDp30/25**. To read the following table, start in left column and read from left to right.

Table 1. Video Template Settings

Template Name	Profile	Resolution 16:9 (4:3)	Bit Rate	Frame Rate	IDR	Rate Control	Entropy
12Mbps,1080p60	High	1920x1080	12M	60(50)	4	5	CABAC
10Mbps,1080p60	High	1920x1080	10M	60(50)	4	5	CABAC
10Mbps,1080p30	High	1920x1080	7M	30(25)	4	5	CABAC
8Mbps,720p60	High	1280x720	8M	60(50)	4	5	CABAC
7Mbps,720p60	High	1280x720	7M	60(50)	4	5	CABAC
7Mbps,720p30	High	1280x720	7M	30(25)	4	5	CABAC
5Mbps,544p60	High	960x544	5M	60(50)	4	5	CABAC
4Mbps,544p60	High	960x544	4M	60(50)	4	5	CABAC
4Mbps,544p30	High	960x544	4M	30(25)	4	5	CABAC
1.5Mbps,SDp60	High	656x368 (640x480)	1.5M	60(50)	4	5	CABAC
1.5Mbps,SDp30	High	656x368 (640x480)	1.5M	30(50)	4	5	CABAC
750Kbps,SDp60	High	656x368 (640x480)	750k	60(50)	4	5	CABAC
750Kbps,SDp30	High	656x368 (640x480)	750k	30(25)	4	5	CABAC
128Kbps,SIFp60	High	256x144 (192x144)	128k	60(50)	4	5	CABAC
128Kbps,SIFp30	High	256x144 (192x144)	128k	30(25)	4	5	CABAC

Note: If you are working with an encoder with presentation features enabled, your interface or functionality may differ slightly for this section in that video input and video encode settings are two separate menu options under **Encoder Configuration**. See the Presenter Encoder Video Input topic if you need more information on the differences.

Video Template Settings

Video Rate Settings

Clone Video Input

Video Rate Settings

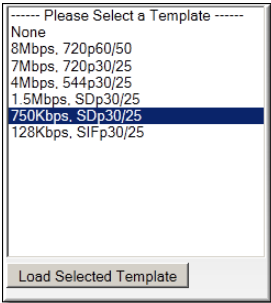
▼ To access the Video Rate Settings fields:

1. Navigate to **Encoder Configuration > Video > Video Rate Settings** section.
2. Click the (+) expand icon to access additional fields and settings and advanced rate setting fields per setting.

The encoder supports multiple bit rate encoding (MBR). This means the encoder can encode one input stream at multiple bit rates that can be optimized and targeted for different devices. For example HD-TVs, PCs, and smartphones have different bandwidth requirements and will be associated with different streams. Each configured stream must be configured with a specific video and audio rate.

Note: There are five video rates available per input channel and a maximum of 16 video rates can be configured per unit. Be sure to review the MBR rules and constraints in the 9000 Series Encoder Release Notes.

Field	Description
Rate & Enable	Rate 1 is enabled by default. At least one rate must always be configured.

Field	Description
Template	<p>This read-only field shows the template (if any) that is currently applied. The templates provide an optimized combination of settings that have been configured and tested at Vbrick. The templates available when you click Load Template will vary depending on your encoder model (1, 2, or 4 channels). See Table 1 on page 69 for a list of all templates and settings. If a template is applied it will display the template name (e.g. 750Kbps, SDp30/25) or Custom Settings (if you made changes after initially selecting a template). Select Load Template > None to clear a "Custom Settings" message. Select Copy to Other Rates to copy the "Advanced Rate Settings" only for the selected rate to all of the other rates on the same Slot and Channel.</p> 
Resolution	<p>Sets the video encoding resolution (the width and height respectively) of the compressed video stream. The Vbrick encoder has high quality video up/downscaling built-in to let you choose from a wide range of standard encode resolutions regardless of the Video Format of your source video. For example, you can use a 1080p60 High Definition video input source and have the encoder downscale the video to a Standard Definition resolution so it can be streamed with good quality at bit rates to match your network or to match the processing power and display resolution of your decoders, STBs or PC players. When the aspect ratio of the encode resolution does not match the aspect ratio of the input, the encoder will letterbox. Available video resolutions include:</p> <p>1920x1080, 1680x1050, 1680x1008, 1600x1200, 1400x1050, 1366x768, 1360x768, 1344x1074, 1280x1024, 1280x768, 1280x720, 1120x700, 1024x768, 960x544, 832x666, 832x520, 832x500, 800x600, 720x576, 720x480, 656x410, 656x394, 656x368, 640x480, 512x288, 400x304, 384x288, 352x288, 352x240, 320x240, 256x144, 192x144, 176x128, 176x144, 128x96.</p>

Field	Description
Target Bit Rate (bits/sec)	32,000–20,000,000 bits/sec. Constant bit rate. Default = 750,000. This number can only be changed in 1000 bits/sec increments. It represents how much data the encoder will send out each second to carry video to a player. The word target is used because the encoder can vary its bit rate slightly in response to the amount of detail in the movie or camera output. The more data the encoder sends in one second, the more clearly the details of the video will be seen on a player. It is not always desirable to send the most possible data, since that requires a large network "pipe" (connection). The trade-off is the level of detail in the video with the use of smaller network connections. The encoder tries to encode the video at a quality that will (on average) match the Target Bit Rate. <i>The larger the number, the better the quality but this can potentially limit the number of clients that can connect to the encoder.</i>
Target Frame Rate (frames/sec)	<p>The following options for Target Frame Rate vary depending on the Video Format selected above. There are specific Frame Rates associated with Standard Definition formats (NTSC or PAL) or with High Definition formats (all others). The default is based on the model: 60 (for single and dual channel models) or 30 (for quad channel models).</p> <ul style="list-style-type: none"> • NTSC – 60, 30, 24, 15, 10, 7.5, 6, 5, 3, 2 • PAL – 50, 25, 12.5, 5, 2.5 <p>Note: For Presenter Mode all of the above rates are allowed.</p> <p>This number represents how many frames the encoder will send out each second to carry the video to an H.264 player. The word target is used because the encoder can vary its frame rate slightly in response to the amount of motion in the movie or camera output. See the Rate Control Setting parameter below for more details. Frame rate is the number of "frames" the encoder sends in a second for an H.264 player to display. Moving pictures are made up of a rapid series of "still" pictures that move so fast that the "illusion" of motion is produced. A frame is one such "still" picture. Regular TV programs in the U.S. run at about 30 frames in a second, and the more frames presented in a second, the smoother the motion contained within the video will appear. Encoding and transmitting a frame requires the use of data, so that, when considering a particular bit rate, sending more frames demands that each frame contain fewer fine details.</p>
IDR Frame Interval (sec)	0–30. Default = 4. Also called "key frame interval." The frequency in seconds at which IDR (Intra Dynamic Refresh) frames are inserted for Seek, Fast Forward and Rewind functionality. Higher values create fewer random access points and better compression efficiency. Lower values create more access points but with less compression efficiency. Zero means all frames are IDR frames. Vbrick recommends you do not set to zero because video quality is not generally acceptable and stream bandwidth may be excessive.
Copy to Other Rates	Click this button to copy the "advanced rate settings" (IDR Frame Interval, Rate Control Setting, Profile, and Entropy Coding) to all other configured rates.

Field	Description
Rate Control Setting	<p>1: Lowest Latency – 5: Best Quality. Default = 5. This parameter lets you trade off video quality versus the latency imposed by the encoder. A higher value provides better quality but more latency; a lower value provides less latency with a loss of quality. This parameter lets you trade-off video quality with how tightly rate control is imposed. A larger number increases the number of frames over which the target number of bits can be distributed. This means that the average bit rate, measured over small periods of time, can fluctuate more around the specified target bit rate. A smaller number will reduce the fluctuations around the target bit rate but will also reduce the ability of rate control to apply the bits to scenes which might be visually optimized by their application. In addition, when using the Custom transport mode (see Transport Stream Settings) and attempting to tune for lowest possible latency (minimal PTS-PCR Gap), it is useful to minimize the bit rate fluctuations by using a smaller value. <i>In bandwidth-restricted networks with little tolerance for bit rate fluctuations, or when tuning aggressively for minimum delay, a smaller value is recommended; otherwise, use a larger value or the default.</i></p>
Profile	<p>The profile defines the subset of bit stream features in an H.264 stream, including color reproduction and video compression.</p> <ul style="list-style-type: none"> • Baseline: Default. A simple profile with a low compression ratio. The baseline profile uses more bits to compress quality video than the other profiles. Use the baseline profile in applications with limited scene changes and minimal motion. • Main: An intermediate profile with a medium compression ratio. This profile uses fewer bits to compress video than the baseline profile; however, it uses more bits than the High profile. • High: A complex profile with a high compression ratio. This is the primary profile for high-definition applications. For example Blu-ray and HD-DVD use this profile. • Note: Use a High profile if you are streaming to Rev.
Entropy Coding	<ul style="list-style-type: none"> • CAVLC – Default. Context-adaptive variable-length coding is an alternative to CABAC. CAVLC requires considerably less processing than CABAC but does not compress the data as effectively. CAVLC is supported in all H.264 profiles, unlike CABAC which is supported in Baseline and Extended profiles only. • CABAC– Context-adaptive binary arithmetic coding is a lossless compression. It is one of the primary advantages of the H.264/AVC encoding scheme. CABAC is only supported in Main and higher profiles and is CPU-intensive. As a result, CAVLC (a lower efficiency method) is used to increase performance on slower playback devices. • Note: Use CABAC if you are streaming to Rev.

Note: If you are working with an encoder with presentation features enabled, your interface or functionality may differ slightly for this section in that video input and video encode settings are two separate menu options under **Encoder Configuration**. See the Presenter Encoder Video Input topic if you need more information on the differences.

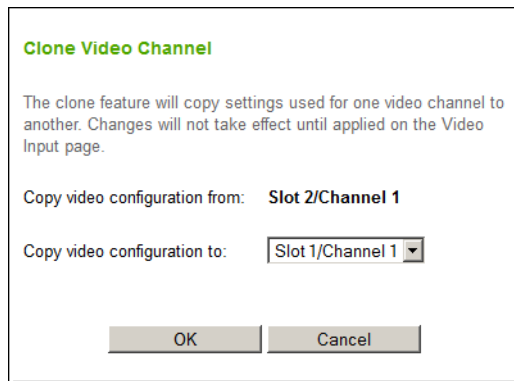
Video Template Settings

Video Rate Settings

Clone Video Input

Clone Video Input

When configuring **Video Input** parameters on multi-channel encoders, click on the **Clone** button to apply the entire set of configuration parameters (including **Video Rate Settings**) to one or all of the other channels. Simply click on the slot and channel you wish to copy from, then use the dropdown to select the individual slot and channel you wish to copy to (or select all) and click **OK**. Note that the cloning will not take effect until you click **Apply** on the **Video Input** page.



Clone Video Channel

The clone feature will copy settings used for one video channel to another. Changes will not take effect until applied on the Video Input page.

Copy video configuration from: **Slot 2/Channel 1**

Copy video configuration to:

Note: If you are working with an encoder with presentation features enabled, your interface or functionality may differ slightly for this section in that video input and video encode settings are two separate menu options under **Encoder Configuration**. See the Presenter Encoder Video Input topic if you need more information on the differences.

Video Template Settings

Video Rate Settings

Clone Video Input

Audio

▼ To access the Audio fields:

1. Navigate to **Encoder Configuration > Audio**.

The audio circuit on the Vbrick 9000 encoder uses mixed signal technology (a combination of analog and digital signals). The encoder has two audio input connectors for each channel (left and right). The input signals are unbalanced and have a usable voltage range up to 10 dbU.

Various channel configurations and bit rates can be set on the **Encoder Configuration > Audio** page. The encoder provides controls for mic level vs. line level balanced mode support, input gain/attenuation, automatic level controls, and other advanced audio features. The encoder supports three types of electret microphones:

- Electret Condenser, battery operated or plug-in power (SoundBlaster style)
- Dynamic type balanced or unbalanced
- Externally-powered phantom types and otherwise amplified types such as wireless.

The microphone preamplifier provides a selectable 16 or 32 db of gain (boost). Various configuration parameters control how the input signals are conditioned as well as how the resulting audio is compressed. The audio input signal parameters define how audio is connected, what the signal ranges are, the style of electrical interfaces, and the number of channels connected to the device. Audio encoder parameters define how the audio will be compressed and are used to control the bit rate. The bit rate directly affects the audio quality levels and determines the range of audio content that can be handled.

The screenshot shows the 'Encoder Configuration -> Audio' settings page. At the top, there are four tabs for 'Choose input': Slot 1/Channel 1, Slot 1/Channel 2, Slot 2/Channel 1, and Slot 2/Channel 2. Below this, there are several sections of controls:

- How is Audio Connected?**: Analog (dropdown)
- What is the Audio Source?**: Stereo (dropdown)
- Audio Input Enable**: Enabled
- Audio Input Name**: Slot 2/Channel 1 (text field)
- Mute**: Enabled
- Gain/Attenuation (dB)**: 0 (text field)
- Input Range**: Line Normal (dropdown)
- Automatic Volume Control**: Standard (dropdown)
- Noise Gate**: Enabled

Below these is the **Audio Rate Settings** section, which includes a table and several checkboxes:

	Enabled	Bit Rate	Sample Frequency	Encode Stereo as Mono	AAC-HE
Rate 1	<input checked="" type="checkbox"/>	72k	48KHz	Disabled	Disabled
Rate 2	<input type="checkbox"/>	72k	48KHz	Disabled	Disabled
Rate 3	<input type="checkbox"/>	72k	48KHz	Disabled	Disabled

Additional settings for Rate 1 include:

- Rate 1 Enable**: Enabled
- Template**: Med Fidelity (dropdown) with a 'Load Template' button
- Encode Stereo Inputs as Mono**: Enabled
- AAC-HE**: Enabled
- L+R Bit Rate (bits/sec)**: 72k (dropdown)
- Sample Frequency**: 48KHz (dropdown)

Note: There are four possible audio input sources and three audio rates available per input. The audio source can be unbalanced or the digital audio from HDMI or SDI.

Field	Description
Choose Input	<p>Choose the audio input to configure. Your encoder may be configured with one slot or two slots, with one or two channels in each slot. Note that Slot 1 is on the right; Slot 2 is on the left.</p> <ul style="list-style-type: none"> • Slot1/Channel 1 • Slot1/Channel 2 • Slot2/Channel 1 • Slot2/Channel 2
How is Audio Connected?	<p>The audio is connected using the input jacks (Main, Aux, SDI, HDMI) on the rear of the unit. Select one of the following depending on the electrical cable configuration of the input.</p> <ul style="list-style-type: none"> • Analog – used with component and composite video but also available for SDI and HDMI. • Digital L+R (1–2) – use any pair of left and right channels with HDMI or SDI video input. For most common HDMI and SDI sources the audio will be available on Digital L+R 1. When using digital audio, the Advanced Settings (Gain/Attenuation, Input Range, Automatic Volume Control, and Noise Gate) are not displayed.
What is the Audio Source	<p>The audio mode can be configured to one of three possible settings:</p> <ul style="list-style-type: none"> • Stereo – Stereo directs the input left channel to the left channel in the audio stream and the input right channel to the right channel in the audio stream. In this mode, the encoder expects that the two channels are <i>not</i> totally discrete and have audio components that are common to both the left and right channels. In Stereo mode, the encoder can compress the audio more efficiently and achieve higher performance with lower bitrates. Always select Stereo for DVD/VCR reproduction. • Mono (left to stereo) – Mono directs the left input channel to both the left and right channels. • Dual – Each channel is compressed independently. Two totally separated channels are compressed and decompressed. Dual is ideal for voice applications where the microphone input from two channels is separated to avoid crosstalk. <p>Note: There is performance benefit in bitrate efficiency when operating in Stereo rather than Dual mode. However if the original audio source has separate channels, you must use Dual.</p>
Audio Input Enable	<p>Use to Enable Disable the selected Audio Input. At least one audio input on the unit must be enabled. All audio inputs are enabled by default.</p>
Audio Input Name	<p>Used to provide a meaningful name to the audio input source. The default value of the field is useful to understand the physical connection while renaming the field will convey what audio source will be enabled.</p>
Mute	<p>Mutes the audio signal (but does not stop audio encoding). Silent audio will be encoded and streamed.</p>

Field	Description
Gain/Attenuation	Analog only. Controls the audio attenuation (or gain) applied to the input signal of the encoder. Input levels can be gain-compensated to adjust for mismatched input levels. Range: -96 to 10 dB in 1 dB increments. Default = 0 dB.
Input Range	<p>Analog only. Controls the amplitude (voltage range) of the input signal.</p> <ul style="list-style-type: none"> • Line Normal – Default. Use if the signal excursion will be above 0 dB. • Line High Headroom – Use if the signal excursion will be at or below 0 dB. • Mic Boost 16 dB – Low preamplifier. Sets microphone preamplifier to 16 dB. If not loud enough after performing a sound check, set to 32 dB and check for distortion. • Mic Boost 32 dB – High preamplifier. Sets microphone preamplifier to 32 dB. If distorted after performing a sound check, set to 16 dB and check sound quality.
Automatic Volume Control	<p>Analog only. The volume is continually monitored and automatically adjusted to normalize audio levels as follows. Default = Standard.</p> <ul style="list-style-type: none"> • Standard – Default. Use for general content which may already be companded (compressed and expanded). • Light – Peak limiting. Best dynamic range. • Moderate – Peak limiting with expansion. Reduced dynamic range. • Aggressive – strong normalization, low dynamic range, most noticeable. • User-Defined – <i>Advanced users only</i>. User Defined values employ two thresholds (high level limit and low level boost) which define db threshold levels to which volume changes are applied. The low level boost threshold defines the threshold whereby lower signals lower will be amplified by gain. The gain is applied gradually until the audio level is higher than the configured threshold. The high level limit threshold defines the threshold whereby signals higher than this value will be attenuated until the audio level is reduced to a lower value than the threshold. <p><u>Attack Rate</u> – determines how quickly the volume is increased or decreased once a level threshold is crossed.</p> <p><u>Release Rate</u> – determines how quickly the encoder volume levels are relaxed to the normal position.</p> <p><u>Maximum Level</u> – the maximum (attenuated) audio level you wish to achieve after reaching the threshold.</p> <p><u>Minimum Level</u> – the minimum (boosted) audio level you wish to achieve after reaching the threshold.</p>

Field	Description
Noise Gate	Analog only. Used to suppress unwanted audio noises that are continuous and predictable (for example air conditioning equipment or traffic sounds). A noise gate allows a signal to pass through only when it is above a certain threshold. If the signal falls below the threshold no signal is allowed to pass. Note: The noise gate is particularly useful in AVC (automatic volume control) configurations to keep ambient, low-level noise from propagating with gain (i.e. being amplified).
Noise Gate Level	Displayed only if Noise Gate is enabled. Range: -34 to -82 dB.

Audio Rate Settings

Clone Audio Input

Audio Rate Settings

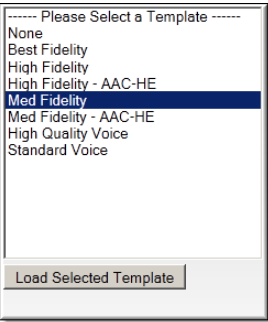
▼ To access the Audio Rate Settings fields:

1. Navigate to **Encoder Configuration > Audio > Audio Rate Settings** section.
2. Click the (+) expand icon to access additional fields and settings and the **Load Template** button.

The encoder can encode multiple instances of live audio for devices with varying bandwidth requirements (e.g. HD-TVs, PCs, and smartphones). The lower area of the Audio page has a set of parameters that can be controlled by preconfigured templates. Use the **Load Template** button to populate the Audio Template Settings with preconfigured audio values. The audio templates vary depending on the selected **Audio Source** (Stereo, Mono, or Dual). **Med Fidelity** is the default template.

Audio Rate Settings					
	Enabled	Bit Rate	Sample Frequency	Encode Stereo as Mono	AAC-HE
[-] Rate 1	<input checked="" type="checkbox"/>	72k	48KHz	Disabled	Disabled
Rate 1 Enable		<input checked="" type="checkbox"/> Enabled			
Template		Med Fidelity		Load Template	
Encode Stereo Inputs as Mono		<input type="checkbox"/> Enabled			
AAC-HE		<input type="checkbox"/> Enabled			
L+R Bit Rate (bits/sec)		72k ▾			
Sample Frequency		48KHz ▾			
[-] Rate 2	<input type="checkbox"/>	72k	48KHz	Disabled	Disabled
[-] Rate 3	<input type="checkbox"/>	72k	48KHz	Disabled	Disabled

Field	Description
Rate n Enable	Audio Rate 1 is enabled by default and required. Audio Rates 2 and 3 (if enabled) use all of the same parameter settings as Audio Rate 1 except for L+R Bit Rate .

Field	Description
Template	<p>This read-only field shows the template (if any) that is currently applied. The templates available when you click Load Template will vary depending on how the audio is connected (Digital or Unbalanced). See Table for a list of all templates and settings. If a template is applied it will display the template name (e.g. High Quality Voice) or Custom Settings (if you made changes after initially selecting a template). Select Load Template > None to clear a "Custom Settings" message.</p> 
Encode Stereo Inputs as Mono	Any stereo source containing different audio material will be mixed down to mono. The net result is that the stereo effect is lost but the encoding efficiency is doubled thereby reducing network bandwidth while retaining sound quality.
AAC-HE	AAC-HE is a highly-efficient audio compression technology that uses spectral bandwidth replication (SBR). AAC-HE is optimized for better quality at lower bit rates.
L+R Bit Rate (bits/sec)	Defines the audio encoding bit rate of the audio stream. In general, higher bit rates provide better audio quality. The range of selectable values for this parameter is determined by (1) the Audio Source (Stereo or Mono), (2) the AAC-HE setting (enabled/disabled), (3) the Encode Stereo Inputs as Mono setting (enabled/disabled), and (4) the Sample Frequency. Valid entries range from 8K–84K for one-channel encoding and 18K–256K for two-channel encoding.
Sample Frequency	<p>Defines the frequency (or sampling rate) at which the audio is sampled at the encoder. In general, higher sampling frequencies provide better audio quality. Lower sampling frequencies however, use less CPU resources, support lower bit rates, and provide increased compression efficiency. The range of selectable values for this parameter is determined by the L+R Bit rate setting. With Digital audio, 32, 44.1, and 48kHz are the only sample frequencies allowed and you must configure the sample rate to match the sample rate provided by the source device. <i>With digital audio the configured Sampling Frequency must match the actual Sampling Frequency.</i></p> <p>When an HDMI or SDI source with digital audio is connected to the encoder and the audio connection is configured for a Digital L+R selection, you will also see the Detected Sample Frequency below the Sample Frequency to help you choose a matching setting. Note that all defined Audio Rates must have the same Sample Frequency.</p> <p>Note: Both sample frequencies on a dual channel slot must be the same. 44.1KHz is only allowed for digital audio.</p>

Field	Description
Detected Sampling Frequency	HDMI/SDI. Indicates the measured Sampling Frequency (see above) when an HDMI or SDI source with digital audio is connected to the encoder and the audio connection is configured for a Digital L+R selection. This is useful for determining configuration mismatches.

Table 1. Audio Template Settings

Template Name	Stereo as Mono?	AAC-HE	Sample Freq	Bit Rate †	
				Stereo/Dual	Mono
Best Fidelity	Off		48kHz	256k	84k
High Fidelity	Off		48kHz	160k	84k
High Fidelity – AAC-HE ††	Off	Enable	48kHz	64k	32k
Med Fidelity (default)	Off		32kHz	72k	40k
Med Fidelity - AAC-HE ††	Off	Enable	32kHz	40k	24k
High Quality Voice	Off		24kHz	56k	28k
Standard Voice	Off		16kHz	32k	18k

† Based on Audio Source.

†† When AAC-HE is disabled, the audio is encoded using AAC-LC.

Audio Rate Settings

Clone Audio Input

Clone Audio Input

When configuring **Audio Input** parameters on multi-channel encoders, click on the **Clone** button to apply the entire set of configuration parameters (including Audio Rate settings) to one or all of the other channels. Simply click on the slot and channel you wish to copy from, then use the dropdown to select the individual slot and channel you wish to copy to (or select all) and click **OK**. Note that the cloning will not take effect until you click **Apply** on the Audio Input page.

Clone Audio Channel

The clone feature will copy settings used for one audio channel to another. Changes will not take effect until applied on the Audio Input page.

Copy audio configuration from: **Slot 1/Channel 1**

Copy audio configuration to:

Audio Rate Settings

Clone Audio Input

Programs

▼ To access the Programs fields:

1. Navigate to **Encoder Configuration > Programs**.

A "program" is a way to group a video and/or audio source and define information common to the program. The number of programs available depends on the number of channels. Depending on what you purchased, your encoder can have 1, 2, or 4 channels (and therefore 1, 2, or 4 programs) available. Encoders with presentation features enabled have only 1 program available regardless of the number of inputs.

Encoder Configuration --> Programs

Choose Program

Used by Streams

Video Input

Audio Input

Program Name

Author

Copyright

Category

Information

Information URL

Contact Email

Contact Phone

Contact Name

Field	Description
Choose Program	Select Program 1, 2, 3, or 4.
Used by Streams	Shows the stream numbers that are associated with this program.
Video Input	Read-only. Set on Encoder Configuration > Video Input page.
Audio Input	Read-only. Set on Encoder Configuration > Audio Input page.

