

# **Video Watchdog Lite**

**User's Guide**

**Release 1.01**

**May 4<sup>th</sup>, 2005**



Welcome to Watchdog Video System manual. This manual describes the fundamental ideas of the video, CCTV and support systems. Within this manual are both hardware device descriptions and software control concepts covering the “Client” and the “Lite” versions of the product. When the functions are the same, the Client interface is shown.

Every attempt was made to write this manual so that it would be easy to follow and understand. The documentation department of CoreTec welcomes your inputs and suggestions for improvement.

Please send all comments and suggestions to [Feedback@GoCoreTec.com](mailto:Feedback@GoCoreTec.com).  
Finally, our website at [www.GoCoreTec.com](http://www.GoCoreTec.com) can be checked for future versions of this manual.

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# **1 Introduction**

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## About this document

This document contains product specification information about the CoreTec Video Watchdog system in the following sections:

1. *Introduction* – Is an introduction to the Video Watchdog system, including how the system integrates into an existing network.
2. *Product Overview* – Is background information on the general factors that affect the product installation and usage. We describe the client for the product and the intended users of the system. This section describes the main features of the proposed system and the most important constraints that may affect design decisions (reliability, hardware limitations, and interfaces to other systems).
3. *System Model* – Is a high-level view showing the major components of a proposed system and their relationships with each other.
4. *User Interaction* – This section describes the actions of the Video Watchdog from the point of view of the user. Use-case diagrams and scenarios are used to describe the interaction.
5. *User's Guide* – Covers the usage of all screens, forms and commands within the Video Watchdog system
6. *Hardware Requirements* – This section describes the hardware requirements and the physical environment in which the Video Watchdog will be used, including any other systems that the product will interface.
7. *Product Options and Accessories* – Lists of the equipment and accessories available for use with the Video Watchdog system.
8. *Appendices* – Diagrams and other supplemental information as appropriate.
9. *Glossary* – The glossary is a list of technical terms and definitions.

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## **2 Product Overview**

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## 2.1 Background

Closed circuit television (CCTV) places an important role in facility operations, the protection of property and people. The CCTV technology was first applied to the security industry in the 1960's and rapidly changed due to advances in microcomputers and data communications. The data communications area is undergoing this rapid transition due to advances in local area networks (LAN) and the emerging availability of wide area communications (WAN) using an Intranet/Internet backbone.

The main function of the CCTV system is to allow remote viewing (typically from several cameras back to one location within the same building) and surveillance. It is typically part of an integrated security package and is operated by security personnel that included access control, alarms, intrusion detection, and communications. CCTV systems are also integral parts of advanced traffic management systems (ATMS). Traffic management systems are operated by traffic-control center personnel providing additional functionality such as traffic management control, variable message sign (VMS) control and vehicle detection.

Typical CCTV systems include cameras, a transmission medium (coax, fiber, twisted-pair, etc.), video switchers/multiplexers, display monitors, VCRs and video printers. The cameras can be overt or covert. Cameras must first be selected for the application and location (i.e. inside or outside the building). In most cases, these cameras can also be equipped with pan/tilt/zoom (PTZ) capabilities. Most modern cameras are solid state using a close-coupled device (CCD) that provides a NTSC or PAL composite output video signal in color or monochrome at 30 frames per second.

Video images are typically stored on special time-lapse VCRs that can be programmed to record up to 960 hours on a single VHS tape. These VCRs connect with the CCTV system via a serial port for computer control of the device. Other storage mediums include digital audio tape (DAT), hard disk and optical storage. The resolution of the camera image, monochrome or color image, speed of the transmission medium and recording method will determine the number of hours that can be stored on these digital devices. With today's multiplexing video capture boards and digital video recorders (DVRs), recording can be done on the computer hard disk and camera images can be displayed on the computer monitor.

In the case of the computer controller unit, a PC with special proprietary software from the manufacturer provides a graphical user interface (GUI) to control the cameras, the switcher and other external devices. The switcher has the internal electronic circuitry to provide for individual camera PTZ, alarming (typically based on video motion detection), multi-monitor control, multi-VCR control and printer control. This control environment allows for "point and click" operation of the CCTV surveillance system, bandwidth allocation and the other numerous "user-defined" enhancements that are possible since the system is operating in a computer-based mode.

