comnet
Communication Networks

CNVETX1

VIDEO ENCODER/DECODER UNIT

The ComNet™ CNVETX1 is a single-channel, camera-ready H.264/MPEG-4/MPEG-2, and MJPEG intelligent video server/video encoder or decoder unit, with video quality of up to D1 at 1 to 30 FPS, and dual or triple encoding/streaming. The CNVETX1 is industrially hardened for deployment in unconditioned/out-of-plant operating environments. It is user-configurable for use as an encoder or decoder, or the video decoding may be done with third party decoding software. Incorporating a distributed intelligent video architecture, analog/composite video NTSC or PAL CCTV cameras with IP or full-duplex serial data pan-tilt-zoom control may be easily integrated onto any IP network. Full command and control of the various video encoding parameters are provided, including resolution, bit rate, and frame rate. A full-duplex mono audio channel is included. The ComNet IVS (Integrated Video Server) allows for managing multiple simultaneous video streaming, and enables onboard video content management.

About This Guide

This guide is intended for different users such as engineers, integrators, developers, IT managers, and technicians.

It assumes that users have some PC competence and are familiar with Microsoft Windows operating systems and web browsers such as Windows Internet Explorer and Mozilla Firefox, as well as have knowledge of the following:

» Installation of electronic equipment

» Electrical regulations and guidelines

» Knowledge of Local Area Network technology

This document includes the following sections:

Introduction describes the system hardware and software.

Installation describes how to install the hardware.

Getting Started includes the system requirements, installation overview and a general description of the functionalities of the user interface.

Monitoring Live Video contains instructions for operating live monitoring and the PTZ camera.

Audio/Video Configuration describes setting the audio/video configuration and how to control the streaming parameters and view the active running streams.

Video Analytics includes procedures for video analytics configuration activation and operation.

Managing System Settings includes procedures for various system settings and management tasks.

Board Configuration via Serial Port describes how you can configure the board via a serial port.

RTP/RTSP Video Node describes the RTSP URI format.

Related Documentation

The following documentation is also available:

» CNVETX1 Datasheet

» CNVETX1 Quick Start Guide

About ComNet

ComNet develops and markets the next generation of video solutions for the CCTV, defense, and homeland security markets. At the core of ComNet's solutions are a variety of high-end video servers and the ComNet IVS integrated web server, which provide the industry with a standard platform for analytics and security management systems enabling leading performance, compact and cost effective solutions.

ComNet's products are available in commercial and rugged form.

Website

For information on ComNet's entire product line, please visit the ComNet website at http://www.comnet.net

Support

For any questions or technical assistance, please contact your sales person (**sales@comnet.net**) or the customer service support center (**techsupport@comnet.net**)

Safety

» Only ComNet service personnel can service the equipment. Please contact ComNet Technical Support.

» The equipment should be installed in locations with controlled access, or other means of security, and controlled by persons of authority.

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Overview

Legal Information

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Abbreviations List

The following terms and abbreviations are used throughout the document.

Table 1: Abbreviation Table

API	Application Programming Interface
CBR	Constant bit rate
CCTV	Closed Circuit Television
CIF	Constant Intermediate Format 352 x 288
CVBS	Color Video Blank Sync
CVBS	Composite Video Baseband Signal
DDR	Double data rate SDRAM memory
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
DPDT	Double Pole Double Throw switch
DSP	Digital Signal Processor
DST	Daylight Savings Time
FOV	Field of View
FPS	Frames per Seconds
G.711	ITU-T standard for audio
GMT	Greenwich Mean Time
GOP	Group of Pictures
HTTP	Hypertext Transfer Protocol
H.264	Standard for video compression
I-Frames	Intra coded picture
IP	Internet Protocol
IVS	Intelligent Video Server
JPEG	Joint Photographic Experts Group
LAN	Local Area Network
LED	Light Emitting Diode
MAC	Media Access Control
MIC	Microphone
MJPEG	Motion JPEG
MMSE	Multimedia Messaging Service Environment
MPEG	Motion Picture Experts Group
MTU	Maximum Transmission Unit
MPA	Motion Picture Association
MP3	MPEG-1 Audio Layer 3

NTSC	National Television Standards Committee
OSD	On-Screen Display
PAL	Phase Alternating Line
PCI	Peripheral Component Interconnect
P-Frames	Predictive coded picture
PTZ	Pan Tilt Zoom
Q	Quantization
QCIF	Quarter CIF 176 x 144 video resolution
QVGA	Quarter VGA 320 x 240 video resolution
RTP	Real Time Transport Protocol
RTSP	Real Time Streaming Protocol
RTP2	ComNet library communication protocol
SDK	Software Development Kit
SNMP	Simple Network Management Protocol
SNTP	Synchronized Network Time Protocol
STDP	Single Throw Double Pole
TTL	Transistor-Transistor Logic
TCP	Transmission Control Protocol
TCP/IP	Internet protocol suite
UART	Universal Asynchronous Receiver Transmitter
UDP	Universal Datagram Protocol
URI	Uniform Resource Identifier
URL	Uniform Resource Locator
VBR	Variable Bit rate
VGA	Video Graphics Array
VSP	Virtual Serial Port
XML	Extensible markup Language

Introduction

The CNVETX1 is an intelligent IP video streamer with an easy-to-use web server called IVS that combines H.264, MPEG-4, MPEG-2, and M-JPEG video streaming with video content analysis.

The IP video streamer is a DSP based multimedia server supplying compressed video over a TCP/IP network via standard RTP/RTSP streaming protocols. Nodes supporting video and audio output may also act as clients, receiving streams from another node and displaying them.

The IVS Software runs on ComNet's fully featured CNVETX1 video server. Access to the web server is through a standard browser. The CNVETX1 unit is a single channel Encoder or Decoder (Dual purpose user-configurable).
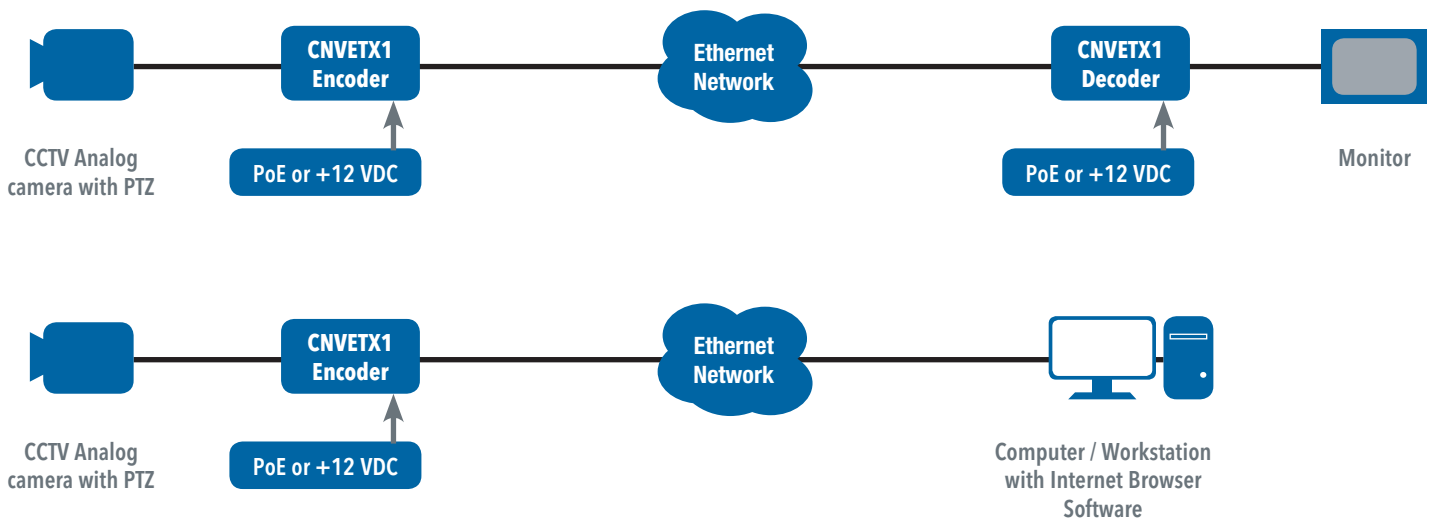

Figure 1: CNVETX1 System Typical Applications

Figure 1 shows two scenarios where the CNVETX1 is connected directly to an analog camera source and the network.

Software Features

» Video and audio streaming over the IP network

» Analog video input and video output

» Serial Ports for controlling PTZ cameras

» TTL alarm inputs and relay output for controlling additional sensors

» Fast Ethernet for video streaming and board control

» Industrial-grade PoE operation w/Camera Output Power

» Optional internal storage for event-driven or continuous local audio / video recording

» UDP, HTTP, TCP/IP, RTP/RTSP, SNMP, SNTP, Telnet, DHCP

» H.264, MPEG-4, and MJPEG up to D1, MPEG-2 up to 4CIF

» Intuitive Web GUI for easy configuration and setup

» Optional Video Analytics with On-Board Rule Management

Resolutions

Image size	NTSC	PAL
D1	720×480 pixels	720×576 pixels
4CIF	704×480 pixels	704×576 pixels
CIF	352×240 pixels	352×288 pixels
QCIF	176×112 pixels	176×144 pixels

Performance (Encoder Operation Mode)

Frame Rates – Without Analytics or Local Recording

Triple Streaming:

- » H.264: D1@30fps + CIF@7.5fps + QCIF@7.5fps
- » MPEG-4: [D1 + CIF + QCIF]@30fps
- » MJPEG: D1@30fps + CIF@7.5fps + QCIF@7.5fps

Dual streaming:

- » H.264 D1@30fps + CIF [H.264@7.5fps or MPEG-4@15fps or MPEG-2@7.5fps or MJPEG@30fps]
- » MPEG-4 D1@30fps + CIF@30fps[H.264 or MPEG-4 or MPEG-2 or MJPEG]
- » MPEG-2 4CIF@30fps + CIF@7.5fps[H.264 or MPEG-4 or MPEG-2 or MJPEG]
- » MJPEG: D1@30fps + CIF [H.264@30fps or MPEG-4@15fps or MPEG-2@7.5fps or MJPEG@10fps]

Frame Rates – With Local Recording (Internal MicroSD Card)

Dual streaming:

- » Live H.264   D1@30fps   + Recording H.264 CIF@15fps
- » Live MPEG-4   D1@30fps   + Recording H.264 CIF@15fps
- » Live MPEG-2   D1@30fps   + Recording H.264 CIF@15fps
- » Live MJPEG   D1@30fps   + Recording H.264 CIF@15fps

Frame Rates – With Analytics

Dual streaming:

- » H.264 D1@15fps + MJPEG CIF@30fps
- » MPEG-4 [D1@15fps + CIF@30fps]
- » MPEG-4 D1@15fps + MJPEG CIF@30fps
- » MJPEG [D1@15fps + CIF@30fps]
- » MJPEG D1@15fps + CIF@30fps[H.264 or MPEG-4]

Single streaming:

- » H.264: D1@15fps or CIF@30fps
- » MPEG-4: D1@15fps or CIF@30fps
- » MPEG-2: 4CIF@7.5fps or CIF@15fps
- » MJPEG: D1@15fps or CIF@30fps

Hardware Overview

Hardware Features

The ComNet IVS web server is designed to run on ComNet's CNVETX1 unit.

The following is a specific description of the unit and its unique features.

The CNVETX1 unit contains one TI DM6446 DSP acting as an independent, standalone unit with its own IP address, and network node.

The CNVETX1 has the following physical connections:

  » 1 composite BNC 75Ω connector for analog camera input
  » 1 composite BNC 75Ω connector for analog camera output
  » 1 RS232 serial port and 1 RS422/485 via Terminal Block
  » 2 alarm inputs and 1 relay output via terminal block
  » 1 Audio Mono Line/Mic input, 1 line output via 3.5 mm audio jack
  » Optional factory-installed internal MicroSD Storage Card (up to 64 GB)
  » Power source: 12V DC power input jack or PoE
  » 12V DC power output micro-header for external camera
  » 1 RJ45 10/100 Ethernet network connector
  » 2 Solid State relay outputs on micro-header
  » 1 USB port (Unused, reserved for future implemintation)

Figure 2: The CNVETX1 Unit

Front Panel

Figure 3: CNVETX1 Chassis Front Panel

Indicators: The three indicating LEDs on the front panel display status information.

Label	Description
ANALYTICS	Analytics Engine On
VIDEO IN	Video Input Capturing
PWR	Power (DSP Running)

Video Input: The CNVETX1 provides one analog video input. The video is connected via a 75Ω coax cable to the BNC input connector on the front panel.

Audio Input: The CNVETX1 receives one mono input on a 3.5mm connector on the front panel.

Audio Output: The CNVETX1 transmits one mono line channel on a 3.5mm connector on the front panel.

Video Output: The CNVETX1 provides one analog video output. The video is connected via a 75Ω coax cable to the BNC output connector on the front panel.

Rear Panel

Figure 4: CNVETX1 Chassis Rear Panel

12-pin I/O Terminal Connector: The CNVETX1 unit provides one relay contact comprised of the Common Contact, the Normally Closed Contact, and the Normally Open Contact. The current through the contacts should not exceed 1 Amp @ 30 VDC load. The CNVETX1 also provides two TTL alarm inputs. The alarm inputs are designed as a digital logic input (-0.3V to 0.6V logic 0, 1.2V to 5V logic 1), and are pulled up by default. One RS232 port and one RS422/485 port are also provided.

Pin-out information for the 12-pin terminal block is provided below:

Table 3: Terminal Block Connector Pinout

Pin	Description	Pin	Description
1	GND	7	RS232 TX
2	RS422/485 TX +	8	TTL 1
3	RS422/485 TX –	9	TTL 0
4	RS422/485 RX –	10	Relay COM
5	RS422/485 RX +	11	Relay NC
6	RS232 RX	12	Relay NO

USB Port: The CNVETX1 provides one USB 2.0 port (port has no function and is reserved for future use).

Ethernet port: The CNVETX1 connects to the network using a standard Ethernet cable on the back panel.

DC Power Input: Connection to the external 12V DC power supply on the back panel.

Power over Ethernet (PoE): The CNVETX1 supports a PoE operation mode. When connected to a PoE switch, the voltage is provided from the RJ45 connector, and the 12V DC power input is not used.

DC Power Output: Connection to an external camera (5W Max.) on the back panel.

Solid-State Relay Outputs: Connection to 2 Solid-State relays on the back panel.

Connecting the Cables

For viewing video, the video cable, Ethernet cable and power cable must be connected. Figure 5 below shows the front panel of the CNVETX1 configured as an Encoder with the BNC video input cable and the audio input cable. In Decoder operation, the BNC video output and audio output shall be used.

1. Connect the CNVETX1 video input using a standard 75Ω coaxial video cable.

2. Connect the audio input using standard 3.5 mm audio cable.

Figure 5: CNVETX1 Front Panel Connectors

Figure 6 and Figure 7 show the rear panel of the CNVETX1 with the RJ45 Ethernet connector, power connector, terminal block mating connector for the alarms and relays, and USB connector.

3. Connect the CNVETX1 unit to the network using a standard network cable.

4. Connect the power using connector to the external DC power supply. If a PoE switch is used, the network cable supplies the power to the unit.

5. Connect the alarms and TTL inputs via the terminal connector.

Figure 6: CNVETX1 Rear Panel Connectors

Figure 7: CNVETX1 Rear Panel Connectors with Terminal Block

Within a few seconds the front panel power LED 3 should light up, indicating that the unit is functional and ready for network connections.

CNVETX1 Technical Specifications

Table 4: CNVETX1 Technical Specifications

Video	Video In	One Composite 1 Vpp 75Ω NTSC / PAL
	Video Out	One Composite 1 Vpp 75Ω NTSC / PAL
	Resolutions	D1 down to QCIF programmable
	Compression	H.264, MPEG-4, MPEG-2, MJEPG
	Frame Rate	1-30 fps programmable
	Bit Rates	Configurable 32 Kbps to 20 Mbps
	Connector	BNC Type
Audio	Audio In	Single Mono (Encoder)
	Audio Out	Single Mono (Decoder)
	Compression	G.711
	Connector	3.5mm Audio Jack
Network	Interface	10/100 Ethernet
	Protocols	ARP, HTTP, IGMP, RTP, RTSP, SNMP, UDP, TCP/IP
	Connector	RJ-45 Connector
Alarms & Contact Closures	Input	2 TTL (- 0.3V to + 0.6V logic 0, + 1.2V to + 5V logic 1)
	Output	1 SPDT Type relay (up to 1A @ 30 VDC Load) 2 Solid-State Relays (Micro-header connector)
	Connector	12 Position Terminal Block (See table 3 above)
Serial Port	Interface	RS232, RS422/485 serial ports
	Connector	12 Position Terminal Block
	PTZ Support	Yes
System	Internal Storage	Optional MicroSD Storage Flash, Up to 32GByte
	LEDs	3 General Purpose LEDs (Power, Video, and Analytics)
Power	Supply Voltage	6–13V DC or Power over Ethernet (PoE)
	Connector	DC Barrel Plug or RJ-45 connector
Environment	Form Factor	88.5 mm × 66.2 mm × 42.6 mm
	Operating Temperature	-40° C to + 75° C
Regulation Compliance	Certification	FCC, CE EMC and Safety RoSH
Warranty	Lifetime warranty	

Getting Started

System Requirements

» Computer running Windows OS or Mac OS (for web browsing only)

» Network Access

» Internet Web browser Microsoft Internet Explorer (version 6.0 or later), or Mozilla Firefox, or Google Chrome, or Apple Safari.

» Java Software: Download Version 6 Update 7 or later from: http://www.java.com/en/download/index.jsp

Installation

Access your ComNet unit via its Web interface.

Web Interface

The ComNet IVS web server can be configured using the ComNet Web interface. To access the Web configuration open a web browser and enter the unit's IP address in the address bar. For example, enter the following IP address: **http://192.168.10.1**

Note: You can leave the IP Address at the factory installed address of 192.168.10.1, or change to an address of your choice. For instructions on changing the IP Address see Changing the IP Address.

General

When the Web page is first entered, the About page sub menu of the General menu is displayed. The About page displays system information such as the board name, MAC address, current date, system and application uptime, CPU and DSP load, and storage memory information, and version information of various software components.

The left pane contains a menu listing available options. When a menu item is selected its sub-menus are displayed (some sub-menus contain an additional selection of options). The right pane contains the work area for the currently selected option.

Figure 8 shows sub levels revealed when General is selected in the left pane.
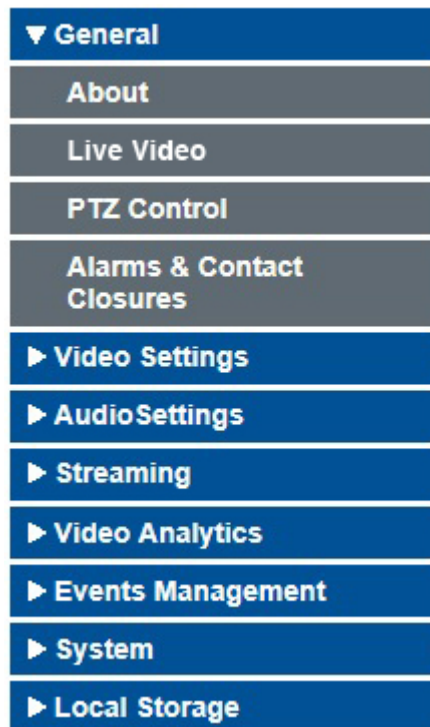
Figure 8: General Sub Menus

About

The right pane displaying the About page appears in the browser window as shown in figure 9 (some of the system and version information may vary):
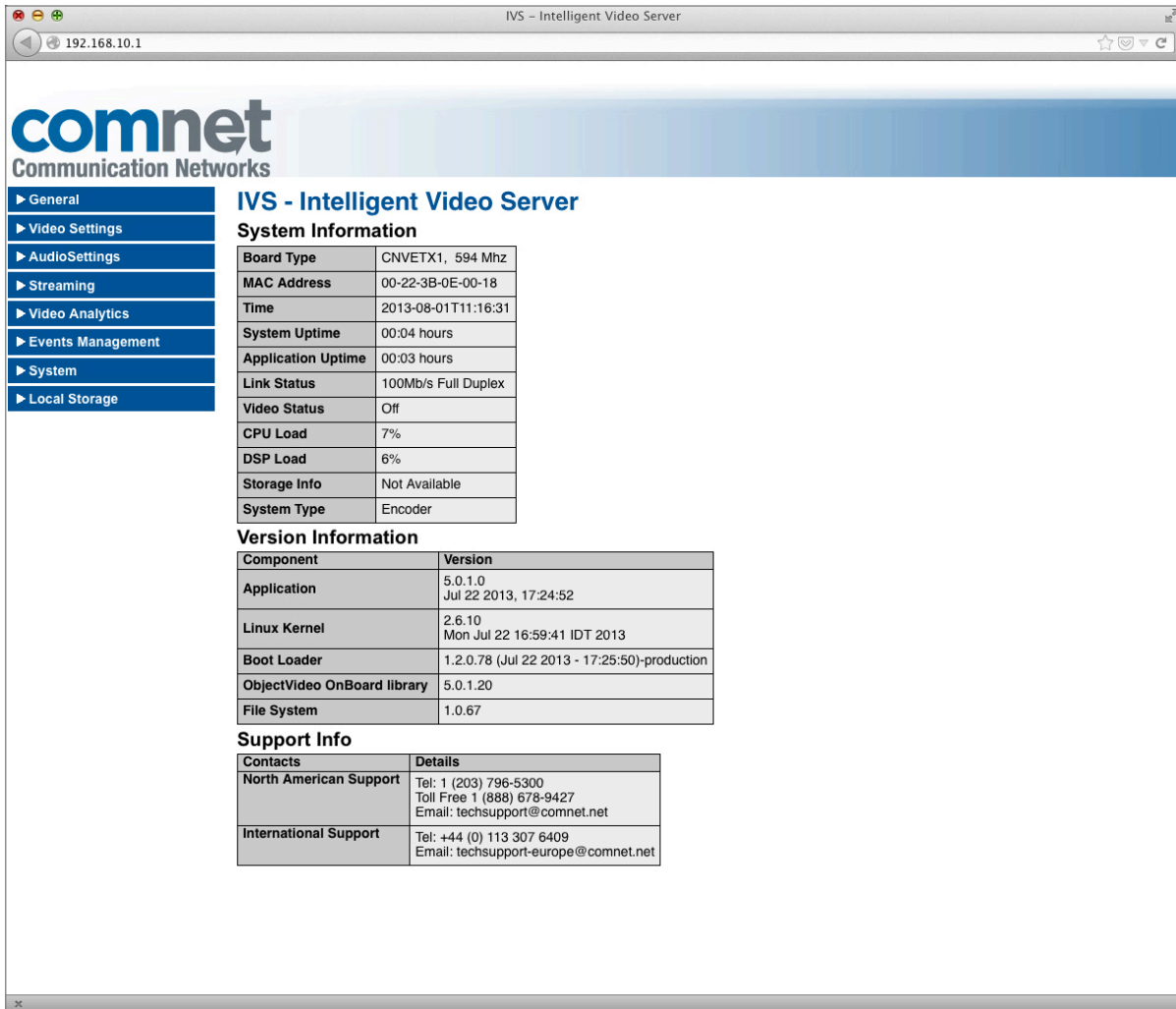
Figure 9: The About Page

Table 5 and 6 details the menus and sub-menus of the Web interface and their functions.

Table 5: Menu Options for Encoder Operation Mode

Encoder Option	Menu Suboption	Description
General	About	Displays general information about the application
	Live Video	Displays live video feed from the connected video source
	PTZ Control	Allows controlling of a Pan Tilt Zoom (PTZ) camera
	Alarms & Contact Closures	Enables setting (1 or 0) Relay Output, reading input status
Video Settings	Analog Video	Enables setting analog video settings
Audio Settings	Analog Audio	Enables setting analog audio settings
Streaming	General	Enables setting general streaming parameters
	Auto Start	Enables multicast Auto Start and configure parameters
	Running Streams	Displays running streams
Video	Encoding Parameters	Video encoding general parameters
	OSD	Enables On-Screen-Display (OSD)
	MPEG-4	Enables setting MPEG-4
	MPEG-2	Enables setting MPEG-2
	H.264	Enables setting H.264
	MJPEG	Enables setting MJPEG
Video Analytics	Software Activation	Enables local key activation
	General	Enables setting video overlay configuration, resetting analytics configuration
	Rule Management	Enables setting up rules
	OnBoard Configuration	Enables configuring the views
	Response Management	Enables event responses management for single or multiple sources
Event Management	HTTP Post Settings	Enables setting HTTP server for receiving events
System	Serial Port Settings	Enables setting RS232 and RS422/485 terminal settings
	Network Settings	Enables setting network settings (Host name, IP Address, etc.)
	Change Password	Enables changing your password
	Clock Setup	Enables setting the real time clock
	SNMP Settings	Enables SNMP enterprise traps and thresholds
	Operation Settings	Enables switching between Encoder / Decoder operation modes
	Firmware Upgrade	Enables updating the firmware

System Administration	Reset User Password	Resets user password
	Change sysadmin Password	Changing system password
	Factory Defaults	Returns to factory defaults
	Change Web Interface Language	Changing Web Language
Reset	Resets the unit (Hardware reset may take up to 60 sec.)	
Local Storage	Recording Settings	Enables continuos local recordings of Video and/or Audio
	Media Files	Displays local storage clips (MKV format) – Allows HTTP download / delete
	SD Maintenance	Sets the retention percentage (cyclic recording) and allows erasing ALL MicroSD

Table 6: Menu Options for Decoder Operation Mode

Decoder Options	Menu Suboption	Description
General	About	Displays general information about the application
	Live Video	Displays live video feed
	PTZ Control	Allows controlling of a Pan Tilt Zoom (PTZ) camera
	Alarms & Contact Closures	Enables setting (1 or 0) Relay Output, reading input status
Video Settings	Decoder Profiles	Defines up to 16 decoding profiles settings
	Display Configuration	Selects the decoding profile to be used
Video Analytics	Response Management	Enables event responses management for single or multiple sources
Event Management	HTTP Post Settings	Enables setting HTTP server for receiving events
System	Serial Port Settings	Enables setting RS232 and RS422/485 terminal settings
	Network Settings	Enables setting network settings (Host name, IP Address, etc.)
	Change Password	Enables changing your password
	Clock Setup	Enables setting the real time clock
	SNMP Settings	Enables SNMP enterprise traps and thresholds
	Operation Settings	Enables switching between Encoder / Decoder operation modes
	Firmware Upgrade	Enables updating the firmware
System Administration	Reset User Password	Resets user password
	Change sysadmin Password	Changing system password
	Factory Defaults	Returns to factory defaults
	Change Web Interface Language	Changing Web Language
Reset		Resets the unit (Hardware reset may take up to 60 sec.)