Field	Description
Program Name	Lets you define a descriptive name for the program which is added to the announcement. This announcement text is displayed in the Program Guide for other Vbrick products. Default = \H Program x . Both Program Name and Session Information allow special character strings to be inserted automatically into these fields. \H or \h – Host Name of Vbrick encoder. When the default entry is used, the program is identified by the default Vbrick Host Name.
Author	A string in the announcement that can be used to identify the author. This string is shown in StreamPlayer. Default = "My Author."
Copyright	A string in the announcement that can be used to identify the copyright information. This string is shown in StreamPlayer. Default = "My Copyright."
Category	An encoder can have an announce Category string. This string consists of one or more keywords separated by spaces. Each category keyword represents a tag associated with the encoder's video stream. Vbrick VEMS and players can be configured to display in their Program and Conferencing guides only video streams tagged by specific category keywords or those containing no keyword. The characters are ASCII and case sensitive. The maximum number of characters for all keywords in the string cannot exceed 36 including spaces. You can also use this field to filter the live streams shown in the VEMS Portal Server by source and client IP address by using the following string: IPMask=xxx.xxx.xxx.xxx where xxx.xxx.xxx.xxx represents a bit mask. (This string is simply another keyword you can use in addition to those described above.) The Portal Server will parse the bitmask and send the live stream only to clients with a masked IP address that matches the masked IP address of the source encoder. For example, a stream with a category IPMask=255.255.0.0 from a Vbrick with an address of 172.22.6.67 will be available to a client with an IP address 172.22.3.4 but not to a client with an IP Address 172.16.3.4 . There is no admin interface to this feature on the Portal Server; you can use this filtering in addition to the standard authorization features provided by the Portal Server.
Information	String identifying Vbrick announce Session Information that appears on Program Guide. Default = Vbrick Streaming Video .
Information URL	Sets the URL advertised in announce URI field. It should be a pointer to additional information about the session. Maximum 64 characters.
Contact Email	Sets the e-mail address advertised in announce e-mail field. It should be the e-mail address of the person responsible for the session. Maximum 50 characters.
Contact Phone	Sets the phone number advertised in announce phone number field. It should be the contact number of the person responsible for the session. Maximum 20 characters.

Field	Description
Contact Name	Sets the contact name in announce contact name field. It should be the contact name of the person responsible for the session. Maximum 20 characters.
Program Override	Set a program override. Allows you to quickly override a transmitter and server's "enable" settings if needed. See: Add a Program Override.

Note: If you are working with an encoder with presentation features enabled, your interface or functionality may differ slightly for this section in that video input and video encode settings are two separate menu options under **Encoder Configuration**. See the Presenter Encoder Video Input topic if you need more information on the differences.

Global

Video

Audio

Programs

Streams

Transmitters

Servers

Archivers

Add a Program Override

▼ To add a Program Override:

1. Navigate to **Encoder Configuration > Programs > Program Override** field.

You are able to set a program override for a Program if needed. The **Program Override** drop-down field overrides *all* a program's transmitter and server's "enable" settings. It should be used to quickly shutdown transmitters and/or servers for a specific Program.

Encoder Configuration --> Programs

Number of Programs Available: 1

Program Name	\H Program 1
Author	My Author
Copyright	My Copyright
Category	
Information	VBrick Streaming Video
Information URL	
Contact Email	
Contact Phone	
Contact Name	
Program Override	No Override

Field	Description
No Override	Default setting.
Disable All	Disable transmitters and servers on this Program.
Disable Transmitters	Disable transmitters only on this Program.
Disable Servers	Disable servers only on this Program.

Streams

▼ To access the Streams fields:

1. Navigate to **Encoder Configuration > Streams**.

A "stream" is a bundled group of resources that describes the characteristics of the output bit stream.

A Stream specifies:

- program
- transport type
- video rate
- audio rate

A Stream can be

- transmitted
- served
- encrypted (in some cases)
- archived

Once a stream is defined, it can be used by any combination of transmitters, servers, and archivers. The maximum number of different stream types you can enable is shown in the table below. (Note that "adaptive" streaming is only supported with transport type set to **Smooth Streaming Transport Type**.)

Encoder Configuration --> Streams

Choose Stream: Stream 1 -

Used By

Transmitters: None
Servers: Server 1
Archivers: None

Enable Stream: Enabled

Stream Name:

Transport Type: RTP

Select Video Rate: Video Rate 1

Select Audio Rate: Audio Rate 1

Estimated Bit Rate: 7,378,870

[Hide advanced settings](#)

Enable Closed Caption: Enabled

Metering: Enabled

Metering Aggressiveness: Medium

Encryption: Enabled

Encryption Key: Key 1 - Stream1Camera1Back

Field	Description
Choose Stream	Select a stream from those defined on the Encoder Configuration > Programs page.
Used By	Read-only. Shows which Transmitters, Servers, and Archivers (future) are configured to use this stream.
Enable Stream	Enable the selected stream.
Stream Name	Enter a user-friendly name for the selected stream.
Transport Type	<ul style="list-style-type: none"> RTP – Real Time Protocol. RTP is supported by the Vbrick 9000 Series decoder. MPEG2TS – MPEG-2 Transport Stream. Used with KLV and FEC. RTMP – Real Time Messaging Protocol. This is the multimedia streaming protocol used in Adobe Flash. SMOOTH – Smooth Streaming Transport Type is an IIS Media Services extension that enables adaptive streaming of media to clients over HTTP. RTMFP (Flash Multicast) – Adobe’s Flash Multicast protocol that enables playback by existing, fielded Flash players removing the need to distribute players for multicast playback. Note: Use RTP for streaming to a DME or Rev.
Select Video Rate	Select video rate (defined on Encoder Configuration > Video Input page) from dropdown list.
Video Rate Enable	SMOOTH only. Select Video Rate. Note the following: <ul style="list-style-type: none"> In this release only one Video Rate is available. All Video Rate(s) included in the Smooth Stream must have the same Frame Rate and IDR. The IDR Frame Interval (on the Encoder Configuration > Video page) for rates assigned for Smooth Streaming streams must be 1 or 2 seconds (not zero).

Field	Description
Select Audio Rate	Select audio rate (defined on Encoder Configuration > Audio Input page) from dropdown list.
Audio Rate Enable	SMOOTH only. Select Audio Rate.
Estimated Bit Rate	Read-only. Shows the estimated bit rate with the configured options. The actual bit rate will vary based on the content.
RTMFP Key	RTMFP (Flash Multicast) only. Select the Generate Key button to generate the key or manually enter a key that you create. Used as multicast stream name in the Manifest File URL under Encoder Configuration > Transmitters . Two different streams are able to use the same key which results in the same encryption for both streams if desired. See: Manifest Files help topic.
Enable Closed Caption	Enables closed captioning. Note: You will not be able to enable closed captioning and encryption on the same stream. Closed captions are sent as SEI NALs for compatibility with many standard video players and they are supported for all stream types except for Smooth Streaming. When enabled on RTMP streams, the captions are sent both as SEI NALs and as onCaptionInfo Flash metadata packets for compatibility with many Flash based players. Note: You will not be able to enable closed captioning and encryption on the same stream.
Metering	RTP only. Default = Disabled. Metering is designed for RTP transport only and is configured for each encoder so that all RTP streams are treated as a group. When metering is disabled, video frames are sent as soon as they are encoded. This can result in substantial network traffic burstiness since certain encoded frames (i.e. key frames) are substantially larger than other frames. If desired, metering can be used to smooth the transmission of the video stream. This results in less burstiness, and can help to prevent packet loss on some networks, but it can also increase jitter and latency. Vbrick recommends the use of metering only on bandwidth-constrained networks. When you enable metering, Metering Aggressiveness (see below) defaults to Medium. Note: To play metered RTP streams on StreamPlayer, the H.264 playback buffers must be set to 1200 msec or higher for UDP and 2000 msec or higher for TCP. In StreamPlayer go to Preferences > MPEG4/H264 > Buffer Size > UDP Playback/TCP Playback.
Metering Aggressiveness	RTP only. Low, Medium, High. Default = Medium. Low is least aggressive; High is most aggressive and will provide smoother transitions between frames. If Aggressiveness is too high it may result in impaired video and/or audio and you will see the Metering Buffer Full Count increment on the Monitor > Encoder Status > Monitor Global & Streams page. If this happens decrease the Metering Aggressiveness.

Field	Description
Encryption	Enables encryption for RTP streams. View the topic on Encryption for more information.
Encryption Key	If encryption is enabled, use the dropdown to assign the encryption Key ID . The Key ID must have a valid Key Value or the Apply will fail.

Table 1. Number of Stream Types Allowed and Usage †

Transport Type	Max Number of Streams	Where Used		
		Transmitters	Servers	Archivers
RTP	16	x	x	
MPEG2TS	16	x	x	x
RTMP	16	x		
Smooth	4	x		
RTMFP (Flash Multicast)	4	x		

† The total number of all stream types you can define is 16. This means if you define 8 RTP streams and 8 MPEG2TS streams, you will not be allowed to define any RTMP or Smooth streams.

Transport Stream Settings

Flash Multicast Stream Settings

Manifest Files

Enable Forward Error Correction (FEC) on a Stream

Transport Stream PIDs

Flash Multicast Stream Settings

▼ To create a RTMFP (Flash Multicast) stream:

1. Navigate to **Encoder Configuration > Streams**. Note: Click the **Edit** button to make changes on the Streams page.
2. Select a **Transport Type** of **RTMFP (Flash Multicast)**.
3. Complete the fields to create a stream as you normally would. See: Streams
4. Complete the **Flash Multicast** specific fields described below as required.

Encoder Configuration --> Streams

Choose Stream: Stream 2 - KevinFMC ▾

Used By

Transmitters: 2 - KevinFMCTrans

Servers: None

Archivers: None

Enable Stream: Enabled

Stream Name: KevinFMC

Transport Type: RTMFP (Flash Multicast) ▾

Select Video Rate: Video Rate 1 ▾

Select Audio Rate: Audio Rate 1 ▾

Estimated Bit Rate: 831,306

RTMFP Key: F54B0538C1A8D0ECDBDA7EE087315D9F

Field	Description
Transport Type	<ul style="list-style-type: none"> • RTP – Real Time Protocol. RTP is supported by the Vbrick 9000 Series decoder. • MPEG2TS – MPEG-2 Transport Stream. Used with KLV and FEC. • RTMP – Real Time Messaging Protocol. This is the multimedia streaming protocol used in Adobe Flash. • SMOOTH – Smooth Streaming Transport Type is an IIS Media Services extension that enables adaptive streaming of media to clients over HTTP. • RTMFP (Flash Multicast) – Adobe’s Flash Multicast protocol that enables playback by existing, fielded Flash players removing the need to distribute players for multicast playback.
RTMFP Key	<p>RTMFP (Flash Multicast) only. Select the Generate Key button to generate the key or manually enter a key that you create. Used as multicast stream name in the Manifest File URL under Encoder Configuration > Transmitters. Two different streams are able to use the same key which results in the same encryption for both streams if desired.</p> <p>See: Manifest Files</p>

- Transport Stream Settings
- Flash Multicast Stream Settings
- Manifest Files
- Enable Forward Error Correction (FEC) on a Stream

Transport Stream PIDs

Transport Stream Settings

▼ To access the Transport Stream Setting fields:

1. Navigate to **Encoder Configuration > Streams**.
2. Select a **Transport Type** of **MPEG2TS**.
3. Click **Show advanced settings**.

To fine tune **Overhead** and **PTS-PCR Gap**, administrators should refer to the Advanced Transport Stream Settings topics.

Transport Stream Settings	
Enable Closed Caption	<input checked="" type="checkbox"/> Enabled
Enable KLV	<input checked="" type="checkbox"/> Enabled
Enable MISB Timestamp	<input checked="" type="checkbox"/> Enabled
Enable Automatic Latency Control	<input type="checkbox"/> Enabled
Enable FEC	<input type="checkbox"/> Enabled
Mode	Variable Med Delay ▼
Bitrate Mode	Variable
Overhead (%)	10
PTS-PCR Gap (ms)	510
Video PID	<input type="text" value="33"/>
Audio PID	<input type="text" value="36"/>
Metadata PID	<input type="text" value="35"/>
PCR PID	<input type="text" value="34"/>
PMT PID	<input type="text" value="66"/>
PCR Rate	10 per second ▼
Encryption	<input type="checkbox"/> Enabled

Field	Description
Enable Closed Caption	Check to enable closed captions for selected stream. Closed captions must also be enabled on the Encoder > Video page. Refer to Streams for more details when this setting is enabled.
Enable KLV	MPEG2TS only. Check to enable KLV for selected stream. KLV must also be enabled on the Encoder Configuration > Video Input page.
Enable MISB Timestamp	Insert timestamps that meet MISB (Motion Imagery Standards Board) requirements. Timestamps help accurately align metadata with collected motion imagery for further analysis.
Enable Automatic Latency Control	Default = Disabled. This option offers an easy way to adjust the gap settings to minimize the latency for particular content and configuration parameters. The latency control values are set based on certain configuration parameters. For more information about this topic see Automatic Latency Control . Note: The default gap and latency settings for Transport Stream have not been optimized. If you have a requirement for low overhead or low latency, you will need to manually tune these settings for optimal performance.
Enable FEC	Enable Forward Error Correction. For a detailed description of FEC parameters see Enable Forward Error Correction (FEC) on a Stream.

Field	Description
Mode	<p>Transport Stream only. Select from the following options. Note that each transport stream mode is optimized for different applications. In general a "variable" Transport Stream Mode (High, Med, or Low) is more efficient than "constant" for network bandwidth because transport stream null packets are not transmitted. If the variable stream is ingested to a VOD server, the stream is converted to a Constant bit rate file with null packets. As a result the storage requirements on the VOD-W are roughly the same regardless of the mode you select.</p> <p>In the Constant and Variable (High, Med, or Low) modes, Overhead and PTS-PCR Gap are automatically set to values that are optimized for the current Video Resolution, Video Bit Rate, Rate Control Setting, Audio Bit Rate, and Audio Sample Frequency. These auto-selected values are shown as read-only in VBAAdmin. In Custom mode you can choose your own settings for Overhead and PTS-PCR Gap but use caution because incorrect settings can result in poor quality and dropped video frames.</p> <ul style="list-style-type: none"> • Constant – This mode will most likely be handled by an arbitrary decoder and is the most universally recognized and utilized mode for transport stream transmission. To maintain constant bit rate over the network, null packets are added to the transport stream. • Variable High Delay – Caps the overhead at a minimal value thereby reducing maximum bursts at the cost of increased latency. • Variable Medium Delay – Caps the short term bandwidth at the same rate as a comparably configured constant bit rate stream but average bandwidth will be lower because there are no null packets. The latency is equivalent to the latency of a similarly configured constant bit rate stream. • Variable Low Delay – Provides a stream with the same average bit rate as Variable High Delay and the latency is reduced but the short term bit rate will have much higher bursts. • Custom – Lets experienced users tune the algorithm-balancing latency and delay for their individual stream characteristics and application using Bitrate Mode, Overhead, and PTS-PCR Gap. The values in the standard modes described above are relatively conservative and it may be possible to tune overhead and latency (PTS-PCR Gap) to lower values if content is low motion or if for example, low latency is more important than video quality. Another factor is Bitrate Mode: lower values for bitrate will allow more aggressive tuning of the Gap and Overhead at the possible cost of video quality (note that end-to-end latency is a function of network delay and decoder behavior and the gap value generally sets only a lower limit on overall latency). When switching to Custom mode, the current settings for Transport Stream Bitrate Mode, Overhead, and Gap are shown as starting points.
Bitrate Mode	Read-only unless "Custom" Transport Stream Mode defined above. Variable or Constant. Default = Variable.

Field	Description
Overhead (%)	Controls the padding packet overhead as a percentage. Read-only unless "Custom" Transport Stream Mode defined above. Range: 1–500. See Advanced Transport Stream Settings for more information.
PTS-PCR Gap (ms)	Controls the PTS-PCR Gap delay in milliseconds. Read-only unless "Custom" Transport Stream Mode defined above. Range: 50–2000. See Advanced Transport Stream Settings for more information.
Video PID	Range: 4–8190. Default = 33.
Audio PID	Range: 4–8190. Default = 36.
Metadata PID	Range: 4–8190. Default = 35.
PCR PID	Range: 4–8190. Default = 34.
PMT PID	Default = 66.
PCR Rate	<ul style="list-style-type: none"> 10 per second (default). 25 per second.
Encryption	Enable Encryption

Transport Stream Settings

Flash Multicast Stream Settings

Enable Forward Error Correction (FEC) on a Stream

Transport Stream PIDs

Enable Forward Error Correction (FEC) on a Stream

▼ To enable FEC on a stream:

1. Navigate to **Encoder Configuration > Streams**.
2. Click the **Enable FEC** checkbox. Complete the FEC fields that appear as needed.

Forward Error Correction (FEC) is available for MPEG2TS streams only. FEC is configured at the stream level and at the transmitter level. This topic explains how to configure FEC at the stream level only. To configure it at the transmitter level see the Enable Forward Error Correction (FEC) on a Transmitter topic.

FEC is a type of digital signal processing that improves data reliability by introducing a known structure into a data sequence prior to transmission or storage. This structure enables a receiving system to detect and possibly correct errors caused by noise and interference. As the name implies, this coding technique enables the decoder to correct errors without requesting retransmission of the original information. For detailed information about Vbrick's implementation of FEC see the Forward Error Correction (FEC) Theory of Operation topic.

Note: If using FEC you may choose to **Enable UDP Checksums** and you will also need to set the **Max Packet Size** to 1500 bytes or less. Both of these parameters are located on the Encoder Configuration > Programs page.

Transport Stream Settings

- Enable Closed Caption: Enabled
- Enable KLV: Enabled
- Enable MISB Timestamp: Enabled
- Enable Automatic Latency Control: Enabled
- Enable FEC: Enabled
- Number of FEC Columns (L): 10
- Number of FEC Rows (D): 10
- FEC Arrangement Block Aligned: Enabled
- VBR RTP Media Transmit Mode: Constant Rate
- FEC Column Overhead (%): 0
- FEC Row Overhead (%): 0
- Estimated FEC Latency (ms): 0
- Mode: Variable Med Delay
- Bitrate Mode: Variable
- Overhead (%): 10

Field	Description
Enable FEC	Use to enable Forward Error Correction for streams with a Transport Type of MPEG2TS. Default = disabled.
Number of FEC Columns (L)	Range = 1–50. Default = 10. For Constant bit rate Mode, this value must be less than or equal to 20. For Variable bit rate Mode, this value must be less than or equal to 50. If FEC is enabled for this stream, you can configure the interval at which FEC packets will be sent on FEC Stream 2. In addition, it dictates whether or not FEC stream 2 can be enabled at the transmitter level. This setting must be greater than or equal to 4 in order for FEC Stream 2 to be enabled.
Number of FEC Rows (D)	Range = 1–50. Default = 10. For a Constant bit rate, this value must be less than or equal to 20. For a Variable bit rate, this value must be less than or equal to 50. If FEC is enabled for this stream, you can configure the length of the burst packet loss that this stream will be FEC-protected from. It also it dictates the interval at which FEC Stream 1 packets will be transmitted. For example, if FEC Arrangement Block Aligned is enabled, an FEC Stream 1 packet will be transmitted at an interval roughly equal to once for every Number of FEC Rows packets in each configured column in the FEC matrix. Note: If the stream is configured for a Variable bit rate Mode, the product of FEC Rows * FEC Columns must be less than or equal to 256. If the stream is configured for a Constant bit rate Mode the product of FEC Rows * FEC Columns must be less than or equal to 100.
FEC Arrangement Block Aligned	Specifies when the FEC Stream 1 packets are transmitted. Default = Enabled.

Field	Description
VBR RTP Media Transmit Mode	<p>If the MPEG2TS stream Mode is set to one of the variable settings (Low, Medium, or High), this parameter defines how the RTP encapsulated transport stream packets are sent over the network.</p> <ul style="list-style-type: none"> • Constant Rate – Default. With this option Media Datagrams are sent at a constant rate. The number of transport stream packets per Media Datagram varies from 0 to the max transport stream packets per RTP datagram to accommodate the variation in Bit Rate. Default value = 2. • Constant Datagram Size – With this option RTP Media Datagrams are sent with the Max Packet Size defined on the Encoder Configuration > Global page. The rate at which the RTP Media Datagrams are sent varies to accommodate the variation in Bit Rate. Note: Vbrick Support Services can explain how to enable this option. It cannot be enabled from the VAdmin interface.
FEC Column Overhead (%)	Read-only. Shows the amount of overhead added to this stream as a percentage of the total number of RTP packets sent by the stream. The overhead is calculated as $(1 / \text{Number_of_FEC_columns} * 100)$.
FEC Row Overhead (%)	Read-only. Shows the amount of overhead added to this stream as a percentage of the total number of RTP packets sent by the stream. The overhead is calculated as $(1 / \text{Number_of_FEC_rows} * 100)$.
Estimated FEC Latency (ms)	Read-only. The amount of time (in milliseconds) that will be added due to the configured FEC settings. This latency is essentially the equivalent of a fixed network delay.

Transport Stream Settings

Flash Multicast Stream Settings

Enable Forward Error Correction (FEC) on a Stream

Transport Stream PIDs

Transport Stream PIDs

The H.264 transport stream multiplexes the audio and video into a single synchronous bit stream; a demultiplexer then extracts the elementary streams in part by looking for packets with the same Packet ID. A PID is a 13-bit value in the transport packet header. All packets belonging to the same elementary stream have the same PID embedded in the stream that tells the receiver what to do with the packet. Transport Stream packets from the Vbrick encoder have the PIDs shown in Table 1 as defaults.

Table 1. Transport Stream PIDs (Vbrick H.264 Encoder)

PID	Value	Description
Video	33	Video stream.
Audio	36	Audio stream.
Metadata	35	Metadata stream.
PCR	34	Program Clock Reference.

RTP files may also be converted to transport stream files. As part of that conversion process, these transport stream files stored on the VOD-W will have the PIDs shown in Table 2.

Table 2. Transport Stream PIDs (RTP to Transport Stream Converter)

PID	Value	Description
Video	17	Video stream.
Audio	18	Audio stream.
PCR	137	Program Clock Reference.
PMT	16	Program Map Table.

Transport Stream Settings

Flash Multicast Stream Settings

Enable Forward Error Correction (FEC) on a Stream

Transport Stream PIDs

Transmitters

▼ To access the Transmitters fields:

1. Navigate to **Encoder Configuration > Transmitters**.

A **Transmitter** pushes the stream to a configured destination. The destination may be a single endpoint in the case of a unicast, or multiple endpoints in the case of multicast. The transmitter does not directly depend on a client to initiate the streaming but is always transmitting (in the case of multicast) and transmits if the client is reachable and listening (in the case of unicast). The streams are transmitted across the network via RTP, Transport Stream (MPEG2TS), RTMP, or Smooth streaming. A transmitter references a stream to determine Transport Type, Program, Video Rate, Audio Rate, and other parameters. You can configure up to 25 transmitters. An "announce" can also be enabled for each transmitter.

SDP Files

RTP only. Decoders require knowledge of the stream from an .sdp (Session Description Protocol) file before it can be decoded. Each SDP description contains critical stream information such as profile, bit rate, addressing, transmission methods, and content. The decoder (for example StreamPlayer or QuickTime) will examine this file for all necessary configuration information relating to the stream. Upon power-up and service interruption,

Notes:

In **transmitter** mode, a program stream is *pushed* by a transmitter to one or more destinations. It is a constant push and there is no client "request" for the stream.

In a unicast environment, individual copies of the stream are sent from the source to each configured destination. In multicast, the stream is sent from the source only once and a network router transmits the stream to multiple destinations.

To avoid unnecessary network traffic, the transmitter will not send if the network socket fails to connect (has ICMP errors). In addition, Unicast destinations have a configurable Unicast ping option. See the Unicast Ping parameter on the Encoder Configuration > Programs page.

If you wish to retrieve the f4m file via HTTPS, you must replace the IP address with the Fully Qualified Domain Name (as defined by the system and included within the Cert).

the decoder will re-establish stream decoding by relating back to information contained in the SDP file. SDP information may be requested via an RTSP request made from the client to the server whereby the server responds with the same information as contained in an SDP file. The SDP file may also be retrieved via an HTTP server residing either on the encoder or on an external HTTP server. The URL address for the SDP file is based on the transmitter number, for example: **http://<encoder_ip_address>/vbStream1x.sdp** where: **x** is the transmitter number.

Manifest Files

Multicast Flash only. Manifest files for each transmitter can be pasted as a link into a flash player or downloaded from the encoder and served from a location other than the encoder. When the manifest is downloaded, the admin needs to take into account the following considerations in order for a flash player to play from the downloaded manifest file.

With each request to get a manifest file, the flash player will first request a file called crossdomain.xml. Crossdomain.xml is a file that contains information regarding security policies that grant the flash player access to content across domains. This file *must* be in the same directory as the downloaded manifest file. The user can either make his own crossdomain.xml using the instructions from Adobe's Website, or put the manifest file into a directory that already contains a crossdomain.xml file (for example an Adobe server) or the admin can obtain Vbrick's version of crossdomain.xml via FTP or http from the encoder.