## **2.2 General Description**

The Video Watchdog is an IP based CCTV system intended for use in network based remote video surveillance applications. It consists of the CoreTec MPEG encoder/transmitter and receiver/decoder components, the CCTV system management client/server software, the CCTV cameras and optional system components. The optional components are available to provide enhanced system capabilities, including digital video recorders, access control systems, alarm systems and integrated streaming media servers. Each Video Watchdog system provides interactive camera view and control, bandwidth allocation and secures user management functionality.

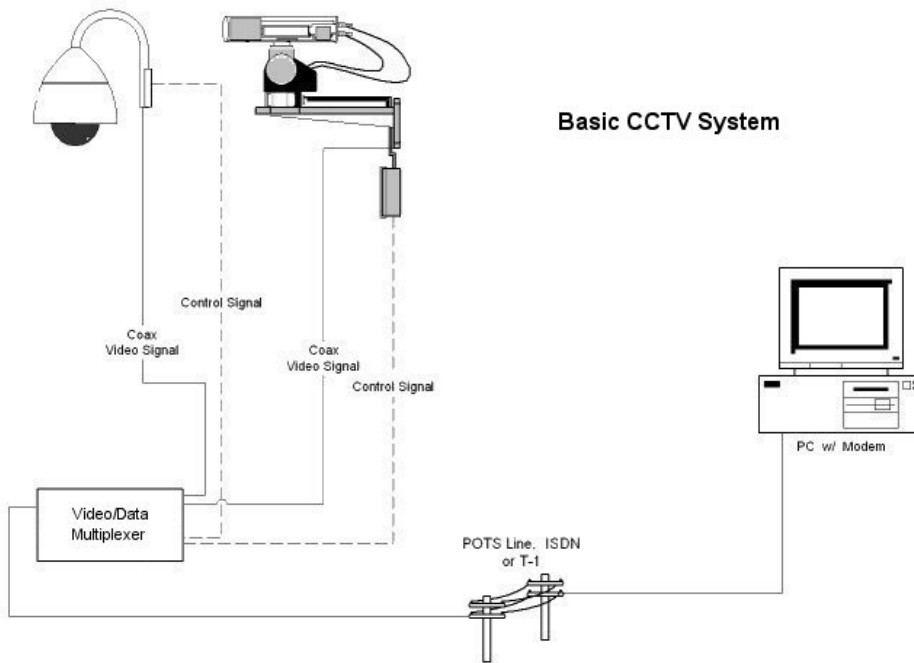
As an IP based system, the Watchdog system provides increased flexibility and substantial cost of deployment reductions over existing based systems using traditional technologies. Ethernet is in approximately 90% of the LANs today. The hardware costs much less and it is highly scalable in megabit increments. These advances in technology offer far greater benefits and functions than the traditional methods of transporting, multiplexing, recording and display. The Watchdog system can also take advantage of existing traditional SONET infrastructures to provide a solution that does not require expensive SONET multiplexers or video matrixes and switches.

## **2.3 Traditional Systems**

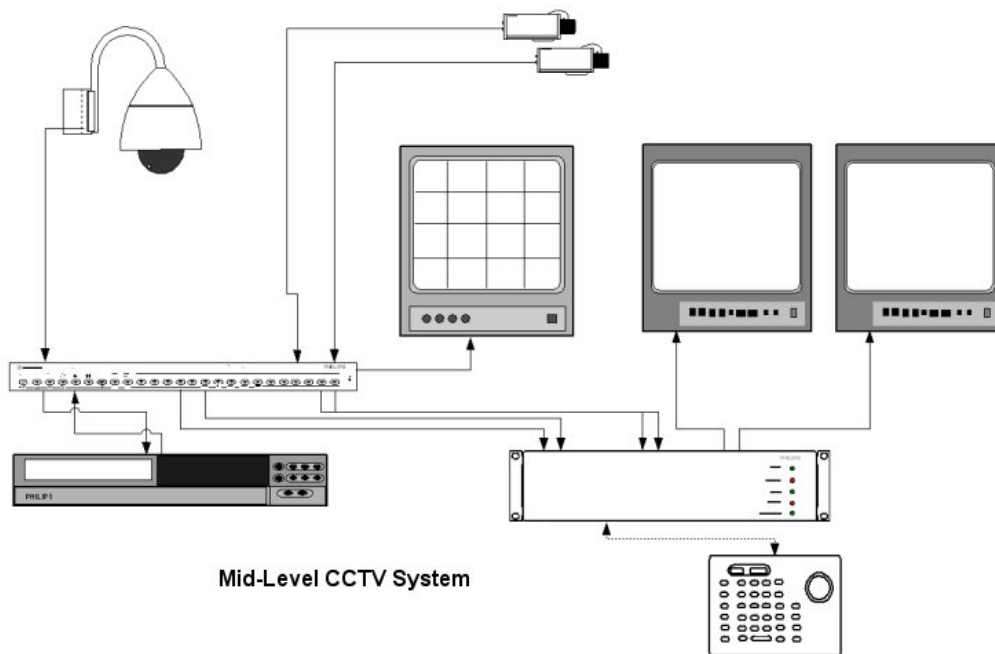
CCTV Systems come in many different configurations and use various communication mediums for the delivery of audio, video and data. The most common feature between systems is the ability to connect to the system from a user control station or workstation PC. From a centralized or distributed control point, the system user is able to view various inputs and control various devices. Common CCTV communications medium include coaxial cable, optical fiber, Cat-5 twisted pair, microwave and others.