Password Protected Options

Most menu options require a user/password combination to access them. When an option is password-protected the Authentication Required window appears.

Figure 10: Enter Password

To access password-protected options:

1. In the Authentication Required window, in the User Name text-box type your user name, and in the Password text-box type your password.

Note: By default, the username is admin, and the default password is admin.

2. Select OK.

Note: For system administration level password see System Administration.

Monitoring Live Video

The Live Video screen enables viewing a live video feed from the camera connected to the video server through the Live Video pane (Java plug-in is required). In addition, operating as an Encoder, it is possible to monitor live video streaming using a media player such as QuickTime or VLC.

Live Video

The Live Video displays the video image of the input video source – Analog input for Encoder or digital input for Decoder. The video source is displayed on the Live View page at CIF resolution at 1/3 of the full frame rate. Thus, if you are running in NTSC video mode, the Live View page displays the data at 10 frames per second.

Figure 11 below displays an example of a fixed outdoor camera connected to a CNVETX1 on the network.
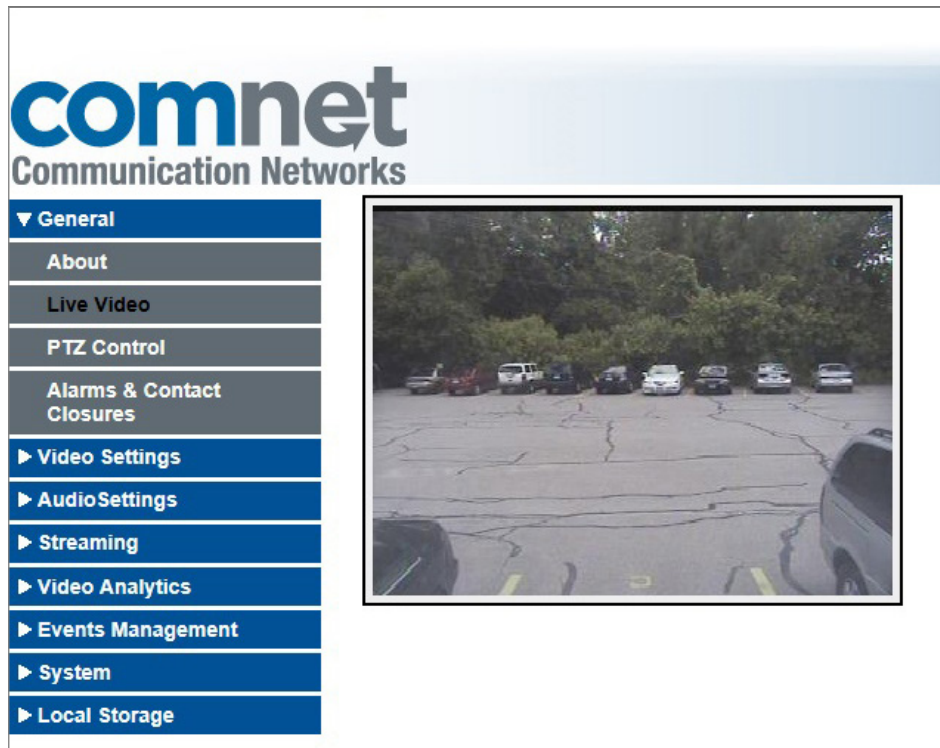
Figure 11: Live Video Page

To display live video:
   » In the left pane select the General menu, and from the sub-menus select Live Video.
   » The right-pane displays the live video.

Alarms and Contact Closures

The Alarms & Contact Closures pane enables you to view the status of the TTL alarm inputs and set the contact closures outputs. There are two alarm inputs, one dry contact relay output, and two solid-state relay outputs. The inputs are status bits and are read only. The relays can be set to Normally Open (1) or Normally Closed (0).
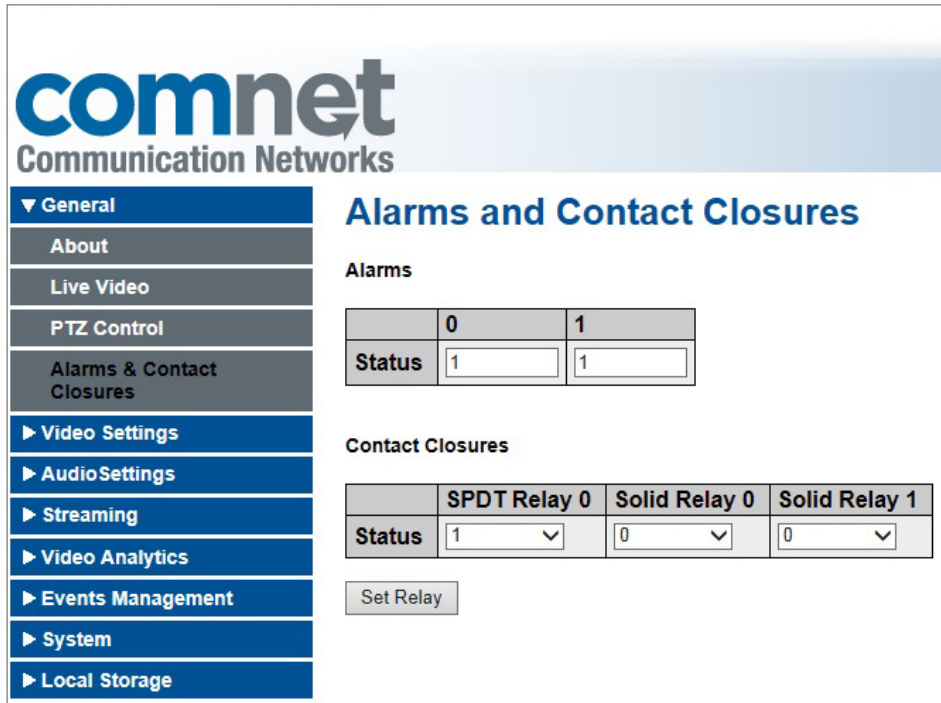
Figure 12: Alarms and Contact Closures Page

To set contact closure output:

1. Select the General menu in the left pane, and from the sub-menus select Alarms & Contact Closures.

2. Select 0 or 1 from the drop down menu in the right pane within the Contact Closures section.

3. Select Set Relay.
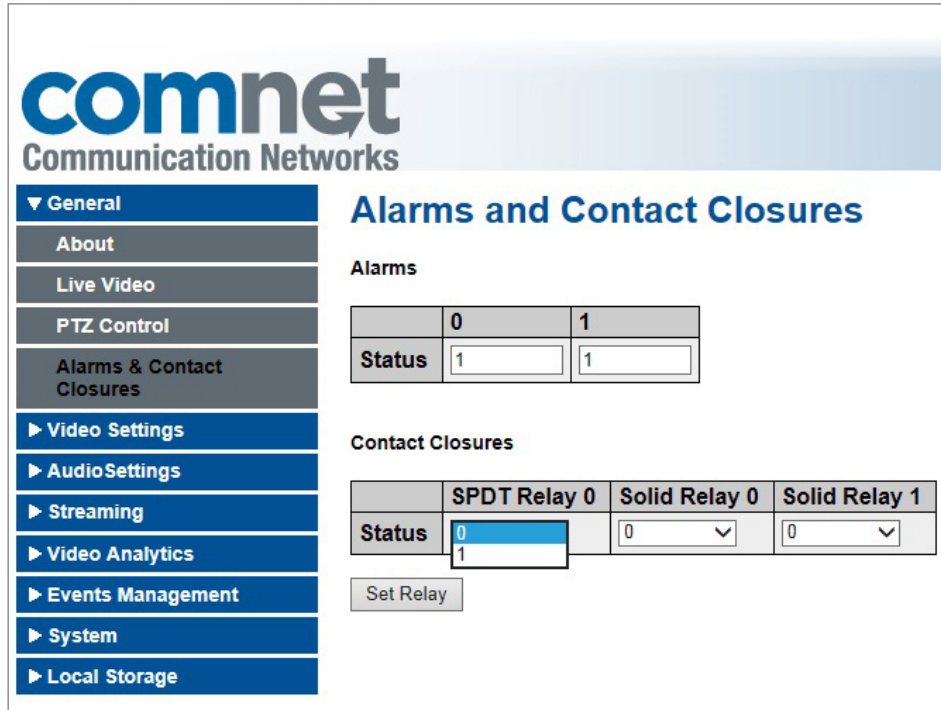
Figure 13: Setting the Contact Closures

Controlling a Pan Tilt Zoom (PTZ) Camera

The Web interface enables controlling the Pan and Tilt movement of a PTZ camera as well as the zoom, focus, and iris operations. When operating as an Encoder, the analog video input may be connected to a PTZ camera and configured from a choice of seven camera protocols. The following procedures outline how to configure the PTZ camera and how to control its movement.

Configuring a PTZ Camera

The PTZ cameras are configured in the PTZ Control Configuration interface.

To configure the PTZ camera:

1. Select the General menu in the left pane, then in the left pane, select PTZ Control.

The right pane displays the PTZ commands work area (Java plug-in is required).
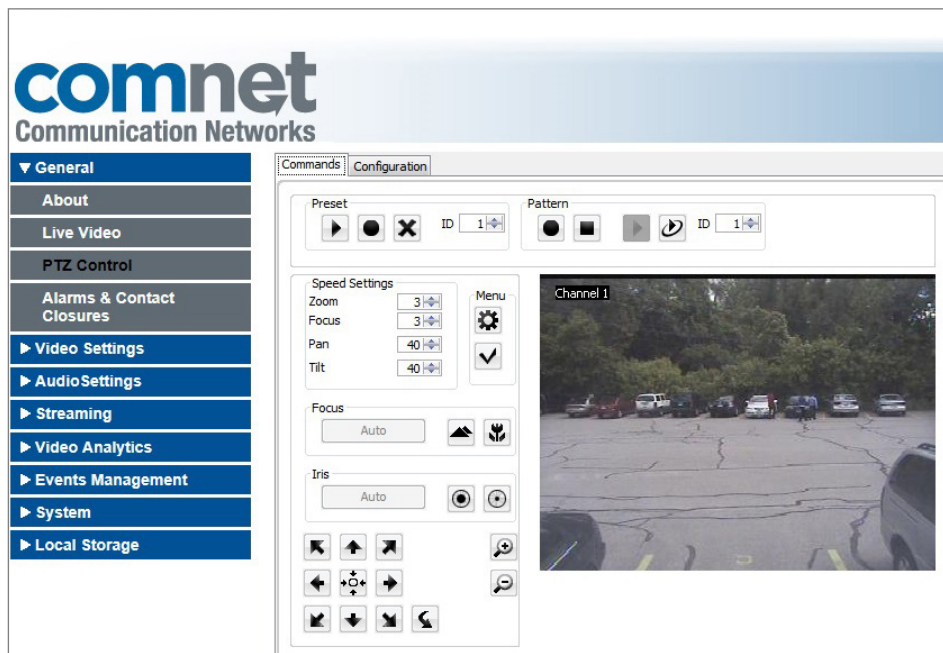
Figure 14: PTZ Commands Page

2. Select the Configuration tab to display the Configurations page.
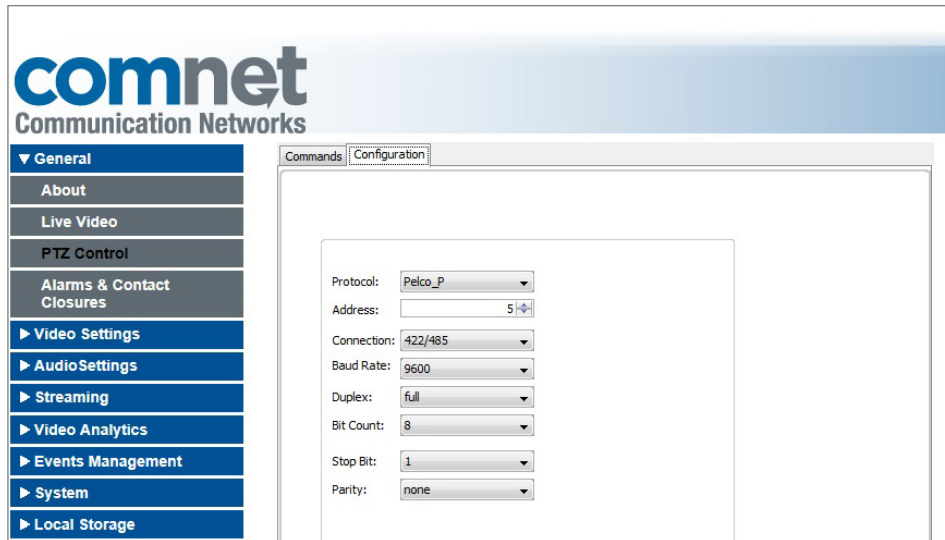
Figure 15: PTZ Configuration Page

3. Select a camera protocol

4. From the Protocol drop-down list. The choices of protocols are Pelco_P, Pelco_D, AD_RS422, BBV_Star_Card, CyberScan1, Phillips_TC7560, RS_422_Dome.
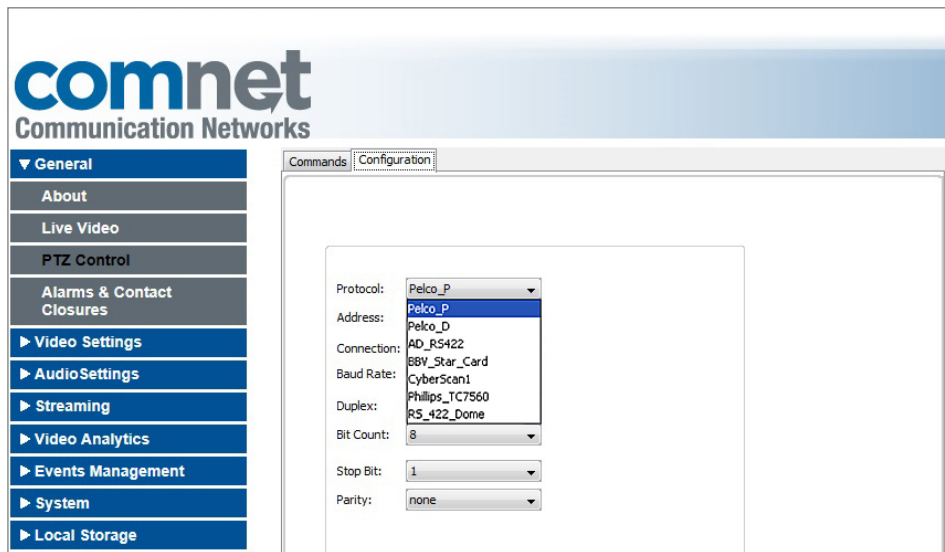
Figure 16: Select Camera Protocol

5. Select the address which is the ID of the selected camera from the Address drop-down list. The ranges vary for each protocol.

Refer to Supported PTZ Protocols Parameter Range.

6. Choose 232 for RS-232, 422/485 for RS422/485 from the Connection drop-down list.

7. The RS232 and RS422/485 are separate physical ports and have separate connectors.
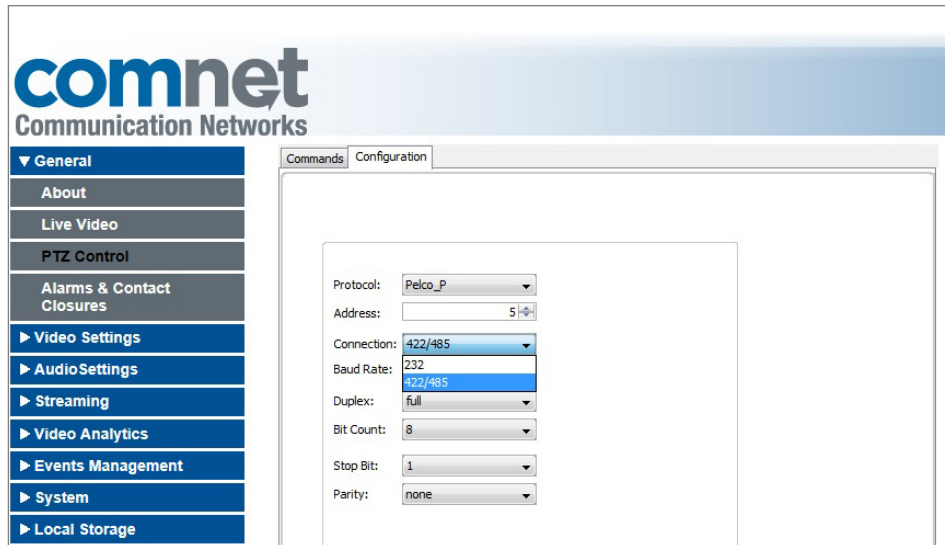
Figure 17: Connection Type

8. Select the baud rate from the Baud Rate drop-down list.
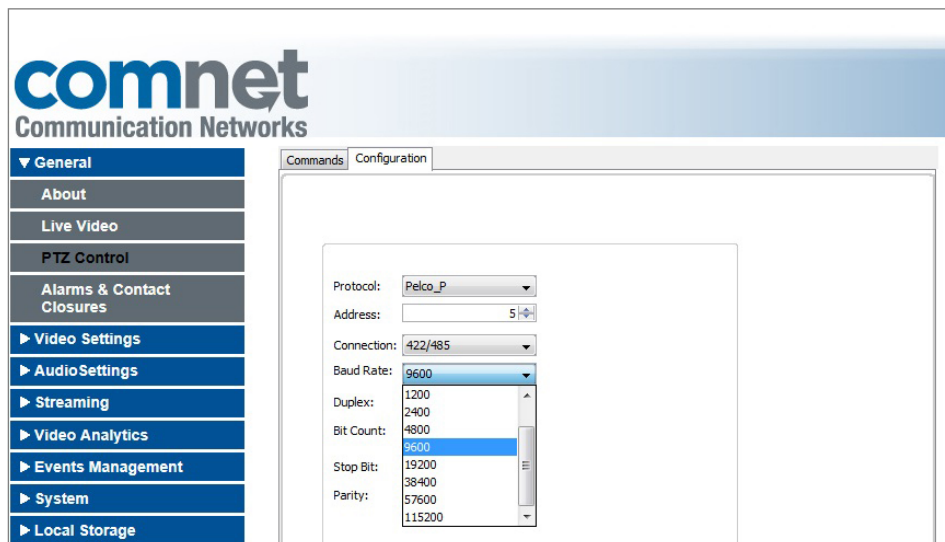
Figure 18: Select the Baud Rate

9. Select full for full duplex mode or half for half duplex mode from the Duplex drop-down list.
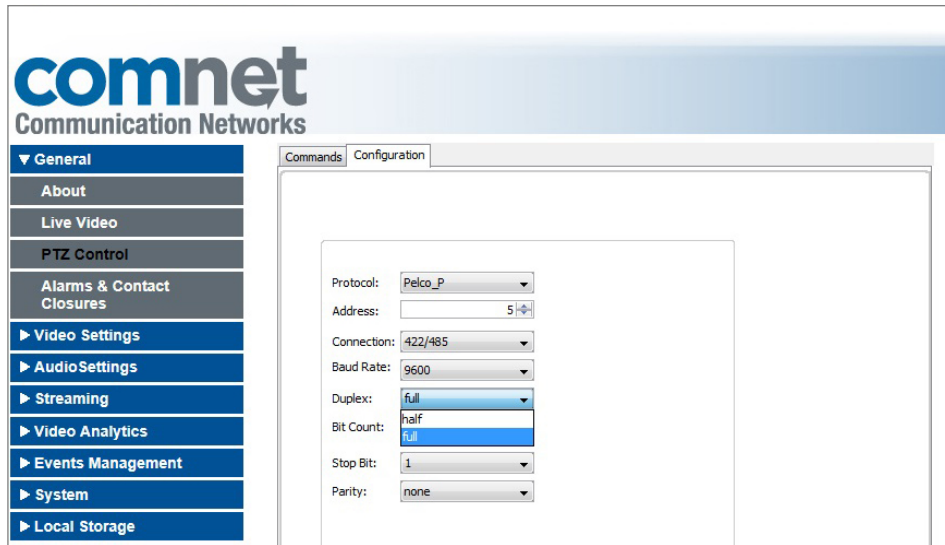
Figure 19: Select Full or Half Duplex Mode

10. Select 7 or 8 bits from the Bit Count drop-down list.
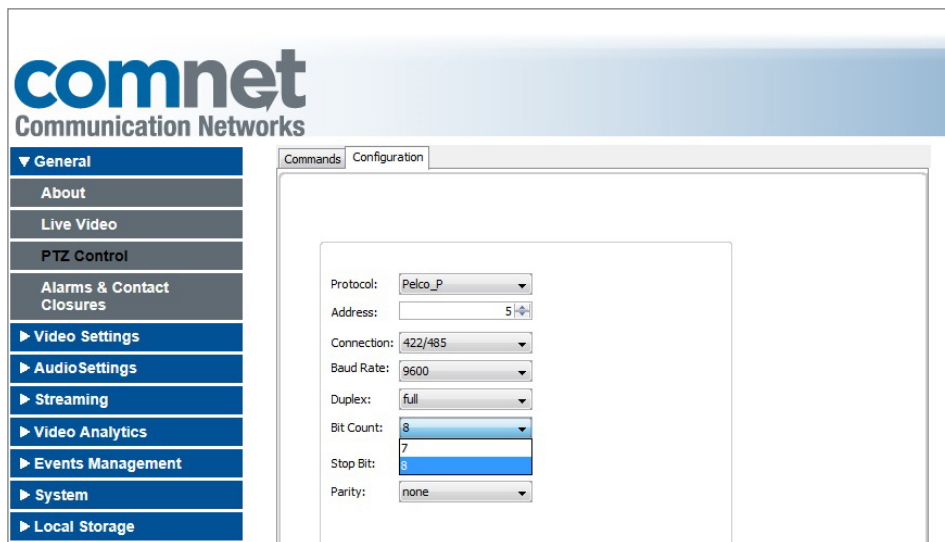
Figure 20: Select Bit Count

11. Select 1 or 2 stop bits from the Stop Bit drop-down list.
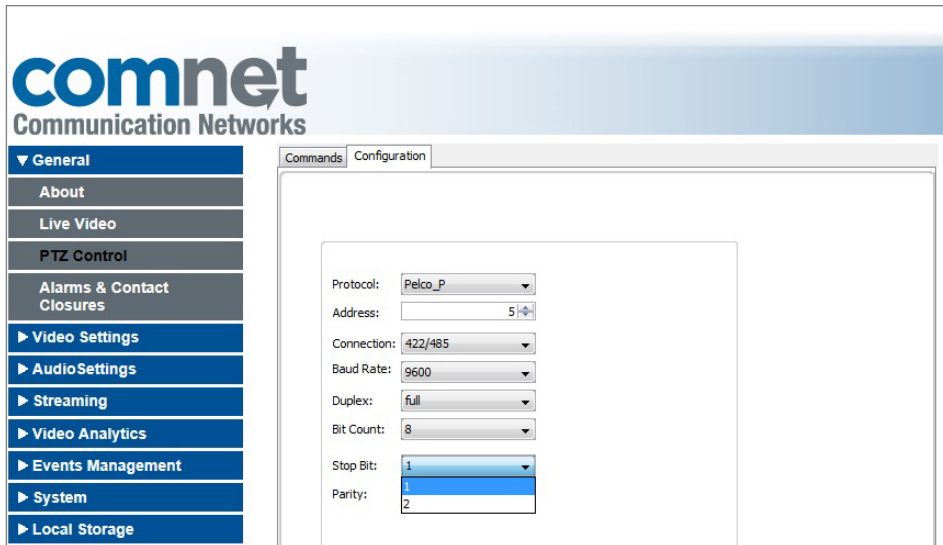
Figure 21: Select Stop Bits

12. Select none, odd, or even parity from the Parity drop-down list.
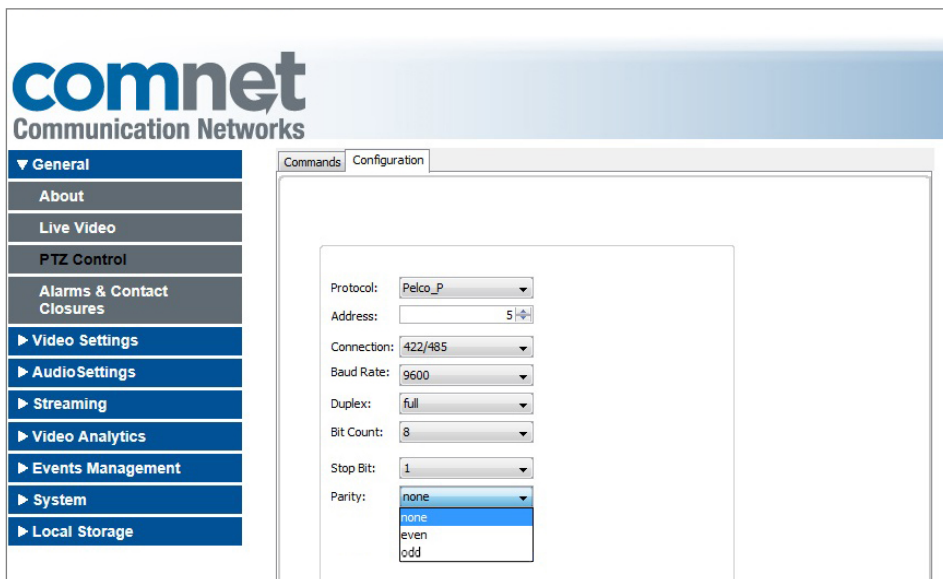
Figure 22: Select Parity

13. Select Apply to save the settings

14. Select the Commands tab to return to the PTZ Control command display.

Controlling the Pan and Tilt Movement of a PTZ Camera

Controlling the pan and tilt movement of a PTZ Camera is done by using the keyboard arrow keys or by selecting the appropriate symbol on the graphical user interface. When a key is pressed, the camera moves in the direction of the pressed key. The possible directions are tiltUp, tiltDown, panLeft, panRight, PTLeftUp, PTRightUp, PTLeftDown, and PTRightDown.