This is important due to the fact that the encoder's SSL certificate is self-signed and the Flash plug-in used for IE and Firefox will not play content from a source that has an untrusted certificate. Therefore, if the encoder is configured to only serve VAdmin using https, the admin will have to download the manifest file and serve it from an alternate location for IE and Firefox playback.

Announcements

RTP and MPEG2TS. For multicast applications the SDP information is periodically broadcast to a pre-defined address via multicast announcements. For unicast announcements, a server can be configured to embed an RTSP URL within an announce message so a remote decoder can easily gain access to SDP information and subsequently initiate a Unicast RTP session. In some cases an H.264 stream may be sent to a third-party reflecting server which is not capable of emitting its own SDP announcements. Transmitters and servers can be configured to provide announcements advertising the URL of the reflected stream and/or required SDP information.

Encoder Configuration --> Transmitters

SDP File URL (click to play or save)

Choose Transmitter

Enable Transmitter Enabled

Transmitter Name

Stream Select

Transport Type

Destination

Destination Port

FEC Stream 1 (Columns) Enable Enabled

FEC Stream 2 (Rows) Enable Enabled

[Hide advanced settings](#)

RTCP Transmit Enabled

RTCP Transmit Interval

Announce Session Name Override

Field	Description
SDP File URL	RTP only. Click to play (open) or save the .sdp file. The .sdp file is retrieved via the HTTP server on the encoder. Paste this URL into a browser to launch the stream "out-of-band" using the .sdp file. The URL address for the .sdp file is based on the program and transmitter number, for example: http://AAA.BBB.CCC.DDD/vbStreamXdY.sdp where: X is the program number, Y is the transmitter number and AAA.BBB.CCC.DDD is encoder IP address.
Choose Transmitter	Select from dropdown list. The number of transmitters is configured on the Encoder Configuration > Global page.
Enable Transmitter	Use to individually disable a transmitter. Default = Disabled. The transmitter must be enabled for streaming to occur.
Transmitter Name	Enter a user-friendly name for the selected transmitter.
Stream Select	Select a configured stream.

Field	Description
Transport Type (read-only)	<ul style="list-style-type: none"> • RTP – Default. RTP is supported by the Vbrick 9000 Series decoder. • MPEG2TS – Multiplexes the digital video and audio into one bit stream. Supported by most hardware decoders. • RTMP – Real Time Messaging Protocol. Multimedia streaming protocol used in Adobe Flash. • SMOOTH – Smooth Streaming Transport Type is an IIS Media Services extension that enables adaptive streaming of media to clients over HTTP. • RTMFP (Flash Multicast) – Adobe’s Flash Multicast protocol that enables playback by existing, fielded Flash players removing the need to distribute players for multicast playback.
Destination	<p>Select IP Address or Host Name from the dropdown. The actual IP address determines whether the stream will be multicast (e.g. 239.22.118.72) or unicast (e.g. 127.22.118.72). Default = 127.0.0.1 (loopback). For guidance on selecting multicast address, see the Getting Started Guide > Assigning a Multicast Address section. If using a Host Name, you must configure a Domain Name Server on the System Configuration > Network page.</p> <p>If Auto Unicast, the following caveats apply: (1) this field is the Host Name or IP address of the streaming server; (2) this field does not support multicast IP addresses.</p>
RTP Encapsulation Enable	Use to configure MPEG2TS transmitters to be RTP encapsulated before transmission. FEC requires RTP Encapsulation. Consequently when you enable FEC Stream 1 or FEC Stream 2, RTP Encapsulation is auto-enabled and this parameter is hidden. Conversely, if you do not enable FEC Stream 1 or Stream 2, you still have the option to enable RTP Encapsulation if desired. Default = Disabled.
RTCP Transmit	RTP and MPEG2TS. Allows RTCP sender reports (containing transmission and reception statistics for all RTP packets) to be sent from the Vbrick encoder. Default = Enable.
RTCP Transmit Interval	RTP and MPEG2TS. When RTP Encapsulation is enabled, this parameter tells the encoder how often (in seconds) to send RTCP reports. Default = 10 seconds.
Destination Video Port	RTP only. Destination video port for this transmitter. Note that viewing a unicast and multicast stream (configured on different transmitters) on the same PC or the same decoder may not work if the transmitter ports are the same.
Destination Audio Port	RTP only. Destination audio port for this transmitter.
Destination Port	RTMP and MPEG2TS only.

Field	Description
Announce Session Name Override	<p>RTP and MPEG2TS. Lets you replace the Program Name (on Encoder Configuration > Programs page) with a new name to be used in session announcements, SDP files, and RTSP Describe responses. This is especially useful in multiple bit rate streaming.</p> <p>Rather than having all transmitters use the same Program Name for announcements, an administrator can optionally assign a unique name to each transmitter. Default = blank. This means the Program Name will be used.</p> <p>Note: There is no validation for unique names. If using this feature, the administrator is responsible for creating unique, individual names for each transmitter.</p>

RTMP Transmitter

Auto Unicast Transmitter Mode

Enable Forward Error Correction (FEC) on a Transmitter

Smooth Streaming Transport Type

Transmitter Announce Settings

Transmitter External Announce Settings

RTMP Transmitter

▼ To access the RTMP Transmitters fields:

1. Navigate to **Encoder Configuration > Transmitters**.
2. Select **RTMP** for the **Transport Type** field. Note: You must also have **RTMP** selected as a **Transport Type** on the Streams page before the **RTMP** fields will appear.

Encoder Configuration --> Transmitters

SDP File URL (click to play or save) <http://172.22.2.75/vbStream1T1.sdp>

Choose Transmitter: Transmitter 1 -

Enable Transmitter: Enabled

Transmitter Name: []

Stream Select: Stream 1 -

Transport Type: RTMP

Destination: IP Address 239.22.113.100

Destination Port: 1935

RTMP Application: vbApp

RTMP Stream: vbStream

RTMP Username: broadcast

RTMP Password: [masked]

[Hide advanced settings](#)

Transmit Buffer Size: 512k

RTMP Timecode: Enabled

RTMP DVR Autostart: Enabled

RTMP ID: VBrick

Announce Session Name Override: []

The Real Time Messaging Protocol (RTMP) is a multimedia streaming protocol used in Adobe Flash. To deliver streams smoothly and transmit as much information as possible, it splits streams into fragments and their size is negotiated dynamically between the client and server.

Field	Description
RTMP Application	The RTMP Application name running on the Flash Media Server (FMS). Use any combination of up to 255 alphanumeric and special characters (no spaces).
RTMP Stream	RTMP stream name to transmit to the FMS. Use any combination of up to 500 alphanumeric and special characters (no spaces).
RTMP Username	Username for the FMS. Only used when the FMS requires authentication. Use any combination of up to 20 alphanumeric and special characters (no spaces).
RTMP Password	Password for the FMS. Only used when the FMS requires authentication. Use any combination of up to 20 alphanumeric and special characters (no spaces).

DVR Player Support

The Digital Video Recorder (DVR) recording option is necessary because there is a RTMP message that tells the DVR application to start recording. The Flash Media Live Encoder (FMLE) has separate options for these. These options are set on a per transmitter basis.

Field	Description
Transmit Buffer Size	256k to 16M. Increasing this buffer size will allow for longer network latencies. Use with caution as this will reduce system resources. Default = 1M.
RTMP Timecode	Enable Disable. Default = disable.

Field	Description
RTMP Timecode Frame Interval	1–30 (default = 15). Shown if RTMP Timecode is enabled. Defines how often the timecode is sent in relation to the video frame. For example 15 means the timecode is sent every 15 video frames.
RTMP DVR Autostart	Enable Disable. Default = disable. If enabled instructs the server to enable DVR when the stream starts or restarts.
RTMP ID	Vbrick FMLE. Default = Vbrick. This setting identifies the type of sender to the server and it changes the way RTMP timestamps are created. The Vbrick setting uses absolute frame capture time for RTMP timestamps and it should be used most of the time, including when streaming to an Akamai CDN or VBoss. The FMLE setting may be required for compatibility with older versions of Vbrick's DME and it uses RTMP timestamps that start at zero with the connection to the server which may be required for certain applications like multicast and DVR on the Adobe Media Server.

RTMP Transmitter

Auto Unicast Transmitter Mode

Enable Forward Error Correction (FEC) on a Transmitter

Smooth Streaming Transport Type

Transmitter Announce Settings

Transmitter External Announce Settings

Auto Unicast Transmitter Mode

▼ To enable Auto Unicast on the Transmitters page:

1. Navigate to **Encoder Configuration > Transmitters**.
2. Select a mode for the **Auto Unicast Mode** field. Note: You must also have **RTP** selected as a **Transport Type** on the Streams page before the **Auto Unicast** fields will appear.
3. Complete the remaining **Auto Unicast** fields that appear as needed.

The screenshot shows the 'Encoder Configuration --> Transmitters' interface. The 'SDP File URL' is <http://172.22.2.75/vbStream1T3.sdp>. The 'Choose Transmitter' dropdown is set to 'Transmitter 3 -'. The 'Enable Transmitter' checkbox is checked. The 'Transport Type' is set to 'RTP'. The 'Auto Unicast Mode' dropdown is set to 'Auto Unicast (TCP)'. A red arrow points to the 'Auto Unicast Dest Port' field, which is set to '554'. Other fields include 'Auto Unicast Dest Pub Point Name' (mystream3.sdp), 'Auto Unicast Dest Username' (broadcast), and 'Auto Unicast Dest Password' (masked).

Auto Unicast Mode is a transmitter mode that allows the Vbrick encoder to "automatically" establish and maintain a connection with a streaming server like Quicktime or Darwin. The stream is pushed to a configured publishing point location on an external server to which external clients can connect to retrieve the stream. For example, you can place a Vbrick encoder inside a private network and configure it to **Auto Unicast** to a server on the outside Internet. External clients will then connect to this server via the Internet. Auto Unicast uses RTSP to control the session. It establishes a connection with the streaming server, negotiates media types and ports, and begins streaming to the server. Once established, the encoder will push this stream to the server until the session is terminated (typically by disabling the transmitter).

Field	Description
Auto Unicast Mode	<ul style="list-style-type: none"> • Disabled – Auto Unicast is disabled. • Auto Unicast (UDP) – Push streams to server via UDP. • Auto Unicast (TCP) – Push streams to server via TCP.
Auto Unicast Dest Port	Port used for TCP RTSP control connection to streaming server.
Auto Unicast Dest Pub Point Name	Destination publishing point name on streaming server, for example: <code><server_ip_addr>:<port>/<publishing_point_name></code>
Auto Unicast Dest Username	User name for authentication on streaming server.
Auto Unicast Dest Password	Password for authentication on streaming server.

Table 1. Auto Unicast – Supported Features

Supported Feature	Description
Streaming Servers	<ul style="list-style-type: none"> • Vbrick Distributed Media Engine (DME) • Apple Darwin Streaming Media Server • Wowza Media Server Pro • QuickTime Streaming Server (QTSS)
Transport Types	RTP only.
Transport Protocols	<ul style="list-style-type: none"> • UDP • TCP Interleaved
Security/ Authentication	Basic Digest Authentication (between the encoder and streaming server) is supported. Domain authentication is not supported.

RTMP Transmitter

Auto Unicast Transmitter Mode

Enable Forward Error Correction (FEC) on a Transmitter

Smooth Streaming Transport Type

Transmitter Announce Settings

Transmitter External Announce Settings

Enable Forward Error Correction (FEC) on a Transmitter

- ▼ To enable FEC on a transmitter:
 1. Navigate to **Encoder Configuration > Transmitters**.
 2. Select a **Transport Type** of **MPEG2TS**. Note: You must also have **MPEG2TS** selected as a **Transport Type** and have the **Enable FEC** checkbox selected on the Streams page.
 3. Complete the FEC fields that appear as needed.

The screenshot shows the 'Encoder Configuration --> Transmitters' web interface. The 'FEC Stream 1 (Columns) Enable' and 'FEC Stream 2 (Rows) Enable' checkboxes are both checked and labeled 'Enabled'. A red arrow points to these two checkboxes. Other visible settings include: 'Enable Transmitter' (checked), 'Transport Type' (MPEG2TS), 'Destination' (IP Address 172.22.2.248), and 'Destination Port' (4444).

Note: For more about FEC see [Enable Forward Error Correction \(FEC\) on a Stream](#) and [Forward Error Correction \(FEC\) Theory of Operation](#).

Field	Description
FEC Stream 1 (Columns) Enable	Use to enable FEC Stream 1. If the stream with which a transmitter is associated is FEC enabled, and the transmitter is enabled for RTP encapsulation, the transmitter will send column-generated FEC packets. Default = Enabled.
FEC Stream 2 (Rows) Enable	Use to enable FEC Stream 2. If the stream with which a transmitter is associated is FEC enabled, and the transmitter is enabled for RTP encapsulation, the transmitter will send row-generated FEC packets. Default = Enabled.
RTP Encapsulation Enable	Use to configure MPEG2TS transmitters to be RTP encapsulated before transmission. FEC requires RTP Encapsulation. Consequently when you enable FEC Stream 1 or FEC Stream 2, RTP Encapsulation is auto-enabled and this parameter is hidden. Conversely, if you do not enable FEC Stream 1 or Stream 2, you still have the option to enable RTP Encapsulation if desired. Default = Disabled.

RTMP Transmitter

Auto Unicast Transmitter Mode

Enable Forward Error Correction (FEC) on a Transmitter

Smooth Streaming Transport Type
Transmitter Announce Settings
Transmitter External Announce Settings

Smooth Streaming Transport Type

- ▼ To access Smooth Streaming fields on a Transmitter:
 1. Navigate to **Encoder Configuration > Transmitters**. Note: You must also have **SMOOTH** selected as a **Transport Type** on the Streams page before the **Smooth Streaming** fields will appear.
 2. Complete the **Smooth Streaming** fields that appear as needed.

Smooth Streaming is a transport type used by Microsoft's IIS (Internet Information Services) server. Smooth Streaming dynamically detects local bandwidth and CPU conditions and seamlessly switches the video quality of a media file a player receives. Smooth Streaming is "adaptive" in that multiple video rates are delivered in one stream and the IIS server decides which stream to serve to the client. This means that viewers with high-bandwidth connections can view high definition quality streaming while viewers with lower bandwidth connections will receive a stream appropriate for their connectivity. With Smooth Streaming the video/audio is encoded into short segments that are hosted on an IIS HTTP web server.

Vbrick Smooth Streaming supports up to three Video Rates and one Audio Rate. Vbrick Smooth Streaming does not support serving, archiving, closed captions, or multicast.

Table 1. Smooth Streaming Requirements

Field	Description
IIS Web Server	Microsoft IIS (6.0 or higher) or compatible web server.
Streams Supported	4 supported streams.
Transmitters Supported	1–25 transmitters (no serving, archiving, closed captions, or multicast).
IDR Frame Interval	IDR Frame Interval must be 1 or 2 seconds (not zero). All Video Rates included in the stream must have the same Target Frame Rate and IDR (configured on the Encoder Configuration > Video page).

Encoder Configuration --> Transmitters

SDP File URL (click to play or save) <http://172.22.113.3/vbStream1T5.sdp>

Choose Transmitter: Transmitter 5 - ▾

Enable Transmitter: Enabled

Transmitter Name:

Stream Select: Stream 1 - ▾

Transport Type: SMOOTH

Destination: IP Address ▾ 172.22.2.248

Destination Port: 80

Smooth Streaming Dest Pub Point Name: VBLiveSmoothStream.ism

Smooth Streaming Username: broadcast

Smooth Streaming Password:

Smooth Streaming Domain:

Generated Smooth Streaming Event ID:

[Hide advanced settings](#)

Field	Description
Smooth Streaming Dest Pub Point Name	Destination publishing point on IIS server. Use any combination of up to 254 alphanumeric and special characters (no spaces).
Smooth Streaming Username IIS Username	Only used when IIS requires authentication. Use any combination of up to 20 alphanumeric and special characters (no spaces).
Smooth Streaming Username IIS Password	Only used when IIS requires authentication. Use any combination of up to 20 alphanumeric and special characters (no spaces).
Smooth Streaming Domain	Use for authentication through a different domain controller. For example If the server is on a domain but a local name will be used for authentication, enter the server name. Use any combination of up to 255 alphanumeric and special characters (no spaces).
Generated Smooth Streaming Event Id	Read-only. This auto-generated string is used to facilitate backup encoders streaming to the same IIS server.

RTMP Transmitter

Auto Unicast Transmitter Mode

Enable Forward Error Correction (FEC) on a Transmitter

Smooth Streaming Transport Type

Transmitter Announce Settings

Transmitter External Announce Settings

Transmitter Announce Settings

▼ To access Announce Settings fields for a Transmitter:

1. Navigate to **Encoder Configuration > Transmitters > Announce Settings** section.

This section contains parameters that are used to modify announcements from the encoder. Announcements are advertisement packets that are transmitted by Vbrick encoders to other Vbrick encoders and Vbrick applications such as the VEMS Portal Server or StreamPlayer. An announce is also required if you will be streaming to a Vbrick 9000 Series decoder. They are used to identify Vbrick streams present in the network. **Announce Settings** are used with RTP and MPEG2TS; **External Announce** is used with all transport types.

Announce Settings	
Announce	<input checked="" type="checkbox"/> Enabled
Use Global Announce IP and Port	<input checked="" type="checkbox"/> Enabled
Send To Unicast Destination	<input type="checkbox"/> Enabled
Destination IP Address	224.2.127.254
Destination Port	9875

Field	Description
Announce	RTP and MPEG2TS only. This section is used to announce the stream to the local network allowing viewable announcements in programs like StreamPlayer, VBDirectory, or a 9000 Series decoder. The unit must be on the same segment of the network or the router must be configured to retransmit broadcast packets for the announcements to be accessible using the IP address 255.255.255.255.
Use Global Announce IP and Port	Use Announce Settings (IP Address for Transmitters and Port) defined on Encoder Configuration > Programs page. If checked, the Destination IP Address and Destination Port fields are greyed out.
Send to Unicast Destination	If enabled and the destination is unicast, the unicast IP address is used for the announcement and the Destination field is greyed out. Default = Disabled.
Destination IP Address	The destination IP Address or Host Name the announcement is sent to. By default, the announcement is sent to the multicast network. <i>If using an VEMS Portal Server, enter the Portal Server IP address.</i>

Field	Description
Destination Port	The destination port the announcement is sent to.

RTMP Transmitter

Auto Unicast Transmitter Mode

Enable Forward Error Correction (FEC) on a Transmitter

Smooth Streaming Transport Type

Transmitter Announce Settings

Transmitter External Announce Settings

Transmitter External Announce Settings

▼ To access External Announce Settings fields for a Transmitter:

1. Navigate to **Encoder Configuration > Transmitters > External Announce Settings** section.

These settings configure an external announcement that can be used when the stream is reflected to a third-party server or a Vbrick reflector.

External Announce Settings	
External Announce	<input type="checkbox"/> Enabled
Use Global Announce IP and Port	<input checked="" type="checkbox"/> Enabled
Destination IP Address	224.2.127.254
Destination Port	9875
URL	

Field	Description
External Announce	This section is used to announce RTSP streams to a network device outside of the broadcast domain.
Use Global Announce IP and Port	Use Announce Settings (IP Address for Transmitters and Port) defined on Encoder Configuration > Programs page. If checked, the Destination IP Address and Destination Port fields are greyed out.
Destination IP Address	The destination IP Address or Host Name the announcement is sent to. If using an VEMS Portal Server, enter the Portal Server IP address. If using a reflector, enter the reflector server IP address.
Destination Port	The destination port the announcement is sent to.
URL	The URL of the reflector (i.e the source of the reflected stream). This URL is embedded in the announcement.

RTMP Transmitter

Auto Unicast Transmitter Mode

Enable Forward Error Correction (FEC) on a Transmitter

Smooth Streaming Transport Type

Transmitter Announce Settings

Transmitter External Announce Settings

Vbrick Rev Transmitter Settings

To use a 9000 encoder to live stream video to a Vbrick Rev Webcast Event, specific Transmitter settings are recommended.

▼ To access the Transmitters fields:

1. Navigate to **Encoder Configuration > Transmitters**.

A **Transmitter** pushes the stream to a configured destination. When configuring a stream to transmit to Vbrick Rev for live streaming for a Webcast Event, the encoder is used as a video source and a DME is set as the destination. Use the fields below for Rev specific settings to accomplish this. Otherwise, the default values may be used as described in the Transmitters Online help topic in the 9000 encoder Admin help.

Encoder Configuration --> Transmitters

SDP File URL (click to play or save) <http://172.22.113.3/vbStream1T1.sdp>

Choose Transmitter Transmitter 1 - HQ Conferen... ▼

Enable Transmitter Enabled

Transmitter Name

Stream Select Stream 1 - ▼

Transport Type RTP

Destination IP Address ▼ 172.22.113.4

Auto Unicast Mode Auto Unicast (UDP) ▼

Auto Unicast Dest Port

Auto Unicast Dest Pub Point Name

Auto Unicast Dest Username

Auto Unicast Dest Password

[Show advanced settings](#)

Setting	Description
Stream Select / Transport Type	Make sure the Stream Select / Transport Type setting is an RTP stream.
Destination	This should be the DME IP Address you plan to use as a Destination. Make sure that no http or https or slashes are used as well as no port. Only the IP address should be entered here.
Auto Unicast Mode	Auto Unicast mode must be enabled. Auto Unicast UDP is the recommended setting.

Setting	Description
Auto Unicast Destination Port	This <i>must</i> be changed to 5544.

2. Click the **Show advanced settings** link.
3. Set your Stream Name in the **Announce Session Override** field. This will be the name used in the Rev Presentation Profile as a playback URL so try to use a descriptive name. A good rule of thumb is to use a name that matches the video source being used so that you remember where the video is coming from. Avoid special characters and spaces, including underscores.



Servers

- ▼ To access the Servers fields:
 1. Navigate to **Encoder Configuration > Servers**.

The Vbrick 9000 encoder is also a streaming server and can be controlled by a remote decoder client via RTSP and RTCP protocols. In server mode, a served stream does not become active on the network until requested by a client. The client may be a software player like StreamPlayer, or a QuickTime player on a PC or a Macintosh. The user requests a stream from the encoder by directing the decoder client to issue an RTSP request to the URL of the Vbrick H.264 encoder. The client and the encoder then exchange a sequence of RTSP messages to direct the encoder to send the program to the client. Multiple servers are available. A server references a stream to determine Transport Type, Program, Video Rate, Audio Rate, and other parameters. A server can be configured as RTP or MPEG2TS (Transport Stream). RTMP and Smooth are not supported. An RTP server also accepts RTSP interleaved and HTTP tunneled requests from a client.

Note: In **server** mode, a program stream is *pulled* from a server. In this mode, a served program does not become active on the network until requested by a decoder client like StreamPlayer or QuickTime.

Encoder Configuration --> Servers

[Click Here to Play Stream](#)

Choose Server to Configure Server 1 - ▾

Enable Server Enabled

Server Name

Stream Select Stream 1 - ▾

Transport Type RTP

Resource Name

Stream URL rtsp://172.22.113.3/vbStream1S1

[Hide advanced settings](#)

RTCP Transmit Enabled

RTCP Transmit Interval

Announce Session Name Override

Field	Description
Click Here to Play Stream	Edit Mode/Read-only. Shown in Edit mode only if the server is enabled and RTP selected for Transport Type. Click once to launch the stream in the QuickTime plugin (using the SDP file). This link will work only with QuickTime 7.0 or higher. If QuickTime is not installed, you will be prompted to download the application from Apple .
Choose Server to Configure	Select from dropdown list. The number of servers is configured on the Encoder Configuration > Global page.
Enable Server	Check to enable the server. Default = enabled. The server must be enabled for streaming to occur
Server Name	Enter a user-friendly name for the selected server.
Stream Select	Select a configured stream from the dropdown.
Transport Type (read-only)	<ul style="list-style-type: none"> • RTP – Default. Realtime transport protocol provides end-to-end network transport functions suitable for video. • Transport Stream – Multiplexes the digital video and audio into one bit stream.
Resource Name	Defines the server URL. Default = vbStream1SX where X is the server number.
Stream URL (read-only)	Use this URL in the decoder to view the stream via RTSP.
RTCP Transmit	RTP only. Enable allows RTCP sender reports to be sent from the Vbrick encoder. Default = Enable.
RTCP Transmit Interval	RTP only. If RTCP Transmit is enabled, this setting tells the encoder how often (in seconds) to send the reports. Default = 10 seconds.

Servers Announce Settings

Servers External Announce Settings

Servers Announce Settings

▼ To access Announce Settings fields for a Server:

1. Navigate to **Encoder Configuration > Servers > Announce Settings** section.

This section contains parameters that are used to modify announcements from the encoder. Announcements are advertisement packets that are transmitted by Vbrick encoders to other Vbrick encoders and Vbrick applications such as the VEMS Portal Server and StreamPlayer. They are used to identify streams present in the network.