As a minimum, you will need at least one CCTV camera and something on which to display the camera images. This could be a monitor or a TV set. If you wish to record images, you will need at least a VCR. The following diagrams depict some traditional CCTV surveillance systems.

## CCTV System – Example 1



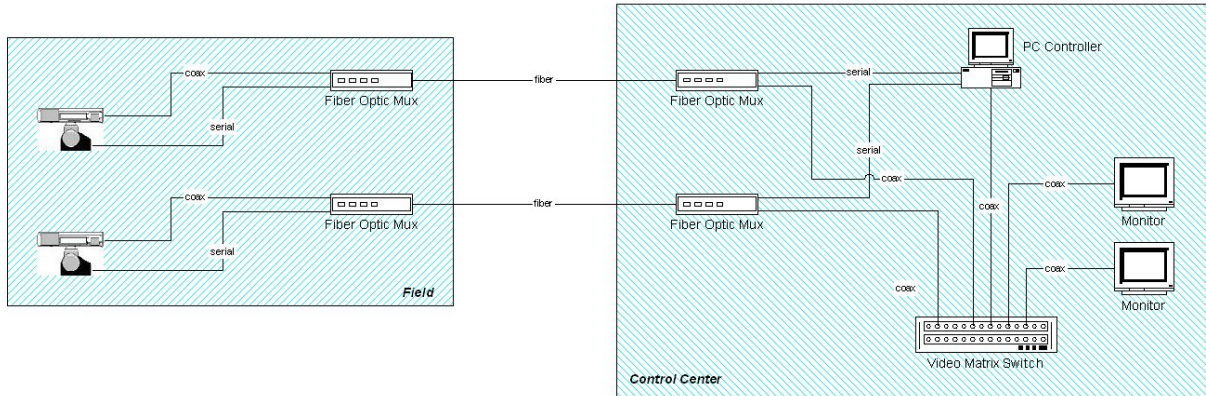
## CCTV System – Example 2



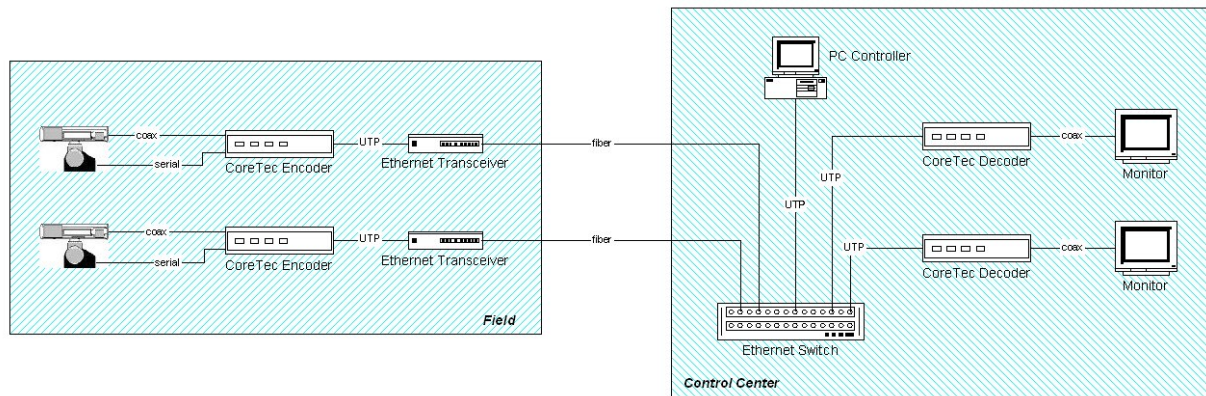
## 2.4 Benefits

The Video Watchdog system has many advantages over traditional CCTV systems. These benefits include increased scalability, system capacity and lower overall system costs. The diagrams below depict a traditional fiber based CCTV system and a typical CoreTec fiber based CCTV system.

**Traditional Fiber CCTV System**



**CoreTec Fiber CCTV System**



In comparing the traditional fiber based CCTV system against the CoreTec system, we will compare cost, scalability and capacity.

## 2.5 Cost

The following cost comparison is only for components that are unique to each system and are not shared between systems. The cost of the non-shared components is slightly lower in a CoreTec baseline system, but in a fully deployed system, the overall costs are significantly lower in a CoreTec system when properties such as scalability are considered. The following two sections show that based on the capacity and scalability issues, a CoreTec system is much more economical.

## **2.6 Scalability**

Traditional CCTV systems do not scale easily. Most traditional systems have a one camera per fiber/cable model and once the all the fiber or cable drops have been used, additional fiber/cable must be laid and/or additional hardware such as video multiplexers are required. Video matrix switches that support a large number of ports are very expensive and do not scale easily. Each matrix switch contains its own set of discrete inputs and outputs that are isolated from other matrix switches and their video feeds.

The CoreTec CCTV systems provide extensive scalability. These systems are capable of multiple cameras per wire due to the shared-wire characteristics of Ethernet technologies. Additionally, since stackable Ethernet switches are used for routing the video scalability is nearly limitless and based purely on the capacity of the transfer mechanism and switching hardware.