Note: During normal keyboard use, the NumLock key is not activated, which means that the direction arrows on the numeric keypad keys are operational.
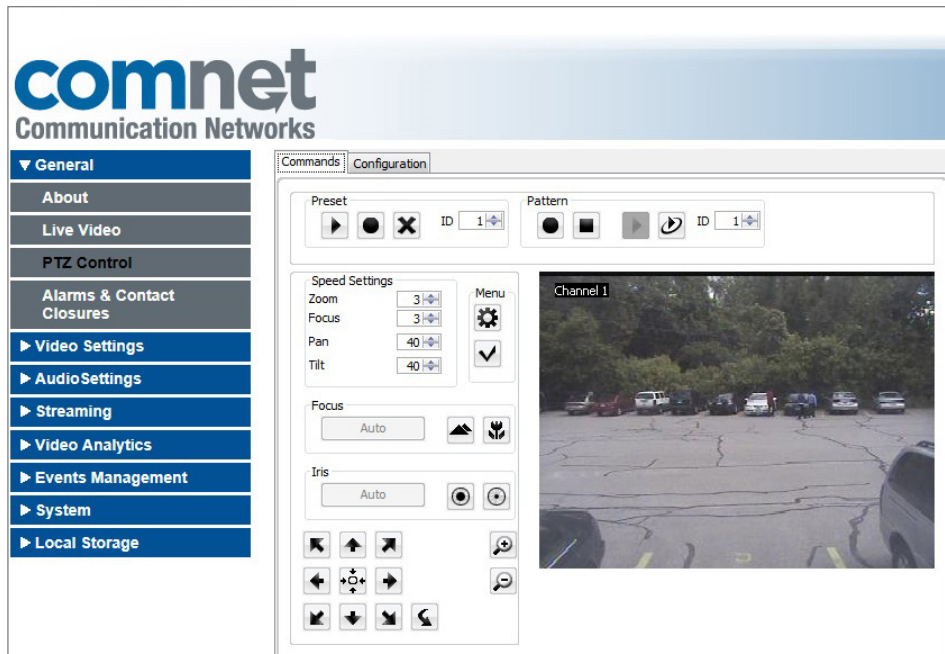
Figure 23: PTZ Commands

To pan and tilt a PTZ camera:

1. Use the directional arrow keys on the numeric keypad or select the mouse on the graphical user interface to control the camera the pan and tilt movement.
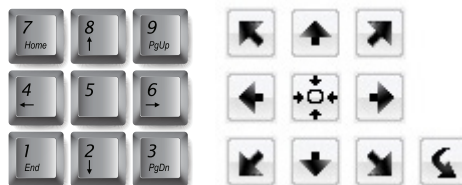
Figure 24: Arrow Keys and Symbols for Pan and Tilt Control

2. Press down an arrow key or symbol to move the camera. When you stop pressing the key the camera stops.

3. Press down on the zeroPanPosition to automatically position the camera in the zero pan position.

4. Press down on the Flip symbol to cause the camera to flip 180 degrees from its current position.

Table 7: PTZ Movement Control

Key	Symbol	Description
8	⬆	Tilt up
2	⬇	Tilt down
4	⬅	Pan left
6	➡	Pan right
7	⬉	Pan Tilt left up
9	⬈	Pan Tilt right up
1	⬋	Pan Tilt left down
3	⬊	Pan Tilt right down
5	✛	Zero Position
N/A	↰	Flip 180°

Panning a PTZ Camera

The following figures illustrate the panning of a PTZ camera using the keypad symbols on the Command user interface. The figures show a PTZ camera panned at 0°, 15°, and 40°. The video is overlaid with the pan angle. The overlay originates from the camera.
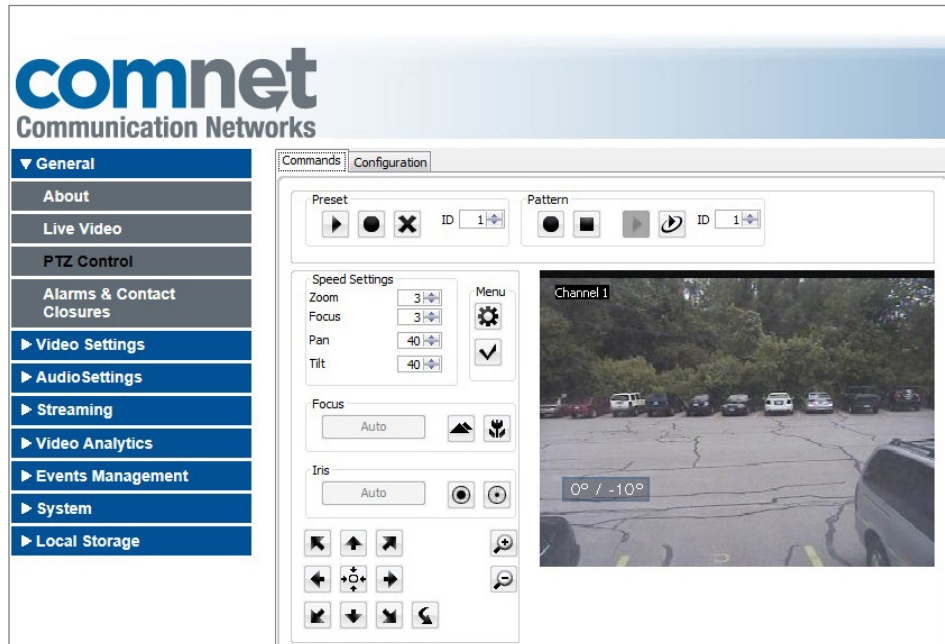
Figure 25: PTZ Camera at 0°
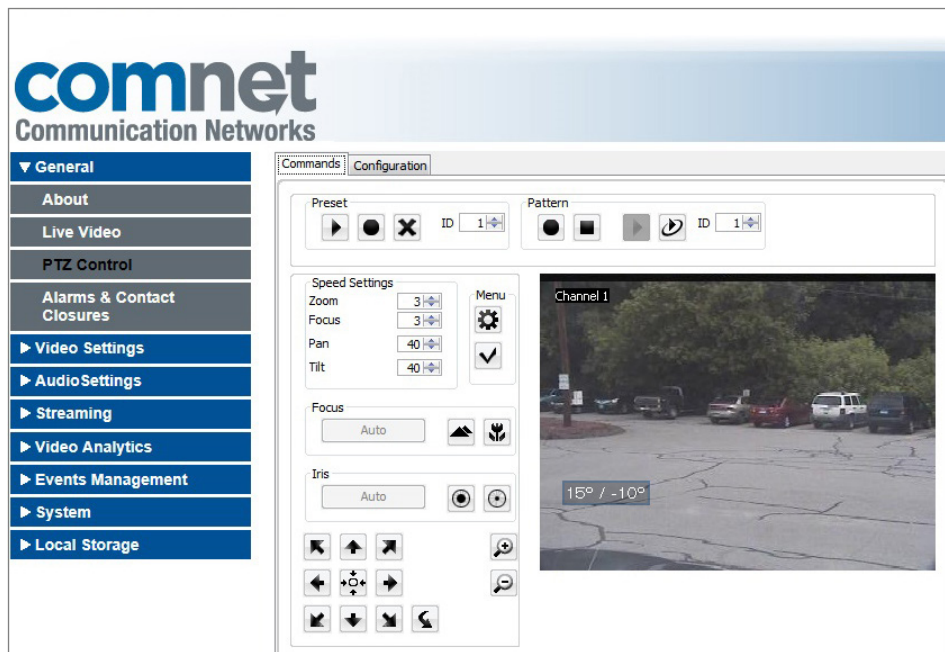
Figure 26: PTZ Camera at 15°
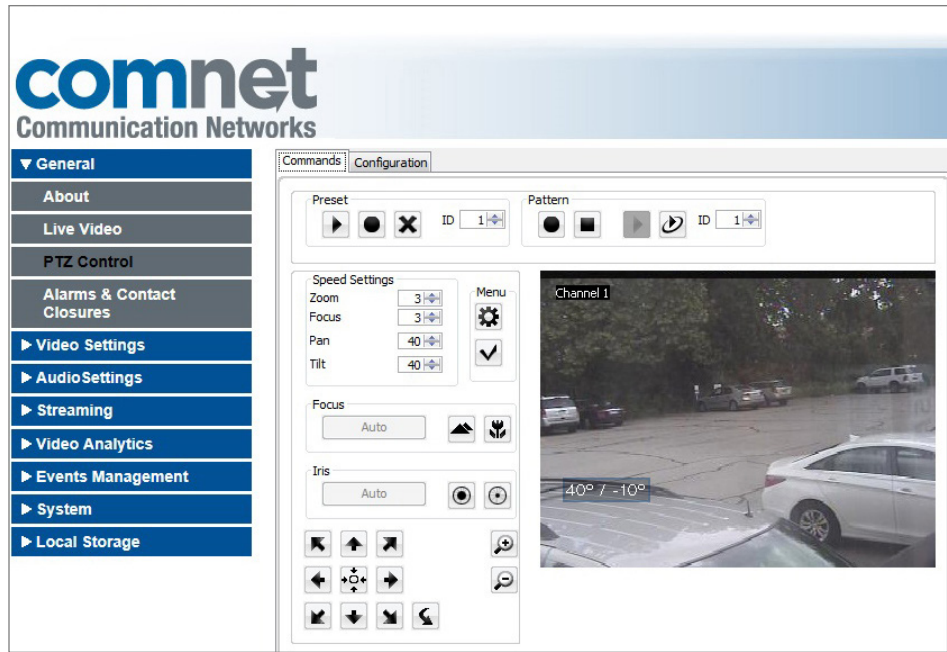
Figure 27: PTZ Camera at 40°

Camera Movement Speed

The camera movement speed is controlled by the value set in the Speed Settings area. The Zoom, Focus, Pan, and Tilt speeds are controlled by selecting a speed setting from the drop-down lists. Unsupported speed parameters will be shaded out and unavailable.

To set the camera movement speed:

1. In the Speed Settings area, enter a numeric value to set the camera zoom speed.

2. In the Speed Settings area, enter a numeric value to set the camera focus speed.

3. In the Speed Settings area, enter a numeric value to set the camera pan speed.

4. In the Speed Settings area, enter a numeric value to set the camera tilt speed.
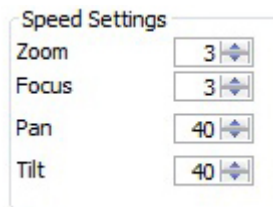
Figure 28: Speed Settings

Refer to Supported PTZ Protocols Parameter Range for the range of speed settings supported.

Table 8: Supported PTZ Protocols Parameter Range

Camera	Focus Speed	Zoom Speed	Pan Speed	Tilt Speed	Preset ID	Pattern ID	Address Range
Pelco_P	Min: 0 Max: 3	Min: 0 Max: 3	Min: 0 Max: 64	Min: 0 Max: 63	Min: 1 Max: 255	Min: 1 Max: 4	Min: 1 Max: 32
Pelco_D	Min: 0 Max: 3	Min: 0 Max: 3	Min: 0 Max: 64	Min: 0 Max: 63	Min: 1 Max: 32	Min: 1 Max: 8	Min: 1 Max: 255
AD-RS422	Min: 0 Max: 3	Min: 0 Max: 3	Min: 1 Max: 100	Min: 1 Max: 100	Min: 1 Max: 96	Min: 1 Max: 3	Min: 1 Max: 99
BBV_Star_Card	Min: 0 Max: 3	Min: 0 Max: 3	Min: 1 Max: 1	Min: 1 Max: 1	Min: 1 Max: 7	Min: 1 Max: 1	Min: 1 Max: 96
CyberScan1	Min: 0 Max: 3	Min: 0 Max: 3	Min: 1 Max: 1	Min: 1 Max: 1	Min: 1 Max: 15	Min: 1 Max: 1	Min: 1 Max: 255
Phillips_TC7560	Min: 0 Max: 3	Min: 0 Max: 3	Min: 1 Max: 1	Min: 1 Max: 1	Min: 1 Max: 99	Min: 1 Max: 1	Min: 1 Max: 1000
RS_422_Dome	Min: 0 Max: 3	Min: 0 Max: 3	Min: 1 Max: 1	Min: 1 Max: 1	Min: 1 Max: 4	Min: 1 Max: 3	Min: 1 Max: 99

Zoom, Focus and Iris Control of a PTZ Camera

Zooming in and out, focusing the PTZ camera, and Iris control is performed using the relevant symbols on the graphical user interface page of the PTZ control menu.

Table 9: Zoom Focus and Iris Symbols

Symbol	Description
🔍➕	Zoom Tele (In)
🔍➖	Zoom Wide (Out)
⛰	Focus Far
🌷	Focus Near
◉	Open Iris
◎	Close Iris

To control the zoom, focus, and iris of a PTZ camera:

1. In the Zoom area press the Zoom tele symbol to zoom in.

2.   In the Zoom area press the Zoom wide symbol to zoom out.

Figure 29: Zoom Area

3. In the Focus area press the Focus far or Focus near symbols to focus the camera. On some cameras there is an auto focus command as well.
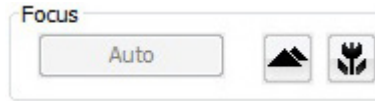

Figure 30: Focus Area

4. In the Iris area press the left icon to open the camera iris.

5. In the Iris area press the right icon to close the iris. On some cameras there is an auto iris command as well.
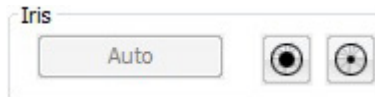

Figure 31: Iris Area

Zooming the Camera

The following figures illustrate the zoom capability of a PTZ camera. An overlay on the picture gives an indication of the zoom. The overlay is a function of the camera. Some cameras have the capability of displaying a zoom factor or a pan angle while others do not.
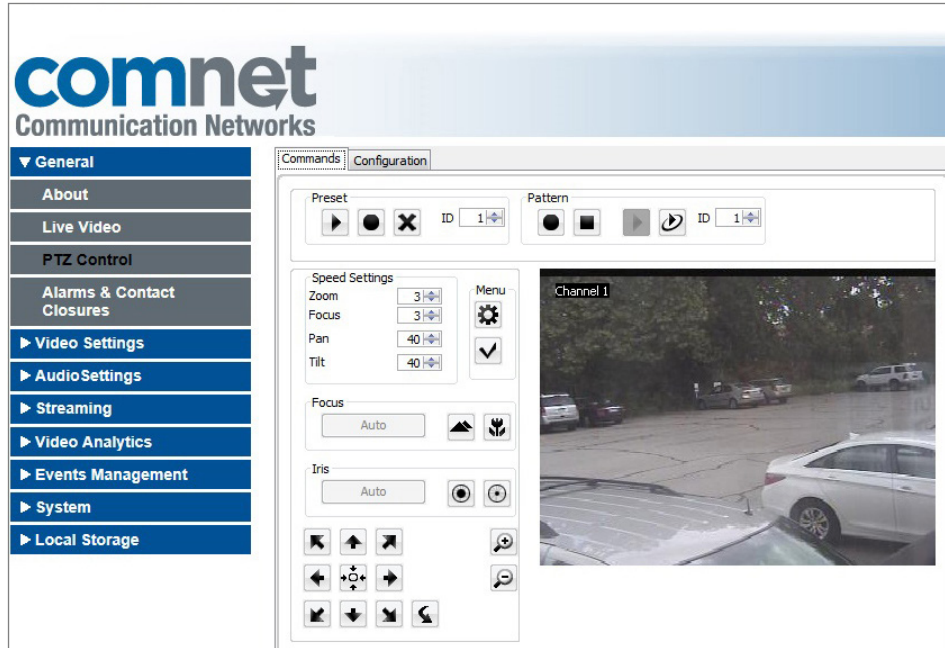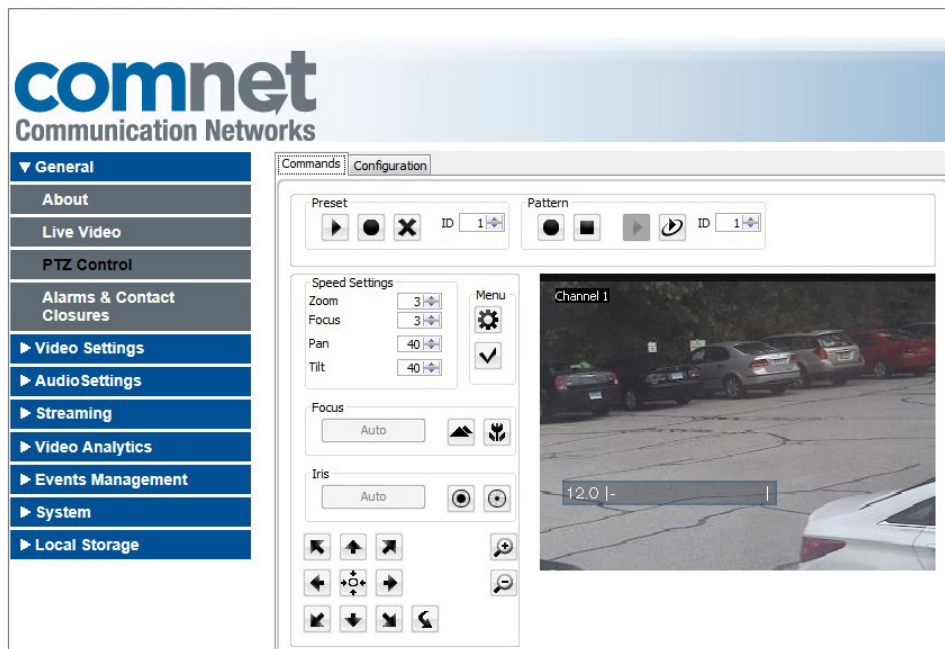

Figure 32: PTZ Display
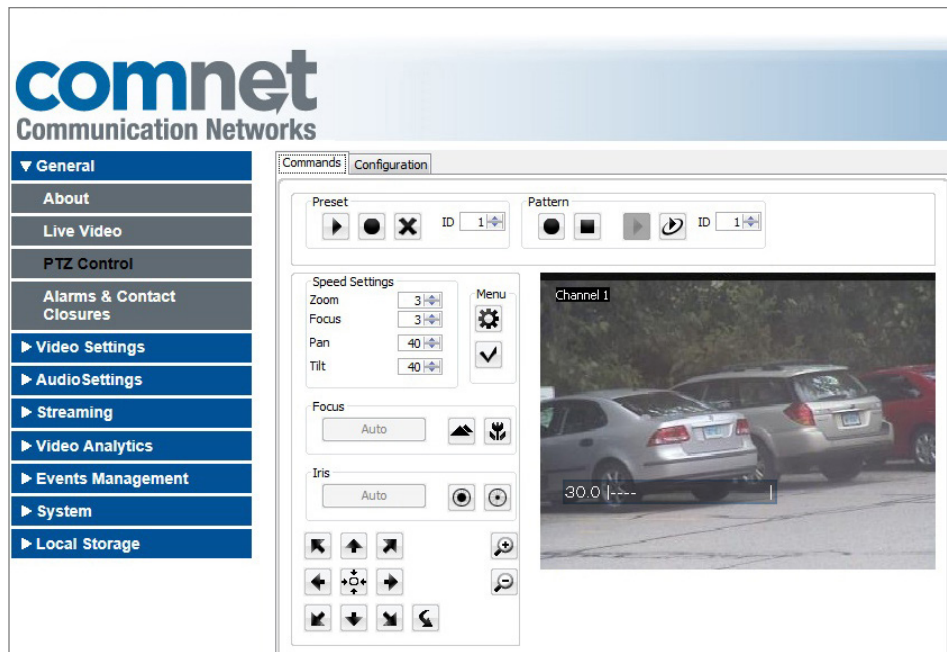

Figure 33: Zooming In on Parked Car – 12.0

Figure 34: Zooming In on Parked Car – 30.0

Focusing the Camera

The following figures illustrate the focus capability of a PTZ camera. Use the focus symbols to bring the picture into focus.
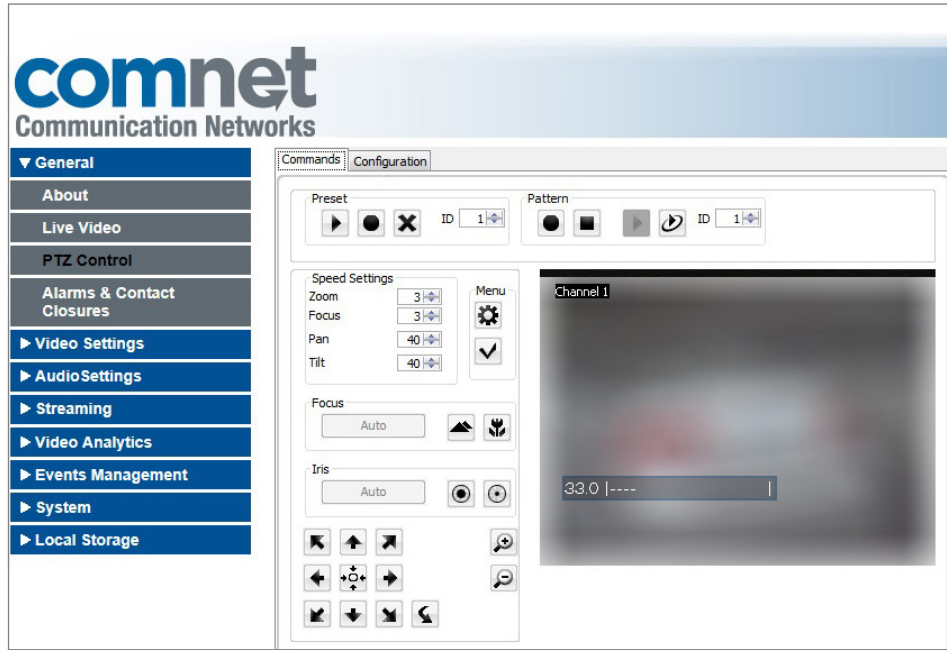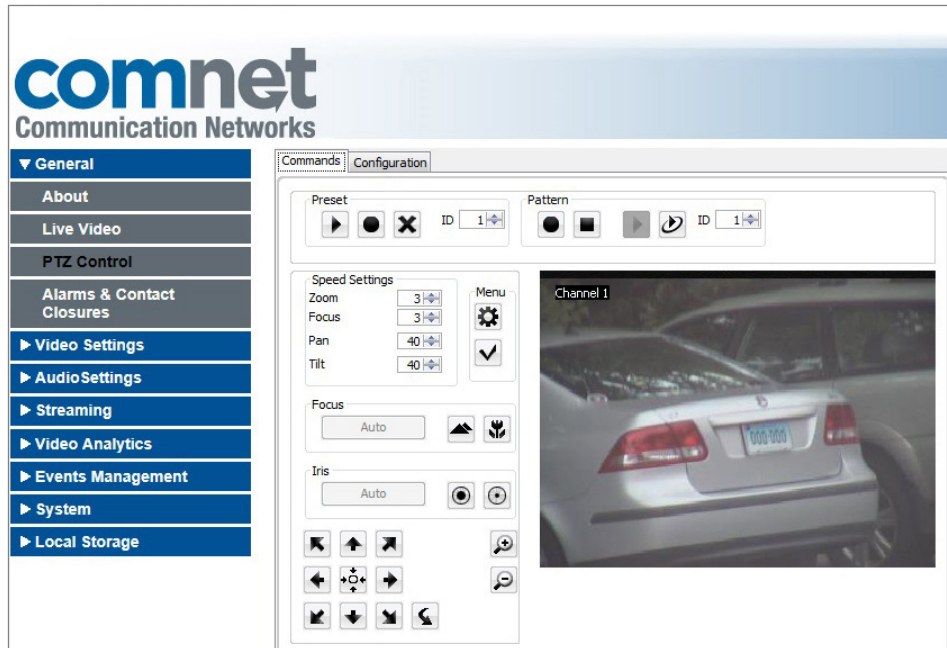

Figure 35: Out of Focus

Figure 36: In Focus

PTZ Camera Preset

Set and store preset locations (camera pan and tilt settings) for the cameras, and then recall them with the ID spin box list on the graphical user interface preset area.