Announce Settings	
Announce	<input checked="" type="checkbox"/> Enabled
Use Global Announce IP and Port	<input checked="" type="checkbox"/> Enabled
Destination IP Address	<input type="text" value="255.255.255.255"/>
Destination Port	<input type="text" value="9875"/>

Field	Description
Announce	This section is used to announce the RTSP streams to the local network allowing viewable RTSP announcements in programs like StreamPlayer. The unit must be on the same segment of the network or the router must be configured to retransmit broadcast packets for the announcements to be accessible using the IP address 255.255.255.255. Default = disabled.
Use Global Announce IP and Port	Use Announce Settings (IP Address for Servers and Port) defined on Encoder Configuration > Programs page. If checked, the Destination IP Address and Destination Port fields are greyed out.
Destination IP Address	The destination IP address the announcement is sent to. By default, the announcement is sent to the multicast network. <i>If using an VEMS Portal Server, enter the Portal Server IP address.</i>
Destination Port	The destination port to which the announcement is sent.

Servers Announce Settings

Servers External Announce Settings

Servers External Announce Settings

▼ To access External Announce Settings fields for a Server:

1. Navigate to **Encoder Configuration > Servers > External Announce Settings** section.

These settings configure an external announcement that can be used when the stream is reflected to a third-party server or a (future) Vbrick reflector.

External Announce Settings	
External Announce	<input type="checkbox"/> Enabled
Use Global Announce IP and Port	<input checked="" type="checkbox"/> Enabled
Destination IP Address	255.255.255.255
Destination Port	9875
URL	

Field	Description
External Announce	This section is used to announce RTSP streams to a network device outside of the broadcast domain.
Use Global Announce IP and Port	Use Announce Settings (IP Address for Servers and Port) defined on Encoder Configuration > Programs page. If checked, the Destination IP Address and Destination Port fields are greyed out.
Destination IP Address	The destination IP Address or Host Name the announcement is sent to. If using a Portal Server, enter the Portal Server IP address. If using a reflector, enter reflector server IP address.
Destination Port	The destination port the announcement is sent to.
URL	The URL of the reflector (i.e the source of the reflected stream). This URL is embedded in the announcement.

Servers Announce Settings

Servers External Announce Settings

Archivers

▼ To access the Archivers fields:

1. Navigate to **Encoder Configuration > Archivers**.

Transport Streams only. An **Archiver** is used to store a local copy of a stream on existing internal or external hard drives.

Archivers reference a stream which is comprised of the following 3 components:

- Video Rate
- Audio Rate
- Transport Type.

Archiving can be controlled locally using the **Start** and **Stop** buttons or it can be controlled from VEMS. VEMS can start and stop an archive and FTP files to and from the encoder. You can also set the start **Mode** to **Automatic Start** and the archiver will automatically start when you power on the encoder or insert an external storage device. Archiving can also be started in Presenter encoders by pressing the **Record** button.

The encoder supports a variety of internal and external storage devices. If the encoder is configured with a storage device, you can create an archive of any **MPEG2TS** transport stream. Once the archiving is complete, the file can be moved or FTPed to a VOD server, a file server, a Windows PC, or any FAT32 device. It can also be Auto-FTPed to an Shared

Archivers External FTP/SFTP Server Settings if present. The H.264 supports four archivers configured on the Program Configuration > Global page.

Note that any change in the configuration settings for an encoder will cause a brief interruption of the video and audio stream. If this happens all streams being sent from the encoders (including multicast) are interrupted and any active HTTP or RSTP clients are dropped. If an archive is in progress when an interruption occurs, the archiver will stop and the file will be saved and closed.

Note: Although internal and external storage devices can store thousands of files, it is important to understand that each device has a finite capacity. For best results, periodically purge unnecessary files from your devices.

Enable Batch Mode and Archive a Batch File

Use an External (USB) Device to Archive a Stream

Enable Rev Metadata (JSON)

Enable Batch Mode and Archive a Batch File

▼ To enable Batch Mode and archive a Batch File:

1. Navigate to **Encoder Configuration > Archivers**.
2. Click the **Enable Batch Mode** checkbox.
3. Complete the Archiver fields as needed.

Batch mode records video in pieces. It allows a DME to transfer segments of a conference, event, training session, or any video, to a remote device while continuing to record. Batch processing minimizes the delay inherent with store-and-forward video while providing video in near-real time.

A batch file is one of a group of files that are handled as a single entity. The **Filename** is the base file name of the batch, for instance **filenamexxx.ts**. Four digits are reserved at the end of the base file name to signify the index number of the batch file. Index numbers are assigned to the base file name as the files are recorded (for example **filename0000.ts** through **filename9999.ts**).

Note: The maximum size of each batch file is 4GB. Be aware that if you configure the archiver to record the maximum number of batch files (9999), you can *easily* exceed the storage capacity of the hard drive (typically 500GB).

Batch Wrap Point and Record Duration

A batch **Wrap Point** sets the number of files to be recorded. When the specified number of files has been recorded, the previously recorded files will be deleted and recorded over, starting with the first file. For example, if the batch **Wrap Point** is set to 10, and the **Filename** is **test.ts**, the files will be recorded from **test0000.ts** to **test0009.ts**. After **test0009.ts** is recorded, the archiver will start recording again at **test0000.ts**.

When batch mode is enabled, **Archive Duration** controls the total time recorded (adding up all the files in the batch) and **Batch Duration** controls the amount of time recorded into each file

in the batch. When batch mode is *disabled*, **Archive Duration** controls the time recorded into the (one) file and the **Batch Duration** setting is not used.

The **Archive Duration** can be set to a specific number of seconds or **Continuous**. For example, if the duration is set for 1800 seconds (1 hour), the archiver will start writing over the previously recorded files after an hour. If set to **Continuous**, the archiver will start writing over the previously recorded files when it reaches the **Wrap Point** (i.e. the maximum number of files).

Note: If the archiver encounters an interruption in file transfer during batch recording, the file being recorded and the next file will both be affected. The file in the process of being replaced will be partially recorded. The next sequential file that was deleted to get ready for receiving data will be missing.

Enable Batch Mode and Archive a Batch File

Use an External (USB) Device to Archive a Stream

Enable Rev Metadata (JSON)

Use an External (USB) Device to Archive a Stream

The external storage devices shown in Table 1 below have been tested and verified by Vbrick. Devices from other manufacturers may work but have not been tested and are not supported. USB devices are portable and can be easily moved to any compatible device with a USB port. *USB storage devices must be formatted before initial use and must be safely removed when done.*

Note: The encoder only supports external drives with one partition. If you insert a drive with more than one partition, only the first partition will be used. This will not affect drive performance and you can safely ignore the "Failed to mount" or similar message.

- ▼ To attach and configure an external storage device:
 1. Connect a recommended external storage device to the USB port on the encoder (or to a blade in a rack mount shelf) using the vendor-provided cable.
 2. Go to the Monitor > Monitor the System page and click **Edit**.
 3. Click **Format** in the External device column and wait for the status to change from **None** to **Formatted**. This may take a few moments depending on the size of the device.
 4. When ready you can enable the archiver and stream to the device as necessary.
 5. When done go back to the to the Monitor > Monitor the System page, click **Eject**, and wait for a message before you can safely remove the device.

Note: Versions of 9000 Series hardware prior to 3.0 do not reliably support USB hard drives that are powered from the USB port (and do not have their own power supply.) Board Assemblies 6106-0000-0200 and higher do support USB-powered hard drives. To check your **Board Assembly Number** go to the Monitor > Monitor Manufacturing Information page.

Table 1. Recommended External Storage Devices

	Vendor	Model	Capacity	Part Number
USB Hard Drives	Western Digital †	WD Elements SE Portable	1 TB USB 3.0	WDBPCK0010BBK-NESN
	Seagate	Backup Plus	1 TB USB 3.0	STCA1000100

† See note above. This powered via USB hard drive requires Board Assembly 6106-0000-0200 or higher.

Field	Description
Choose Archiver	Select a configured archive. Four archivers can be configured and enabled.
Enable Archiver	Check to enable the specified archive.
Stream Select	Select a configured MPEG2TS stream from the dropdown.
Storage Location	The encoder can be configured with a variety of internal and external storage devices. Select an option that matches your device. (The Monitor > Monitor the System page shows the storage devices currently installed as well as the Total Space and total Free Space .) <ul style="list-style-type: none"> Internal Drive (D:) External USB (E:) – Any user-provided USB drive not exceeding 2 TB. Table 1 shows recommended devices.
Storage Location Status	Ready Not Ready

Field	Description
Mode	<ul style="list-style-type: none"> • User Controlled – Default. The user controls which streams to record using the Start and Stop buttons. • Automatic Start – The archiver will automatically start when the encoder is powered on. If the archiver is an external USB drive, it will start or stop when drive is inserted or removed.
Filename	<p>The name of the file to be recorded. The default file name for the file is Archiver_n_>D>T.ts. The general format of the file name is [/path/] filename.ext. The default path will place the recorded files in the root directory of the hard drive.</p> <p>The H.264 encoder has a built-in FTP Server that lets you move files to or from the archiver via anonymous FTP. You can access the following public folders via FTP without the need for a user name or password:</p> <p>D:/Public – public folder on internal drives. E:/Public – public folder on external drives.</p> <p>The archiver can automatically add current date, time, host name, etc. to the file name when it creates a new file by configuring it to contain any of the following special strings:</p> <p>\P – full Program name >P – shortened program name. Strips all non-alphanumerics. \H – host name \D – Date long mm-dd-yy >D – Date short mmddyy \Y – not used “\” is ignored >Y – Date yyyyymmdd >T – Time hhmm \R – Release x_y_z >R – not allowed</p> <p>These special strings may be inserted anywhere in the filename and more than one string may be used. The following rules also apply:</p> <ul style="list-style-type: none"> • Limited to 24 characters (21 in batch mode) with a 3-character extension and a 25-character path name. • Only extensions of .ts and .mpg are allowed. .ts is the default. • A period after the filename must be followed by an extension. • Spaces are allowed but leading spaces are stripped. • The following characters are <u>not</u> allowed: : " * ? < > []
Archive Duration (seconds)	<p>The length of the recorded file when batch mode is disabled, or the length of the entire batch when batch mode is enabled. Range 0–43200 (12 hours) or Continuous. The default (0) implies a manual Start/Stop and will auto-select Continuous. For best results and usable video, set the archive duration to 10 seconds or more.</p>

Field	Description
Enable Batch Mode	Default = Enabled. If enabled, the recorder will create a series of files and the files will be numbered incrementally. To create a "forever archive," check Enable Batch Mode and set Existing File Mode to Overwrite .
Batch Duration (seconds)	Used only when batch mode is enabled to set the length of time recorded into each of the files in a batch. Range 30–7200 sec (12 hours) or check Maximum . Default = zero (no limit).
Wrap Point	Used with Batch Mode. Default = 20. Sets the number of batch files (2–9999) that will be recorded before "wrapping over" the previously recorded files (from lowest to highest batch number).
Existing File Mode	<ul style="list-style-type: none"> • Overwrite – Default. The archiver will automatically overwrite an existing file with the same name. • Error on Duplicate – The archiver will display an error message and <u>not</u> overwrite an existing file with the same name. Not allowed if start Mode is Automatic Start.
Archiver Status	Archiving Stopped Disabled Error
Start Archiver	Click to manually start archive.
Stop Archiver	Click to manually stop archive.
Last Archived File	Read-only. Last archived file name.
Auto-FTP After Archive	<ul style="list-style-type: none"> • None – Do not FTP the file after archiving. • Auto FTP – Automatically FTP the file and save copy on encoder. • Auto FTP then Delete – Automatically FTP the file and delete from encoder.
FTP Status	Status of last FTP transfer. See FTP Status and Control more about FTP status.
FTP Last Archived File	Click FTP Now to FTP the last file that was archived.
FTP Last Archived File Then Delete	Click FTP Then Delete to FTP the last file that was archived and then delete it from the Archiver's hard drive or USB drive.

Note: Use the Monitor > Monitor the System page (seen below) to format, reset, or safely remove a USB drive. Use the Monitor > Monitor Archivers page to check the current status of the archiver(s).

Monitor --> System		
System Information		
System Model	HPS 9000 Encoder	
Hardware Revision	263 - 0	
Boot Revision	2.30 - 04/15/13 15:21	
Application Code Revision	103.0.15 - 06/11/13 20:58	
Current Operational Mode	Run	
Temperature	40°C	
Fan Status	On	
Overloaded Count	0	
CPU Utilization (%)	15	
System Up Time	6 days 04:40:42	
Total System Up Time	00:157 02:53 (yr.day hr.min)	
System Date & Time	6/19/2013 11:57	
Storage Information		
	Internal	External
State	Ready	Ready
Type	WDC WD10JPVT-00A1YT0	Lexar - USB Flash Drive
Total Space	1,000,204,837,376	31,406,876,672
Free Space	969,051,635,712	22,518,448,128
Format Status	Formatted	Formatted
Format Storage	<input type="button" value="Format"/>	<input type="button" value="Format"/>
Reset	<input type="button" value="Reset"/>	<input type="button" value="Reset"/>
Safely Remove Device	Not Supported	<input type="button" value="Eject"/>
Check	You must be in Diagnostics Mode to perform a check.	

Enable Batch Mode and Archive a Batch File

Use an External (USB) Device to Archive a Stream

Enable Rev Metadata (JSON)

Enable Rev Metadata (JSON)

Vbrick encoders can automatically forward content to DMEs or other SFTP/FTP locations. This feature is designed to create a Rev metadata JSON file in association with the recording. While users can connect and FTP the recordings and metadata off of the encoder, this feature was designed to work in tandem with the DME EdgeIngest capability. By configuring this feature and the auto FTP feature to a Rev-enabled DME EdgeIngest folder for an archiver, recordings will automatically be ingested into Rev.

▼ To enable Rev Metadata (JSON):

1. Navigate to **Encoder Configuration > Archivers**.
2. Click the **Enable Rev Metadata** checkbox in **Edit** mode.
3. Complete the Archiver fields as needed. (Reminder: Please verify your automatic FTP settings to a Rev-enabled DME EdgeIngest folder for automatic Rev upload.)

Rev Metadata (JSON)	
Enable Rev Metadata	Disabled
Title	Recorded on >D >T at \H
Description	
Uploader	
Tags	
Enable Comments	Disabled
Enable Ratings	Disabled
Enable Downloads	Disabled
Is Active	Enabled
Video Access Control	Private

Field	Description
Enable Rev Metadata	This controls if a metadata JSON file is created for each of the archiver recordings. The metadata file will contain all the following fields. Note: JSON has particular formatting rules, so please be mindful if you edit the file as it may fail uploads from the DME to Rev. Your uploads from the DME to Rev can be checked in the DME Upload Log.
Title	Enter the Title of the Video. This will be the title for all videos recorded using this archiver, so please plan accordingly and use a generic name. For example, "Video from Conference Room A"
Description	A detailed Description of the video. This will be available and viewable, based on user access controls within Rev associated with your video.
Uploader	Required. This is the Rev account owner of the video.
Tags	These are free form tags that are associated with the Video within Rev. These can be used for searching and sorting videos.
Enable Comments	This allows enabling (or disabling) Rev based users, with appropriate access control, to add comments to the video.
Enable Ratings	This allows enabling (or disabling) Rev based users, with appropriate access control, to add ratings to the video.
Enable Downloads	This allows enabling (or disabling) Rev based users, with appropriate access control, to download a copy of video from Rev.
Is Active	This allows enabling (or disabling) Rev based users setting the status of a video to an Active state.
Video Access Control	This allows selection of the Access Control to Private, All Users, or, if configured, to Public.

Enable Batch Mode and Archive a Batch File

Use an External (USB) Device to Archive a Stream

Receiver Configuration

Receivers

If you are working with a Presenter or a 9000 with a Presenter Feature key, v4.3 introduces “Stream to Presenter”. This capability allows users to incorporate network RTSP/UDP streams into their presentation.

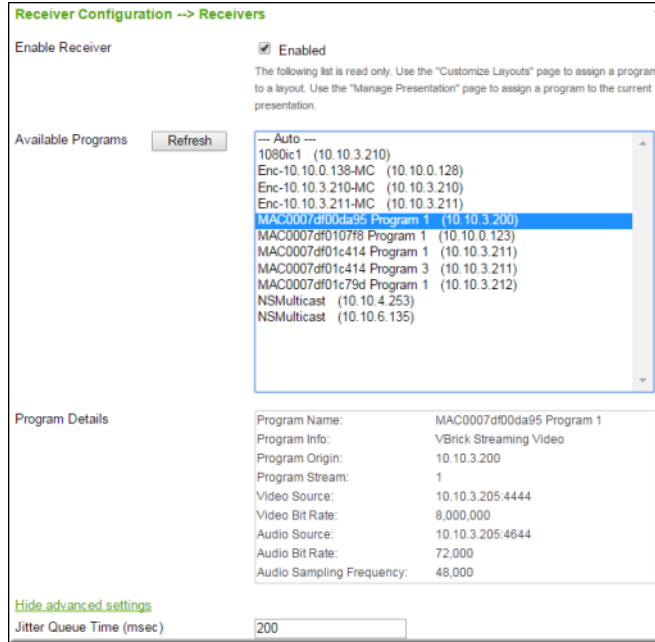
When you enable **Receivers** in the **Receiver Configuration** menu, you will be able to select a network stream for use as a source when you customize a layout for presentations. See: [Customize Presenter Mode Layouts](#) for details.

Note: The **Receiver Configuration** menu (and its options) will not be visible unless you are using a Presenter or a 9000 Encoder with a Presenter Feature key.

If you have a 9000 Decoder model, please view the **Decoder Configuration > Receivers** topic.

- ▼ To access the Receivers fields:
1. Navigate to **Receiver Configuration > Receivers**.

Tip: You must be in **Edit** mode to view all fields on this page.



Field	Description
Enable Receiver	Check box to enable disable receiver. Enabling Receivers will make the network streams in the Available Programs list selectable as a video area source when customizing a layout for Presenter Mode. See: Customize Presenter Mode Layouts.
Available Programs	Click the Refresh button to refresh list of available programs. During program set up, consider developing a naming convention as a best practice for your business. The encoder will be displaying all remote SAP messages here from various encoders. If a naming convention is not developed, as seen in the image above, figuring out which one to use as a network source will be difficult. Consider naming your streams based on their locations or what content they serve (such as "news" or "weather") if applicable so that there is no confusion when the source is selected on the layout pane. Note that if “Encrypted” appears after the program name, the stream is encrypted. View the topic on Encryption for details.
Program Details	Displays the details of the currently highlighted program in Available Programs including the currently assigned encryption key if applicable. The program is not actually selected until you click Apply . Note: When changing programs, there may be a delay of up to 20 seconds on the output device.

Field	Description
Jitter Queue Time	Advanced Setting. Range 0–800 ms. Default = 200 ms. Jitter is the variation in time between packets of data arriving at the decoder. The amount of jitter present in a media stream depends on (1) the capabilities and configuration of the encoder creating the stream and (2) on the network carrying the stream from the encoder to the decoder. The decoder can compensate for jitter by buffering extra data so that playback can be smooth and consistent even when the data stream has bursts and droughts—but adding extra buffering to handle jitter has the disadvantage of adding latency. The Vbrick 9000 Series decoder has an adjustable Jitter Queue Time so you can choose the right balance between handling jitter and achieving low latency. The default setting of 200 ms works well when the decoder is playing streams from Vbrick 9000 Series encoders over a good network and will result in low end-to-end latency of approximately 300 ms. The Jitter Queue doubles as a re-ordering queue so if your network delivers packets out of order you can increase the Jitter Queue time to compensate. If your decoder will be playing streams from a Vbrick 7000 Series encoder, you should configure the Jitter Queue Time to 600 ms or higher. For more information see Automatic Latency Control .

Tip: If the network source you want to use does not have a SAP that is displaying in the Available Programs list, Configure a New RTSP URL.

Announce Receive Settings

Announce Receive Settings may be viewed when the **Advanced Settings** hyperlink is clicked.

Field	Description
Announce IP Address	The IP address that announcements are being received on. This must match the address the transmitter is using.
Announce Port	The port that announcements are being received on. This must match the port the transmitter is using.
Announce Timeout	If no announcements are received after this configurable timeout period, the connection is dropped and the entry is removed from the table of available programs on the Receiver Configuration > Receivers page. Default = 90 sec.

RTSP URLs









The **RTSP URLs** page can be used to create a custom RTSP URL and is normally used for a network source that does not have a SAP announcement. You must be in **Edit** mode to view and change most fields on this page.

▼ To access the RTSP URLs fields:

1. Navigate to **Receiver Configuration > RTSP URLs**.

Receiver Configuration --> RTSP URLs

Configured RTSP URLs

	URL Name	URL	Transport
 	Test	rtsp://172.22.185.100/vbStream1S1	UDP
 	Mirror	rtsp://10.10.0.135/vbStream1s1	UDP
 	Another Test	rtsp://10.10.3.215/s720p.sdp	UDP
 	Test 44	rtsp://198.64.249.22:554/mbc.sdp	UDP

RTSP URL Details:

Host: 172.22.185.100
Resolved IP Address: 172.22.185.100
Port: 554
Server URL: vbStream1S1
User Name:
Password:

Configure New RTSP URL

Name:
Data Transport:
URL:

Field	Description
URL Name	The name that is used to describe your custom RTSP URL.
URL	The RTSP URL.
Transport	The data transport type; UDP is only available at this time.
Trash Edit	Use the trash and pencil icons to delete and edit the selected RTSP URL respectively.

Configure a New RTSP URL

You must be in **Edit** mode to configure a new RTSP URL..

Field	Description
Name	The name that is used to describe your custom RTSP URL. The same best practice that is used for Receivers should be considered when creating your own RTST URLs. That is, consider developing a naming convention for your streams based on their locations or what content they serve (such as "news" or "weather") if applicable so that there is no confusion when the source is selected on the layout pane.
Data Transport	The data transport type; UDP is only available at this time.
URL	The RTSP URL. If your RTSP requires authentication, the syntax to enter a user name and password is: testing:test@IP This is the only format that Vbrick supports at this time.
Add URL	Click the Add URL button to add the newly created stream to the encoder. You must also click Apply and Save to complete the configuration.
Clear Fields	Click the Clear Fields button to erase all entered information and start over.



Presentation Features

Presentation Features Overview

Presentation features support the ability for end users to stream video and Webcasts directly from the H.264 using an intuitive Presenter Mode interface. Presenter Mode is based on layouts defined by an account admin which are covered in this topic. When streaming, the presenter may dynamically switch between layouts and video inputs without interruption to the video stream and without the need to restart the player. Layout configuration values may also be seamlessly switched as well including the background color and image, borders, and margins. This provides the ability to create very compelling video Webcasts. Note: These seamless transitions do not apply to changing encoding values within VAdmin.

This topic covers how to use presentation features to set up layouts, video sources, and so forth for presentations. How to use Presenter Mode to run a presentation that has been previously configured by an admin is covered in the Presenter Mode User Guide.



Note: The presentation features discussed in this topic are applicable to the Presenter encoders (number p/n 9311-1612-100) and any 9000 that has the Presenter Mode enabled (System Configuration > General > Additional System Settings for enabling Presenter Mode). As a reminder, not all encoders may use Presenter Mode.

The following video hardware is supported in the Presenter encoder:

- Slot 1 Dual HDMI(DVI)/VGA Input AVM
- Slot 2 Dual HDMI/Component Input AVM
- Internal SATA drive

Presenter Mode Login

If enabled by an admin, the **Manage Presentation** button will appear on the **Login** screen which will enable an end user to go directly to Presenter Mode without the need to log in to VAdmin first. This button is seen in the image below.



Note: If access without log in is enabled, Presenter Mode may also be accessed by direct URL as well by accessing the Presenter encoder's name or IP address. The full URL is: `http://<presenter encoder name or IP>/presenter.htm`

If Presenter Mode has *not* been enabled, the **Manage Presentation** button will not be present on the Login screen and logging in will be required. An admin may disable this button so that log in is required. (See: [Disable Presenter Mode Access from the Login Screen](#))

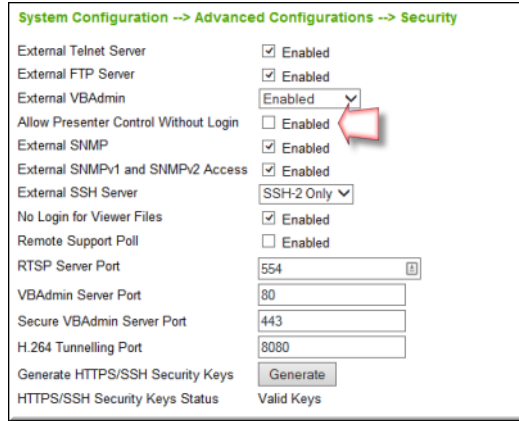
Presenter Mode must then be accessed by clicking on the **Manage Presentation** button within the VAdmin interface. See: [Access Presenter Mode and Controls](#).

For information on how to use the Presenter Mode interface itself, see: [Presenter Mode User Guide](#).

Disable Presenter Mode Access from the Login Screen

The ability to access Presenter Mode from the Login screen without logging in is enabled by default. To remove this ability you must disable the **Manage Presentation** button from the Login screen.

- ▼ To disable Presenter Mode access from the Login screen:
 1. Navigate to **System Configuration > Advanced Configuration > Security**.
 2. Click the **Edit** button.
 3. Deselect the **Allow Presenter Control Without Login** checkbox.
 4. Click **Apply > Finish Edit**.
 5. The **Manage Presentation** button will no longer appear on the Login screen. Presenter Mode will now have to be accessed after logging in.