## **2.7 Capacity**

Where the one camera per wire nature of these systems limits the capacity of traditional CCTV systems, CoreTec CCTV systems do not have this constraint. The camera capacity of a CoreTec system is only limited by the capacity of the transmission protocol and the switch (10/100/1000 Mbps Ethernet).

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## **3 System Model**

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The figure 3.1 at the end of this section gives a graphical representation of a typical Video Watchdog system configuration and associated components. The following section describes each of the CoreTec and third party components that make up a typical system and their functionality.

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## 3.1 CoreTec Hardware

The CoreTec hardware for the Video Watchdog system consists primarily of the encoder and decoder units. Additional custom hardware components will be incorporated into the system as required.

### 3.1.1 Encoders / Decoders

The CoreTec Encoder provides conversion of an analog NTSC or PAL video signal into a MPEG-2 compressed digital stream and transmits the encoded video signal along with any device control data. Remote control of the camera's pan, tilt, zoom, and iris functions are multiplexed with the encoded video signal. The CoreTec Decoder reverses the process, converting the encoded digital video signal back into an analog signal and providing device control data to attached devices.

The CoreTec Video Encoders and Decoders provide for maximum flexibility in full motion video encoding/decoding and transmission with extremely low end-to-end video latency. The CoreTec Encoders/Decoders support transmission rates up to four T1 or three E1 signals. The encoders also provide fractional T1/E1 speeds for optimizing bandwidth. Most importantly, the Encoders provide IP Multicast transmission over Ethernet networks.

The encoders support programmable selection of MPEG-2 encoding/decoding parameters, including decoding resolution and bit rate. Settable video parameters include brightness, contrast, hue, and sharpness. The CoreTec Encoders/Decoders provide full field/frame adaptive motion compression for near-broadcast quality high-motion transmission. The Encoders and Decoders are available in single 1U rack mount units.