Figure 37: Preset Area

The number of presets allowed varies with the camera protocol selected and camera model. Refer to Supported PTZ Protocols Parameter Range for the number of presets allowed per protocol. describes each of the preset symbols.

Table 10: Preset Symbols

Symbol	Description
▶	GoTo preset location
●	Define preset
✖	Delete preset

To define a preset:

1. Select an ID.

2. Move the camera to the desired location by using the Pan and Tilt symbols.

3. Select the Define preset symbol.

4. Move the camera to a different location.

5. Select the GoTo preset location to jump to the preset defined.

To delete a preset:

1. Select an ID

2. Select the Delete preset symbol on the graphical user interface.

PTZ Camera Pattern

Set and store patterns of movement (camera pan and tilt settings) for the cameras, then recall them with the ID spin box list on the graphical user interface preset area shown below.

Figure 38: Pattern Area

The number of patterns allowed varies with the camera protocol selected and camera model. Refer to Supported PTZ Protocols Parameter Range for the number of patterns allowed per protocol. The symbol table below describes each of the preset symbols.

Table 11: Pattern Symbols

Symbol	Description
●	Start define pattern
■	Finish define pattern
▶	Run pattern once
⟳	Run pattern repeatedly

To define a pattern:

1. Select a camera ID.

2. Select the Start define pattern symbol ● on the graphical user interface.

3. Use the pan and tilt symbols to define a pattern of movement of the camera.

4. Select the finish define pattern symbol.

5. Select the Run pattern once or Run pattern repeatedly to run the defined pattern.

Configuring from within the Camera's User Interface

The selected camera can be defined through a user interface overlaid on the video. The symbol opens the textual menu of the selected camera on the screen. The On Screen Display (OSD) is used to set many of the features of the camera. The Select Menu icon is used to select the item that is highlighted on the OSD.

Figure 39: Menu Symbols

Table 12: Menu Symbols

Symbol	Description
⚙	Open textual menu screen
✓	Select menu item

The menu that is displayed will vary according to the camera model.

Audio/Video Configuration

The Video Settings menu is used to configure the Analog Video Settings.

The Streaming menu is used to set the video encoding general parameters and configure the video CODECs. This menu is also used to configure the general streaming parameters and to view the active running streams.

The Audio Settings menu is used to configure the analog audio settings.

When hovering over a field, the tool tip describes the field. When hovering over a field containing a required parameter, the allowed range of values appears.

Configuring Video Settings – Encoder Operation Mode

In the Video Settings menu select on Analog Video to specify the Video Standard, Brightness, Contrast, Color, Hue, De-Interlace, and Noise Reduction. Possible video standards are PAL, and NTSC. Each standard has a different image size and frame rate.
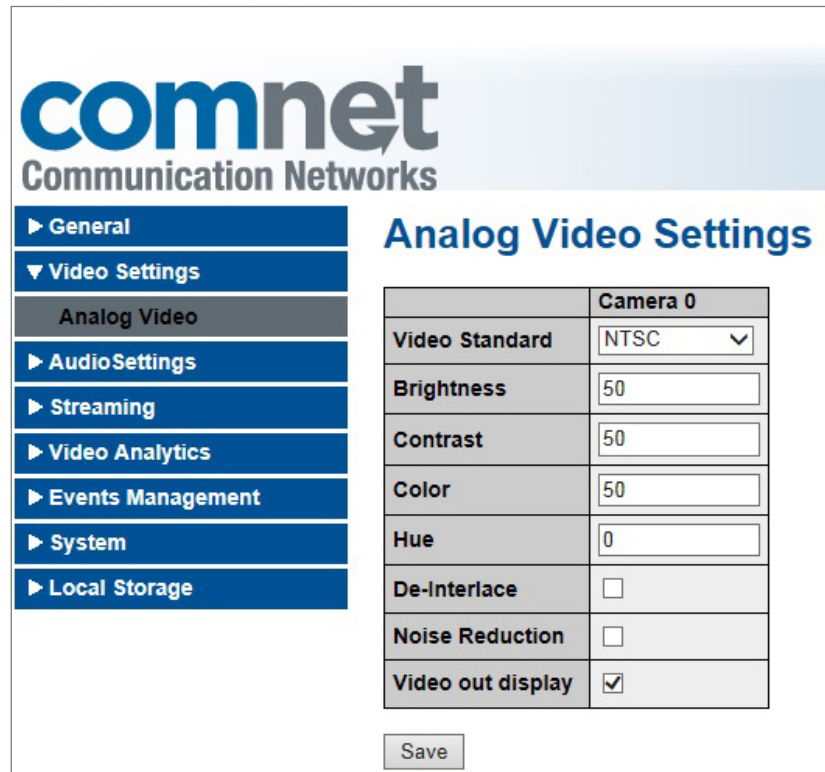

Figure 40: Video Standard Selection

To configure analog video settings:

1. In the left pane select the Video Settings menu, and from the sub-menu select Analog Video.

The right pane displays the Analog Video Settings area.

2. From the Video Standard drop-down list select the video standard for the camera.

3. You can set the brightness, contrast, and color to a value in the range 1 – 100.

4. You can set the hue to a value in the range -50 to +50.

5. Check the De-Interlace box to enable the De-Interlace function.

6. Check the Noise Reduction box to enable the Noise Reduction function.

7. Select the Video out display box to enable the video output operation.

8. Select Save.

Configuring Video Encoding Parameters

The Video Encoding General Parameters of Image Size and Frame Rate are set in this sub menu.

Image Size

Select the image size of the video stream. The image size can be adjusted between QCIF, CIF, 4CIF, and D1.

Table 13 shows the different video formats and their associated resolutions.

Table 13: Video Formats and Resolutions

Format	Video Resolution PAL	Video Resolution NTSC
QCIF	176 × 144	176 × 112
CIF	352 × 288	352 × 240
4CIF	704 × 576	704 × 480
D1	720 × 480	720 × 576

Frame Rate

The frame rates correspond to the number of frames per second. The frame rate is different when in NTSC or in PAL.

The supported frame rates for NTSC are:

1, 1.2, 1.25, 1.5, 1.875, 2, 2.5, 3, 3.75, 5, 6, 7.5, 10, 15, 30

The supported frame rates for PAL are:

1, 1.25, 1.5625, 2.5, 3.125, 5, 6.25, 12.5, 25

To set the video encoding general parameters:

1. In the left pane select the Streaming menu, and from the sub-menus select Video and then Encoding Parameters.

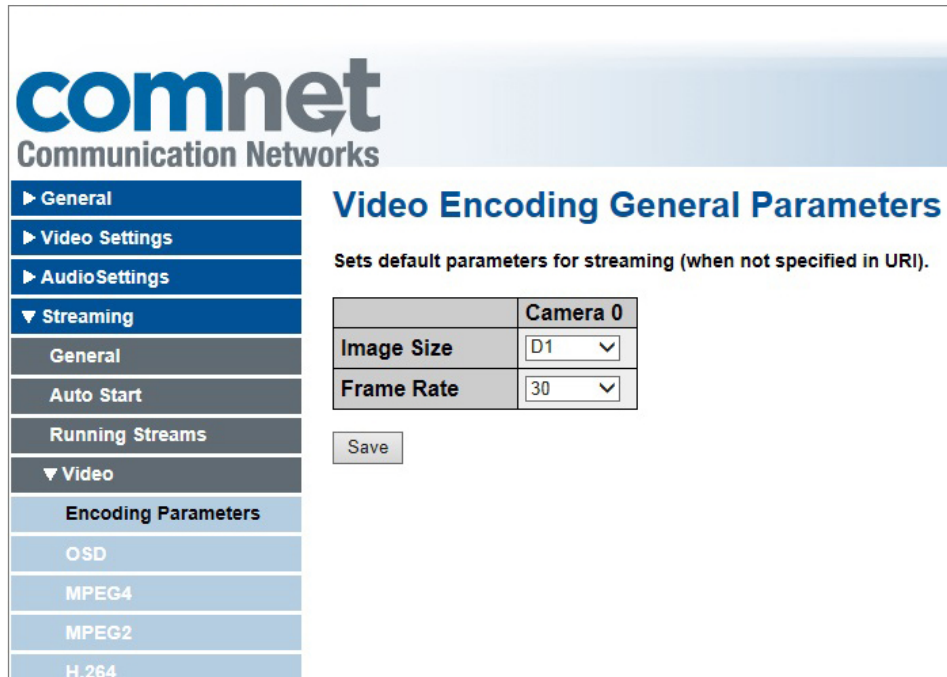The right pane displays the Video Encoding General Parameters area.

Figure 41: Video Streaming General Parameters

2. From the Image Size drop-down list select the image size of the video stream. The image size can be adjusted between QCIF, CIF, 4CIF, and D1 as shown in the figure below.
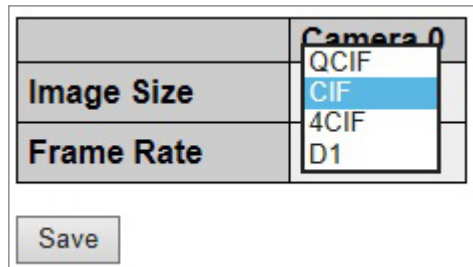

Figure 42: Adjusting the Image Size

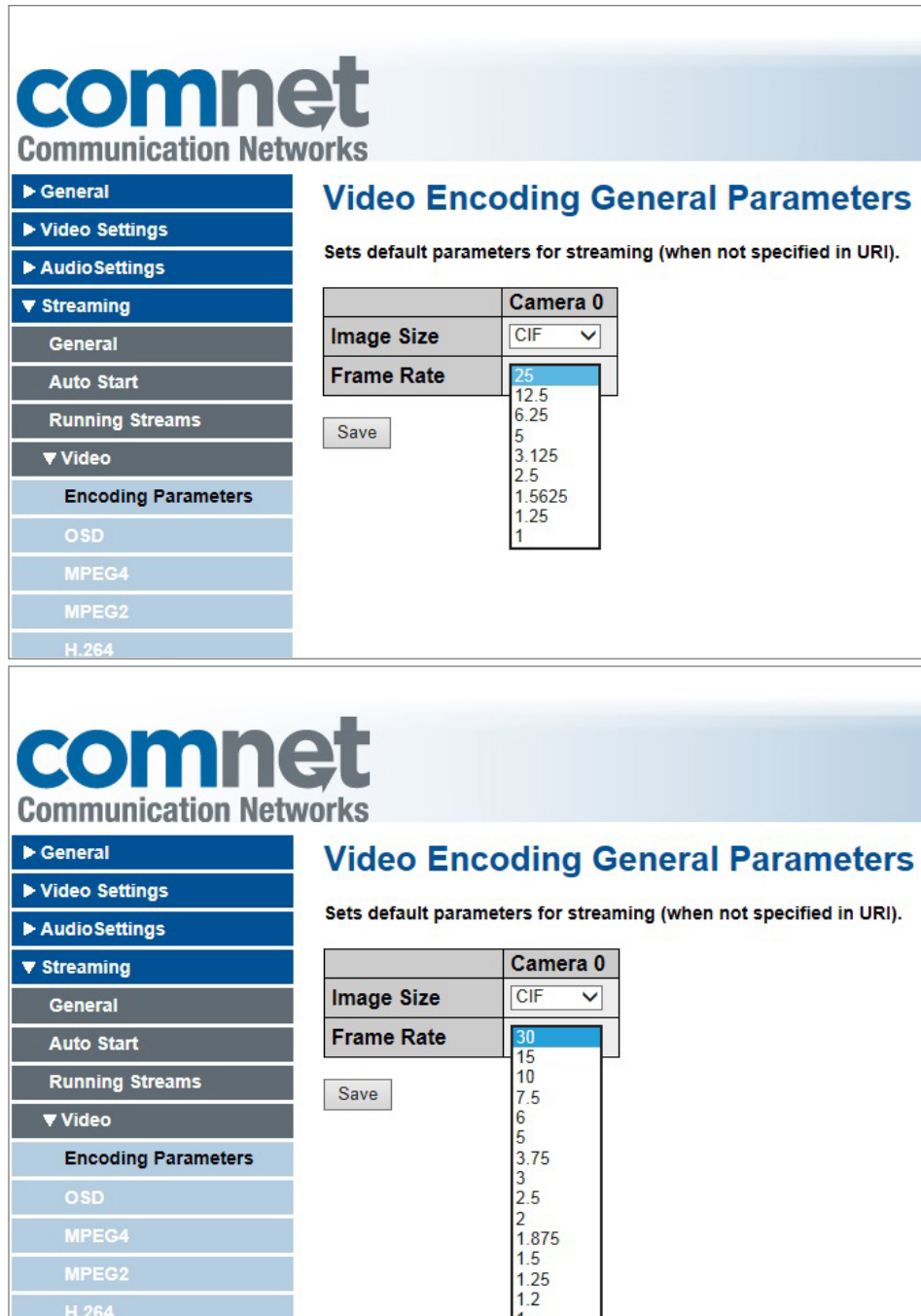3. From the Frame Rate drop-down list select the frame rate.

Figure 43: Frame Rate Settings for PAL and NTSC

4. Select Save.

Configuring the OSD Feature

The OSD feature allows embed a small logo, free text, date and time, into the live stream image.
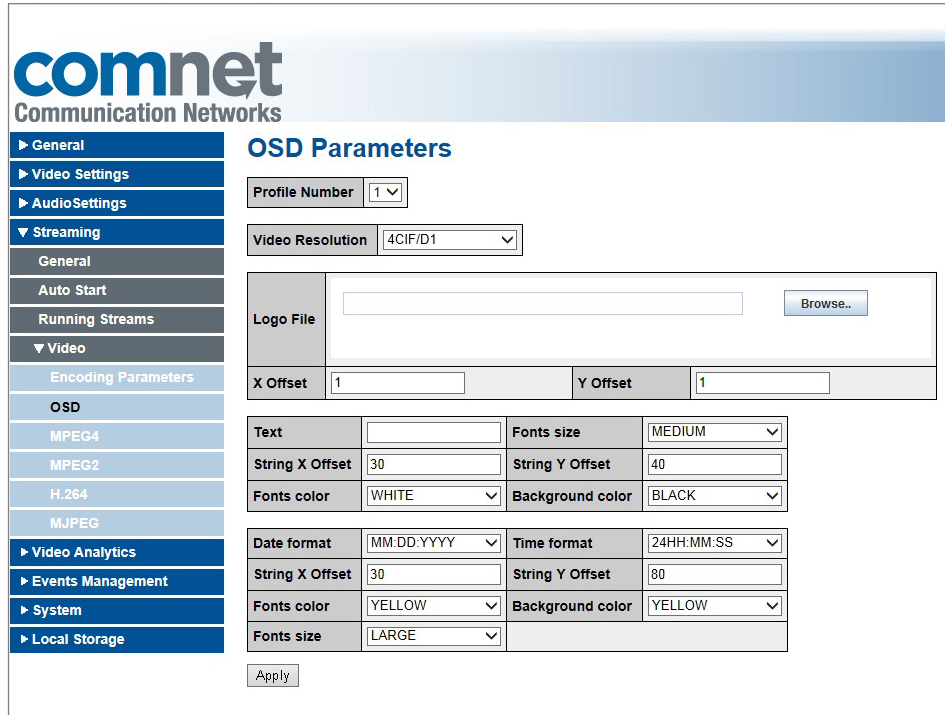

Figure 44: OSD Parameters

Profile Number and Video Resolution

There are up to 3 possible profiles. Each profile is associated with one of the supported video resolutions: 4CIF/D1, CIF, and QCIF

Logo File

Using a Java applet, a logo can be added onto the live stream.

The logo format can be JPEG or BMP. The maximum width is 256 pixels and the maximum height is 96 pixels. The logo placement is done by entering horizontal (X) and vertical (Y) offsets in pixels.

Free Text OSD

Free text up to 32 characters can be configured.

Text font size, color, and background color are configurable. The free text placement is done by entering horizontal (X) and vertical (Y) offsets in pixels.

Date & Time OSD

Date and/or time info can be configured.

The date and time format, size, color, and background color are configurable. The date and/or time placement are done by entering horizontal (X) and vertical (Y) offsets in pixels.
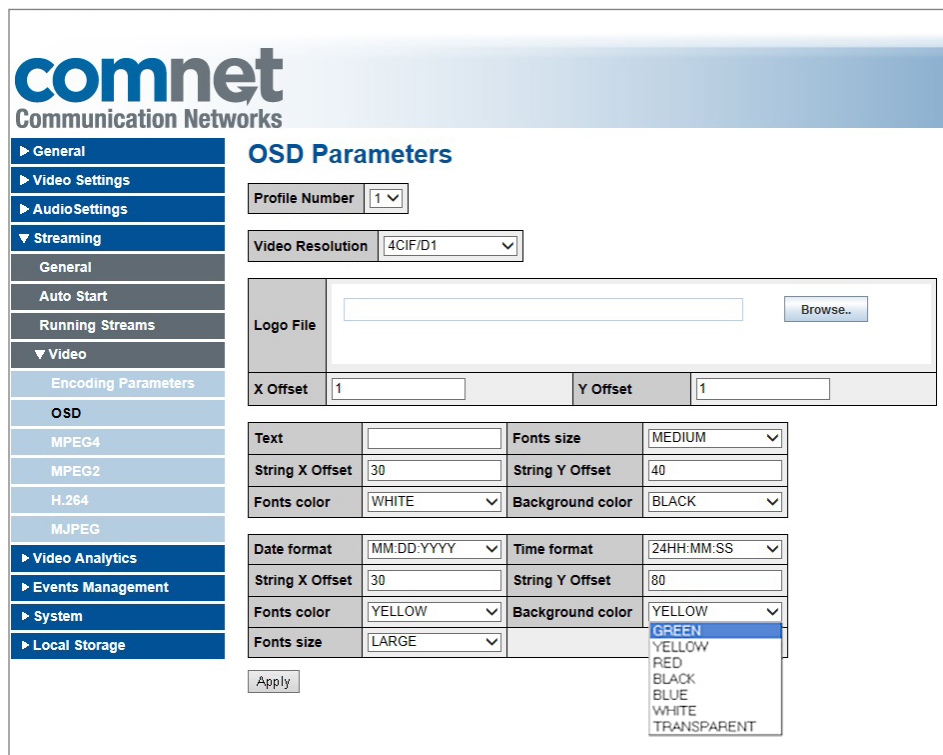

Figure 45: OSD Text / Date / Time Colors

Configuring the MPEG-4 Video CODEC

You can set the MPEG-4 video CODEC settings of GOP Size, Rate Control Mode, Constant Bit rate, Average Bit rate, Maximum Bit rate, and Q Initial.

GOP Size

In order to allow high compression rates for digital video it may be encoded into GOPs, or Groups of Pictures, which consist of key frames (I-Frames) and delta frames (P or B Frames). The Group of Pictures GOP Size defines the distance between consecutive I-Frames in a video stream.

Rate Control Mode

The Rate Control Mode parameter defines Rate control options for the MPEG-4 encoder. The options are CBR, VBR, and Constant Q.

In CBR encoding the bit rate is kept constant and is useful for streaming multimedia content on limited capacity channels.

VBR files vary the amount of output data per time segment. VBR allows a higher bit rate (and therefore more storage space) to be allocated to the more complex segments of media files while less space is allocated to less complex segments. The average of these rates can be calculated to produce an average bit rate for the file.

The advantages of VBR are that it produces a better quality-to-space ratio compared to a CBR file of the same size. The disadvantages are that it may take more time to encode, as the process is more complex, and that some hardware might not be compatible with VBR files.

In Constant Q mode only Q Initial is entered. This mode is intended to keep a constant quality. A low Q setting will generally have a high bit rate providing high quality. A high Q setting will generally have a low bit rate with lower quality.

Each mode has its own relevant parameters. Other parameters are shaded.

Bit rate

The Bit rate parameter is the bit rate of the stream. The Bit rate can be set to a value in the range of 50000 to 10000000. The default value is 4000000.

The rate control mode determines the required parameters:

» Average Bit rate: Average bit rate of the video stream (VBR mode only).

» Maximum Bit rate: Maximum bit rate of the video stream (VBR mode only).

» Constant Bit rate: The bit rate of the video stream (CBR mode only).

Quantization

The Q (Quantization) parameters are quality settings, where 8 is lowest quantization and highest quality (and more bits used), and 30 is the highest quantization and lowest quality (and less bits used).

The rate control mode determines the required parameter.

» QInitial: Quantization value used in the first encoded frame. In Constant Q mode this value shall remain fixed for all frames.

The figures below show the CBR, VBR, and Constant Q modes of the MPEG-4 encoder.

Figure 46: MPEG-4 CBR Parameters
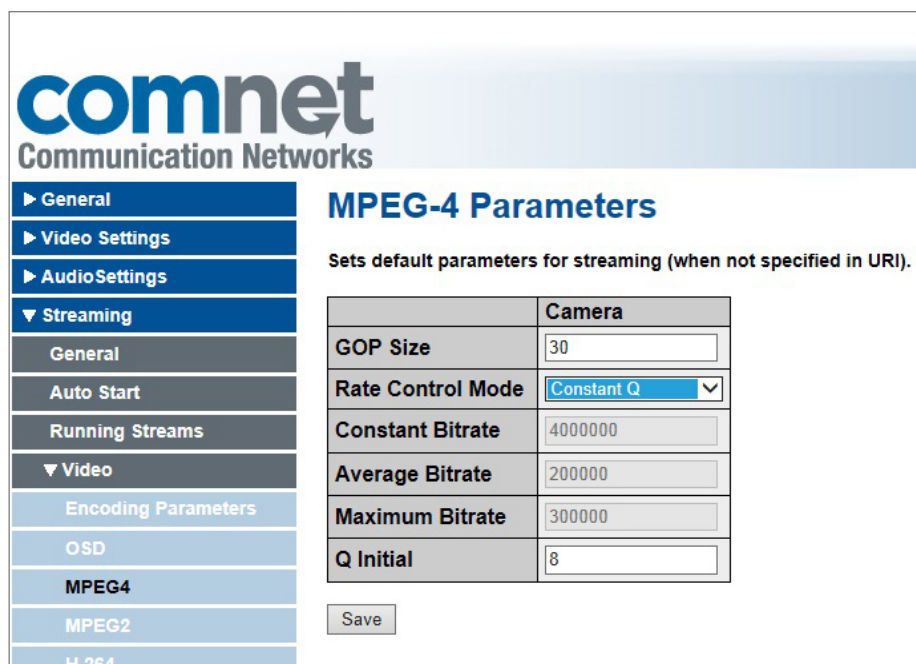

Figure 47: MPEG-4 VBR Parameters

Figure 48: MPEG-4 Constant Q Parameters

To set the MPEG-4 Video CODEC:

1. In the left pane select the Streaming menu, and from the sub-menus select Video and then MPEG-4.

The right pane displays the MPEG-4 Parameters area.

2. In the GOP Size text-box Select the number of frames in a GOP (Group of Pictures) in the range of 1–100.

3. From the Rate Control Mode drop-down list select the rate control mode for the MPEG-4 encoder. The default is CBR.
   › VBR (Variable Bit Rate)
   › CBR (Constant Bit Rate)
   › Constant Q (Constant Quantization)

4. Enter the required bit rate parameter according to the rate control mode (between 50000 to 10000000):
   › VBR:
     Average Bit rate - average bit rate of the video stream. The default is 4000000
     Maximum Bit rate – maximum bit rate of the video stream. The default is 5000000
   › CBR: the constant bit rate of the video stream. The default is 4000000
   › CONSTANT_Q: No bit rate control.

Table 5 – UTC Time Zones

5. Enter the required Q parameters. The range of QInitial is 8 to 30.

    › CBR:
    Q Initial: initial quantization value. The default is 8

    › CONSTANT_Q:
    Q Initial: initial quantization value. The default is 8

Configuring the MPEG-2 Video CODEC

You can set the MPEG-2 video CODEC settings of GOP Size, Rate Control Mode, Average Bit rate, Maximum Bit rate, Bit rate and Q Initial.

GOP Size

In order to allow high compression rates for digital video it may be encoded into GOPs, or Groups of Pictures, which consist of keyframes (I-Frames) and delta frames (P or B Frames). The Group of Pictures GOP Size defines the distance between consecutive I-Frames in a video stream.

Rate Control Mode

The Rate Control Mode parameter defines Rate control options for the MPEG-2 encoder. The options are CBR and Constant Q.

In CBR encoding the bit rate is kept constant and is useful for streaming multimedia content on limited capacity channels.

In Constant Q mode only Q Initial is entered. This mode is intended to keep a constant quality. A low Q setting will generally have a high bit rate providing high quality. A high Q setting will generally have a low bit rate with lower quality.