Presentation Features Interface

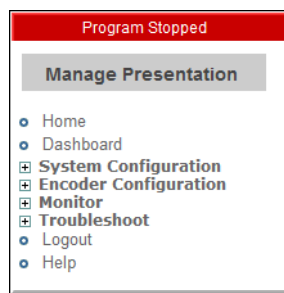
The Presenter encoder user interface varies slightly from a standard encoder interface in that it provides several indicators for how your video sources and Presenter Mode are operating. Further, some left menu navigation features and options have been added and modified.

Note: For the sake of simplicity, both Presenter encoders and those encoders that have Presenter Mode enabled are referred to as a “Presenter encoder” going forward.

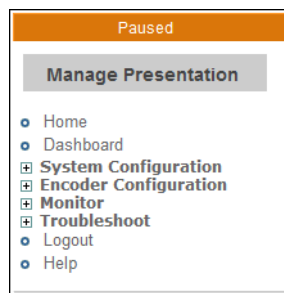
Presenter Mode Status Bar

The first item of note is that admins are always aware of the presentation’s status in Presenter Mode by the Presenter Mode Status Bar at the top of the left navigation menu.

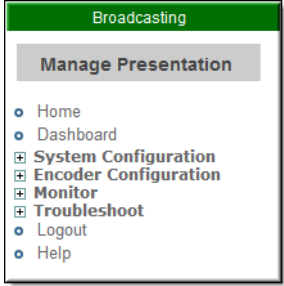
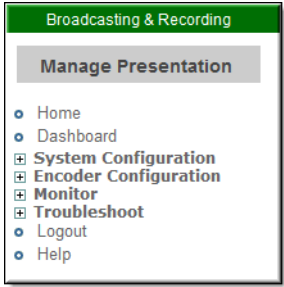
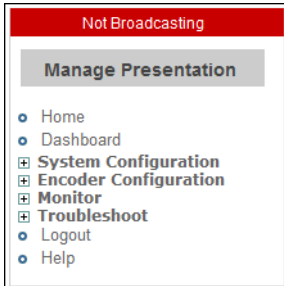
The Presenter Mode Status Bar appears on every screen in the Presenter encoder left navigation menu and may be in one of four states:



Program Stopped: Status when Presenter Mode is not currently being accessed.



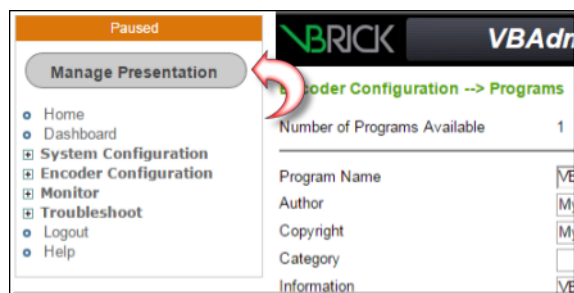
Paused: Status when Presenter Mode has been started but is not broadcasting or recording. While in this state, the audience may watch the stream but will see a static image that informs them the presentation is paused. Audio is muted. This is different from “Not Broadcasting” which is used when the stream may not be watched at all. (See Below)

	<p>Broadcasting: Status when Presenter Mode has been started and is currently broadcasting to a live audience.</p>
	<p>Broadcasting & Recording: Status when Presenter Mode has been started and is currently broadcasting to a live audience and is recording the presentation.</p>
	<p>Not Broadcasting: Status when a presentation has been started but users cannot see the stream for some reason. This may be because there are no functioning transmitters or servers and the admin will need to use the various status and config pages to troubleshoot and fix the issue. If a presentation is both Paused and Not Broadcasting, Not Broadcasting takes priority.</p>

Access Presenter Mode and Controls

Presenter Mode is accessed by clicking the **Manage Presentation** button found in two areas:

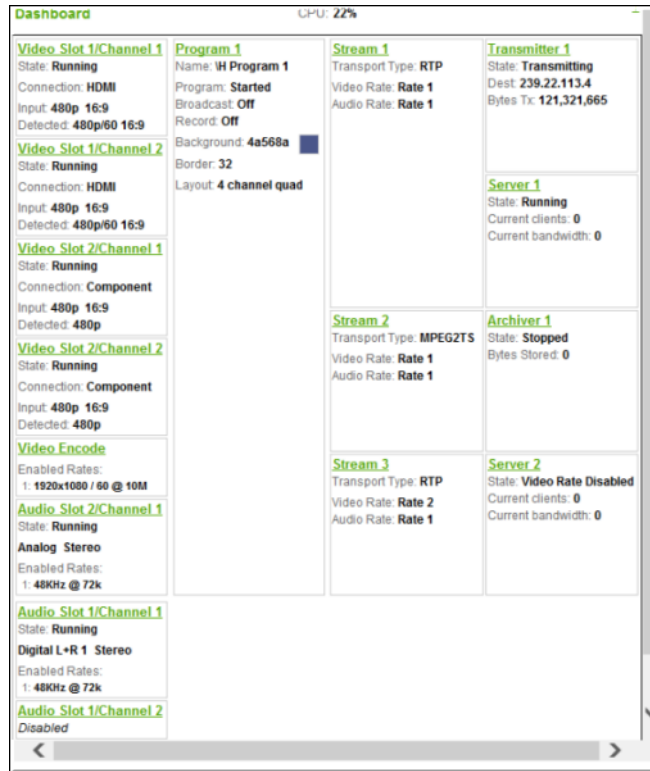
- The **Manage Presentation** button will be available from the encoder Login screen if Presenter Mode is enabled without requiring a user to log in. (This check box option is enabled on the **System Configuration > Advanced Configuration > Security** screen)
- The **Manage Presentation** button is always available from the left navigation menu under the Presenter Mode Status Bar (once a user is logged in).



Presenter Encoder Dashboard

The Presenter encoder dashboard functions much like the standard encoder Dashboard. There are a few slight differences, however, such as the ability to view Presenter Mode states under **Program**. Specifics used in the program are also noted such as background color, border, and template used.

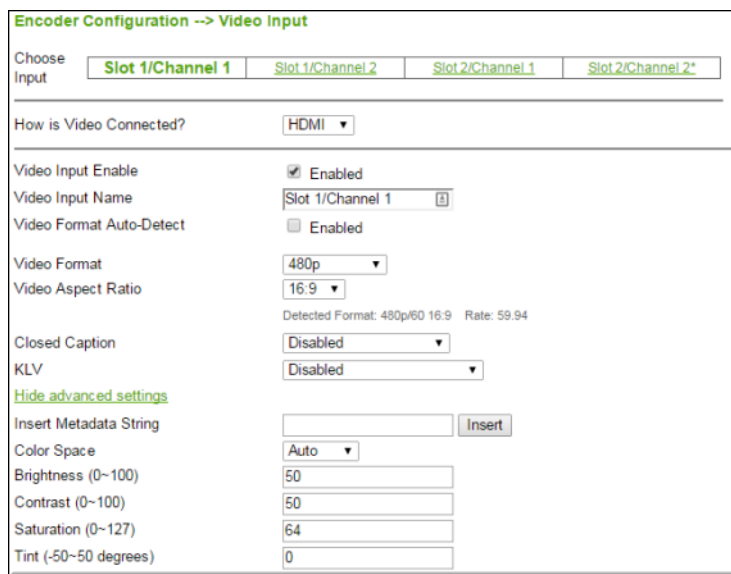
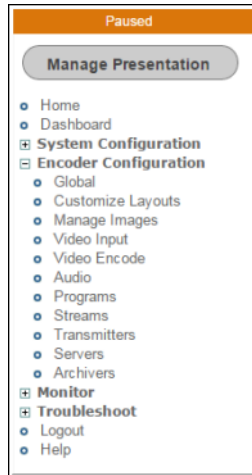
Further, a new **Video Encode** box displays rates for a Presenter encoder while all audio and video channels that are not assigned to the presentation are shown below the others instead of next to the **Program** box as normally seen on a standard encoder Dashboard.



Presenter Encoder Video Input

Video inputs are configured in standard encoders under the **Encoder Configuration** > Video configuration menu option. Both input and encoding are handled on the **Video** menu.

The Presenter encoder has separated these two functions. Video inputs are configured under the **Encoder Configuration** > **Video Input** menu on a Presenter encoder as seen in the image below.



Note: The **Video Input Name** appears in Presenter Mode and should describe the input that is connected such as “Camera 1”, “Laptop”, or “Document Camera” so that the user will understand what video will be visible in each area of the layout.

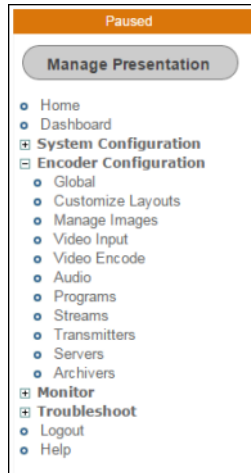
The default values of the form are useful for the admin to understand where the physical connection is but should be replaced with useful names for the end users. This is particularly important since video inputs may be seamlessly switched once a presenter begins streaming.

See Video under the standard encoder Encoder Configuration topic for complete information on how to use the **Video Input** page fields.

Presenter Encoder Video Encode

Video encoding rates are configured in standard encoders under the **Encoder Configuration** > Video configuration menu. Both input and encoding are handled on the **Video** menu.

The Presenter encoder has separated these two functions. Video encoding rates are configured under the **Encoder Configuration** > **Video Encode** menu on a Presenter encoder as seen in the image below.



Encoder Configuration --> Video Encode

Video Rate Settings

	Enabled	Resolution	Bit Rate	Frame Rate	IDR	Rate Control	Profile	Entropy
Rate 1	<input checked="" type="checkbox"/>	1920x1080	11,000,000	60	4	5: Best Quality	Baseline	CAVLC
Rate 1 Enable		<input checked="" type="checkbox"/> Enabled						
Template		Custom Settings						<input type="button" value="Load Template"/>
Resolution		1920x1080 ▼						
Target Bit Rate (bit/sec)		11000000						
Target Frame Rate (frames/sec)		60 ▼						
Hide advanced rate settings		<input type="button" value="Copy to Other Rates"/>						
IDR Frame Interval (sec)		4						
Rate Control Setting		5: Best Quality ▼						
Profile		Baseline ▼						
Entropy Coding		CAVLC ▼						
Rate 2	<input type="checkbox"/>	656x368	750,000	30	4	5: Best Quality	Baseline	CAVLC
Rate 3	<input type="checkbox"/>	656x368	750,000	30	4	5: Best Quality	Baseline	CAVLC
Rate 4	<input type="checkbox"/>	656x368	750,000	30	4	5: Best Quality	Baseline	CAVLC
Rate 5	<input type="checkbox"/>	656x368	750,000	30	4	5: Best Quality	Baseline	CAVLC

Note: It is important that these values not be changed once a broadcast begins streaming. Otherwise, the stream may be broken.

See Video Rate Settings under the standard encoder Encoder Configuration topic for complete information on how to use the **Video Encode** page fields.

Presenter Encoder Video Encoder Status Video Monitoring

Encoder status video input monitoring on a standard encoder is found under the Monitor > Encoder Status > Video left navigation menu. Both input and encoding are handled within the same line entries.

Similar to the **Video Input** and **Video Encode** menus, the Presenter encoder has separated these two functions. Encoder rates are separated from the video input on a Presenter encoder.

Monitor --> Encoder Status --> Video

Slot 1/Channel 1 (VGA)					
Video State	Video Mismatch <i>Possible Input Resolution Problem</i>				
Detected Video Format	1024x768/60				
Detected Frame (Field) Rate	59.82				
Video Time Code	Not Available				
Slot 1/Channel 2 Disabled					
Slot 2/Channel 1 (HDMI)					
Video State	Video Input Problem				
Detected Video Format	0				
Detected Frame (Field) Rate	Unknown				
Slot 2/Channel 2 Disabled					
Video Encode					
	Actual Bit Rate	Actual Frames per Second	Frames Processed	Frames Dropped by Congestion	Frames Discarded by Rate Control
Video Rate 1	158,565	30	172,921	0	0

Note: See Monitor Encoder Status topic for complete information on how to use the **Video Encode** page fields.

Customize Presenter Mode Layouts

Admins are responsible for specifying which presentation layouts will be available for presenters to select and switch between when in Presenter Mode and what their default values will be when selected.

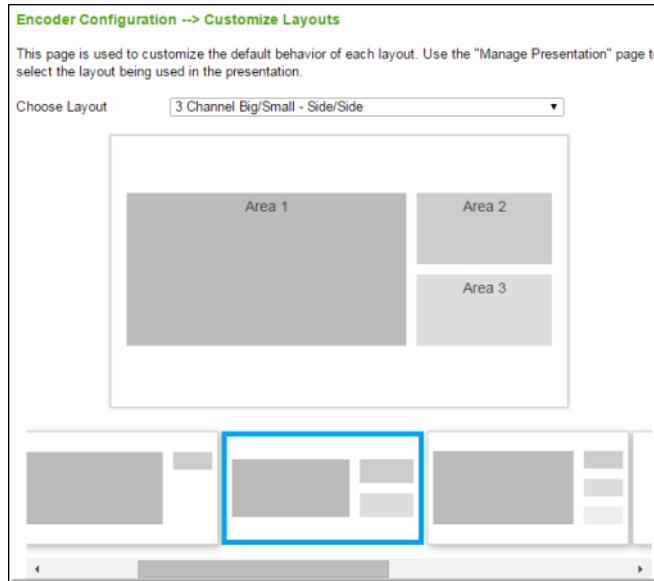
Keep in mind the following:

- A layout combines a video image and an associated audio channel with a background color, border, margins, and a background image (if desired). A video image is created when video from one or more video inputs to the presentation encoder are combined.
- A total of seven different layouts are available to make visible to users when in Presenter Mode.
- Each layout may have different default behaviors and values from other layouts.
- The presenter may modify the default values the admin has specified to suit the needs of his/her presentation.
- When streaming, the presenter may dynamically switch between layouts without interruption to the video stream and without the need to restart the player. Layout Configuration values may also be seamlessly switched as well including the background color and image, borders, margins, and the video or network source. This provides the ability to create very compelling video Webcasts.
- A video source or network source may be used to stream content. However, only one network source may be used at a time while up to four video sources may be used at one time.

▼ To customize layouts and default values for Presenter Mode:

1. Navigate to **Encoder Configuration > Customize Layouts**.
2. The **Customize Layouts** form appears.
3. Use the **Choose Layout** dropdown or the **Layout Scroll** bar beneath the **Layout Preview** box to select a layout to customize.

4. Click the **Edit** button to customize the currently selected layout displayed in the **Layout Preview** box.



Field/Area	Description
Choose Layout	<p>Select from seven layouts to enable and set default values for when in Presenter Mode. If a layout is selected here, it is also selected in the Layout Scroll bar. Layout selections may include:</p> <ul style="list-style-type: none"> • Single area layout with the selected video input filling the entire video image. • Two area layout with each area approximately the same size, displayed side by side. • Two area layout with one large area and a smaller area in the upper right. This is ideal for a single computer screen capture with live video of the presenter. • Three area layout with one large area on the left and two smaller areas on the right. This is ideal for a single computer screen capture with two live videos. • Four area layout with one large area on the left and three smaller areas on the right. • Four area layout with one large area on the left and three smaller areas below. • Four area layout with areas arranged in a 2x2 grid.
Layout Preview Box	<p>Displays the currently selected layout in visual format. A layout defines the combined video image (depicted by areas) and the associated audio channel that make up a presentation. Each layout has predefined, unchangeable video areas. Other items in the layout are configurable such as background colors and borders and what video or network sources are mapped to what areas.</p>

Field/Area	Description
Layout Scroll	Functions the same as the Choose Layout dropdown and selects a layout to enable and set default values for when in Presenter Mode. If a layout is selected here, it is also selected in the Choose Layout dropdown.

The screenshot shows a configuration window with the following fields and values:

- Layout Name: 3 channel big/small - Side
- Layout Available To Presenter: Enabled
- Background: D:/abstract-red-2.jpg
- Background Color: 000000 (with a black color swatch)
- Borders: 1
- Left Margin: 0
- Right Margin: 0
- Top Margin: 0
- Bottom Margin: 0
- Video**
- Area 1 Source: PC HDMI
- Area 2 Source: Camera
- Area 3 Source: Laptop
- Area 4 Source: Not Available
- Audio**
- Audio Source: Slot 2/Channel 1

Buttons at the bottom: Apply, Revert, Default, Save, Finish Edit.

Field/Area	Description
Layout Name	The layout name may be changed to make selection and/or video mapping easier if needed.
Layout Available To Presenter	When this is disabled, the layout will not appear in Presenter Mode for the user to select and use. The default is enabled.
Background	If a background image has been uploaded, it may be selected through the Background drop-down to be added to the layout. The current background color may be selected as well by selecting Use Background Color . Upload background images by navigating to Encoder Configuration > Manage Layout Images.
Background Color	Only solid background colors (or Hexadecimal values) may be selected. To select a background color, click on the colored square to activate a color chooser and either select the desired color or enter the Hex value for that color.
Borders	A border value of 0-50 may be selected with the default set at 0. If a border is applied, it will be applied to all video areas in the selected layout. Video will be scaled down to fit the border with no video lost due to border size. It should be noted that borders in Presentation mode are used as a means to add space between video areas and the background color appears within the border. You should not expect a border to appear as a frame around a video area.

Field/Area	Description
Margins	<p>Margins are useful when inserting branding. Margins are different from borders in that borders are applied to all video source areas whereas the margins define the layout area itself. Margins are specified in pixels.</p>
Video Area Source Mapping	<p>Each video area in the layout you have selected is assigned either a video input channel or a network source. You may only specify one network source at a time. Only the channel is mapped, not the specific input type. For example, channel 1 is mapped, not channel 1 VGA.</p> <p>For video sources, the input type is defined on the Video Config page. (See: Presenter Encoder Video Input)</p> <p>For network sources, the input type is defined on the Receivers page. (See: Receiver Configuration).</p> <p>The caveats below should be kept in mind when switching between sources.</p> <p>If you use an encrypted network source and switch to another encrypted network source:</p> <ul style="list-style-type: none"> • Seamless switching between the two sources occurs if both have the same encryption. • Seamless switching between the two sources does <i>not</i> occur if different encryption methods exist between them or if one is encrypted and other is not. <p>If you switch between a video source and a network source:</p> <ul style="list-style-type: none"> • If the network source requires decryption, the switch between video and network sources is seamless between the local video input and the decrypted stream. • However, if the video source is playing first, the first time the encrypted network source is selected, the switch is not seamless. Every switch thereafter, is seamless. <p>The user may override the defaults the admin maps when in Presenter Mode.</p>

Field/Area	Description
Audio Source Mapping	<p>Similar to video area mapping with the exception that only one audio channel source is selectable for each layout.</p> <p>Further, in order to switch audio channels within a presentation and <i>not</i> reset the stream, all audio channels <i>must</i> have the same sampling rate and audio rate settings. The easiest way to assure this, and a best practice, is to create the desired audio configuration for one channel and then use the Clone button to copy the Audio Rate settings to other audio channels. After cloning, you can then manually configure the setting for How Audio is Connected for each channel if you have a mixture of analog and digital audio sources.</p> <p>You may still change audio channels with different settings, but this will cause a reset of the stream and attendees/viewers may need to reset their players as a result.</p> <p>Note: Changing audio channels during a presentation is <i>not</i> supported for streams with encryption.</p>

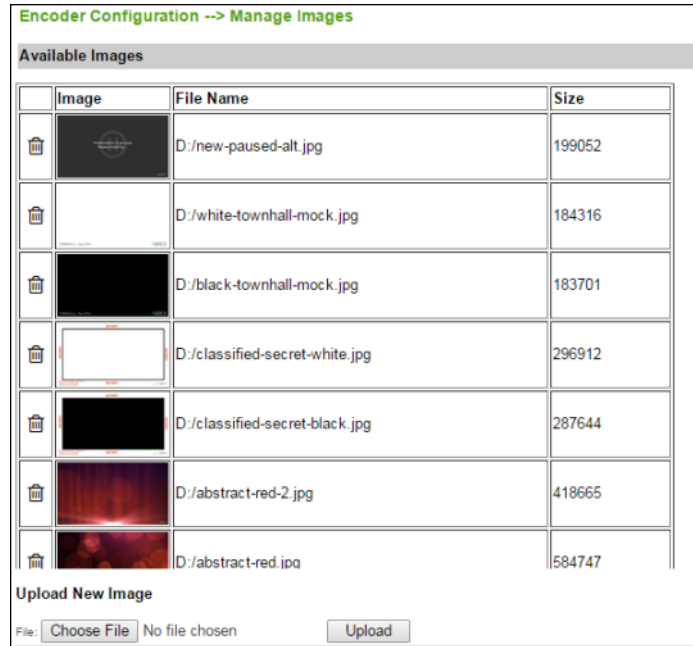
Tip: Keep in mind that presenters may switch seamlessly between layouts, configurations, and video/network inputs when presenting. (Some caveats apply, see the table above with regard to Video Area Source Mapping) As a result, consider a best practice of making border values, margin values, pause images, and so forth consistent between layouts so you do not have any odd jumps or glitches in the event a presenter switches between layouts during a presentation.

Manage Layout Images

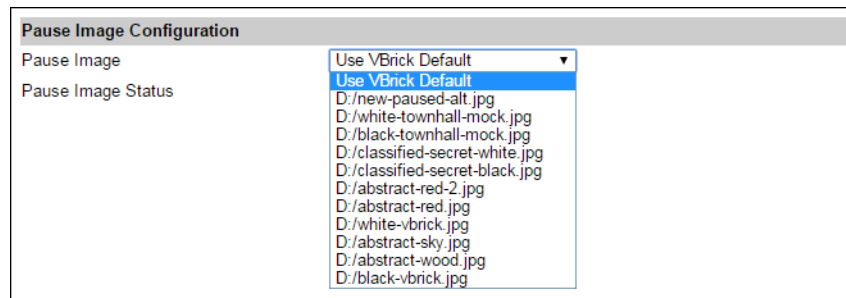
Admins have the ability to upload images that may then be selected for use in presentation layouts.

Note: This feature only works when the encoder contains an internal hard drive. If your encoder does not have a local hard drive, or has a USB hard drive attached, this feature will not work.

- ▼ To upload a new image:
 1. Navigate to **Encoder Configuration > Manage Images**.
 2. Click the **Choose File** button and select an image from your local drive to upload. The screenshot below has multiple images as an example. Your list will vary.



3. Click **Upload** > **Ok** to complete your image upload. The image may now be selected in the **Background Image** dropdown when customizing a layout.
4. You may also now select the image to use as the “Pause” image in the presentation if desired, by selecting it in the **Pause Image** dropdown. This means any time you pause the stream, the selected image will be displayed. The screenshot below has multiple images within the dropdown as an example. Your list will vary.



Keep in mind:

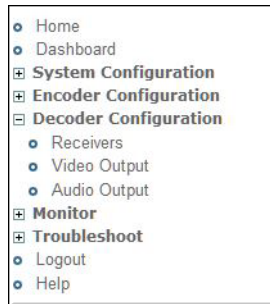
- Images should be in jpeg format; size 1920x1080. Do not use spaces or symbols in the file name.
- To delete an image, click the **Edit** button > **Delete** (trashcan) icon next to the image.
- Do *not* delete any images that are currently set as defaults to layouts (though you may modify which image is used; such as the default pause image).

Tip: Keep in mind that presenters may switch seamlessly between layouts, configurations, and video/network inputs when presenting (Some caveats apply, see the table on Customize Presenter Mode Layouts with regard to Video Area Source Mapping). As a result, consider a best practice of making border values, margin values, pause images, and so forth consistent between layouts so you do not have any odd jumps or glitches in the event a presenter switches between layouts during a presentation.

Decoder Configuration

The Vbrick 9000 Series encoder is available in a single channel model or an encoder/decoder (EnDec) model. It works seamlessly with 7000 or 9000 Series encoders and is designed to provide the highest video quality and reliability with low latency.

The options in the **Decoder Configuration** menu are used by system administrators to configure decoder parameters. These parameters should not be changed except by knowledgeable systems administrators.



Receivers

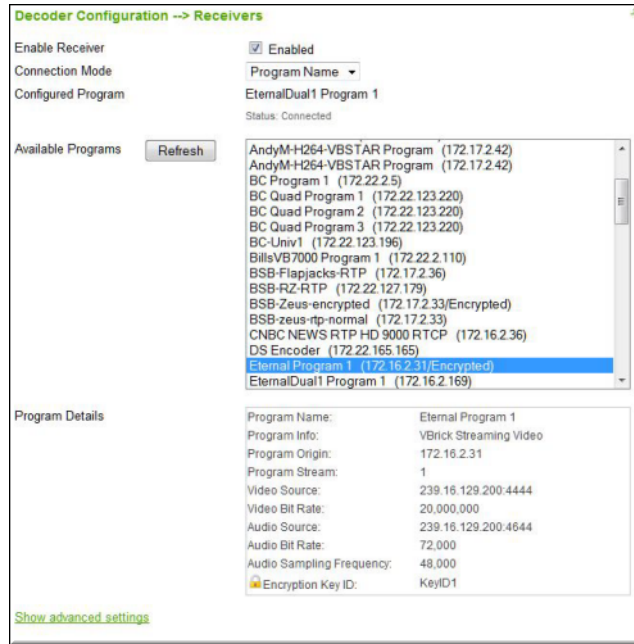
Video Output

Audio Output

Receivers

Note: The **Decoder Configuration** menu (and its options) will not be visible if you have presentation features enabled on your encoder. Instead, view the [Receiver Configuration > Receivers](#) topic.