Each mode has its own relevant parameters. Other parameters are shaded.

Bit rate

The Bit rate parameter is the bit rate of the stream. The Bit rate can be set to a value in the range of 50000 to 10000000. The default value is 5000000.

The rate control mode determines the required parameters.

» Constant Bit rate: The bit rate of the video stream (CBR mode only).

Quantization

The Q (Quantization) parameters are quality settings, where 1 is lowest quantization and highest quality (and more bits used), and 112 is the highest quantization and lowest quality (and less bits used).

The rate control mode determines the required parameter.

» QMin: Minimum quantization that is used for encoding.

» QMax: Maximum quantization that is used for encoding.

» QInitial: Quantization value used in the first encoded frame. In Constant Q mode this value shall remain fixed for all frames.

The figures below show the CBR and Constant Q modes of the MPEG-2 encoder.

Figure 49: MPEG-2 CBR Parameters

Figure 50: MPEG-2 Constant Q Parameters

To set the MPEG-2 Video CODEC:

1. In the left pane select the Streaming menu, and from the sub-menus select Video and then MPEG-2.
   The right pane displays the MPEG-2 Parameters area.

2. In the GOP Size text-box select the number of frames in a GOP (Group of Pictures) in the range of 1–1000.

3. From the Rate Control Mode drop-down list select the rate control mode for the MPEG-2 encoder. The default is CBR.

   › CBR (Constant Bit Rate)

   › Constant Q (Constant Quantization)

4. Enter the required bit rate parameter according to the rate control mode (between 50000 to 10000000):

   › CBR: the constant bit rate of the video stream. The default is 5000000

5. Enter the required Q parameters:

   › CBR:
   Q Min: minimum quantization value. The default is 1.
   Q Max: maximum quantization value. The default is 112.

   › Constant Q:
   Q Initial: constant quantization value. The default is 20.

Configuring the H.264 Video CODEC

You can set the H.264 video CODEC settings of GOP Size, Rate Control Mode, Average Bit Rate, Maximum Bit Rate, Q Max, Q Min, and Q Initial.

GOP Size

In order to allow high compression rates for digital video it may be encoded into GOPs, or Groups of Pictures, which consist of key frames (I-Frames) and delta frames (P or B Frames). The Group of Pictures GOP Size defines the distance between consecutive I-Frames in a video stream.

Rate Control Mode

The Rate Control Mode parameter defines Rate control options for the H.264 encoder. The options are CBR and VBR and Constant_Q.

In CBR encoding the bit rate is kept constant and is useful for streaming multimedia content on limited capacity channels.

VBR files vary the amount of output data per time segment. VBR allows a higher bit rate (and therefore more storage space) to be allocated to the more complex segments of media files while less space is allocated to less complex segments. The average of these rates can be calculated to produce an average bit rate for the file.

The advantages of VBR are that it produces a better quality-to-space ratio compared to a CBR file of the same size. The disadvantages are that it may take more time to encode, as the process is more complex, and that some hardware might not be compatible with VBR files.

In Constant Q mode only Q Initial is entered. This mode is intended to keep a constant quality. A low Q setting will generally have a high bit rate providing high quality. A high Q setting will generally have a low bit rate with lower quality.

Each mode has its own relevant parameters. Other parameters are shaded.

Bit rate

The Bit rate parameter is the bit rate of the stream. The Bit rate can be set to a value in the range of 50000 to 10000000.

The rate control mode determines the required parameters.
   » Average Bit rate: Average bit rate of the video stream (VBR mode only).
   » Maximum Bit rate: Maximum bit rate of the video stream (VBR mode only).
   » Constant Bit rate: The bit rate of the video stream (CBR mode only).

Quantization

The Q (Quantization) parameters are quality settings, where 20 is lowest quantization and highest quality (and more bits used), and 51 is highest quantization and lowest quality (and less bits used).

The rate control mode determines the required parameter.
   » QMin: Minimum quantization that is used for encoding.
   » QMax: Maximum quantization that is used for encoding.
   » QInitial: Quantization value used in the first encoded frame. In Constant Q mode this value shall remain fixed for all frames.

The figures below are the VBR, CBR, and CONSTANT_Q, modes of the H.264 encoder.

Figure 51: H.264 CBR Parameters

Figure 52: H.264 VBR Parameters

Figure 53: H.264 Constant_Q Parameters

To set the H.264 Video CODEC:

1. In the left pane select the Streaming menu, and from the sub-menus select Video and then H.264.
   The right pane displays the H.264 Parameters area.

2. In the GOP Size text-box Select the number of frames in a GOP (Group of Pictures) in the range of 1–100.

3. From the Rate Control Mode drop-down list select the rate control mode for the H.264 encoder. The default is Constant_Q.

   › VBR (Variable Bit Rate)

   › CBR (Constant Bit Rate)

   › CONSTANT_Q (Constant Quality)

4. Enter the required bit rate parameters according to the rate control mode (between 50000 to 10000000):

   › VBR:
   Average Bit rate - average bit rate of the video stream. The default is 2400000
   Maximum Bit rate – maximum bit rate of the video stream. The default is 3000000

   › CBR: the constant bit rate of the video stream. The default is 2000000

   › CONSTANT_Q: No bit rate control.

5. Enter the required Q parameters according to the rate control mode. The range of Q Min is 20

to 51. The range of Q Max and Q Initial is 25 to 51.

  › VBR:
    Q Min: lowest quantization value. The default is 20
    Q Max: highest quantization value. The default is 51

  › CBR:
    Q Min: lowest quantization value. The default is 20
    Q Max: highest quantization value. The default is 51
    Q Initial: initial quantization value. The default is 28

  › CONSTANT_Q:
    Q Initial: initial quantization value. The default is 28

6. Select Save.

Configuring the MJPEG Video CODEC

You can set the MJPEG video CODEC setting of Q for the cameras. The range for the quality adjustment is 1 to 99. The default setting is 75. At a higher setting, the bit rate will be higher. Quality settings above 75 will result in higher bit rates with little gain in quality and are therefore not recommended.

To set the MJPEG parameters:

1. In the left pane select the Streaming menu, and from the sub-menus select Video and then MJPEG.
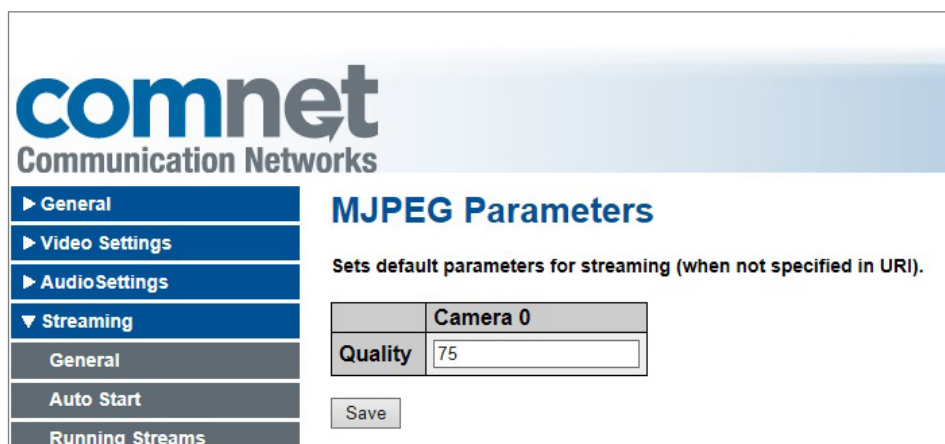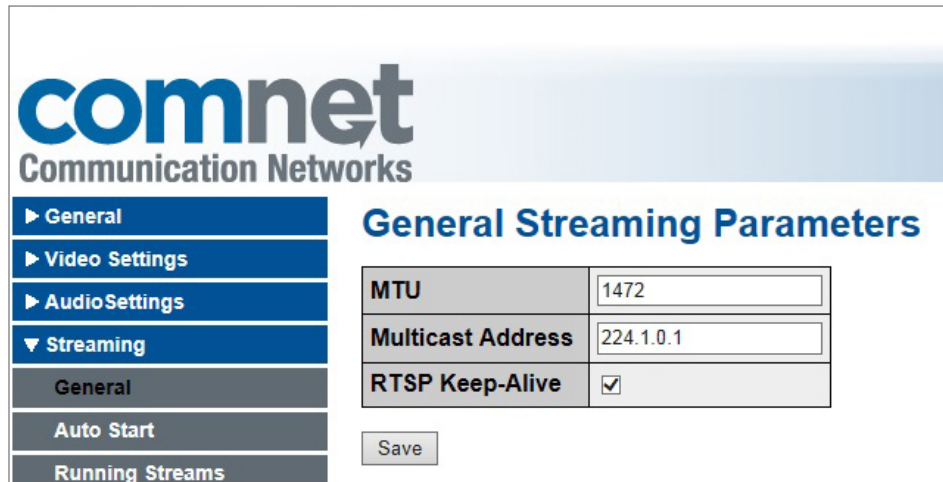   The right pane displays the MJPEG Parameters area.

Figure 54: MJPEG Settings

2. For each camera, In the Quality text-box enter a Q value for the camera between 1 and 99.

3. Select Save.

Configuring General Streaming Parameters

In the Streaming menu select on the General sub-menu to specify the MTU and Multicast Address, and to disable the RTSP Keep-Alive requests.

Figure 55: General – Streaming Parameters

MTU

The MTU refers to the size in bytes of the largest packet that a given layer of a communications protocol can pass onwards. A higher MTU means higher bandwidth efficiency. When a transmission is noisy, changing the size of the MTU improves the communication and bit error rate.

Multicast Address

The multicast address is the default address used for multicast streaming.

RTSP Keep-Alive

The RTSP Keep-Alive scheme is used to ensure that an RTSP initiated session stays active. A system that does not support this scheme can disable it.

To set general streaming parameters:

1. In the left pane select the Streaming menu, and from the sub-menus select General.
   The right pane displays the General Streaming Parameters area.

2. In the MTU text-box, enter a MTU value between 368 and 1472.

3. In the Multicast Address text-box, enter the required multicast address. The range of addresses that can be used is specified by RFC 3171 standard as 224.0.0.0 to 239.255.255.255.

4. Select to clear the RTSP Keep-Alive check box to disable the keep-alive scheme.

5. Select Save.

Opening Video Streams

A video stream can also be opened using the QuickTime Media Player.

To open a stream in QuickTime:

1. Display the QuickTime window.

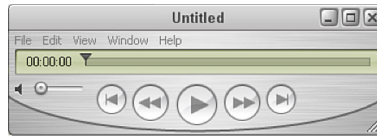*Figure 56: QuickTime Window*

2. From the File menu choose Open URL.

In the text-box enter the URL for the stream. The following URI opens an H.264 video stream.
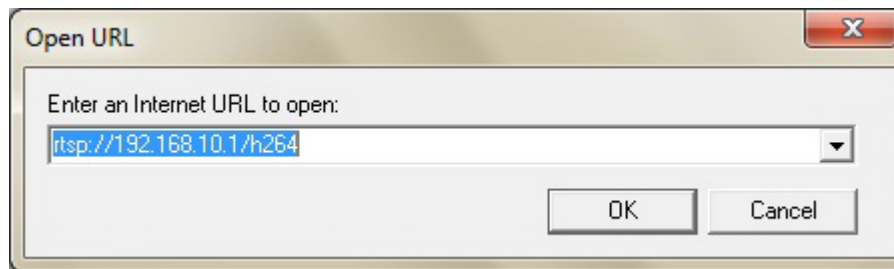
Figure 57: Insert URL

Refer to Example URIs found in the RTP/RTSP Video Node section of this manual (see RTP/RTSP Video Node).

The stream appears in the QuickTime player as shown below:

Figure 58: QuickTime Player Video Image

Viewing Running Streams Information

The Running Streams screen displays information on the actively running streams. It indicates the type of stream, the CODEC used, the mode, state, transport type, peer address, clients, and SDP. When there are no active streams, the screen indicates that there are no active streams running.

To display the Running Streams information:

» In the left pane select the Streaming menu, and from the sub-menus select Running Streams.

The right pane displays the Running Streams area. No active streams are displayed if there are currently no active streams.
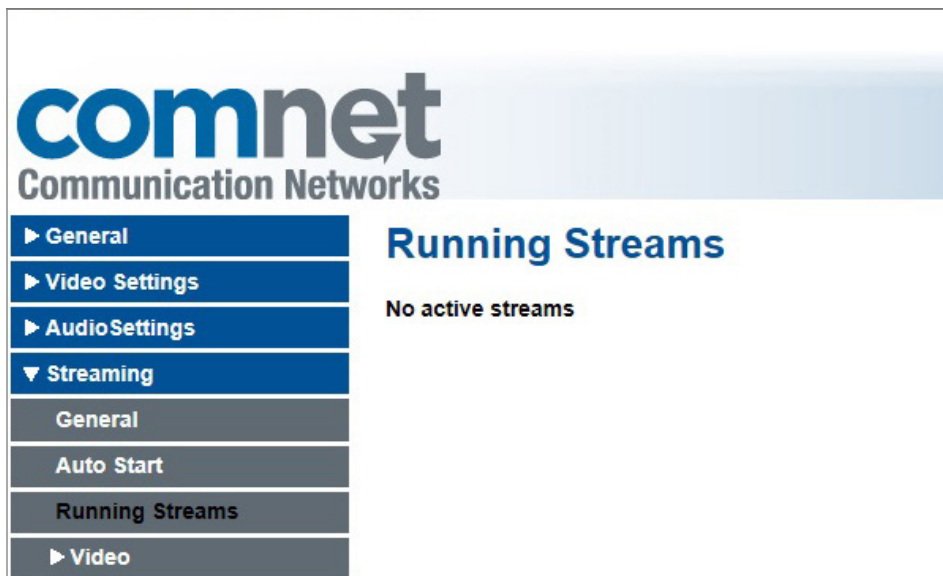
Figure 59: No Active Streams

The Running Streams pane displays information on all active running streams.

Figure 60: Active Unicast Stream

If an audio/video stream was opened the running streams display the video and audio as separate streams.

If a stream is being recorded on the internal storage, the mode displays STORAGE.
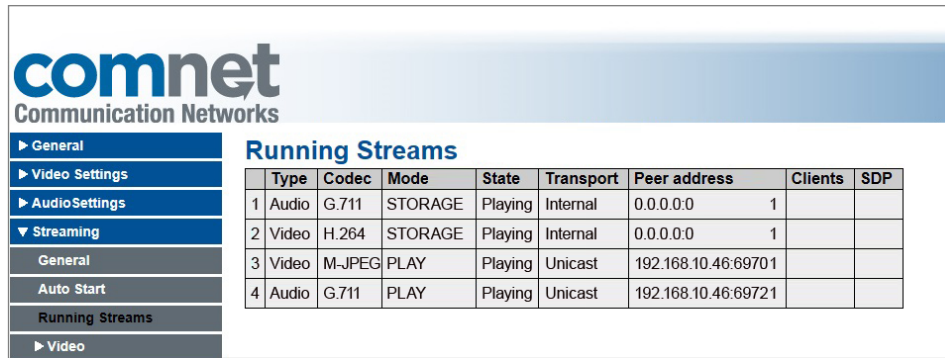
Figure 61: Audio and Video Running Streams

When running a multicast stream the link Get SDP appears in the SDP column of the Running Streams. The multicast stream can be viewed directly in the Web interface.
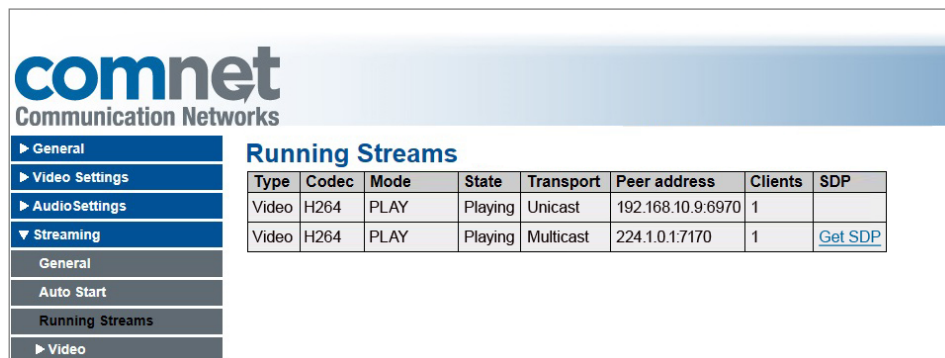
Figure 62: Adding a Multicast Stream

To display a multicast stream:

1. Display the Running Streams screen.

2. Select the Get SDP link of the multicast stream. The stream appears in the right pane.

Figure 63: Displaying the Stream in the Running Streams Menu

Configuring Auto Start

You can automatically start up to 2 different multicast streams on system startup.

When hovering over a field, the tool tip describes the field.
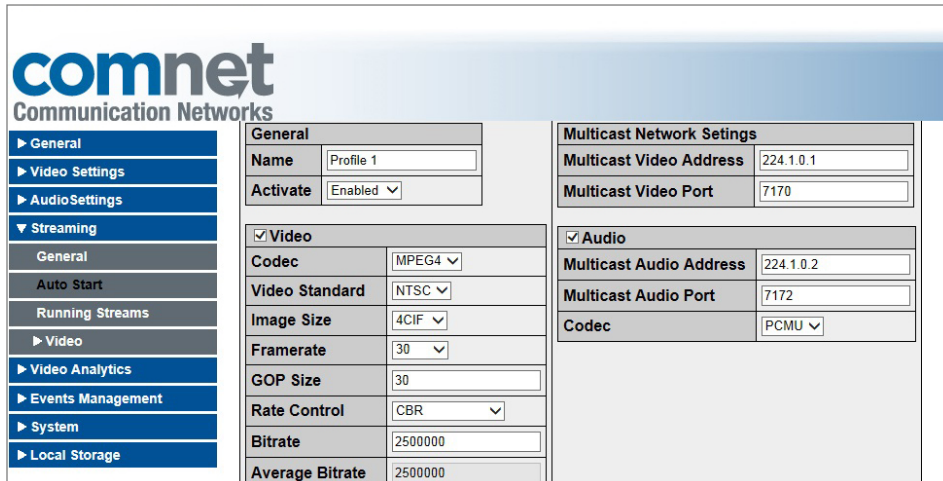
Figure 64: Multicast Encoding Settings

To configure the multicast auto start:

1. In the left pane select the Streaming menu, and from the sub-menus select Auto Start.

2. Select one of the 2 available profiles.

3. Set the Activate box to 'Enabled' in order to view all configurable parameters.

To configure the video CODEC:

» Mark the checkbox next to Video.

» Select the video CODEC from the CODEC drop down list. The CODECs available are MPEG-2, MPEG-4, MJPEG, and H.264.

Figure 65: Video Settings

Video Formats and resolution are:

Table 14: Multicast Auto-Start Video Resolutions

Format	Video Resolution PAL	Video Resolution NTSC
QCIF	176 × 144	176 × 112
CIF	352 × 288	352 × 240
4CIF	704 × 576	704 × 480

The supported frame rates for NTSC are:
1, 1.2, 1.25, 1.5, 1.875, 2, 2.5, 3, 3.75, 5, 6, 7.5, 10, 15, and 30.

The supported frame rates for PAL are:
1, 1.25, 1.5625, 2.5, 3.125, 5, 6.25, 12.5, and 25.

MPEG-2

You can set the MPEG-2 video CODEC settings of GOP Size, Rate Control Mode, Average Bit rate, Maximum Bit rate, Bit rate and Q Initial.

To set the MPEG-2 Video CODEC:

1. In the CODEC drop down list select MPEG-2.

2. In the Camera text-box enter the number of cameras per video source.

3. In the Video Standard drop down list, select PAL or NTSC.

4. In the Image Size drop down list, select the image size of the video stream. The image size can be adjusted between QCIF, CIF, and 4CIF.

5. From the Frame Rate drop-down list select the frame rate. The frame rates correspond to the number of frames per second. The frame rate is different when in NTSC or in PAL.

6. In the GOP Size text-box select the number of frames in a GOP (Group of Pictures). The GOP size is the distance between consecutive keyframes.

7. From the Rate Control drop-down list select the rate control mode for the MPEG-2 encoder. The default is CBR. The Rate Control Mode parameter defines Rate control options for the MPEG-2 encoder. The options are CBR and Constant_Q.

8. Enter the required bit rate parameters according to the rate control mode. For CBR enter the Bit rate.

9. Enter the required Q Max and Q Min parameters for CBR. Enter the required Q Initial parameter for Constant_Q.

10. Select Save to save the settings.

MPEG-4

You can set the MPEG-4 video CODEC settings of GOP Size, Rate Control Mode, Average Bit rate, Maximum Bit rate, Q Max, Q Min, and Q Initial.

To set the MPEG-4 Video CODEC:

1. In the CODEC drop down list select MPEG-4.

2. In the Camera text-box enter the number of cameras per video source.

3. In the Video Standard drop down list, select PAL or NTSC.

4. In the Image Size drop down list, select the image size of the video stream. The image size can be adjusted between QCIF, CIF, and 4CIF.

5. In the GOP Size text-box select the number of frames in a GOP (Group of Pictures). The GOP size is the distance between consecutive keyframes.

6. From the Rate Control Mode drop-down list select the rate control mode for the H.264 encoder. The Rate Control Mode parameter defines Rate control options for the H.264 encoder. The options are VBR, CBR and Constant_Q. The default is Constant_Q.

7. Enter the required bit rate parameters according to the rate control mode. For CBR enter the Bit rate. For VBR enter the Average Bit rate and the Maximum Bit rate.

8. Enter the required Q parameters according to the rate control mode. Enter Q Max, Q Min, and Q Initial for CBR. Enter Q Initial for Constant_Q. Enter Q Max, and Q Min and Q Initial for VBR.

9. Select Save to save the settings.

H.264

You can set the H.264 video CODEC settings of GOP Size, Rate Control Mode, Average Bit rate, Maximum Bit rate, Q Max, Q Min, and Q Initial.

To set the H.264 Video CODEC:

1. In the CODEC drop down list select H.264.

2. In the Camera text-box enter the number of cameras per video source.

3. In the Video Standard drop down list, select PAL or NTSC.

4. In the Image Size drop down list, select the image size of the video stream. The image size can be adjusted between QCIF, CIF, and 4CIF.

5. In the GOP Size text-box select the number of frames in a GOP (Group of Pictures). The GOP size is the distance between consecutive keyframes.

6. From the Rate Control Mode drop-down list select the rate control mode for the H.264 encoder. The Rate Control Mode parameter defines Rate control options for the H.264 encoder. The options are VBR, CBR and Constant_Q. The default is Constant_Q.

7. Enter the required bit rate parameters according to the rate control mode. For CBR enter the Bit rate. For VBR enter the Average Bit rate and the Maximum Bit rate.

8. Enter the required Q parameters according to the rate control mode. Enter Q Max, Q Min, and Q Initial for CBR. Enter Q Initial for Constant_Q. Enter Q Max, and Q Min for VBR.

9. Select Save to save the settings.

MJPEG

You can set the MJPEG video CODEC setting of Q for the cameras. The range for the quality adjustment is 1 to 99. The default setting is 75. At a higher setting, the bit rate will be higher. Quality settings above 75 will result in higher bit rates with little gain in quality and are therefore not recommended.

To set the MJPEG parameters:

1. In the CODEC drop down list select MJPEG.

2. In the Camera text-box enter the number of cameras per video source.

3. In the Video Standard drop down list, select PAL or NTSC.

4. In the Image Size drop down list, select the image size of the video stream. The image size can be adjusted between QCIF, CIF, and 4CIF.

5. In the Quality text-box enter a Q value for the camera between 1 and 99.

6. Select Save to save the settings.

Multicast Network Settings

In the Multicast Network Settings section, set the Multicast Video Address and the Multicast Video Port.

Multicast Network Setings	
Multicast Video Address	224.1.0.1
Multicast Video Port	7170

Figure 66: Multicast Network Settings

To set multicast Network Settings:

1. In the Multicast Video Address text box, enter the required multicast address. The range of addresses that can be used is specified by the RFC 3171 standard as 224.0.0.0 to 239.255.255.255.

2. In the Multicast Video Port text-box enter the required port.

3. Select Save.

Audio Settings

In the Audio section, set the Multicast Audio Address, Multicast Audio Port and the Audio CODEC.

Figure 67: Audio Settings

To set Audio Settings:

1. Mark the checkbox next to Audio.

2. In the Multicast Video Address text-box, enter the required multicast address. The range of addresses that can be used is specified by the RFC 3171 standard as 224.0.0.0 to 239.255.255.255.

3. In the Multicast Video Port text box enter the required port.

4. From the CODEC drop down list select PCMU or PCMA.

5. Select Save.

Configuring the Audio Settings

In the Audio Settings menu you can configure the Analog Audio Settings.

Figure 68: Analog Audio Settings

In the Analog Audio menu you can configure the Gain Setting of the audio input. The Gain Setting can be either Line input or Microphone input.