- ▼ To access the Receivers fields:
1. Navigate to **Decoder Configuration > Receivers**.



Field	Description
Enable Receiver	Check box to enable disable receiver.
Connection Mode	Program Name is the only Connection Mode supported in v2.0.
Configured Program	Read-only. Shows the program name currently being decoded followed by the status of that program.
Available Programs	Click button to refresh list of available programs. Note that if “Encrypted” appears after the program name, the stream is encrypted. View the topic on Encryption for details.
Program Details	Use to select a program. Shows details of the currently highlighted program including the currently assigned encryption key if applicable. The program is not actually selected until you click Apply . Note: When changing programs, there may be a delay of up to 20 seconds on the output device.

Field	Description
Jitter Queue Time	<p>Range 0–800 ms. Default = 200 ms. Jitter is the variation in time between packets of data arriving at the decoder. The amount of jitter present in a media stream depends on (1) the capabilities and configuration of the encoder creating the stream and (2) on the network carrying the stream from the encoder to the decoder. The decoder can compensate for jitter by buffering extra data so that playback can be smooth and consistent even when the data stream has bursts and droughts—but adding extra buffering to handle jitter has the disadvantage of adding latency.</p> <p>The Vbrick 9000 Series decoder has an adjustable Jitter Queue Time so you can choose the right balance between handling jitter and achieving low latency. The default setting of 200 ms works well when the decoder is playing streams from Vbrick 9000 Series encoders over a good network and will result in low end-to-end latency of approximately 300 ms. The Jitter Queue doubles as a re-ordering queue so if your network delivers packets out of order you can increase the Jitter Queue time to compensate. If your decoder will be playing streams from a Vbrick 7000 Series encoder, you should configure the Jitter Queue Time to 600 ms or higher. For more information see Latency and Quality Tuning.</p>

Announce Receive Settings

Field	Description
Announce IP Address	The IP address that announcements are being received on. This must match the address the transmitter is using.
Announce Port	The port that announcements are being received on. This must match the port the transmitter is using.
Announce Timeout	If no announcements are received after this configurable timeout period, the connection is dropped and the entry is removed from the table of available programs on the Decoder Configuration > Receivers page. Default = 90 sec.

Receivers

Video Output

Audio Output

Video Output

▼ To access the Video Output fields:

1. Navigate to **Decoder Configuration > Video Output**.

Decoder Configuration --> Video Output

Enable Video Output Enabled

Display Mode Letterbox

Video Format Auto
Current: 720p
Compatible Outputs: HDMI, SDI, Component

Frame (Field) Rate Auto
Current: 59.94

The 9000 Series decoder includes very high quality video scaling and several configuration options to allow you to control the format of the output video and how it relates to the format of the network video stream being decoded. By default the decoder is configured to automatically choose the optimum output resolution, frame rate, and aspect ratio based on the resolution, frame rate, and aspect ratio of the network stream. However, it also offers options to force any decoded stream format to a selected and fixed output format as well.

The decoder has SDI, HDMI/DVI, component, and composite video connections to allow video to be sent to a wide range of both high definition (recommended) and standard definition devices but a connection is automatically disabled if it is not capable of supporting the current output format. For example, if the output video format is 480i then all connections are active, but if the output format is 1080p then only SDI and HDMI/DVI connections are active and component and composite connections are disabled. You can check the current output format and the active output connections on either this configuration page or the **Decoder Status > Receivers/Video/Audio** page. This page is detailed in the Monitor Receivers/Video/Audio topic.

When the decoder is connected to an HDMI or DVI device it will read the device's EDID to ensure that the device can accept the current output format and, if necessary, the decoder will automatically adjust its output to a format supported by the attached device. This check and possible adjustment will happen in both auto and fixed output format modes.

Field	Description
Enable Video Output	Enable disable video output from the decoder.
Display Mode	<ul style="list-style-type: none"> Letterbox – Also known as "pillarbars." This will add vertical or horizontal black bars if necessary to preserve the aspect ratio of the decoded video when scaling to the output format. Fit – This will stretch the decoded video if necessary when scaling to the output format and will potentially change the aspect ratio. Crop – This will crop vertical or horizontal edges of the decoded video if necessary to preserve the aspect ratio of the decoded video when scaling to the output format.

Field	Description
Video Format	<p>Select the Video Format you wish to output from the decoder. Auto will select the best possible output for the detected input stream. For best results, the Video Format you select should match your output device. 480i and 576i are automatically associated with 4:3; 480p, 576p, 720p, 1080i, and 1080p are associated with 16:9.</p> <ul style="list-style-type: none"> • Auto (default), 1080p, 1080i, 720p, 576p, 576i, 480p, 480i • Select Auto to have the decoder choose an output format that best matches the decoded video or select fixed format to have the decoder scale any decoded video to your desired output format. For aspect ratio handling, the decoder considers 480i and 576i output formats as 4:3 and it considers all other output formats as 16:9. • Current: Shows the current output format if Auto is selected. • Compatible Outputs: Shows the active connections for the current output format including HDMI, Component, Composite, and/or SDI.
Frame (Field) Rate	<p>Select the desired Frame Rate (for Progressive) or Field Rate (for Interlaced). Auto will select the best possible output for the detected input stream.</p> <ul style="list-style-type: none"> • Auto, 60, 59.94, 50 • Current: Shows the current Frame (Field) Rate if Auto is selected.

Receivers

Video Output

Audio Output

Audio Output

▼ To access the Audio Output fields:

1. Navigate to **Decoder Configuration > Audio Output**.

Decoder Configuration --> Audio Output

Enable Audio Output Enabled

Mute Enabled

Attenuation (dB)

The 9000 Series Decoder supports both analog stereo audio outputs via left and right BNC connectors on the breakout cable, and digital stereo audio outputs via HDMI and SDI. All audio outputs are either active or forced to silent depending on the settings for Enable and Mute as described below.

Field	Description
Enable Audio Output	Enable disable audio output.
Mute	Suppress audio output.
Attenuation	Used to lower the level of the decoder's analog audio output. Does not affect digital audio on HDMI or SDI. Range is -127–0. Default = 0.

Receivers

Video Output

Audio Output

Latency and Quality Tuning

Vbrick 7000 Series and 9000 Series encoders offer a wide range of high quality and low latency steaming capabilities to Vbrick 9000 Series decoders. This section describes how to choose the right combination of systems and configure them to meet your streaming needs.

Vbrick 9000 Series encoders and decoders have default settings that (when used together) will provide low latency of approximately 300 ms and high quality video and audio over a good network. By default the 9000 Series encoder Video Template settings use the **Baseline Profile** and CAVLC **Entropy Coding** for compatibility with a broad range of standard PC and mobile video players. However, when using the 9000 encoder with a 9000 decoder, you will achieve better quality by using **High Profile** and CABAC **Entropy Coding**. Even for ultra-low latency applications as described below, **High Profile** and CABAC Video Template settings are always recommended on the 9000 Series encoder when streaming to a 9000 Series decoder.

9000 Series encoders can stream to 9000 Series decoders with ultra-low latency of 100 ms or less when properly configured and when connected through a very good network. Configure the **Rate Control Setting** in the Encoder's Video Template settings to level 1 for Lowest Latency and then evaluate the decoder's playback quality and statistics using the lowest **Jitter Queue Time** settings that provide acceptable performance. When **Jitter Queue Time** is set to 0, the end-to-end latency is approximately 100 ms. Adding milliseconds to your configured **Jitter Queue Time** will allow the decoder to manage jitter better and will correspondingly add approximately the same number of milliseconds to the end-to-end latency.

Audio sampling and compression at the encoder introduces unavoidable jitter that will cause some audio frames to be dropped when the decoder **Jitter Queue Time** is set very low. The decoder is designed to minimize the quality degradation from dropped frames so, after listening to the decoder output, you might consider a few light audio clicks or faint static to be an acceptable trade-off to achieve ultra-low latency, or you can increase the **Jitter Queue Time** slightly to avoid audio frame drops. Disabling audio in the encoder's Stream configuration will obviously avoid the issue of audio jitter and also improves the decoder's ultra-low latency performance because there will be no need for the decoder to maintain audio/video sync.

Information on the Monitor > Monitor Decoder Status page can help you tune your **Jitter Queue Time** to the appropriate trade-off between quality and latency. The **Jitter Queue**

Average Depth will show you how well the decoder is able to maintain the level in the queue while also maintaining audio/video sync. It is normal to see a difference between the audio and video averages, but if either of the averages is a negative number, the decoder may not be able to maintain acceptable sync. Comparing the **Jitter Queue Minimum Depth** to the **Jitter Queue Average Depth** will give you an indication of the amount of jitter in the stream, and when the minimum gets very low or negative, you will see the **Jitter Queue Late Frame Count** increase (which is a warning that the decoder is approaching its limits of managing the jitter in the stream). When those limits are exceeded you will see the **Frames Dropped by Jitter** counter increase to indicate that the decoder cannot play all frames cleanly. If this happens you should either increase your configured **Jitter Queue Time** to achieve better statistics, or watch and listen to the decoder output to determine whether the quality trade-off is acceptable to achieve your low latency goal.

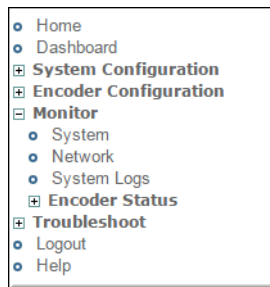
Vbrick 7000 Series Encoders provide excellent video and audio quality when paired with 9000 Series Decoders but they are not designed for ultra-low latency applications. When streaming High Definition video and audio from a 7000 Series encoder you should configure the **Jitter Queue Time** on the 9000 Series decoder to at least 600 ms to avoid potential issues with audio/video sync. The 7000 Series encoder can achieve lower latency for Standard Definition and/or video-only applications by setting the Video Template **Rate Control Setting** on the encoder to level 1 for Lowest Latency and using the decoder status as described above to tune the **Jitter Queue Time** configuration.



Monitor

The **Monitor** pages let you assess the status of various system, network, and encoder components. They also provide access to the system logs and program status. All Monitor pages are read-only and cannot be edited.

Tip: Most of the parameters on the Monitor pages have counters that track dynamic system events (for example **Frames Processed** on the Monitor > Encoder Status > Video Input page). These counters are typically auto-updated every two seconds although you can manually **Refresh** at any time.



Monitor the System

Monitor the Network

Monitor the System Logs

Monitor Encoder Status

Monitor Decoder Status

Monitor the System

▼ To monitor the System:

1. Navigate to **Monitor > System**.

Monitor --> System		
System Information		
System Model	HPS 9000 Encoder	
Hardware Revision	263 - 0	
Boot Revision	2.30 - 04/15/13 15:21	
Application Code Revision	103.0.15 - 06/11/13 20:58	
Current Operational Mode	Run	
Temperature	40°C	
Fan Status	On	
Overloaded Count	0	
CPU Utilization (%)	15	
System Up Time	6 days 04:40:42	
Total System Up Time	00:157 02:53 (yr.day hr.min)	
System Date & Time	6/19/2013 11:57	
Storage Information		
	Internal	External
State	Ready	Ready
Type	WDC WD10JPVT-00A1YT0	Lexar - USB Flash Drive
Total Space	1,000,204,837,376	31,406,876,672
Free Space	969,051,635,712	22,518,448,128
Format Status	Formatted	Formatted
Format Storage	<input type="button" value="Format"/>	<input type="button" value="Format"/>
Reset	<input type="button" value="Reset"/>	<input type="button" value="Reset"/>
Safely Remove Device	Not Supported	<input type="button" value="Eject"/>
Check	You must be in Diagnostics Mode to perform a check.	

Monitor System Information

Monitor Storage Information

Monitor Manufacturing Information

Monitor System Restarts

Monitor System Information

▼ To monitor System Information:

1. Navigate to **Monitor > System > System Information** section.

System Information	
System Model	HPS 9000 Encoder
Hardware Revision	263 - 0
Boot Revision	2.50 - 08/08/14 22:21
Application Code Revision	4.2.0b - 01/28/15 20:47
Current Operational Mode	Run
Temperature	35°C
Fan Status	On
Overloaded Count	0
CPU Utilization (%)	40
System Up Time	6 days 20:56:49
Total System Up Time	02:061 22:48 (yr.day hr.min)
System Date & Time	6/22/2015 10:45

Field	Description
System Model	Displays the hardware model number of the encoder.
Hardware Revision	XX-YY . XX = Hardware Revision. YY = CPU Revision.
Boot Revision	Displays current boot revision.

Field	Description
Application Code Revision	Displays the revision number of the application code running on the encoder.
Current Operational Mode	<p>Indicates the current operational mode of the encoder. The following modes are supported. See Operational Modes for more information.</p> <ul style="list-style-type: none"> • Run – Normal operation. • Diagnostics – User selected mode for running certain Vbrick diagnostics. See Device Tests for information. • Maintenance – Not selectable. Automatically launched when the software on the Vbrick encoder does not load. • Limited Run – Not selectable. Normally occurs if a hardware problem exists within the encoder but it can still partially operate. • Overloaded – Not selectable. This mode occurs when the encoder is configured to handle more video than its operational capacity. If this occurs, the encoder needs to be reconfigured to reduce the number of streams and/or data rates. Under this condition, the encoder temporarily reduces video traffic in order to maintain VAdmin functionality.
Temperature	<p>Displays the encoder temperature in Celsius (for example 60° Celsius = 140° Fahrenheit). A temperature exceeding 72° C will cause an alarm, a trap, and a log message; if the temperature drops below 72° C the alarm and trap will clear. When the temperature exceeds the maximum threshold (81°), the encoder will reboot and come up in Limited Run Mode; when the temperature drops to an acceptable level, reboot the encoder to return to normal Run Mode. The temperature (in Celsius) determines the fan speed as follows:</p> <ul style="list-style-type: none"> • If temperature > 60° fan speed = Full 100% • If temperature < 60° fan speed = Low 10%
Fan Status	On Off Alarm.
Slot ID	Blade Server only. Indicates slot number of blade in server chassis. Blades are numbered 1–11 from left to right.
Overloaded Count	Provides a count of the number of times the box has entered the Overloaded Mode.
CPU Utilization (%)	Shows average CPU utilization percentage over the previous 10 seconds.
System Up Time	Total up time since last power cycle.
Total System Up Time	Aggregate up time since customer delivery.
System Date & Time	Read-only. Set date and time on System Configuration > General page.

Monitor System Information

Monitor Storage Information

Monitor Manufacturing Information

Monitor System Restarts

Monitor Storage Information

▼ To monitor Storage Information:

1. Navigate to **Monitor** > **System** > **Storage Information** section.

This page has status indicators and controls in two columns for **Internal** and **External** storage media respectively if present.

Storage Information		
	Internal	External
State	Not Present	Not Present
Type	N/A	N/A
Total Space	0	0
Free Space	0	0
Format Status	None	None

Field	Description
State	<ul style="list-style-type: none">• Ready Not Ready• Not Present Not Present. If you click Eject (see below) to remove a device, Not Present means it is safe to remove.
Type	Displays manufacturer information.
Total Space	Total space available on device.
Free Space	Total free space available on device.
Format Status	<ul style="list-style-type: none">• None – device has not been formatted.• Formatted – device has been formatted.
Format Storage	Click button and confirm to format the storage device for FAT32. Be aware that you will lose all data if you format the device.
Reset	Resets the storage device. This allows a drive that was ejected but not physically reseated to be recognized.
Safely Remove Device	External storage only. Click Eject and wait for message before removing external USB device.
Check	Performs a check of the drive and file system. The Operational Mode (See: Additional System Settings) must be set to Diagnostics to run this test.

Monitor System Information

Monitor Storage Information

Monitor Manufacturing Information

Monitor System Restarts

Monitor Manufacturing Information

▼ To monitor Manufacturing Information:

1. Navigate to **Monitor > System > Manufacturing Information** section.

Manufacturing Information					
User Information Version	User Info 1.0				
Part Number	9312-1212-1000				
System Serial Number					
Customer Class					
Manufacturing Date	20110515				
Board Assembly Number	6106-0000-0112				
Power Assembly Number					
Lot Number					
Board Serial Number	5111200699				
MAC Address	00:07:df:01:c7:06				
Upgrade Date					
Add-on Boards Information Table					
Board Name	Version	Assembly #	Lot #	Unit Serial #	Board Serial #
Slot 1	User Info 1.0	6106-0030-xxxx			5051100479
Slot 2	User Info 1.0	6106-0030-010d		91031200016	5121100605

Field	Description
User Information Version	As displayed.
Part Numbers	As displayed.
System Serial Number	As displayed.
Customer Class	As displayed.
Manufacturing Date	As displayed.
Board Assembly Number	As displayed.
Power Assembly Number	As displayed.
Lot Number	As displayed.
Board Serial Number	As displayed.
MAC Address	Displays the encoder's Media Access Control (MAC) address.
Upgrade Date	Vbrick manufacturing data.
Add-on Boards Information Table	Use this table to find specific information about the add-on boards in the encoder assembly. Shelf data, if shown, is read from Slot 1 on an H.264 blade server.

Monitor System Information

Monitor Storage Information

Monitor Manufacturing Information

Monitor System Restarts

Monitor System Restarts

▼ To monitor System Restarts:

1. Navigate to **Monitor > System > System Restart** section.

System Restart			
Start Time	Stop Time	Up Time	Restart Type
06/15/2015 13:49:05	Currently Running	00:006 20:46	POWER
04/27/2015 10:42:51	06/13/2015 16:09:48	00:047 05:26	RESET
04/10/2015 14:47:34	04/27/2015 10:41:01	00:016 19:53	RESET
03/03/2015 18:25:53	04/10/2015 14:44:10	00:037 19:18	RESET
02/23/2015 17:37:01	03/03/2015 18:24:58	00:008 00:47	POWER
02/23/2015 17:32:40	02/23/2015 17:35:30	00:000 00:02	POWER
02/23/2015 17:24:33	02/23/2015 17:31:09	00:000 00:06	RESET
02/23/2015 17:17:58	02/23/2015 17:23:17	00:000 00:05	RESET
01/29/2015 12:15:11	02/23/2015 17:01:08	00:025 04:45	RESET
01/29/2015 12:13:30	01/29/2015 12:13:30	00:000 00:00	RESET

This table tracks the date, time, and restart type (power or reset) of all system restarts.

Monitor System Information

Monitor Storage Information

Monitor Manufacturing Information

Monitor System Restarts

Monitor the Network

▼ To monitor the Network:

1. Navigate to **Monitor > Network**.

Monitor --> Network	
Network	
DHCP Status	Disabled
COM1 Passthrough Operational State	Disabled (Management)
COM2 Passthrough Operational State	Disabled
MAC Address	00:07:df:01:07:95
Network Port Status	Link OK
Network Port Speed	1000Mbit
Network Port Mode	Full Duplex
Network Time Synchronization	
Last Successful Update	
Network Time Client State	Idle
Primary Network Time Server:	
Successful Update Counter	0
Failed Update Counter	0
Current Server Status	Server Standby
Secondary Network Time Server:	
Successful Update Counter	0
Failed Update Counter	0
Current Server Status	Server Standby

Field	Description
DHCP Status	Shows DHCP status from System Configuration > Network page.
COM1/2 Passthrough Operational State	The current operational state of the COM ports. Only COM1 can be used as a management port. The possible values are: <ul style="list-style-type: none"> • Disabled • Active • Internal Error (may indicate a KLV configuration mismatch) • Rejected • No Dedicated IP Addr
MAC Address	Displays the encoder's Media Access Control (MAC) address.
Network Port Status	Status of the Ethernet network interface.
Network Port Speed	Speed of transmission for the Ethernet network interface.
Network Port Mode	The mode of transmission for the Ethernet network interface.

Monitor the Network Time Synchronization Fields

Field	Description
Last Successful Update	The last time the encoder successfully acquired the time.
Network Time Client State	Status of client.
Primary Network Time Server	
Successful Update Counter	The number of times the time was reset from the primary server.
Failed Update Counter	The number of times the encoder failed to read the time from the primary server.
Current Server Status	Status of primary server.
Secondary Network Time Server	
Successful Update Counter	The number of times the time was reset from the secondary server.
Failed Update Counter	The number of times the encoder failed to read the time from the secondary server.
Current Server Status	Status of secondary server.

Monitor the System Logs

▼ To monitor System Logs:

1. Navigate to **Monitor > System Logs**.

System logs can give you more information about the status of your encoder. Each log can hold up to 40 of the latest informational messages. All logs are emptied when the encoder is powered down or reset.

Monitor --> System Logs	
1) Configuration Log 2) SNMP Traps 3) System Events 4) System Information	
Configuration Log	
config:172.22.2.115:admin:09/19/2012 10:31:35LOC ProgramStreamFECEnable.1 changed from disabled to enabled	
config:172.22.2.115:admin:09/19/2012 10:31:35LOC ProgramStreamNetworkMetered.1 changed from disabled to enabled	
config:172.22.2.115:admin:09/19/2012 10:31:35LOC ProgramStreamTransportType.1 changed from rtp to smooth	
config:172.22.2.115:admin:09/19/2012 10:24:35LOC ProgramStreamFECEnable.1 changed from disabled to enabled	
config:172.22.2.115:admin:09/19/2012 10:24:35LOC ProgramStreamNetworkMetered.1 changed from disabled to enabled	
config:172.22.2.115:admin:09/19/2012 10:24:35LOC ProgramStreamTransportType.1 changed from rtp to mpeg2ts	
config:172.22.2.115:admin:09/19/2012 10:19:13LOC ProgramStreamNetworkMetered.1 changed from disabled to enabled	
config:172.22.2.115:admin:09/19/2012 10:19:13LOC ProgramStreamTransportType.1 changed from rtp to	

Hyperlink	Description
Configuration Log	This log contains a list of the latest Vbrick configuration changes. To avoid flooding the log, consecutive login passes or failures from the same IP address overwrite the previous log entry.
SNMP Traps	This log contains all of the SNMP traps generated by the box whether or not the traps have been emitted.
System Events	This log contains reports of system events within the encoder. These events may occur during normal operation and include some details of successful and unsuccessful attempts to access the HTTP and RTSP server as well as a some details concerning server push retries.
System Information	This log contains unexpected behaviors detected by the encoder software. Normally this log is used by Vbrick Support Services to help debug system errors.

Monitor Encoder Status

Monitor Video Input Fields

▼ To monitor Video Inputs:

1. Navigate to **Monitor > Encoder Status > Video**.

The header for each Slot and Channel on this page shows **How is Video Connected** from the Encoder Configuration > Video page. For example, depending on the video input, it will be either **Composite**, **Component**, **HDMI**, or **SDI**.

Monitor --> Encoder Status --> Video Input

Slot 1/Channel 1 (HDMI)					
Video State	Running				
Detected Video Format	480i/60 16:9				
Detected Frame (Field) Rate	59.94				
	Actual Bit Rate	Actual Frames per Second	Frames Processed	Frames Dropped by Congestion	Frames Discarded by Rate Control
Video Rate 1	5,059,948	60	0	0	0
Video Rate 2	502,442	30	0	0	0
Slot 1/Channel 2 (HDMI)					
Video State	Running				
Detected Video Format	480i/60 16:9				
Detected Frame (Field) Rate	59.94				
	Actual Bit Rate	Actual Frames per Second	Frames Processed	Frames Dropped by Congestion	Frames Discarded by Rate Control
Video Rate 1	5,012,822	59	0	0	0
Slot 2/Channel 1 Disabled					
Slot 2/Channel 2 Disabled					

Field	Description
Video State	Shows the state of the connected video source. <ul style="list-style-type: none"> Running – video connection is OK. Video input problem – video connection is not OK. Video mismatch – The video input connection does not match the Video Format. <p>Note: If a video source is protected by HDCP (High-bandwidth Digital Content Protection) it cannot be streamed and this field will display "Video input problem." See "HDCP Support" in the <i>Encoder Release Notes</i> for more about HDCP.</p>
Detected Video Format	Indicates what is actually connected. This is useful for determining configuration mismatches.
Detected FPS	Shows the actual Frame Rate in decimal. This is useful for configuring some decoders.
KLV Status	Shown if KLV is enabled.
KLV Bytes Received	Shown if "ESD to LDS" selected for KLV.
KLV Packets Created	Shown if "ESD to LDS" selected for KLV.
KLV Errors	As displayed.

Monitor Video Rate

Field	Description
Actual Bit Rate	Measured rate in bits per second of the encoded video stream being created by the encoder.
Actual Frames per Second	Measured rate in frames per second of the encoded video stream being created by the encoder. This rate is rounded down and may indicate 0 for frame rates less than 1 per second.

Field	Description
Frames Processed	Total video frames encoded and streamed by the encoder.
Frames Dropped by Congestion	Frames dropped due to congestion or overloading. If this happens you may need to lower the resolution or frame rate.
Frames Discarded by Rate Control	Frames discarded to limit the short term video bit rate. If this happens, increase the Rate Control Setting and/or the Target Bit Rate.

Note: If you are working with a Presenter encoder, your interface or functionality may differ slightly for this section. See the topic on Presenter Encoder Video Encoder Status Video Monitoring if you need more information.

Monitor Audio Input Fields

▼ To monitor Audio Inputs:

1. Navigate to **Monitor > Encoder Status > Audio**.

The header for each Slot and Channel on this page shows **How is Audio Connected** from the Encoder Configuration > Audio page. For example, depending on the audio input, it will be either **(Analog)** or **(Digital L+R 1/2)**.