To configure the analog audio settings:

1. Select the Audio Settings menu in the left pane, and select Analog Audio.

2. In the Gain Setting drop-down list select Line input or Microphone input.

3. Select Save.
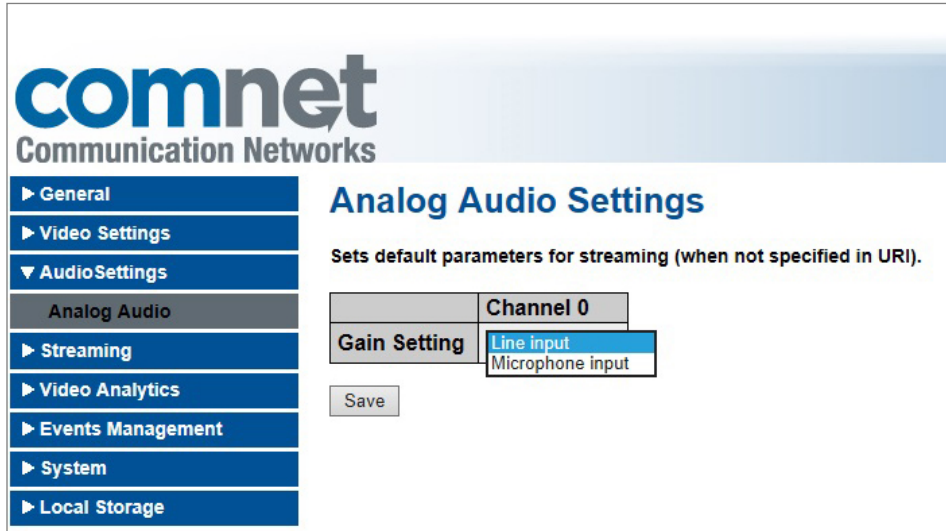
Figure 69: Gain Settings

Managing System Settings

The System menu enables you to set up the serial port settings, network, change passwords, update the firmware, reset the board, update the clock and configure storage settings.

Some system management tasks require a system administrator password.
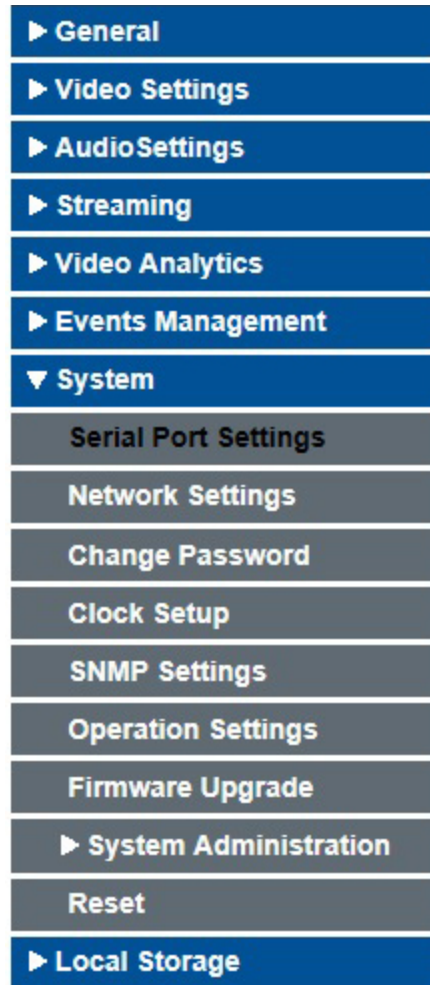
Figure 70: System Menu

Serial Port Settings

The Serial Port Settings page allows you to configure the Serial Port API. There are three operational modes as follows:

The VSP mode only allows you to configure in advance the TCP port (In VSP mode, the same TCP port is used for both RS-232 and RS-422/485).

The Terminal mode allows you to configure all RS-232 and RS-422/485 port settings in advance and transmit the data directly to the configured port without the need for a negotiation phase.

The Board-To-Board mode allows you to configure from a single point both local and remote serial ports' settings and establish automatically half-duplex or full-duplex serial communications between two units over the network. Use case example: Remote PTZ camera control and monitoring.
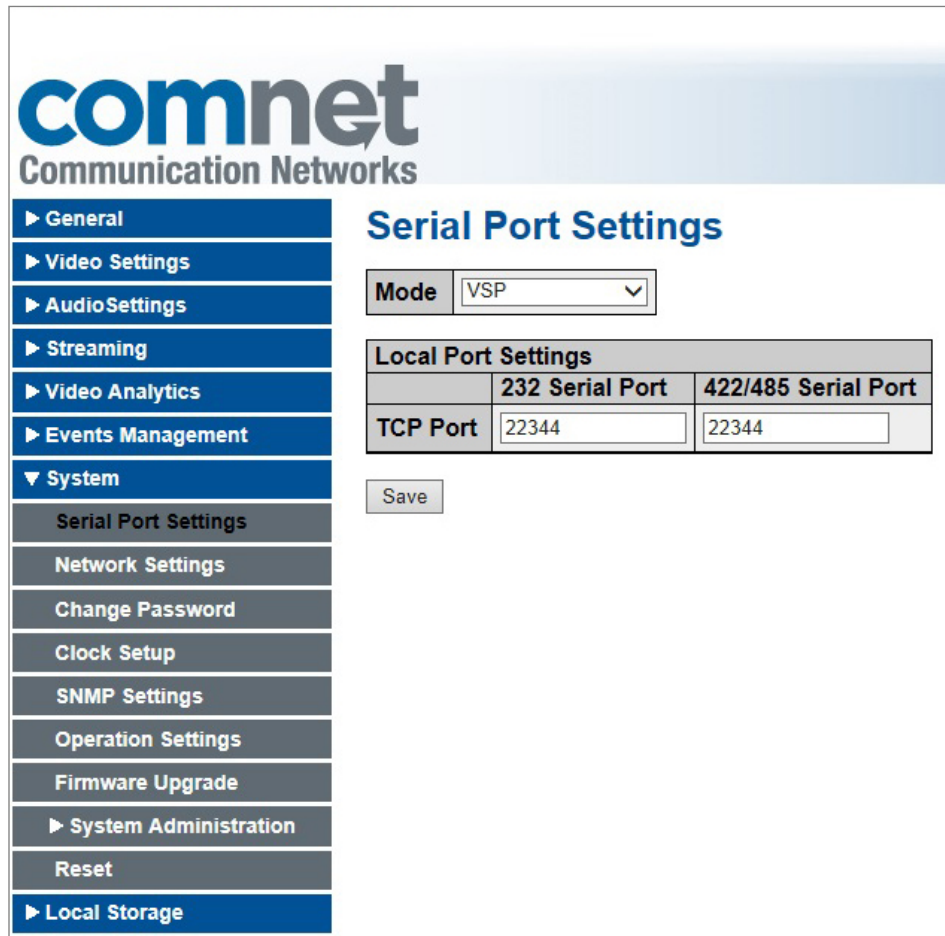
Figure 71: Serial Port Settings

To configure the serial port settings:

1. In the left pane select the System menu, and select Serial Port Settings.

2. Select the Mode.

Figure 72: Serial Port Modes

3. If you selected VSP mode, enter the TCP Port to be used for both RS-232 and RS-422/485.

4. Proceed to step 7.

5. If you selected Terminal mode enter the configuration parameters for both the RS232 port and the RS422/485 port:

  › TCP Port: enter the port number

  › Data Bits: Select 7 or 8 data bits

  › Stop Bits: Select 1 or 2 stop bits

  › Baud Rate: Select one of the following baud rates: 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200, 600, 300.

  › Parity: Select Even, Odd or No Parity (None)

  › Duplex: Select Half or Full Duplex

Figure 73: Serial Port Terminal Mode

6. If you selected Board-To-Board mode enter the configuration parameters for both local and remote serial ports:

    › Enable Port: check to enable the remote port settings.

    › Port Type: enter the serial port type (RS232 or RS422/485).
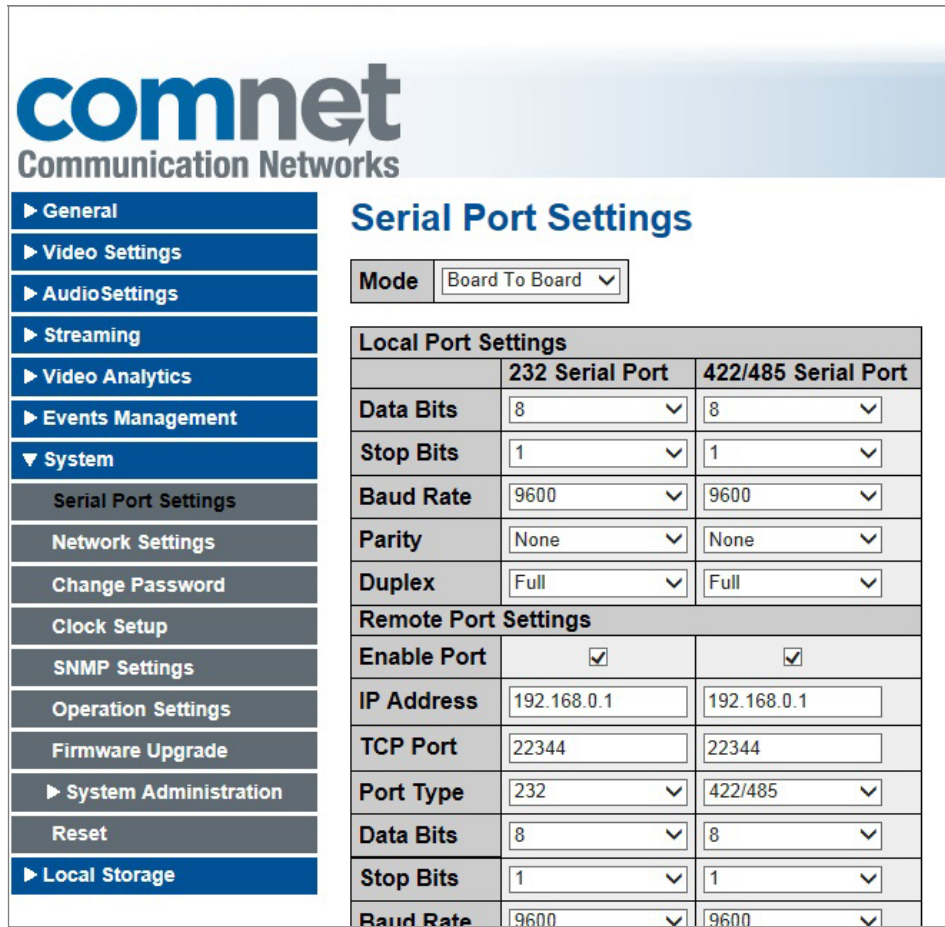
Figure 74: Serial Port Board To Board Mode

7. Select Save. A message to reset the unit will be displayed.

8. Press on Select here to reset the board to apply the settings.

Network Settings

When configuring the IP address you can select Auto or Fixed network settings. When you select the auto network settings, the unit tries to configure the network stack from a DHCP server. If this step fails, it may cause the unit to remain unconnected.

When selecting the fixed network settings, the unit uses the parameters you set to configure the network. You should configure at least the IP address and the Subnet Mask. The Default Gateway is only needed if the board needs to be accessed from outside the local subnet. The DNS Server and Domain Name are also optional; set all optional fields to 0.0.0.0 and leave the Domain Name blank if you do not wish to configure them.

The IP Address default setting is 192.168.10.1. The Subnet Mask default setting is 255.255.0.0. You can discover the IP address that the unit received using the ComNet Site Control Utility (see Using the ComNet Site Control Utility).

Note: Use caution when configuring the unit's network parameters. Wrong parameters (such as IP address outside the subnet) may cause the unit to lose communication with the network. There is some protection implemented to prevent entry of invalid settings.

To set up network parameters:

1. In the left pane select the System menu, and select Network Settings.
    The right pane displays the Network Setting area.
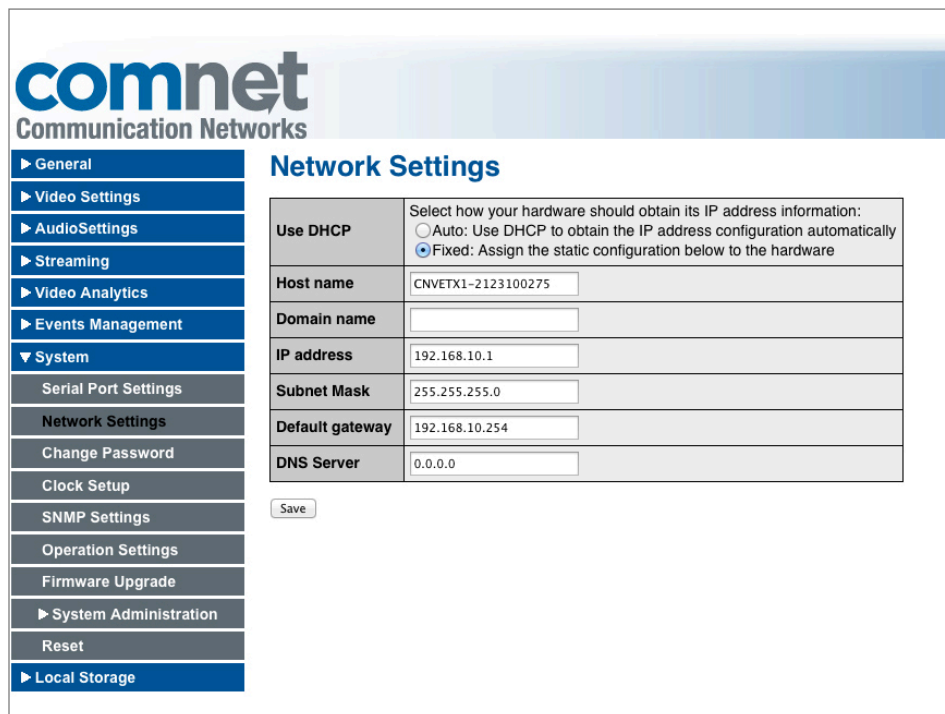
Figure 75: Network Settings Page

2. In the Host Name text box, type a name for the host.

3. In the Use DHCP area, select:

> › Auto: if you want the hardware to use DHCP to obtain an IP address

> › Fixed: to assign the static configuration.

4. If you selected Auto proceed to step 5.
   or
   If you selected Fixed enter the configuration parameters:

> › Domain name (optional): enter a domain name or leave empty.

> › IP address (required): the required IP address.

> › Subnet Mask (required): The required subnet mask.

> › Default gateway (optional): The default gateway is required if the board needs to be accessed from outside the local subnet; otherwise leave as 0.0.0.0.

> › DNS server (optional): Enter the IP address of the DNS server or leave as 0.0.0.0.

5. Select Save when done to confirm your new settings. Press Select here to reset the board.

Note: It is recommended that you use the "Fixed" setting and set the network settings manually. If, however, you wish to use DHCP for automatic configuration, you can enter a unique hostname and select "Auto: Use DHCP".

Using the ComNet Site Control Utility

To discover the IP address given to your board run the ComNet Site Control Utility included with this package. This Windows-based application listens for all ComNet encoders on the network and displays their IP address, MAC address, board type and version information.

When you run the ComNet Site Control Utility, a screen appears as shown in the figure below. In the following example the screen displays the CNVETX1 board at the IP Address 192.168.10.45.
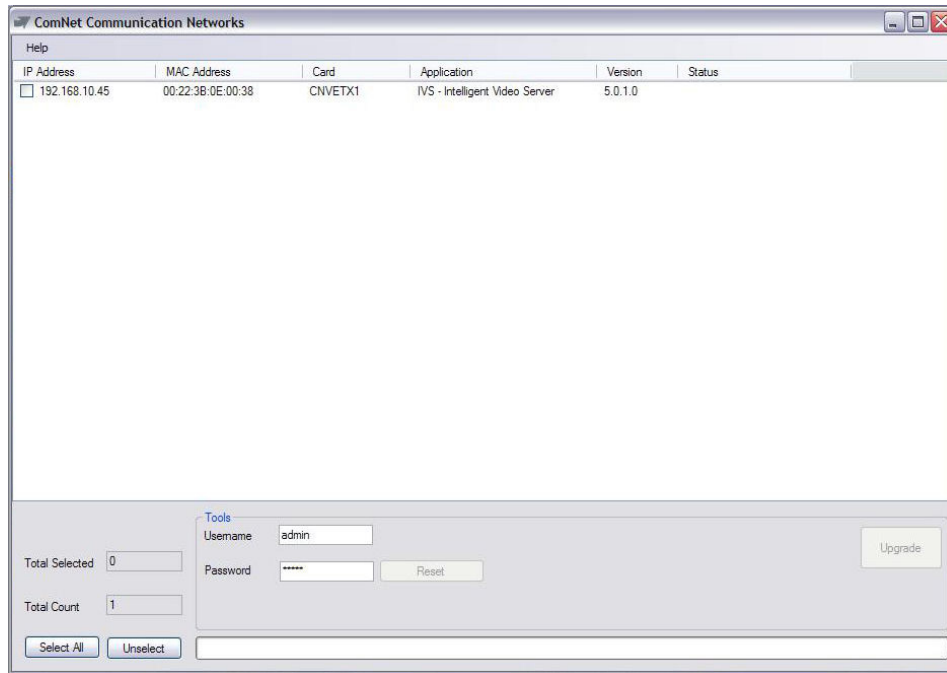
Figure 76: ComNet Site Control Utility

Each node comes with a pre-set and globally unique MAC address. You cannot modify this address.

Note: All ComNet Video Servers will be detected by this utility.

Changing the IP Address

The following procedure illustrates how to change the IP Address of the CNVETX1 from its default address of 192.168.10.1.

To change the IP address of the board:

1. Choose the Network Settings sub-menu from the System menu.

2. Enter the username **admin** and the password **admin** when prompted.

This password is required for all menu items except "About", and can be changed by selecting "Change User PW".

3. Select OK; the Network Settings screen appears.

You should see the current IP Address of the CNVETX1 (192.168.10.1).

4. In the Network Settings area you can configure the CNVETX1 for your network. For this example change the IP Address to 192.168.10.45.

5. Select Save when done to confirm your new settings. Press on Select here to reset the board.
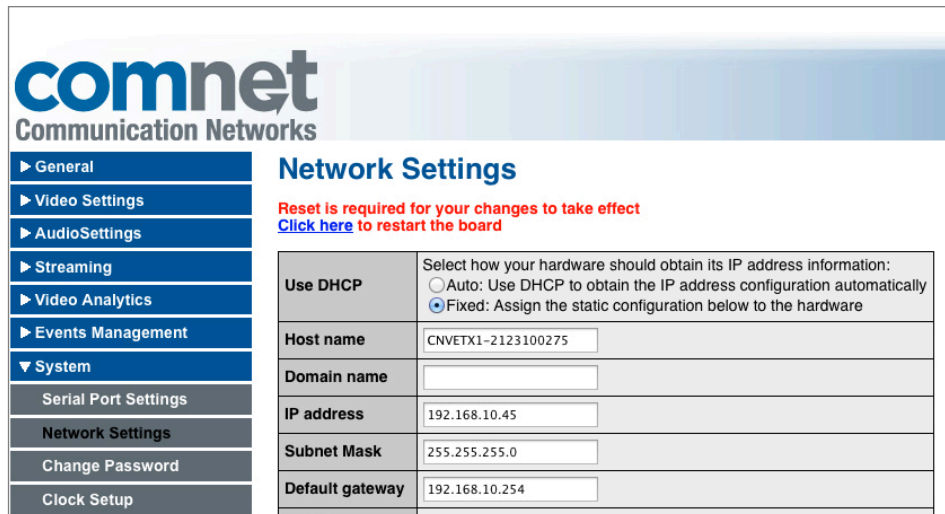
Figure 77: New IP Address and Reset Prompt

6. Select OK in the confirmation message window to reset the encoder.

Note: It is normal for the reset to take up to a minute to complete.
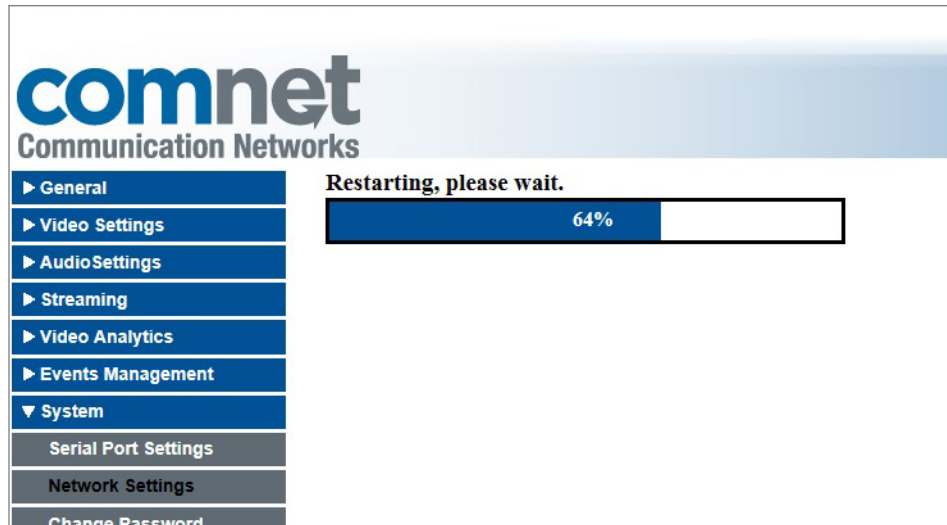
Figure 78: System Reset

You have now completed the setup of your network IP Address.

Once the reset is finished, the CNVETX1 unit is connected and ready to begin working with the Web server software. The Web browser automatically redirects to the About pane.

You can view the new network setting on the Network Setting pane. You can also ping the board or use the ComNet Site Control Utility.

To ping the board:

1. Open a command window: From the Start menu choose Run; In the Run window text-box type cmd and select OK.

2. Type: ping 192.168.10.45 (or whatever the new IP address is set to) in the CMD window. The result should look like the next figure.
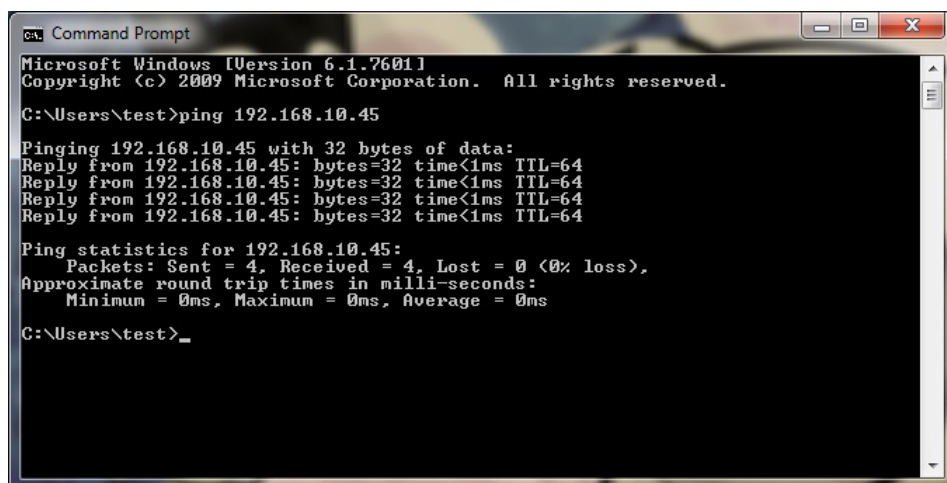
Figure 79: Ping the board with new IP Address

To run the ComNet Site Control Utility:

1. Run the ComNet Site Control Utility. A screen appears which shows the boards on the network as shown in the figure below.

2. The screen displays the CNVETX1 unit at the new IP Address 192.168.10.45.
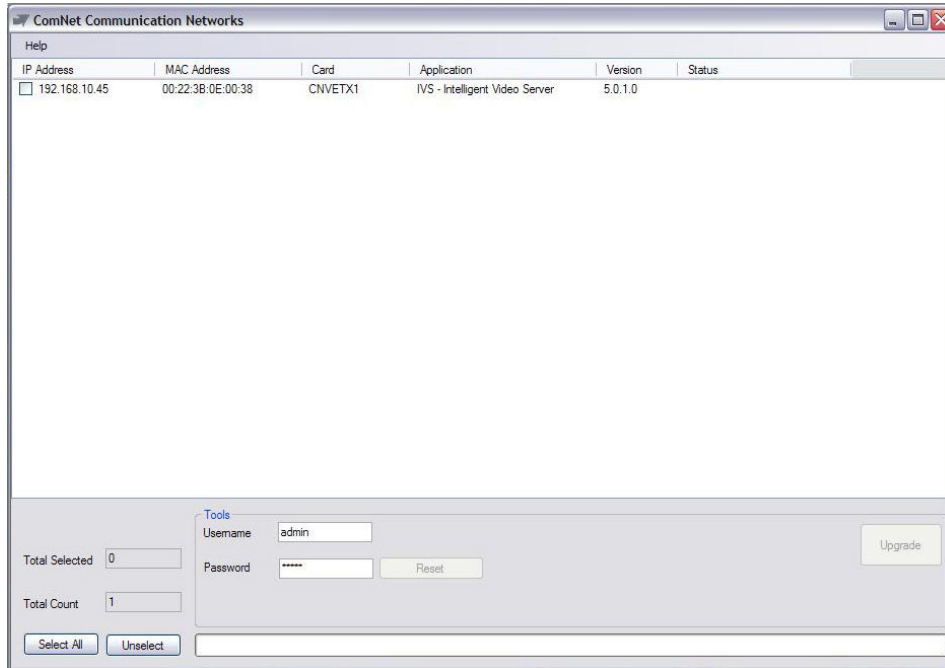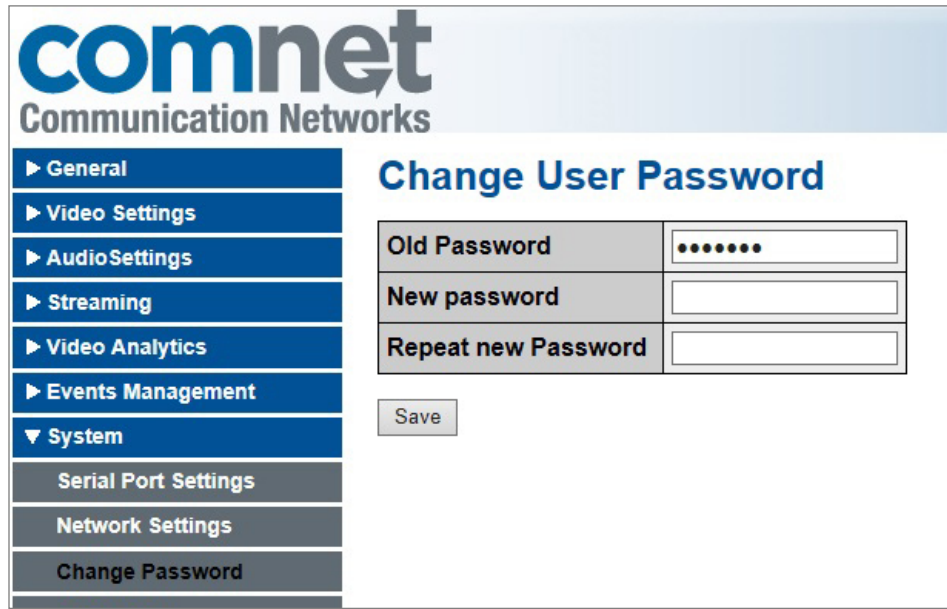
Figure 80: ComNet Site Control Utility with new IP Address

Changing the User Password

You can change your password. The default password is admin.

To change the user password:

1. In the left pane select the System menu, and select Change PW.
    The right pane displays the Change User Password area.

Figure 81: Change User Password Page

2. In the Old Password text-box, type the old password.

3. In the New Password text-box, type the new password;
    Re-type the new password in the Repeat new Password text-box.

4. Select Save to save the new password.

Setting up the Clock

You can set up an NTP (Network Time Protocol) server for time synchronization. You can also set up the local time zone as well as daylight saving time for the About pane.

The board supports the use of NTP to synchronize the board's time to an external clock. This is required for maintaining a long streaming session, compensating for clock skew between the board and the host computer. For it to work correctly the host computer must either be the NTP server or it must synchronize to the same NTP server as the board.

Optionally you can set the on-board Real Time Clock according to the current time of your PC.

To set up the clock:

1. In the left pane select the System menu, and select Clock Setup.
    The right pane displays the Clock Setup area.

Figure 82: Change Clock Setup

To enable NTP, check the Use SNTP box and enter the IP address of your server.

- or -

If you are not using SNTP, select Set Time to set the unit's clock according to your PC's time.

For the time to be correctly displayed, make sure to set both the Local Time Zone and the Daylight Savings settings.

2. In the Local Time Zone textbox, enter a value between -12 and +13 (the offset relative to GMT).

3. Check the Daylight Savings Time box if DST is presently used in your region.

4. Select Save.

The unit applies the new settings. The web browser displays the following message.

Figure 83: Clock Setup Change Saved

Configuring the SNMP Settings

The board supports the use of SNMP mainly for monitoring the board's operation and I/O statuses using standard and/or enterprise SNMP traps and GET SNMP commands as well as controlling few functions, such as: Relays, using SET SNMP commands.

SNMPv1 and SNMPv2 Protocol Data Units (PDUs) requests will be supported. Enterprise MIB files are available for quick integration with SNMP systems.

The SNMP agent will be running automatically and SNMP traps can be enabled as described below.

To configure the SNMP settings:

1. In the left pane select the System menu, and select SNMP Settings.
    The right pane displays the SNMP Settings area.

Figure 84: SNMP Settings

2. Read / Write Communities for GET/SET SNMP commands are user configurable. The defaults are shown above.

3. Enter the SNMP System Description parameters: (Optional)

    › System Description: default value: "not set"

    › System Name: default value: "not set"

    › System Contact info: default value: "not set"

    › System Location: default value: "not set"

4. To enable the SNMP traps complete the following settings:

› Enable Traps: Check to enable sending standard and enterprise traps

› Trap Receiver (1) IP Address: Traps destination 1 (Mandatory)

› Trap Receiver (2) IP Address: Traps destination 2 (Optional)

› Trap Receiver (3) IP Address: Traps destination 3 (Optional)

› Trap community: User configurable (Default: public)

› Cold Start trap: Signifies that the encoder is reinitializing itself and that its configuration may have been altered

› Warm Start trap: Signifies that the encoder is reinitializing itself such that its configuration is unaltered

› Link Up trap: Signifies that the encoder has a live Network Interface

› VideoExists trap: Signifies a state change of the video input signal

› Digital In0 trap: Signifies a state change of digital input#0 (TTL #0)

› Digital In1 trap: Signifies a state change of digital input#1 (TTL #1)

› CPU usage threshold: CPU threshold value (90% Def.)

› CPU Load (over threshold) trap: Signifies the CPU usage threshold (%) was exceeded

› DSP usage threshold: DSP threshold value (90% Def.)

› DSP Load (over threshold) trap: Signifies the DSP usage threshold (%) was exceeded

5. Select Save to apply the settings.

Figure 85: SNMP Traps Settings

Configuring Operation Mode

The CNVETX1 unit is running a unified code and can be operated in two modes: Encoder or Decoder. When switching between these modes all the relevant settings of each operation mode will be retained.

More details on the Decoder operation mode are provided later on.
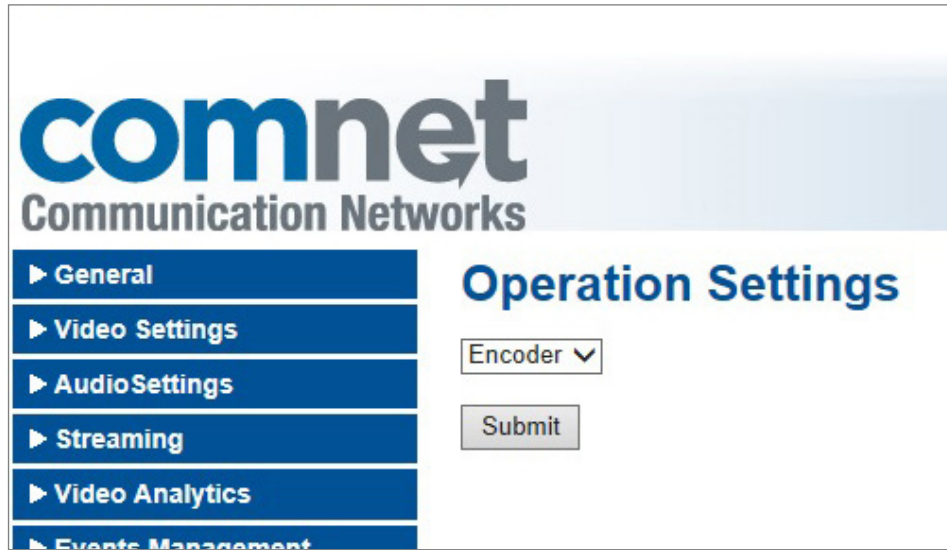
Figure 86: Operation Settings

To switch operation mode:

1. In the left pane select the System menu, and select Operation Settings.

2. Select the desired operation mode, and select Submit.

3. Operation was finished successfully. Select Select here to restart the board. User will be prompt to approve the reset operation. The About pane of the new version should appear automatically within a minute.

Warning: Never interrupt the reset process in any way, as this may lead to a board that cannot boot!

Updating the Firmware

You can update the unit's on-board firmware version. The software updates are provided as files with the .tgz file extension.

To update the firmware:

1. In the left pane select the System menu, and select Firmware Upgrade.

The right pane displays the Flash Update area.
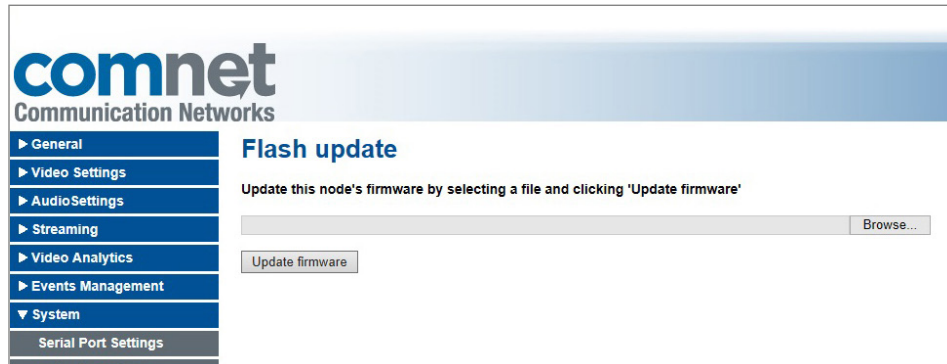
Figure 87: Flash Update Page

2. Select Browse button to select the file.

3. Select Update firmware to start the software update.
    The unit starts writing the Flash memory. Operation was finished successfully is displayed when the firmware has been updated.

4. Select Select here to restart the board. The About pane of the new version should appear automatically within a minute.

Warning: Never interrupt the flash process in any way, as this may lead to a board that cannot boot!

System Administration

Using the System Administration feature an authorized user can reset the user password for other users, as well as change the system administrator's password and restore the server to the factory defaults.

These actions require authentication: a system administration password is needed.

Figure 88: System Administration Header

The authentication screen appears when any of the system administrator menus are entered for

the first time.

To access system administration options:

1. In the Authentication Required window, in the User Name text-box type your user name, and in the Password text-box type your password.

By default, the username is sysadmin, and the default password is sys394.

2. Select OK.

Resetting the User Password

The following screen pops up when this pane is selected:
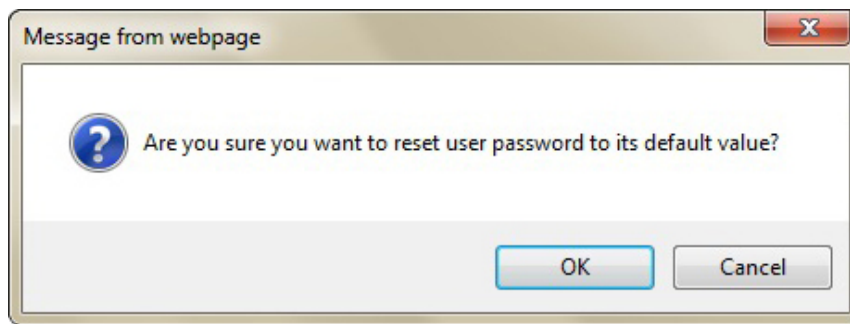
Figure 89: Reset User Password Confirmation

Select OK to reset the User password.
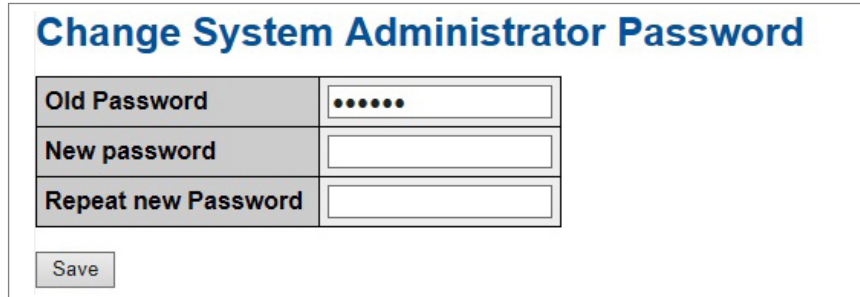
The password is reset to its original default value of **admin**.

Changing System Administrator Password

This page allows the user to change the system administration password.

To change the system administrator password:

1. Enter the new system administration password, and retype it in the Repeat new Password field.

Figure 90: Change System Administration Password

2. Select Save.

Reset to Factory Defaults

An authorized user can reload the factory defaults. This resets the board to the original factory default settings.

After selecting this option the board is restarted and your Web browser automatically redirects to the About page.

This operation resets all board parameters to their factory default values including IP Address and passwords. All configured information is lost.

To reset to factory defaults:

1. In the left pane select the System menu, and from the sub-menus select System Administration and then Factory Defaults.

The right pane displays the Factory Defaults area.

Factory Defaults

Click the button in order to reset all board parameters to factory defaults

Reset To Factory Defaults
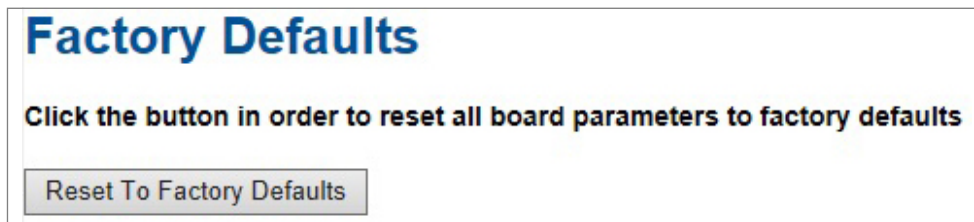
Figure 91: Reset to Factory Defaults

2. Select Reset to Factory Defaults.

The message "This action will require starting the board. Continue?' appears.

3. Select OK to confirm.

4. Wait for reset to finish. When the reset is finished the About page is displayed.

All of the parameters of the application have been restored to the factory settings including video and network parameters.

The following table lists the factory default settings.

Table 19: Factory Default Settings

Factory Default Settings	
Analog Video Settings	Video Standard = NTSC
	Brightness = 50
	Contrast = 50
	Color = 50
	Hue = 0
Audio Settings	Gain Setting = Line In
General Streaming Parameters	MTU = 1472
	Multicast address = 224.1.0.1
Video Streaming Parameters	Image Size = CIF
	Frame rate = 30 fps
MPEG-4 Parameters	GOP Size = 30
	Rate Control Modee = CBR
	Constant Bit rate = 4000000
	Average bit rate = 4000000
	Maximum bit rate = 5000000
	Qinitial = 8
MPEG-2 Parameters	GOP Size = 30
	Rate Control Modee = CBR
	Constant Bit rate = 5000000
	Average bit rate = 5000000
	Maximum bit rate = 5000000
	Qinitial = 20
H264 Parameters	GOP Size = 30
	Rate Control Modee = Constant_Q
	Bit rate = 5000000
	Average bit rate = 2400000
	Maximum bit rate = 3000000
	Qmin = 20
	Qmax = 51
	Qinitial = 28
MJPEG Parameters	Quality = 75
Video Analytics Parameters	Max views = 1
	Max rules per view = 3

Network Parameters	DHCP = Fixed
	Host Name = Blank
	Domain Name = Blank
	IP Address = 192.168.10.1
	Subnet Mask = 255.255.0.0
	Default Gateway = 192.168.0.254
	DHS Server = 0.0.0.0
Clock Setup Parameters	Use NTP = false
	NTP Server = 0.0.0.0
	Local Time Zone = 0
	Daylight Savings Time = false
Storage Setting	Sorage = Disabled
Alarms & Contact Closure	Relay Out Setting = 0
User Password	admin
System Administration Password	sys394
Web Interface Language	English
PTZ Control Settings	Protocol = Pelco¬_D
	Address = 4
	RS Type = 422-485
	Baud Rate = 9600
	Duplex = full
	Move Speed = 40
	Zoom Speed = 3
	Focus Speed = 3

Change Web Interface Language

The administrator can change the Web Interface language. This enables changing the Graphical User Interface to one of six languages; English, French, Spanish, German, Portuguese and Chinese.

To change the Web Interface language:

1. Select the System menu in the left pane, select System Administration and then Change the Web Interface Language.

The Web Interface Language Pane appears.

Figure 92: Web Interface Language

2. Select the language of choice from the drop down list.
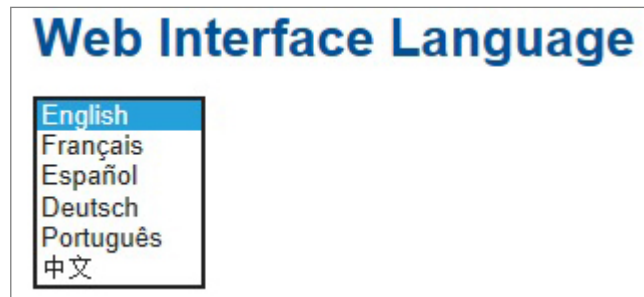
Figure 93: Select Language

3. Select Save.

Reset

An authorized user can reset the board. Such a reset is identical to power cycling the unit, but is safer since it ensures that Flash-based storage is properly flushed before restarting.

Use this option to restart the unit.

To reset the board:

1. In the left pane select the System menu, and select Reset.
   A confirmation window appears.

2. Select OK to confirm. After reset the unit starts automatically.

3. Wait for reset to finish.

4. When the reset is finished the About pane is displayed.

Configuring Local Storage

You can enable local storage on the CNVETX1 for recording live video clips onto existing media (if installed). The video recording profile uses the default image resolution, frame rate, and H.264 parameters, which are configured under the Streaming menu.

Note: Local storage is a factory installed option. By default no storage is included. It is not possible for the user to add storage in the field.
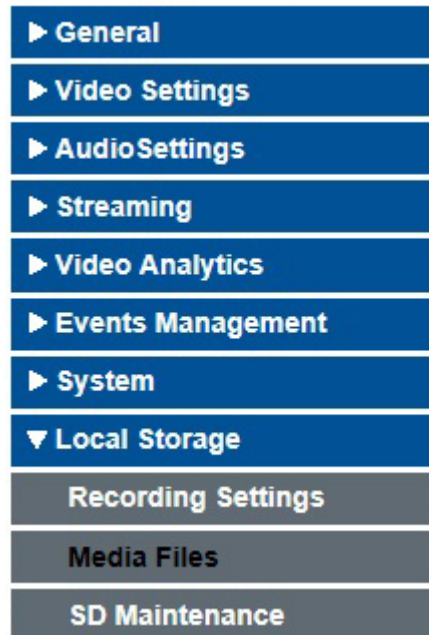
Figure 94: Local Storage

Recording Settings

The following are available settings:

- » Device ID: Prefix name (Alphanumeric)
- » File Format: MKV - Matroska video/audio multimedia file (Fixed)
- » Activate Video: Enables video recording
- » Activate Audio: Enables audio recording
- » Recording Mode: Continuous (Fixed)
- » Recording Mode Settings: Fixed Clip Time in minutes (1-180min.)
- » Mute Audio: Enables muting the audio input
- » Start new clip: Starts a new clip (useful for synchronizing with external event)

To enable the recording and storage of video clips:

1. In the left pane select the Local Storage menu

2. Select on the Recording Settings sub-menu to configure the settings

Figure 95: Local Recording Settings

3. Select Save to apply the settings and start the local video/audio recording. The recordings are stored onto an internal media (MicroSD card).

Note: The Video Storage functionality is a factory installed option. It is not possible for the user to add storage in the field.

Media Files

File Naming Convention:
» Track name: Device ID-Month-Day-Year-Start time(HH.MM.SS)-End time-Trigger Type-Status
» Status: Recording/Complete/Interrupted
» Example:Camera1-Jun-14-2009-16.30-17.10-X-C.MKV
» Device ID is configurable in the web GUI – Alphanumeric free text

File Validity after interruption: After a power failure, the file that was in recording process during the power failure will still be viewable.

To access the recorded files:
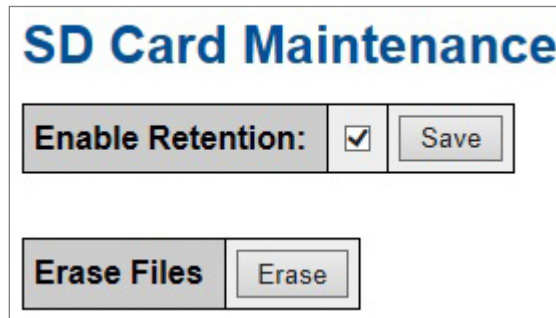
4. Select on the Media Files sub-menu. A list of the recorded files is displayed.

5. These files can be downloaded or deleted from the browser using the hyperlinks in the last two columns.

SD Maintenance

Simple maintenance options are described below. It is recommended to erase the media before deploying the unit in the field.

To maintain the media storage:

6. Select on the SD Maintenance sub-menu. In this web page you can do the following:

- › Enable Retention: When checked, strorage threshold of 75% capaciity will apply to allow continuous recording with sufficient space for cyclic storing with no video loss.
- › Erase Files: Erase ALL files on the media storage. This operation can only be executed when the video / audio recordings are disabled.

Figure 96: Local Recording Settings

Decoding Video

The Video Settings menu is used to configure the Digital Profile Settings and the Display Configuration.

Decoding Profile Settings

The Decoding Profile Settings page is used to:

» Set the IP Address of the video stream to be decoded

» Configure the decoder audio and video parameters

» Configure multicast streaming

Settings on the Decoding Profiles Settings page vary as a function of the Video Type.

Note: When hovering over a field, the tool tip describes the field.

Figure 97: Digital Video settings

Selecting the Profile Number

The decoding profiles settings can be configured for 16 different profiles. To set the profile number:

1. In the Profile Number drop down list select the profile number. A pop up window appears.

2. Select OK to confirm that you wish to discard changes.

Video Type

In the General section of the Decoding Profiles Settings you can select the profile Video Type. The Decoding Profiles Settings window changes for each Video Type. You can set the Video Type for RTP, Parameterized, URL, or Disabled.

To set the video type:

» In the General area select the Video Type.

Video Type: RTP

In the RTP video type you can define a connection to an existing stream. This allows you to connect to a previously defined multicast stream. In the RTP window you can configure the video, audio, and multicast streaming.

To configure the video:

1. Select the video check box.

2. From the CODEC drop down list select the video CODEC.

3. From the Video Standard drop down list select the video standard of your video source.

To set the audio:

1. Select the audio check box.

2. From the CODEC drop down list select the audio CODEC.

To set multicast streaming parameters:

1. Select the Multicast Streaming check box to enable multicast streaming.

2. Select the Additional Parameters check box.

3. In the Multicast Video Address text-box, enter the required multicast video address. The range of addresses that can be used is specified by the RFC 3171 standard as 224.0.0.0 to 239.255.255.255.

4. In the Multicast Video Port text-box enter the required port.

5. In the Multicast Audio Address text-box, enter the required multicast audio address.

6. In the Multicast Audio Port text-box enter the required port

7. Select Save.

Video Type: Parametrized

In the Parametrized video type you can define the parameters of the stream for ComNet devices. In the General area type the profile name and the Server IP address.

In the video section of the Digital Video Settings configure the CODEC and its parameters, and select the video standard and camera. For each CODEC selected you can manually configure the parameters or check the Use Server Defaults check box.

To configure the video CODEC:

» Select the video CODEC from the CODEC drop down list. The CODECs available are MPEG-2, MPEG-4, MJPEG, and H.264.

MPEG-2

You can set the MPEG-2 video CODEC settings of GOP Size, Rate Control Mode, Average Bit rate, Maximum Bit rate, Bit rate and Q Initial.

Video Formats and resolution are:

Table 20: Video Formats and Resolutions

Format	Video Resolution PAL	Video Resolution NTSC
QCIF	176 × 144	176 × 112
CIF	352 × 288	352 × 240
4CIF	704 × 576	704 × 480
D1*	720 × 576	720 × 480

*Note: When switching to D1 from any other resolution the user will be prompted to reset the unit. Same reset will be required to switch back from D1 to any other resolution. User should pick the same image resolution to all decoding profiles.

The supported frame rates for NTSC are: 1, 1.2, 1.25, 1.5, 1.875, 2, 2.5, 3, 3.75, 5, 6, 7.5, 10, 15, and 30.

The supported frame rates for PAL are: 1, 1.25, 1.5625, 2.5, 3.125, 5, 6.25, 12.5, and 25.

Video	
Codec	MPEG2
Camera	0
Video Standard	PAL
Use Server Defaults	☐
Image Size	4CIF
Framerate	12.5
GOP Size	30
Rate Control	CBR
Bitrate	6000000
Average Bitrate	2500000
Maximum Bitrate	5000000
Q Max	51
Q Min	20
Q Initial	28
Quality	75

Figure 98: MPEG-2 CODEC

To set the MPEG-2 Video CODEC:

1. In the CODEC drop down list select MPEG-2.

2. In the Camera text-box enter the number of cameras per video source.

3. In the Video Standard drop down list, select PAL or NTSC.

4. In the Image Size drop down list, select the image size of the video stream. The image size can be adjusted between QCIF, CIF, and 4CIF.

5. From the Frame Rate drop-down list select the frame rate. The frame rates correspond to the number of frames per second. The frame rate is different when in NTSC or in PAL.

6. In the GOP Size text-box select the number of frames in a GOP (Group of Pictures). The GOP size is the distance between consecutive key frames.

7. From the Rate Control drop-down list select the rate control mode for the MPEG-2 encoder. The default is CBR. The Rate Control Mode parameter defines Rate control options for the MPEG-2 encoder. The options are CBR and Constant_Q.