Monitor --> Encoder Status --> Audio Input			
Slot 1/Channel 1 (Analog)			
Audio State	Running		
Detected Audio Sampling Frequency	48KHz		
	Actual Bit Rate	Total Frames	Frames Processed
Audio Rate 1	76,541	14,601	14,601
Slot 1/Channel 2 (Analog)			
Audio State	Running		
Detected Audio Sampling Frequency	48KHz		
	Actual Bit Rate	Total Frames	Frames Processed
Audio Rate 1	76,549	14,601	14,601
Audio Rate 2	0	14,601	14,601
Slot 2/Channel 1 (Analog)			
Audio State	Running		
Detected Audio Sampling Frequency	48KHz		
	Actual Bit Rate	Total Frames	Frames Processed
Audio Rate 1	76,797	14,601	14,601

Field	Description
Audio State	<p>Only audio from SDI or HDMI inputs can be monitored. Audio from the Main or Aux inputs is not monitored and will not generate an alarm.</p> <ul style="list-style-type: none"> Running – no audio problems detected. Digital Audio Input Problem – audio connection is not OK. Audio mismatch – SDI or HDMI. The audio input connection does not match the configured Audio Source.
Detected Audio Sampling Frequency	Indicates the actual audio frequency. This field is shown only for HDMI input configured with digital audio.

Monitor Audio Rate

Field	Description
Actual Bit Rate	Measured rate in bits per second of the encoded audio stream being created by the encoder.
Total Frames	Total audio frames received from connected audio source.
Frames Processed	Total audio frames encoded and streamed by the encoder.

Monitor Global & Streams

▼ To monitor Global & Stream information:

1. Navigate to **Monitor > Encoder Status > Global & Streams**.

Monitor --> Encoder Status --> Global & Streams

Global

Global Override	No Override
Current System Bandwidth	7,222
Peak System Bandwidth	849,707
Current Number of Served Clients	0
Peak Number of Served Clients	0
Current Number of Active Transmitters	0

Streams

Stream	State	Transport Type	Actual Bit Rate	Buffer Full Count			
				Video	Audio	CC	Metering
Stream 1	Enabled	SMOOTH	120,293	0	0	0	0

Global

Field	Description
Global Override	Read-only. This parameter is configured on the Encoder Configuration > Programs page.
Current System Bandwidth	The actual bandwidth currently being sent to the network.
Peak System Bandwidth	The highest bandwidth sent to the network since the last time these parameters were Reset.
Current Number of Served Clients	Current number of HTTP and/or RTSP clients connected to all servers.
Peak Number of Served Clients	Highest number of HTTP and/or RTSP clients that were concurrently connected since the last time these parameters were Reset.
Current Number of Active Transmitters	As displayed.

Streams

Field	Description
Stream Name	Defined on Encoder Configuration > Streams page. Click hyperlink to jump to Streams page.
State	Enabled Disabled.
Actual Bit Rate	Measured packetized bit rate.
Video Buffer Full Count	These values increment when the stream's Video, Audio, or Closed Caption buffers overflow. This usually indicates an overload condition. If this happens reduce the load by lowering the video Target Bit Rate or reducing the number of transmitter-served clients or archivers.
Audio Buffer Full Count	
Closed Caption Buffer Full Count	
Metering Buffer Full Count	Increments when the metering buffer is full. If full, lower the Metering Aggressiveness value on the Encoder Configuration > Streams page.
Refresh	Refresh all counters.
Reset Counters	Reset all counters to zero.

Monitor Transmitters

▼ To monitor Transmitters:

1. Navigate to **Monitor > Encoder Status > Transmitters**.

The **Monitor Transmitters** page displays the program status of all defined transmitters. Note that when more than 5 transmitters are configured, auto-refresh is disabled and you must use the **Refresh** button to manually refresh the page.

Monitor --> Encoder Status --> Transmitters							
Transmitters							
Transmitter	State	Destination	Video Port	Audio Port	Bytes Transferred	IP Packets Sent	Transp Type
Transmitter 1	Transmitting	239.22.113.3	4444	4644	1,659,277,932	257,308,630	RTP
Transmitter 2	Disabled	172.22.2.236	1935	N/A	0	0	RTMP
Transmitter 3	Disabled	172.22.2.219	0	0	0	0	Auto Unicast (UDP)
Transmitter 4	Disabled	p.ep86300.i.akamaientrypoint.net	1935	N/A	0	0	RTMP
Transmitter 5	Transmitting	172.22.2.248	36970	47194	1,657,997,841	257,307,669	Auto Unicast (UDP)
Transmitter 6	Transmitting	172.22.2.248	6972	6974	1,657,904,888	257,307,601	Auto Unicast (UDP)

Transmitter Name	Transmitter Name (from Encoder Configuration > Transmitters page). Click on hyperlink to jump to Transmitters page.				
State	<ul style="list-style-type: none"> • Transmitting – no transmitter problems detected. • Video Input Disabled – no video input • Audio Input Disabled – no audio input. • Disabled – transmitter has not been enabled. • Ping Failed – ping to unicast destination failed. • Ports Not Open – IP port failure. • Loopback Address – destination address is a loopback address. • Invalid Authorization – user name/password incorrect for AutoUnicast or RTMP. • Rejected – AutoUnicast server connection issue. • Video Problem – Video input error. • Global Override – Global Override set. • Program Override - Program Override set. • Invalid Application – RTMP error. • Not FEC Protected – one or both of the FEC sockets are not operational. • No Video Data – Video is enabled in the stream but disabled on the configuration page. • No Audio Data – Audio is enabled in the stream but disabled on the configuration page. 				
Destination	Destination IP Address or Host Name (from Encoder Configuration > Transmitters page).				
	RTP	Transport Stream	Auto Unicast (UDP)	Auto Unicast (TCP)	RTMP
Video Port	Configured port.	Configured Transport Stream port.	Negotiated port.	Negotiated port.	Configured port.
Audio Port	Configured port.	N/A	Negotiated port.	N/A	N/A
Bytes Transferred	Use Reset Counters to reset to zero.				
IP Packets Sent	Use Reset Counters to reset to zero.				

Transport Type	<ul style="list-style-type: none"> • RTP • Transport Stream • RTMP • Auto Unicast (UDP) • Auto Unicast (TCP) • Smooth
----------------	---

Monitor Servers

▼ To monitor Servers:

1. Navigate to **Monitor** > **Encoder Status** > **Servers**.

The **Monitor Servers** page displays the program status for all servers. Use the dropdown list box to select a specific server. You must also be in **Edit** mode.

Tip: When CPU usage on the selected server is extremely high, auto-refresh is disabled but you can still use the **Refresh** button to manually refresh the page.

Monitor --> Encoder Status --> Servers									
Choose Server		Server 1 - ▾							
Server									
Server State		Running							
		Current				Maximum			
Client Bandwidth		232,274				1,759,510			
Number of Served Clients		1				1			
Clients									
Session State	IP Address	Up Time (days hr:min:sec)	Video Port	Audio Port	Video Packets Sent	Audio Packets Sent	Session Transport	Video Packets Dropped	Audio Packets Dropped
Play	172.22.2.115	0 0:01:01	51940	51942	3,637	2,844	UDP	0	0

Server

Field	Description
Choose Server	Select a defined server from the dropdown.
Server State	State may be Running, Global Override, Program Override
Client Bandwidth Used	<ul style="list-style-type: none"> • Current – Approximate calculated bandwidth being used by all currently connected clients on this server. • Maximum – Highest aggregate bandwidth used by all connected clients on this server since the last time these parameters were reset.s
Number of Served Clients	<ul style="list-style-type: none"> • Current – Current number of HTTP and/or RTSP clients connected to the server. • Maximum – Highest aggregate number of HTTP and/or RTSP clients that were concurrently connected since the last time these parameters were reset.

Clients

Session State	Setup Play Pause Suspend.			
IP Address	As displayed.			
Up Time	The time (in hr:min:sec) since the last reset or power cycle.			
	UDP	RTSP Interleaved	HTTP Tunneled	Transport Stream
Video Port	Negotiated port.	Negotiated channel.	Negotiated channel.	Configured Transport Stream port.
Audio Port	Negotiated port.	Negotiated channel.	Negotiated channel.	N/A
Video Packets Sent	Video packets sent since session start.			
Audio Packets Sent	Audio packets sent since session start.			
Session Transport	UDP, RTSP Interleave, Http Tunneled, Transport Stream.			
Video Packets Dropped	Video packets dropped since session start.			
Audio Packets Dropped	Audio packets dropped since session start.			

Monitor Archivers

▼ To monitor Archivers:

1. Navigate to **Monitor > Encoder Status > Archivers.**

Monitor -> Encoder Status -> Archivers

Archiver	State	Start Date/Time	Bytes Stored	File Name	Overflow Count
Archiver 1 <input type="button" value="Stop"/>	Archiving	1/17/2014 16:05	Current File: 28,110,848 Total: 5,118,896,672	In Progress: E:/Archiver_1_01201406320018.ts Last Completed: E:/Archiver_1_01201405430017.ts	0
Archiver 2 <input type="button" value="Start"/>	Stopped	1/17/2014 16:05	Total: 50,392,496	Last Completed: E:/Archiver_2_01171416050000.ts	0

FTP Status and Control

Filename:

Add File To FTP Queue

Add File To FTP Queue Then Delete

Remove File From FTP Queue

Files in FTP Queue: 0

FTP Queue:

File Name	File Size	File Time
FTP Queue Is Empty		

Current FTP File Transfer:

File Name	FTP Start Time	Bytes Transferred	File Size	FTP Transfer Status	FTP Read Status
No Active FTP Transfer					

Last FTP File Transfer:

File Name	FTP Start Time	FTP End Time	Bytes Transferred	File Size	FTP Transfer Status	FTP Read Status
E:/Archiver_1_01201405430017.ts	MON JAN 20 07:20:57 2014	MON JAN 20 07:21:06 2014	65,270,592	65,270,592	Transfer Complete	Read Complete

Note: The **Reset Counters** button applies to the **Buffer Full Count** field only.

Field	Description
Archiver	You can configure from 1–4 archivers. Click on the numbered archiver to jump to the configuration page. You can Start or Stop an Archiver here.
State	<ul style="list-style-type: none"> • Disabled • Stopped (enabled but not archiving) • Archiving • Error
Start Date/Time	Start date and time of the currently active archive.
Bytes Stored	Total bytes stored for the current archive session.
Filename	Used with Batch mode. Total bytes in the current batch file.
Overflow Count	Indicates data may be lost. Increments when the Archiver buffer overflows. This usually indicates an overload condition. If this happens reduce the load by lowering the video Target Bit Rate or reducing the number of Archivers. Use Refresh Counters to zero out the buffer.
File in Progress	File <name> currently in progress.
Last Completed File	File <name> of last completed archive.

FTP Status and Control

This panel is typically used to manually FTP any files on the encoder's internal hard drive (or on an external USB drive) to the external FTP server defined on the System Configuration > Network page.

Field	Description	
Filename	The fully-qualified path to a file. For example: D: /<filename>.ts = the path to a file on the internal hard drive. E: /<filename>.ts = the path to a file on an external hard drive.	
Add File To FTP Queue	Click Add File to add the specified file to the FTP queue.	
Add File To FTP Queue Then Delete	Click Add File Then Delete to add the specified file to the FTP queue and then delete from local hard drive.	
Remove File From FTP Queue	Click Remove File to remove selected file from FTP queue.	
Files in FTP Queue	Read-only. The number files currently in the FTP queue.	
FTP Queue	File Name	Name of file.
	File Size	Size of file.
	File Time	Time the file was created.
Current FTP File Transfer	File Name	Name of file currently being transferred.
	FTP Start Time	Time the FTP transfer was started.
	Bytes Transferred	Number of bytes transferred so far.
	File Size	Size of file.
	FTP Transfer Status	Status (including errors) of transfer to FTP server.
	FTP Read Status	Status of read (i.e. "get") from file system.
Last FTP File Transfer	File Name	Name of last file transferred.
	FTP Start Time	Time the FTP transfer was started.
	FTP End Time	Time the FTP transfer ended.
	Bytes Transferred	Number of bytes transferred.
	File Size	Size of file.
	FTP Transfer Status	Status (including errors) of transfer to FTP server.
	FTP Read Status	Status of read (i.e. "get") from file system.

Monitor Decoder Status

Monitor Receivers/Video/Audio

▼ To monitor Receivers/Video/Audio:

1. Navigate to **Monitor > Decoder Status > Receivers/Video/Audio**.

Monitor --> Decoder Status --> Receivers/Video/Audio

Receiver		
Status	Connected	
Program Name	FOX NEWS RTP HD 9000 RTCP	
Program Info	VBrick Streaming Video	
Program Origin	172.16.2.36	
Program Stream	1	
Connection Duration	2 days 19:53:31	
Network Statistics <input type="button" value="Hide Advanced Statistics"/>		
	Video	Audio
Source	239.2.59.126:4444	239.2.59.126:4644
Frames Received	14,650,488	11,457,155
Frames Dropped	1	0
Bytes Received	236,550,296,209	1,955,354,286
Actual Bit Rate	7,742,677	64,001
Jitter Queue Late Frame Count	0	0
Jitter Queue Overflow Count	0	0
Jitter Queue Minimum Depth (msec)	522	594
Jitter Queue Average Depth (msec)	624	615
Frames Dropped by Jitter	1	0
Frames Dropped by Age	0	0
Frames Dropped by Rx Buffer Overflow	0	0
Duplicate RTP Fragment Count	0	0
RTP Validation Failure Count	0	0

Receiver

Field	Description
Status	<ul style="list-style-type: none"> Connected – The decoder is connected to the encoder and is receiving packets associated with the program. Connecting – The decoder is in the process of connecting to the encoder. No Announce – A SAP has not been received for the configured program. Disabled – The decoder is disabled on the Decoder Configuration > Receivers page. Inactive – The decoder is enabled but not actively decoding a stream.
Program Name	Name of the received stream.
Program Info	Information description from Encoder Configuration > Programs page.
Program Origin	Source IP of the encoder.
Program Stream	Transmitter number (1–25) of the received stream.
Connection Duration	Number of days (plus the number of hh:mm:ss) the connection has been active.

Network Statistics

Network Statistics show information about the streams being received by the decoder including addresses and ports, frame and byte counts, dropped frames, and jitter queue performance. The Statistics automatically reset when you start or change the connection or you can manually reset with the **Reset Counters** button at the bottom of the page (in edit mode). Click on the **Advanced Statistics** button to show or hide extra details.

Video Slot 2	
Source	
Video Resolution	720x480
Scan Type	Progressive
Target Frame (Field) Rate	29.97
Target Bit Rate	750,000
Profile	Baseline
Level	3.0
Output	
Video Format	480i
Compatible Outputs	HDMI, SDI, Component, Composite
Frame (Field) Rate	59.94
Audio Slot 2	
Source	
Target Bit Rate	72,000
Sampling Frequency	48,000
Output	
Compatible Outputs	HDMI, SDI, Analog

Field	Description
Source	Source IP address and port number of the stream.
Frames Received	Number of frames received.
Frames Dropped	Aggregate sum of frames dropped by Jitter, Age, and Rx Buffer Overflow. Note that the 9000 Series decoder is designed to minimize the negative effects of video and audio frame drops so your video/audio quality may still be acceptable even if challenging networks or aggressive low latency configurations cause frame drops.
Bytes Received	Number of bytes received.
Actual Bit Rate	Calculated bit rate.
Jitter Queue Late Frame Count	Represents the number of times the jitter queue went empty. The decoder may or may not be dropping frames, but this count represents at least a warning condition that the configured Jitter Queue Time is too small for the network conditions and/or the encoder configuration. You can use this count to help achieve a trade-off between low latency and dropped frames by reducing the configured Jitter Queue Time until you see this count incrementing slowly, with only a few or no Frames Dropped By Jitter. For more information see Latency and Quality Tuning.
Jitter Queue Overflow Count	These counts indicate that large bursts of data are reaching the decoder and filling the jitter queue. The queue can hold nearly 2 seconds of data so this would indicate either a severe network issue or a problem with the encoder or decoder.
Jitter Queue Minimum Depth	The lowest level the jitter queue has reached. A negative value indicates the jitter queue went past empty by that amount. You can use this statistic to tune your configured Jitter Queue Time to obtain the lowest decoder latency without under flowing the jitter queue too much or too often. For more information see Latency and Quality Tuning.

Field	Description
Jitter Queue Average Depth	This value, as compared to the configured Jitter Queue Time and in combination with the Jitter Queue Minimum Depth, gives you an indication of the amount of jitter in the current connection and how well the decoder is handling that jitter. If this value is negative, the jitter queue is under flowing and the decoder probably will not be able to keep audio and video in sync. For more information see Latency and Quality Tuning.
Frames Dropped by Jitter	An increasing count here is an indication that the configured Jitter Queue Time may be too small given the network conditions and encoder configuration. The 9000 Series decoder is designed to minimize the effects of video and audio frame drops, so for aggressive low latency applications, you may decide to set the Jitter Queue Time so low as to cause some frames to be dropped but keeping your video/audio quality still acceptable. For more information see Latency and Quality Tuning.
Frames Dropped by Age	Partial frame persistent for > 5 seconds. Indicates a network issue.
Frames Dropped by Rx Buffer Overflow	An increasing count indicates that the decoder is unable to process the received stream. Check for system overload conditions.
Duplicate RTP Fragment Count	Count of RTP fragments with a duplicate sequence counter (per frame). Indicates an encoder and/or network issue.
RTP Validation Failure Count	Count of RTP packets that failed validation. Indicates an encoder and/or network issue.

Video

When viewing the video and audio data be aware that the **Source** values reflect what the decoder is receiving from the encoder. The **Output** values are what the decoder is actually playing as output.

Source	
Video Resolution	As configured on Encoder Configuration > Video page of the source encoder.
Scan Type	Progressive or Interlaced.
Target Frame (Field) Rate	As configured on Encoder Configuration > Video page of the source encoder.
Target Bit Rate	As configured on Encoder Configuration > Video page of the source encoder.
Profile	Baseline, Main, or High as configured on Video Input page of the source encoder.
Level	In the H.264/AVC standard, a specified "Level" indicates certain quantitative capabilities of bit stream decoding. For example, the level-constrained decoding capabilities specify the maximum resolution, maximum frame rate and maximum bit rate of video the decoder is able to decode. A decoder conforming to a given level must be able to decode bit streams at that level and all lower levels.

Output	
Video Format	The actual Video Format configured on the Decoder Configuration > Video Output page.
Compatible Outputs	Compatible outputs for the selected Video Format.
Frame (Field) Rate	The progressive Frame Rate or the interlaced Field Rate actually being output.

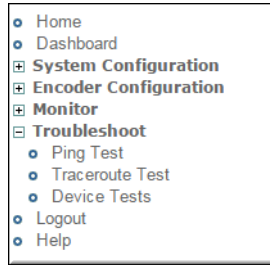
Audio

Source	
Target Bit Rate	As configured on Encoder Configuration > Audio page of the source encoder.
Sampling Frequency	Detected audio sampling frequency.
Output	
Compatible Outputs	Compatible outputs for the selected audio source.



Troubleshoot

The options in the **Troubleshoot** menu are used by system administrators to test connections and data from the Vbrick 9000 encoder to other devices.



Ping Test

TraceRoute Test

Device Tests

Operational Modes

Ping Test

- ▼ To conduct a Ping Test:
 1. Navigate to **Troubleshoot > Ping Test**.

A ping test lets you initiate a data test from the encoder to another IP device. Enter the IP address and Test Settings and select the **Start** button. The Operational State will read **Ping Test**. The results of the test will be displayed in the top portion of the screen.

Troubleshoot --> Ping Test

Operational State: None

Ping Test Result

Response Counter	0
Timeout Counter	0
Resolved IP Address	
Ping Result	

Ping Test Configuration

Destination	IPv4 <input type="text" value="127.0.0.1"/>
Number of Packets	<input type="text" value="4"/>
PDU Size	<input type="text" value="64"/>
Transmit Interval (sec.)	<input type="text" value="1"/>
Transmit Timeout (sec.)	<input type="text" value="5"/>

Ping Test Result

Field	Description
Response Counter	Counts the successful responses.
Timeout Counter	Counts the response timeouts.
Resolved IP Address	IP Address of destination.
Ping Result	Host is alive/not alive.

Ping Test Setting

Field	Description
Destination	IP Address (IPv4), Host Name, or IPv6. Cannot be blank.
Number of Packets	Number of packets to send for the test (default = 4).
PDU Size	Protocol Description Unit size of packets, in bytes (default = 64).
Transmit Interval (sec.)	In seconds (default is sending the packets in 1 second intervals).
Transmit Timeout (sec.)	The length of time, in seconds, before the test times out, in the event the target device fails to respond.

TraceRoute Test

▼ To conduct a Traceroute Test:

1. Navigate to **Troubleshoot > Traceroute Test**.

The Internet is a complex aggregation of network hardware connected by gateways. Tracking the route packets follow or finding a gateway where the packets are being discarded is difficult. The Trace Route test attempts to trace the route an IP packet follows to a specified Internet host. This test utilizes the Time To Live (TTL) field in the IP header to allow intermediate nodes to be "discovered" via Internet Control Message Protocol (ICMP). Intermediate hops are discovered by launching probe packets with a small TTL and then listening for an ICMP Time Exceeded reply from a gateway. Use **Refresh**, **Start/Stop**, and **Default** to run the test.

Troubleshoot --> Traceroute Test

Operational State: None

Traceroute Test Result

Resolved IP Address
Traceroute Result

Traceroute Test Configuration

Destination

Probe Count

Trace Route Test Result

The results of the test appear at the top of the screen. The results include the **Resolved IP Address** of the Destination Host Name. When the test is finished or stopped, the **Overall Result** will display the result of the test, such as "Test Done," or "Max hops (=30) Finished,"

or "Test Stopped," etc. An entry shows the hop number, which is equal to the TTL, IP address (and Host Name if available) of the gateway, and round trip time of each probe. If the probe answers are received from different gateways, the address of each responding system will be shown. If there is no response within a 5 second timeout interval, a "*" is printed for that probe. If the result string exceeds 255 characters, the string will be terminated by ending it with "Too Long."

Field	Description
Resolved IP Address	IP Address of destination.
Traceroute Result	Displays "done" when finished.
Summary	Shows results summary including byte packet size and number of hops.

Trace Route Test Configuration

Field	Description
Destination	IP Address (IPv4), Host Name, or IPv6. Cannot be blank. Multicast IP Addresses are not valid.
Probe Count	Can be set from 3 to 20. Default = 3. This setting is the number of probe packets sent to a host at each hop.

Device Tests

The encoder automatically performs a full POST (Power On Self Test) hardware test whenever the unit is powered-on or reset. The Device Test runs the POST and displays the results.

The **Operational Mode** (on the System Configuration > General page) must be set to **Diagnostics** to run this test. **When done, be sure to reset the encoder to Run mode or you will not be able to stream video.**

▼ To run the Device Test:

1. Navigate to System Configuration > General and set the **Operational Mode** to **Diagnostics**. (See: Operational Modes)
2. Navigate **Troubleshoot > Device Tests** and click **Edit**.
3. Set the test parameters (see below).
4. Click **Start** and wait a few seconds to see the test results.
5. When done go back to System Configuration > General and set the **Operational Mode** to **Run**.

Troubleshoot --> Device Tests

Operational State: None

Device Tests Result

Current Test	None
Number of Loops Run	1
Failure Count	0

Device Tests Configuration

You must be in Diagnostics Mode to start device tests

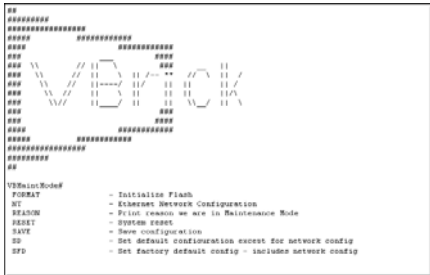
Vbrick Debug Information File

Field	Description
Current Test	As displayed.
Number of Loops to Run	Number of times to run the test.
Failure Count	Number of items that failed.
Intensity	Low intensity is faster but runs fewer tests. High intensity runs all tests but may take 30 minutes or more.
Vbrick Debug Information File	Click button to generate a debug file. When requested by Vbrick Support Services, you will need to fetch multiple files via FTP.

Operational Modes

The encoder has five operational modes that reflect differing conditions. **Run Mode** and **Diagnostics Mode** are user-selectable on the System Configuration > General page. **Maintenance Mode**, **Limited Run Mode**, and **Overloaded Mode** are automatically launched when certain conditions occur.

Mode	Description
Run Mode	This is the standard operating mode when the system is functioning normally. If you power up the encoder under normal conditions, the system will be in Run mode.
Limited Run Mode	This mode is launched when the software loads but encounters other errors. When some error conditions occur, for example a high temperature alarm, the encoder will automatically go into Limited Run Mode. When this happens a message will display on the encoder front panel and a Limited Run Mode status will display on the Monitor > Monitor the System page in VBAAdmin. In Limited Run Mode, you can make configuration changes with VBAAdmin, reboot the encoder, or perform other admin tasks to resolve the problem. The only thing you cannot do in Limited Run Mode is stream video. When the error condition(s) that initiated Limited Run Mode have been resolved, manually reboot the encoder. It will come up in normal Run Mode and you can resume streaming.
Diagnostics Mode	This mode is required to run Device Tests and to check the hard drive and file system on internal and external storage devices.

Mode	Description
Maintenance Mode	<p>Maintenance mode is automatically launched when the software on the Vbrick encoder does not load. A message on the front panel will indicate the encoder is in Maintenance mode. Maintenance mode runs from a reduced functioning kernel that provides limited access to the encoder via the Command Line Interface only. You can access the Command Line Interface via the serial port or Telnet—but not via SSH. (See the <i>Encoder Getting Started Guide</i> for more about the Command Line Interface.) As shown below, Maintenance mode has limited configuration and diagnostic capabilities. It enables the FTP server on the encoder so you can download new software.</p> 
Overloaded Mode	<p>This mode is used to prevent the user from being locked out of VAdmin when CPU utilization approaches 100% (as shown on the Monitor > Monitor the System page). If this happens, certain management tasks (for example, running VAdmin) are given priority over streaming. Overloaded Mode will transition to Run Mode when CPU utilization is reduced. This mode occurs when the encoder is configured to handle more video than its operational capacity. If this occurs, the encoder needs to be reconfigured to reduce the number of streams and/or data rates. For more details see below Avoiding Overload Conditions.</p>

Avoiding Overload Conditions

The Vbrick 9000 series H.264 encoder has numerous configuration options and under some configurations may overload the host processor. This is indicated by the Operational Mode reporting an "overload" on the Monitor > System page. Transport Streams and TCP clients are more CPU intensive than RTP and UDP clients. CPU loading can be decreased by reducing some or all of the following: Target Bit Rate, number of streams, transmitters, and clients. Another option is to increase the Max Packet Size on the Encoder Configuration > Global page but proceed with caution as this may cause issues in some IP networks and with some players.



Key Length Value (KLV) Metadata

Inserting KLV Metadata

Vbrick supports Key Length Value (KLV) and Local Data Sets (LDS) metadata insertion in accordance with Motion Imagery Standards Board (MISB) standards. KLV is a data encoding standard often used to embed information in video feeds. Items are encoded into key-length-value triplets where key identifies the data, length specifies the data's length, and value is the data itself. In a typical KLV/LDS application, GPS (global positioning) or telemetry data is embedded in the video using one of the following supported methods:

Table 1. KLV Methods

KLV Method	Description
ESD to LDS	Exploitation Support Data (ESD) is accepted via CC, converted to LDS packets and transported over Transport Stream as a Metadata AU.
LDS Passthrough	LDS is accepted through the following interfaces and transported in the Transport Stream as a Metadata AU. <ul style="list-style-type: none"> • LDS over Serial port • LDS over SDI interface • LDS over IP network
CoT to LDS	Cursor on Target (CoT) converted to LDS and transported over Transport Stream as a Metadata AU. CoT is accepted over the following interfaces: <ul style="list-style-type: none"> • CoT over Serial port • CoT over IP network

In all cases, the encoded video has embedded metadata—typically including the time and geographic location of the video stream. In all cases, the Vbrick encoder remaps the metadata into KLV/LDS per MISB 601.3. This metadata can only be embedded in an MPEG2TS transport stream as defined on the Encoder Configuration > Streams page.

Note: KLV metadata is supported on the serial port(s) and on the network port. If you are using the serial ports on a device with multiple channels, only the first two channels support KLV metadata in the stream: Channel 1 uses COM2 and Channel 2 uses COM1. If you are receiving KLV or CoT into the encoding encoder, there is a maximum of one network KLV stream per video input.

Exploitation Support Data (ESD) to Local Data Set (LDS)

Exploitation Support Data (ESD) to Local Data Set (LDS) uses line 21 (typically used for closed captions) of the video format as an in-band transport mechanism. The embedded text is limited to 120 characters per frame. Control and management of the LDS insertion parameters are available using the VAdmin Web interface, the Command Line Interface, or

SNMP. ESD is converted to LDS per MISB standard 0601 and MISB EG 0104.5. The LDS metadata packets PTS (timestamp) source is the system capture time of the first byte of ESD data.

▼ To configure ESD to LDS:

1. Navigate to Encoder Configuration > Video.
2. Set **KLV** to **ESD to LDS**.
3. Configure the data to be streamed in the **ESD Field** as Field One, Field Two (default), or Field One and Two.
4. Navigate to Encoder Configuration > Streams.
 - a. Set Transport Type to **MPEG2TS**.
 - b. Check **Enable KLV**.
 - c. Configure other advanced settings as necessary.
5. When done the data present in the stream (defined by the ESD Field) will be encoded and delivered with the stream.
6. To view ESD throughput, go to Monitor > Encoder Status > Monitor Video Input Fields.

Local Data Sets (LDS) Passthrough

Serial LDS Passthrough

Serial Local Data Set (LDS) Passthrough uses the encoder's serial (COM) port as an out-of-band mechanism to embed KLV data in the video stream at a significantly higher bit rate than ESD to LDS (and with no character limit). KLV data from a proprietary device is input via the standard RS232/422 interface on the encoder and is embedded in the transport stream as KLV metadata per MISB standard 601.3 and MISB Standard 0604 Section 6.2. The metadata PTS (timestamp) source is configurable as the LDS packet's capture time or the timestamp in the LDS packet.

▼ To configure LDS Serial Passthrough:

1. Connect an input device to the serial (COM) port on the encoder.
2. Navigate to System Configuration > Advanced Configurations > Passthrough page.
 - a. Set Passthrough State to **Initiator** and Destination to **KLV**. Set the Baud Rate, Stop Bits etc. to the values recommended by the input device manufacturer.
3. Go to Encoder Configuration > Video Input.
 - a. Set **KLV** to **Serial LDS Passthrough**.
4. Go to Encoder Configuration > Streams.
 - a. Set Transport Type to **MPEG2TS**.
 - b. Check **Enable KLV**.
 - c. Configure other advanced settings as necessary.

SDI LDS Passthrough

SDI LDS (Local Data Sets) Passthrough uses the encoder's SDI port as an out-of-band mechanism to embed KLV data in the video stream at a significantly higher bit rate than ESD to LDS (and with no character limit). KLV data from the SDI port is input to the encoder and is embedded in the transport stream as KLV metadata per MISB standard 601.3 and MISB Standard 0604 Section 6.2. The metadata PTS (timestamp) source is configurable as the LDS packet's capture time or the timestamp in the LDS packet.

- ▼ To configure SDI LDS Passthrough:
 1. Connect an input device to the SDI port on the encoder.
 2. Navigate to Encoder Configuration > Video.
 - a. Set **KLV** to **Serial LDS Passthrough**.
 3. Navigate to Encoder Configuration > Streams.
 - a. Set Transport Type to **MPEG2TS**.
 - b. Check **Enable KLV**.
 - c. Configure other advanced settings as necessary.

Network LDS Passthrough

Network LDS (Local Data Sets) Passthrough allows use of the encoder's IP interface as an out-of-band mechanism to embed KLV data in the video stream at a significantly higher bit rate than ESD to LDS (and with no character limit). KLV data from a proprietary device is input via the IP interface on the encoder and is embedded in the transport stream as KLV metadata per MISB standard 601.3 and MISB Standard 0604 Section 6.2. The metadata PTS (timestamp) source is configurable as the LDS packet's reception time or the timestamp in the LDS packet.

- ▼ To configure Network LDS Passthrough:
 1. Configure an LDS data source to send the LDS data to an IP port on the encoder.
 2. Navigate to Encoder Configuration > Video Input.
 - a. Set **KLV** to **Network LDS Passthrough**.
 - b. Set KLV Port to the IP port used for LDS data reception (default = 7777).
 3. Navigate to Encoder Configuration > Streams.
 - a. Set Transport Type to **MPEG2TS**.
 - b. Check **Enable KLV**.
 - c. Configure other advanced settings as necessary.

Cursor on Target (CoT) to Local Data Set (LDS)

Serial CoT to LDS

In this method Cursor on Target (CoT) metadata input via the standard RS232/422 interface on the encoder. It is then converted to LDS per MISB EG 0805, MISB Standard 0601.3, and Vbrick extensions, and is embedded in the transport stream as KLV metadata per MISB Standard 0604 Section 6.2.

- ▼ To configure Serial CoT to LDS:
 1. Connect a CoT data source to the serial (COM) port on the encoder.
 2. Navigate to Encoder Configuration > Video.
 - a. Set **KLV** to **Serial CoT to LDS**.
 3. Navigate to Encoder Configuration > Streams.
 - a. Set Transport Type to **MPEG2TS**.
 - b. Check **Enable KLV**.
 - c. Configure other advanced settings as necessary.

Network CoT to LDS

In this method Cursor on Target (CoT) metadata is provided to the encoder via IP packets. It is then converted to LDS per MISB EG 0805, MISB Standard 0601.3, and Vbrick extensions, and is embedded in the transport stream as KLV metadata per MISB Standard 0604 Section 6.2.

▼ To configure Network CoT to LDS:

1. Configure a CoT data source to send CoT data to an IP port on the encoder.
2. Navigate to Encoder Configuration > Video.
 - a. Set **KLV** to **Network CoT to LDS**.
 - b. Set KLV Port to the IP port used for CoT data reception (default = 7777).
3. Navigate to Encoder Configuration > Streams.
 - a. Set Transport Type to **MPEG2TS**.
 - b. Check **Enable KLV**.
 - c. Configure other advanced settings as necessary.

MISB Timestamps

Regardless of what other KLV options you select, an option exists to insert MISB timestamps into the video stream per MISB Standard 0604 Section 4.2.2. To enable this option go to Encoder Configuration > Streams > Transport Stream Settings and check **Enable MISB Timestamp**.

Advanced Transport Stream Settings

Transport Stream Overview

In Vbrick's implementation of transport stream (MPEG2TS) the encoder administrator has unprecedented ability to configure the transport stream behavior optimally for the particular requirements of his network and application. Transport Stream "mode" (See: Transport Stream Settings) can be configured for constant or variable. In constant mode, the transport stream is constrained to maintain a precise bit rate on the network at all times. In order to assure this, it is required to add some level of empty (NULL) packets to handle the inevitable bursts in bit rate generated by the encoding engine. In variable mode, empty packets are not sent, but in Vbrick's implementation, the peak bit rate is still as tightly constrained as it would be in constant mode. Variable medium delay has precisely the same constraint on peak bit rate as constant mode, however, since in constant mode that peak bit rate is always maintained, the number of bits actually transmitted and averaged over time is increased for constant mode.

Overhead and PTS-PCR Gap

Note: The default gap and latency settings for Transport Stream have not been optimized. If you have a requirement for low overhead or low latency, you will need to manually tune these settings for optimal performance.

Variable Mode

The three variable selections (Variable High Delay, Variable Medium Delay, and Variable Low Delay) differ in the peak bit rate permitted. All constrain the peak bit rate, however, Variable High Delay limits the peak bit rate considerably more than Variable Low Delay. In all cases, the bit rate averaged over time is the same. The peak bit rate is reflected in the Overhead setting which selects how much the peak bit rate is allowed to exceed the average bit rate on a percentage basis. Note that the average bit rate includes the video rate, the audio rate, and any additional overhead required by the transport stream algorithm. Generally this transport stream overhead tends to increase at lower bit rates. Selecting Variable High Delay selects an overhead of 5%, Variable Medium Delay and Constant select an overhead of 10%, and Variable Low Delay selects an overhead of 500%. *Variable Low Delay therefore results in very low latency, however, it is not appropriate for use in peak bandwidth constrained networks.*

If the peak bit rate is more constrained, the inevitable variability in the size of the frames output by video encoding algorithm will result in a longer time to transmit the larger frames, and hence will increase latency. This trade off latency (Gap) and peak bit rate (Overhead) desired by the user determines how the Mode, Overhead, and Gap should be set. It should be noted that the settings for these parameters can also interact with the video quality. The Rate Control Setting on the Video page allows you to decide if you wish to improve the latency at a given overhead by sacrificing some video quality. A Rate Control Setting of 1 limits the variability of the encoded frame sizes allowing the latency to be reduced. A Rate Control

Setting of 5 allows the encoding algorithm to create larger encoded frames when the content requires those larger frames to optimize quality—hence requiring larger latency. A Rate Control Setting of 3 is the default.

Custom Mode

Custom mode allows you to vary the presets for Gap (default = 620) and Overhead (default = 50) to correspond to your exact needs. The Gap setting when using any mode other than Custom are conservative numbers taking into consideration the starting template, specific changes in resolution and frame rate for high definition encoding, rate control settings, audio sample rate, and selected mode. It should be noted that low audio sampling rates will force higher latency (greater Gap).

It is also possible that for certain extremely challenging content, the Gap may need to be increased to allow high quality video on certain decoders. The need for higher Gap would be indicated by the decoder dropping frames resulting in a jerky effect on the display device. It is also true that if lower latency is required, and the content is not difficult or some video degradation is permissible, lower gap settings should be used. If you elect to deviate significantly from the video template settings, it may be necessary to change the mode to Custom and tune the Gap and Overhead settings to achieve high quality video output. Some general guidelines are:

- For a given resolution, higher bit rates will allow lower Gaps for a given Overhead.
- For a given bit rate, lower resolutions will allow lower Gaps for a given Overhead.
- For a given resolution and bit rate, higher frame rates will allow lower Gaps for a given Overhead.
- If the IDR interval is increased, quality will be enhanced, but the Gap may need to be increased for a given bit rate.

Automatic Latency Control

The **Automatic Latency Control** option offers an easy way to adjust the gap settings to minimize the latency for particular content and configuration parameters. The latency control values are set based on certain configuration parameters, notably the video template used. If the configuration does not correspond to standard template values, the latency control may be suboptimal—leading to dropped frames if too low and unnecessarily high latency if too high. In addition, since the required latency is variable depending on content, the standard latency control settings are relatively conservative.

The latency control feature may be used in two ways. First, it can be turned on after the final configuration changes, including the overhead setting, have been made and while typical content is being encoded. By observing the **PTS-PCR Gap** value reported on the configuration page, you can then disable the latency control option and utilize the **Custom** transport stream **Mode** to manually set the latency to a value which minimizes latency for a particular use case. A second choice is to simply leave the **Automatic Latency Control** setting enabled. In most cases this will lead to an excellent viewing experience with minimal latency. The disadvantage of using this setting is that if the content changes dramatically, it may take some time for the algorithm to respond to the change.

In order to better use this feature, it is useful to understand some details of its design. The algorithm reverts to the calculated latency whenever a relevant configuration parameter is changed. At this point it observes the timing of the encoding and transmission video frames and determines an optimal value for the buffering required on the decoder to avoid dropped

frames. This buffering value is measured in time and is the **PTS-PCR Gap**. The algorithm adjusts gap only—the overhead is set by the user either by utilizing the **Mode** selection or by setting via the **Custom** option. The algorithm seeks to reduce frame loss by increasing the gap value more rapidly than reducing the gap value. If the gap is too large, latency is increased, but video quality is retained. If the gap is too low, it is likely that frames will be dropped leading to reduced perceived quality.

The algorithm has the capability to adjust its behavior based on a number of factors. The algorithm may be "aggressive" in optimizing latency by reducing the gap to a minimum and accepting the possibility of a limited number of dropped frames. The algorithm may also be "conservative" by keeping the gap higher and thus reducing the likelihood of dropped frames at the cost of increased latency. To determine how to tune the algorithm the encoder software uses the transport stream **Mode** configuration, the template configuration, the video resolution, the video frame rate, the video connection (Standard Definition or High Definition), and the rate control setting. If the transport stream **Mode** is **Variable Low Delay** and the **Rate Control Setting** (on Encoder Configuration > Video Input page) is lowest latency, the administrator is primarily interested in low latency and so the auto gap algorithm is aggressive in controlling latency. On the other hand, if the transport stream **Mode** is **Variable High Delay** and the Rate Control Setting is best quality, the administrator is primarily interested in high quality and latency if of less interest so the latency control algorithm is conservative in controlling latency. The remaining factors are combined to tune the algorithm based on video input and output parameters. In general, if the variation in encoding time is more variable, in order to not drop excessive frames, the algorithm must be more conservative. Lower frame rates and lower resolutions lead to more variation in encoding and thus to higher latency and a less aggressive auto gap algorithm.

Forward Error Correction (FEC) Theory of Operation

Forward Error Correction (FEC) is in general a system of error control for data transmission whereby the sender adds systematically generated redundant data to its messages. The basic trade-offs that must be determined in configuring FEC is the bandwidth overhead and increased latency caused by FEC traded off against the level of error recovery provided by the algorithm. A deeper understanding of the statistics of errors in the network and the details of the FEC algorithm configuration will provide the ability to optimize these trade-offs.

A key concept with FEC systems on IP networks is that, because of the UDP checksums, channel bit errors get translated into packet losses. In addition to this, buffer and re-route issues cause burst packet losses. The combination of packet losses from the three sources—gross reordering, bit-error induced losses, and burst losses needs to be low enough so that the FEC scheme is not broken more than the negotiated error rate. Because any bit errors cause the packet to be discarded there is no requirement for an error correction scheme that can handle errored packets—every packet will either arrive correct or not at all.

An RTP payload format for Generic Forward Error Correction Packets has been defined in the RFC 2733 to enable error correction of realtime media. This standard allows the use of traditional error correcting codes. A major advantage of this scheme is that it can be used with any video format standards (MPEG, SDI, SDTI, etc.) as long as it is encapsulated in RTP packets. This specification was extended by the Pro-MPEG forum in Pro-MPEG Code of Practice #3 and later adopted by SMPTE as SMPTE Standard 2022-1. This standard has been further extended in SMPTE Standard 2022-2, and 2022-3. This is the algorithm Vbrick

has implemented in the 7000 encoders. Direct reference to these specifications is recommended, but a brief discussion of how to utilize the FEC capabilities follows.

The FEC algorithm can be viewed as providing additional XOR packets for a matrix of packets with L Columns and D Rows. FEC is provided as up to two separate streams which are received on separate UDP ports. One stream supports XOR for a row of the matrix - L adjacent packets. This XOR scheme provides for recovery from one single packet loss in a group of L packets. The second stream supports XOR for a column of the matrix - D packets. This second stream provides for recovery from a burst of lost adjacent packets. If the destination port for the media stream is N, then the first stream is sent to port N+2, and the second stream to port N+4.

It can be seen that the overhead added for the scheme is $1/L$ for the first stream and $1/D$ for the second stream. For both streams the overhead is $(L+D)/(L*D)$. Clearly as the matrix size is reduced, the overhead is increased and the ability to recover from random errors is increased. On the other hand, more overhead does not always lead to better recovery. If burst errors are expected, it is desirable to have L to be at least the length of the expected burst error. Whether you are better off with more rows or more columns depends on the statistics of the errors. Row FEC packets are good for protecting against single packet losses in a row. Column FEC packets protect against single packet errors in a column. So - if your errors are random, then rows are better, but if your errors tend to come in bursts, then the row FEC does not help you as much. You need to have at least as many columns in your matrix as the largest expected burst. If you knew your statistics were always going to come in a burst of 10 packets with the bursts being random and rare then you would turn off the row FEC and would create a matrix with at least 10 columns. In this case (for example) a 50 row and 10 column matrix would be better than a 5 row by 5 column matrix.

When determining the FEC configuration, potential limitations of the FEC receiver need to be understood. In the specific case of the Vbrick VB7000 Series decoder, the limitations are: $L*D \leq 100$; $1 \leq L \leq 20$; $4 \leq D \leq 20$. In addition, since in order to recover a packet, both the row and column FEC packet must be received, an additional end-to-end latency equal to the time to receive LXD packets will be incurred. The Encoder Configuration > Streams page in VBAdmin shows the overhead and the latency incurred by each configuration.

Since the specifics of configuration are highly dependent on the expected packet loss statistics, and specific latency requirements of the application, it is not possible to provide guidelines that will work in all situations. It is, however, possible to provide some examples. Note that for random bit errors, each bit error will cause loss of an entire packet so that (for example) if utilizing 1500 byte packets, a bit error rate of 1 in 1,000,000 will translate to a packet loss rate of 1.2% and a bit error rate of 1 in 100,000 will translate to a packet loss rate of 12%. In these cases, a 10x10 matrix is adequate to recover from virtually all errors. The overhead in this case is $20/100$ or 10%.

If the error rate and bandwidth constraints are such that it is not possible to eliminate all video artifacts with FEC configuration, it should be noted that generally artifacts will persist until a reference frame is successfully received. The user's experience may be improved by reducing the **IDR Frame Interval** on the Encoder Configuration > Video Input page. However be aware that IDR frames are very expensive in terms of bandwidth utilization so reducing the IDR interval will cause a general degradation of video quality/sharpness.

In general, once you understand the various trade-offs involved, you may wish to experiment with different FEC settings until you get the best possible results. The following image, from a Vbrick H.264 [decoder](#), shows FEC packet correction statistics from an H.264 transport stream. In this case you will note that the number of **Corrected Packets** matches the number

of **Missing Packets**. While this indicates that FEC error correction has been configured effectively it does not necessarily mean that the viewer experience is optimal. You may still need to experiment with different settings until you get the best results given the bandwidth and latency factors at your site.



Figure 1. FEC Statistics on Vbrick 7000 Series Decoder



Advanced MBR Configuration

Advanced MBR Configuration Rules

The following table shows all possible combinations of inputs and configurable outputs for multiple bit rate encoding. The settings in this table are enforced by VBAAdmin. That means the user interface will not allow you to configure a non-supported combination of inputs and/or outputs. For more about configuring video input and outputs, see the Video topic.

Table 1. Advanced MBR Configuration Rules

Ref. #	Input				Number Output Rates				Total # Rates	Restrictions †
	Chn 1	Chn 2	Chn 3	Chn 4	Chn 1	Chn 2	Chn 3	Chn 4		
1	Any				5				5	R4, R9, R11
2	1080p		1080p		2		2		4	R1, R9
3	1080p		1080i	1080i	2		2 + (1)	2 + (1)	7	R1, R7, R9
4	1080p		1080i		2		4		6	R1, R7, R9
5	1080p		720	720	2		2 + (1)	2 + (1)	7	R1, R3, R9
6	1080p		720		2		4		6	R1, R9
7	1080p		480	480	2		5	5	12	R1, R9
8	1080p		480		2		5			R1, R9
9	1080i		720		4		4		8	R1, R7, R9
10	1080i		720	720	4		2 + (1)	2 + (1)	9	R1, R3, R7, R9
11	1080i		1080i	480	4		5	5	14	R1, R7, R9
12	1080i		480		4		5			R1, R7, R9
13	1080i		1080i		4		4		8	R1, R7, R9
14	1080i	1080i	1080i		2 + (1)	2 + (1)	4		9	R1, R3, R7, R9
15	1080i	1080i	1080i	1080i	2 + [1]	2 + [1]	2 + [1]	2 + [1]	9	R1, R2, R7, R9
16	1080i	1080i	720		2 + (1)	2 + (1)	4		9	R1, R3, R7, R9
17	1080i	1080i	720	720	2 + [1]	2 + [1]	2 + [1]	2 + [1]	9	R1, R2, R7, R9
18	1080i	1080i	480	480	2 + (1)	2 + (1)	5	5	15	R7, R9
19	720		480	480	4		5	5	14	R1
20	720		480		4		5		9	R1
21	720		720		4		4		8	R1
22	720	720	720		2 + (1)	2 + (1)	4		9	R1, R3
23	720	720	720	720	2 + [1]	2 + [1]	2 + [1]	2 + [1]	9	R1, R2, R8
24	720	720	480	480	2 + (1)	2 + (1)	5	5	15	R1
25	720	720	480		2 + (1)	2 + (1)	5		10	R1
26	480	480	480	480	4	4	4	4	16	R1
27	480	480	480		5	5	5		15	R1
28	480		480		5		5		10	R1
29	720/30		1080p							R10
30	720/30		1080i							R10
31	720/30		1080i	1080i						R10
32	720/30		720/30							R10
33	720/30		720							R10
34	720/30		720	720						R10
35	720/30		480							R10

Ref. #	Input				Number Output Rates				Total # Rates	Restrictions †
	Chn 1	Chn 2	Chn 3	Chn 4	Chn 1	Chn 2	Chn 3	Chn 4		
36	720/30		480	480						R10
37	720/30	720/30	1080p							R5
38	720/30	720/30	1080i							R5
39	720/30	720/30	1080i	1080i						R5
40	720/30	720/30	720/30							R5
41	720/30	720/30	720/30	720/30						R5
42	720/30	720/30	720							R5
43	720/30	720/30	720	720						R5
44	720/30	720/30	480							R5
45	720/30	720/30	480	480						R5
46	720/30	720/30	480							R5
47	720	720/30	1080p							R10
48	720	720/30	1080i							R10
49	720	720/30	1080i	1080i						R10
50	720	720/30	720/30							R10
51	720	720/30	720/30	720/30						R10
52	720	720/30	720							R10
53	720	720/30	720	720						R10
54	720	720/30	720	720/30						R10
55	720	720/30	480							R10
56	720	720/30	480	480						R10

† Restrictions	
R1	Requires one common resolution per input.
R2	[1] means one extra rate over all four inputs.
R3	(1) means one extra rate for either input per slot.
R4	Any single input can make 5 rates.
R5	Double 720 case, but max 4 rates per input.
R7	Requires field reduction for 1080i case.
R8	9 rates total, max 3 per input, max 5 per slot.
R9	Only 1 rate per input is 1080p.
R10	Same as full 720.