8. Enter the required bit rate parameters according to the rate control mode. For CBR enter the Bit rate.

9. Enter the required Q Max and Q Min parameters for CBR. Enter the required Q Initial parameter for Constant_Q.

10. Check the Use Server Defaults box if you want to use the default settings.

11. Select Save to save the settings.

MPEG-4

You can set the MPEG-4 video CODEC settings of GOP Size, Rate Control Mode, Average Bit rate, Maximum Bit rate, Q Max, Q Min, and Q Initial.

Figure 99: MPEG-4 CODEC

To set the MPEG-4 Video CODEC:

1. In the CODEC drop down list select MPEG-4.

2. In the Camera text-box enter the number of cameras per video source.

3. In the Video Standard drop down list, select PAL or NTSC.

4. In the Image Size drop down list, select the image size of the video stream. The image size can be adjusted between QCIF, CIF, and 4CIF.

5. In the GOP Size text-box select the number of frames in a GOP (Group of Pictures). The GOP size is the distance between consecutive keyframes.

6. From the Rate Control Mode drop-down list select the rate control mode for the H.264 encoder. The Rate Control Mode parameter defines Rate control options for the H.264 encoder. The options are VBR, CBR and Constant_Q. The default is Constant_Q.

7. Enter the required bit rate parameters according to the rate control mode. For CBR enter the Bit rate. For VBR enter the Average Bit rate and the Maximum Bit rate.

8. Enter the required Q parameters according to the rate control mode. Enter Q Max, Q Min, and

Q Initial for CBR. Enter Q Initial for Constant_Q. Enter Q Max, and Q Min and Q Initial for VBR.

9. Check the Use Server Defaults box if you want to use the default settings.

10. Select Save to save the settings.

H.264

You can set the H.264 video CODEC settings of GOP Size, Rate Control Mode, Average Bit rate, Maximum Bit rate, Q Max, Q Min, and Q Initial.

☑ Video	
Codec	H264
Camera	0
Video Standard	PAL
Use Server Defaults	☐
Image Size	4CIF
Framerate	25
GOP Size	30
Rate Control	CBR
Bitrate	2500000
Average Bitrate	2500000
Maximum Bitrate	5000000
Q Max	51
Q Min	20
Q Initial	28
Quality	75

Figure 100: H.264 CODEC

To set the H.264 Video CODEC:

1. In the CODEC drop down list select H.264.

2. In the Camera text-box enter the number of cameras per video source.

3. In the Video Standard drop down list, select PAL or NTSC.

4. In the Image Size drop down list, select the image size of the video stream. The image size can be adjusted between QCIF, CIF, and 4CIF.

5. In the GOP Size text-box select the number of frames in a GOP (Group of Pictures). The GOP size is the distance between consecutive keyframes.

6. From the Rate Control Mode drop-down list select the rate control mode for the H.264 encoder. The Rate Control Mode parameter defines Rate control options for the H.264

encoder. The options are VBR, CBR and Constant_Q. The default is Constant_Q.

7. Enter the required bit rate parameters according to the rate control mode. For CBR enter the Bit rate. For VBR enter the Average Bit rate and the Maximum Bit rate.

8. Enter the required Q parameters according to the rate control mode. Enter Q Max, Q Min, and Q Initial for CBR. Enter Q Initial for Constant_Q. Enter Q Max, and Q Min for VBR.

9. Check the Use Server Defaults box if you want to use the default settings.

10. Select Save to save the settings.

MJPEG

You can set the MJPEG video CODEC setting of Q for the cameras. The range for the quality adjustment is 1 to 99. The default setting is 75. At a higher setting, the bit rate will be higher. Quality settings above 75 will result in higher bit rates with little gain in quality and are therefore not recommended.

☑ Video	
Codec	MJPEG ˅
Camera	0
Video Standard	PAL ˅
Use Server Defaults	☐
Image Size	4CIF ˅
Framerate	25 ˅
GOP Size	30
Rate Control	CBR ˅
Bitrate	2500000
Average Bitrate	2500000
Maximum Bitrate	5000000
Q Max	51
Q Min	20
Q Initial	28
Quality	75

Figure 101: MJPEG CODEC

To set the MJPEG parameters:

1. In the CODEC drop down list select MJPEG.

2. In the Camera text-box enter the number of cameras per video source.

3. In the Video Standard drop down list, select PAL or NTSC.

4. In the Image Size drop down list, select the image size of the video stream. The image size can be adjusted between QCIF, CIF, and 4CIF.

5. In the Quality text-box enter a Q value for the camera between 1 and 99.

6. Check the Use Server Defaults box if you want to use the default settings.

7. Select Save to save the settings.

Multicast Streaming

In the Multicast Streaming section, select the check box to enable multicast streaming. Select the Additional Parameters check box to change the Multicast Video Address and the Multicast Video Port.

Figure 102: Multicast Streaming

To set multicast streaming parameters:

1. Select the Multicast Streaming check box to enable multicast streaming.

2. Select the Additional Parameters check box.

3. In the Multicast Video Address text-box, enter the required multicast address. The range of addresses that can be used is specified by the RFC 3171 standard as 224.0.0.0 to 239.255.255.255.

4. In the Multicast Video Port text-box enter the required port.

5. Select Save.

Audio

In the Audio section select the Audio checkbox to configure the audio Settings. Select the CODEC, Input Microphone, and Gain Setting. The Gain Setting of the audio input can be either Line In or Mic In.

Figure 103: Audio Settings

To set the Audio Settings:

1. Select the Audio checkbox.

2. From the CODEC drop down list select PCMU or PCMA.

3. In the Input Microphone text-box enter the number of audio/microphone source.

4. In the Gain Setting drop-down list select Line In or Mic In.

5. Select Save.

Video Type: URL

In the URL video type you can define the RTSP URL definition for the stream. The URL supports ComNet and non-ComNet devices. Refer to the latest Release notes for the latest tested devices.

Figure 104: Decoding Profiles Settings

To configure the URL settings:

1. Select the Profile Name.

2. Enter the Server IP address.

3. In the URL text box enter the URL RTSP command.

4. From the Video Standard drop down list select NTSC or PAL video standard.

5. Select Save.

Display Configuration

The Display Configurations menu is used to configure the display configurations settings. The display configurations settings are the single view and the Profile name.

In Single View 16 different profiles or channels can be chosen.

One audio channel can be selected.

To configure display configuration settings:

1. From the Video Source drop down list select one of the 16 profiles:
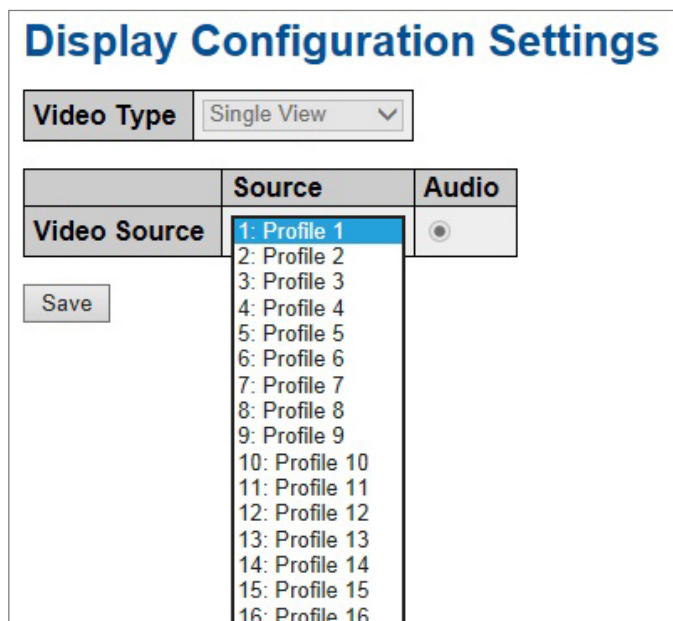
Figure 105: Video Source, Selecting Profile

2. Select the audio box to enable audio.

3. Select Save.

Board Configuration via Serial Port

By connecting an RS232 cable between a PC and the board's serial port, you can access the board and configure network parameters. This is useful in the unlikely event of the board being inaccessible over the network.

You can access the board using a terminal emulation software such as HyperTerminal, which is a Telnet communications utility running under the Windows operating system (not including Windows Vista) for serial communication, or Tera Term, which is a free software terminal emulator communications program for Windows, or Minicom (under Linux) on the PC.

If you don't have an RS232 port on your PC, you can connect the server to the USB port on your PC via a USB to RS232 cable.

Running HyperTerminal

To run the HyperTerminal application you need to set up and configure a HyperTerminal session connection.

The following settings are required:

Bits per second: 115200; Data bits: 8; No parity; Stop bits: 1.

To run HyperTerminal:

1. Select
   Start>
   Programs>Accessories>Communications>HyperTerminal.
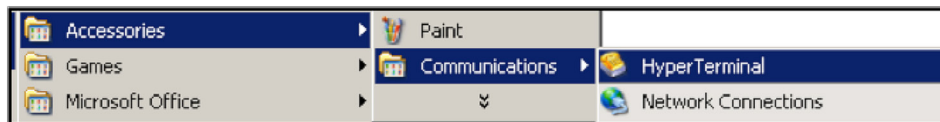
Figure 106: Running HyperTerminal

2. In the Connection Description window enter a name of the new connection and select an icon.

Figure 107: HyperTerminal New Connection

3. Select OK. The Connect To window appears.

Figure 108: HyperTerminal Connect To

4. In the Connect using drop-down list select COM3 or the COM port you are connected to.

5. Select OK. The COM3 Properties window appears.

6. Set up the connection properties according to Figure 109 below.
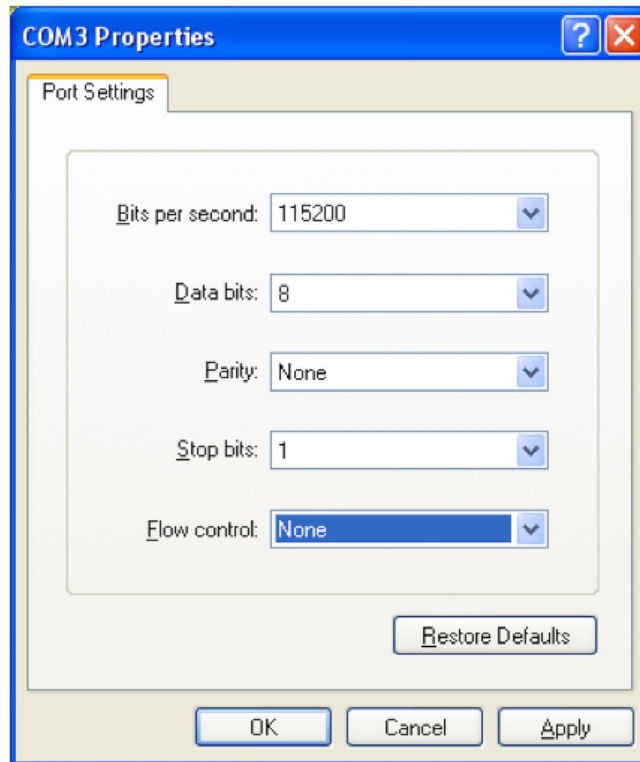
Figure 109: HyperTerminal COM3 Properties

7. Select OK.

This enables you to connect to the server through the RS232 cable using the HyperTerminal application. The HyperTerminal screen on your PC is the System console. The RS232 acts as a console that enables various menu driven operations.
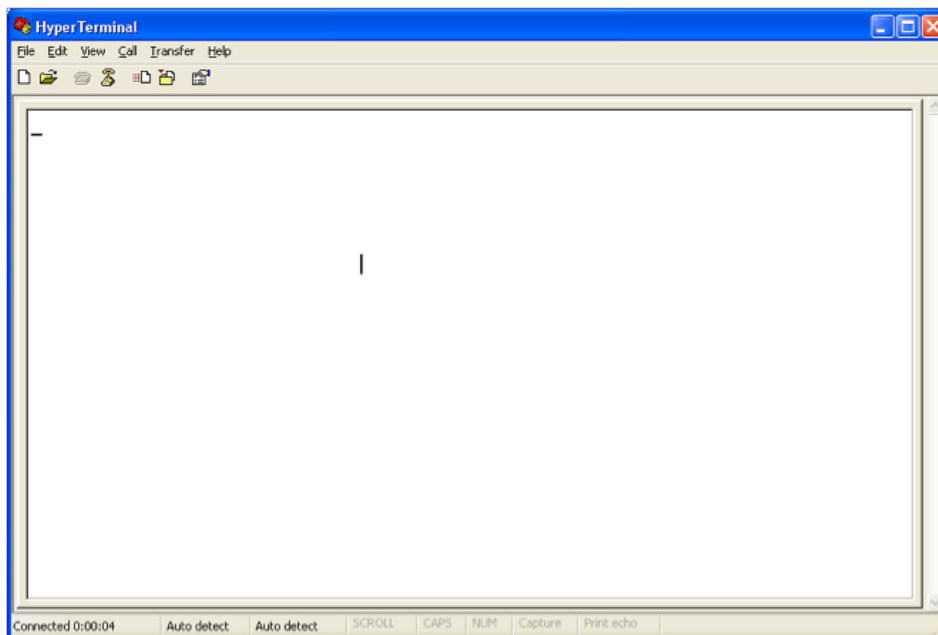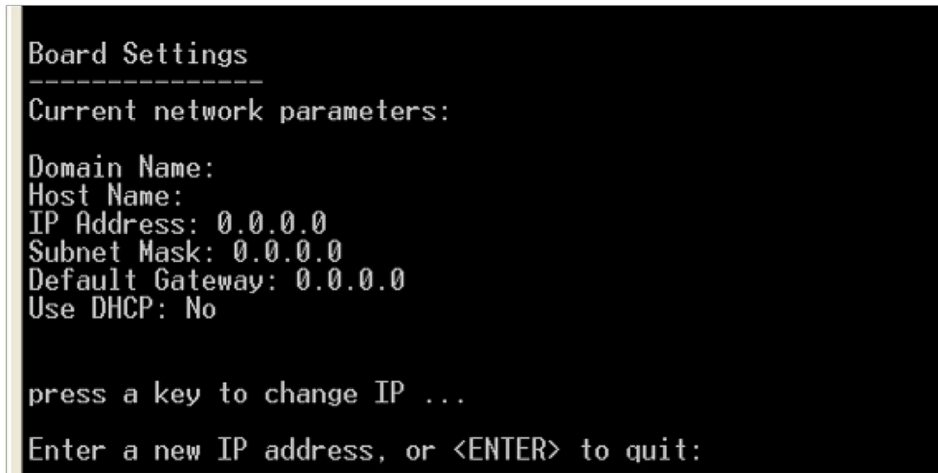
Figure 110: HyperTerminal Console

Configuring the Board

A system console can be used through the RS232 connection for changing the IP Address. If you are connected on HyperTerminal to the server and power is applied, the Boot Process is executed. The Boot Process takes the IVS application and loads it. If the application is not interrupted and allowed to proceed, a message is received on the screen saying that the loading was complete. If you do not hit a key then the Boot Process is allowed to complete. The following screen appears:

```
Board Settings
---------------
Current network parameters:

Domain Name:
Host Name:
IP Address: 0.0.0.0
Subnet Mask: 0.0.0.0
Default Gateway: 0.0.0.0
Use DHCP: No


press a key to change IP ...

Enter a new IP address, or <ENTER> to quit:
```

Figure 111: System Console – IP Configuration Screen

Enter the new IP address and Hit <Enter>. The application program continues with the new IP Address.

RTP/RTSP Video Node

You can open an RTP/RTSP video node in QuickTime. If you do not add parameters to the URI the parameters are taken from the Web configuration.

To open a RTP/RTSP video node:

1. Make sure a video source is properly connected to the first input of your board.

2. Input a URI to your video player.

In QuickTime this is done by choosing Open URL from the File menu or pressing Ctrl-U on the keyboard.
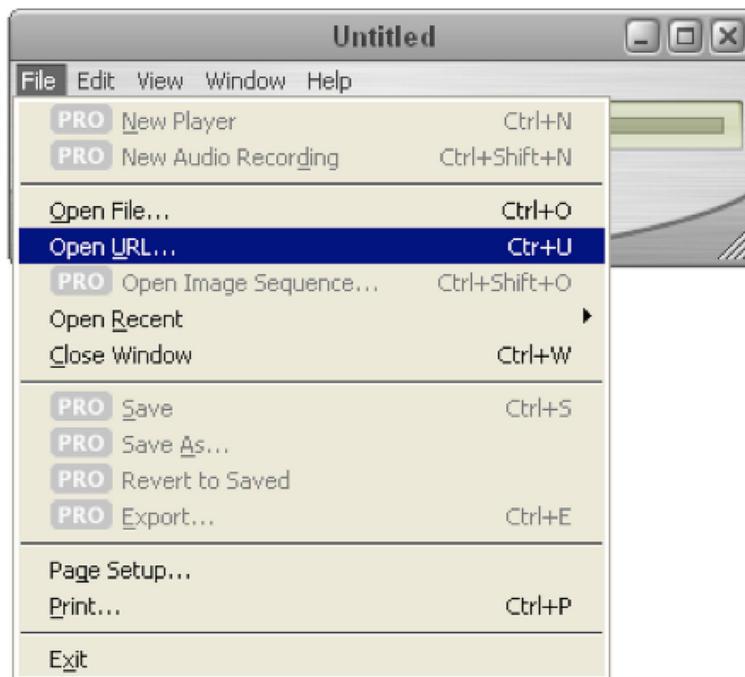
Figure 112: QuickTime Open URL

The Open URL window appears:

Figure 113: URL Input Dialog

3. Type your board's current IP address.

4. Select OK.

The encoding parameters are taken from the Web configuration.

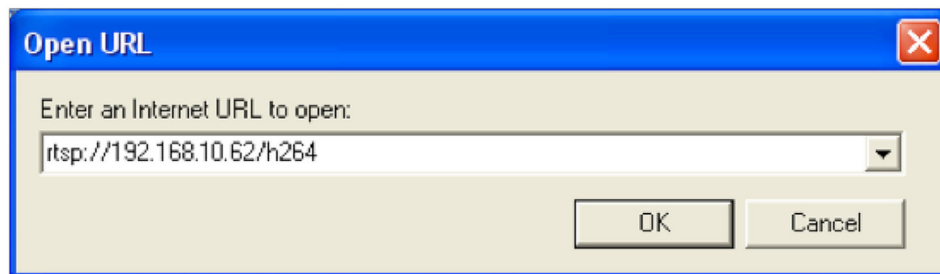*If an error appears, make sure you have a video source connected and that the video standard is the same as in the Web setup (PAL/NTSC). Also check the "Live Video" Web page to verify that the system is receiving video.*

RTSP URI Format

A Uniform Resource Identifiers (URI) is a compact string of characters used to identify or name a resource on the Internet. The main purpose of this identification is to enable interaction with representations of the resource over a network, typically the World Wide Web, using specific protocols. A URI is defined in schemes defining a specific syntax and associated protocols.

General Structure

The URI is built of stream specifications. Each stream specification contains a keyword that identifies the type of the stream (by which stream handlers are registered in the application), and optionally a list of parameters that modify the default behavior of the stream.

rtsp://ip.address/keyword[?param1[=value1][&param2[=value2]…].]/keyword…

A more detailed example of the RTSP URI format is as follows:

rtsp://ip_address/?multicast{&param1{=val1}{&param2{=val2}...}}/video_media{?param1{=val1}{&param2{=val2}...}}/audio_media{?param1{=val1}{&param2{=val2}...}}

Note: Curly braces indicate optional parameters

Where **ip_address** is the address of the board.

multicast section is optional if the user wants multicast streaming (otherwise streaming is regular unicast).

The user can specify a stream of **video_media** and/or a stream of **audio_media**.

video_media can be "mjpeg", or "h264".

audio_media can be "pcma", "pcmu" for audio. PCMA and PCMU are G.711 A-Law and µ-Law, respectively.

Param, val: A list of parameters separated by '&'. Some parameters appear on their own, others have a value. In that case they appear as param=value. Except as noted, any parameter not specified in the URI takes its default value from the Web page settings.

The default values given in the following tables are the initial factory settings. With the exception of "cam" and "mic", they may all be changed in the Web menu.

General Video Parameters

Table 21: General Video Parameters

Parameter	Value	Default	Description
cam	0	0	CNVETX1 has 1 camera so default is 0 and that parameter is ignored
framerate	Valid values are different depending on video standard. PAL: 1,2,4,5,8,10,16,20,25 NTSC: 1,2,3,4,5,6,8,10,12,15, 16,20,24,25,30	1	This is the frame rate divisor. Set it to 1 for full frame rate, 2 for half frame rate, and so on. The actual frame rate is: PAL 25/n fps NTSC 29.97/n fps
std	PAL, NTSC	NTSC	Video standard
Imgsize	D1, 4CIF, CIF, QCIF	CIF	Image Size

MJPEG Parameter

Table 22: MJPEG Parameter

Parameter	Value/Range	Default	Description
q	1 – 99	75	Quality setting for JPEG encoder in percentage.

MPEG-2 Parameters

Table 23: MPEG-2 Parameters

Parameter	Value/Range	Default	Description
rcmode	CBR, CONSTANT_Q	CBR	Rate Control Mode.
ngop	1 - 1000	30	Size of GOP (distance between keyframes)
const_bit rate	50000 -10000000	5000000	Constant Bit rate: Applicable only when rcmode = CBR
Qmin	1 – 111	1	Minimum Quantization: Applicable only when rcmode = CBR.
Qmax	10 – 112	112	Maximum Quantization: Applicable only when rcmode = CBR.
Qinit	10 - 100	20	Initial Quantization: Applicable only when rcmode = CONSTANT_Q.
Qinit	10 - 100	20	Initial Quantization: Applicable only when rcmode = CONSTANT_Q.

MPEG-4 Parameters

Table 24: MPEG-4 Parameters

Parameter	Value/Range	Default	Description
rcmode	VBR, CBR, CONSTANT_Q	Constant_Q	Rate Control Mode. No affect currently. CBR only
ngop	1 – 100	30	Size of GOP (distance between keyframes)
const_bit rate	50000 -10000000	4000000	Constant Bit rate: Applicable only when rcmode = CBR.
Avg_bit rate	50000 -10000000	200000	Average Bit rate: Applicable only when rcmode = VBR.
Max_bit rate	50000 -10000000	300000	Maximal Bit rate: Applicable only when rcmode = VBR.
Qinit	8 - 30	8	Initial Quantization: Relevant for rcmode = CBR or CONSTANT_Q.

H.264 Parameters

Table 25: H.264 Parameters

Parameter	Value/Range	Default	Description
rcmode	VBR, CBR, CONSTANT_Q	Constant_Q	Rate Control Mode. No affect currently. CBR only
ngop	1 – 100	30	Size of GOP (distance between keyframes)
const_bit rate	50000 -10000000	2000000	Constant Bit rate: Applicable only when rcmode = CBR.
Avg_bit rate	50000 -10000000	2400000	Average Bit rate: Applicable only when rcmode = VBR.
Max_bit rate	50000 -10000000	3000000	Maximal Bit rate: Applicable only when rcmode = VBR.
Qmin	20 – 51	20	Minimum Quantization: Applicable only when rcmode = CBR or VBR.
Qmax	25 – 51	51	Maximum Quantization: Applicable only when rcmode = CBR or VBR.
Qinit	25 – 51	28	Initial Quantization: Relevant for rcmode = CBR or CONSTANT_Q.

General Audio Parameters

Table 26: General Audio Parameters

Parameter	Value/Range	Default	Description
conn	LINE, MIC	LINE	Specify Line_In or Mic_In gain setting.
mic	0	0	Audio input

PCMA and PCMU Parameters

No changeable parameters. Mode is always mono, sample rate is fixed at 8 kHz and the bit rate is always 64 Kbit/sec.

Multicast Parameters

In order to request operation in multicast, a special string has to be inserted into the URI before the specifications of the requested streams. It looks like a stream specification, but the media name is empty. See examples below.

Table 27: Multicast Parameters

Parameter	Value/Range	Default	Description
mcast_addr	224.0.0.0 to 239.255.255.255	224.1.0.1	For example 224.1.0.2 or any valid multicast address. Used to change the default.
mcast_port	0 to 65535	6990	Change the default multicast port; If more than 1 stream requested consecutive port numbers are used.
mcast_ttl	1 and up	1	Change the default TTL for multicast packets.

Example URIs

The following examples are those that are used in the ComNet application. If your application registers stream handlers under different keywords, then substitute them in the examples below.

Example 1

```
rtsp://192.168.0.127/mjpeg
```

This example opens a video stream from RTSP server 192.168.0.127, using all the default values as they are configured via the Web configuration.

Example 2

```
rtsp://192.168.0.127/h264?cam=0&imgsize=4CIF&framerate=2&rcmode=CBR&const_bit rate=3000000/
pcma
```

This opens a video and audio stream with the following parameters:

Video: H.264 from video input 0. Size is 4-CIF, frame rate is divided by 2 (so 15 fps for NTSC, 12.5 for PAL), rate control mode is CBR at 3 Mbits.

Example 3

```
rtsp://192.168.0.127/?multicast/h264
```

Request a multicast stream of H.264 with default address & port.

Example 4

```
rtsp://192.168.0.127/?multicast&mcast_addr=224.1.0.3&mcast_port=6790/h264/pcmu
```

Request a multicast stream to the specified address, and use ports 6790 for the video and 6792 for the audio.

MECHANICAL INSTALLATION INSTRUCTIONS

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Customer Care is ComNet Technology's global service center, where our professional staff is ready to answer your questions at any time.

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