### 3.1.2 Programmable Settings

- MPEG-2 encoding/decoding, compliant with ISO/IEC 13818-2
- Horizontal/Vertical Pixel Ratios
  - NTSC: 352-720 Horizontal, 240-480 Vertical
  - PAL: 352-720 Horizontal, 288-576 Vertical
- Fractional T1/E1 (1.000 Mbps – 1.536 Mbps / 1.000 Mbps – 1.984 Mbps)
- Multiple T1/E1 (1.536 Mbps – 6.144 Mbps / 1.984 Mbps – 5.952 Mbps)
- I, P&B frame selection
  - I only, IP, IPP, or IPB
- Input brightness, contrast and hue

### 3.1.3 Product Features

- Low end-to-end video latency (to 250 ms)
- MPEG-2 encoding and decoding

- Network interfaces: one to four and fractional T1 or E1 signals or 10/100 Base-T Ethernet (IP Multicast).
- In-band or out-of-band external device control such as camera PTZ control
  - Type: RS-232 / RS-422
- Connector: DB-9 female
- SNMP network management supported
- Four switchable video inputs (BNC)
- Internet browser can be used to receive and view video without hardware decoder (Optional)
- Internet browser based configuration using built-in HTTP server. (Optional)
- Stereo audio encoding and decoding (Optional)
- Integral CSU for Encoder and Decoder (Optional for T1/E1 versions)
- 4x1 video channel switch integral to Encoder (Optional)

### **3.1.4 Product Versions**

- T1 Interfaces (fractional and multiple, up to four T1s)
- E1 Interfaces (fractional and multiple, up to three E1s)
- 10/100 Base-T Ethernet (SNMP supported)

## 3.2 CoreTec Software Modules

The CoreTec software library is composed of several reusable software modules in the form of libraries, DLLs and ActiveX controls. The controls are used internally with our own software applications and demos but can also be easily incorporated into third party software under our licensing agreement.

### 3.2.1 MPEG2/IP Player Control

- Provides audio and video playback from CoreTec IP-based encoders
- To be used in the Video Watchdog software.
- Provides ability to query and set the following properties:
  - Balance (-10,000 to 10,000)
  - Brightness (0 to 255)
  - Contrast (-127 to 127)
  - Volume (-10,000 to 10,000)
  - Decode Mode (IPB Frame, IP Frame, and I Frame only)
  - Audio (on/off)
  - Clock Display (on/off)
  - Deinterlacing (on/off)
  - Double Precision Decoding (on/off)
  - Full Resolution Decoding (on/off)
  - Half Horizontal Resolution Decoding (on/off)
  - Half Vertical Resolution Decoding (on/off)
  - Quarter Resolution Decoding (on/off)
  - Overlay Support (on/off)
  - Post Processing (on/off)
  - Fullscreen (on/off)
  - Multicast IP Address
  - Multicast Port
  
- Provides ability to query the following properties:
  - Frame Rate
  - Frames Dropped
  - Frames Played
  - Jitter
  - Resolution

### 3.2.2 PTZ Serial/IP Control

- Provides control of PTZ units
- To be used in the Video Watchdog software.
- Multiple modes of control:
  - TCP/IP
  - Serial

- NTCIP (SNMP)
- Support for multiple protocols:
  - Cohu
  - Philips
  - D Protocol
  - Others

### **3.2.3 MPEG2/IP Parser Control**

- This control receives MPEG2/IP transmissions and fires events describing the format of the stream content.
  - Resolution
  - Bitrate
- To be used internally by the MPEG2/IP Player Control.
- May be used in future stream detection and analysis tool

### **3.2.4 CoreTec Encoder Control**

- Provides direct control of CoreTec encoders
- Support for:
  - TCP/IP
  - SNMP

### **3.2.5 CoreTec Decoder Control**

- Provides direct control of CoreTec encoders
- Support for:
  - TCP/IP
  - SNMP

### **3.2.6 Nested Map Control**

- Provides interactive image based maps to represent system deployment layout.
- HTML based
  - Hyperlink support
  - Hotspot support

### **3.2.7 Virtual COM Port Driver**

- Provides support for IP-based virtual COM ports on the PC.
- Each virtual COM port provides access for third party drivers to the IP subchannel on our encoders and decoders.

### **3.2.8 Streaming Media Encoder Control**

- Provides transcoding for Internet-based streaming media support
- Streaming content can be delivered live and either multicast or unicast
- Supports popular streaming media formats:
  - Real Media
  - Windows Media Format
  - QuickTime

### **3.2.9 Voice Over IP Control**

- Provides 2-way, full duplex voice over IP functionality.
- To be integrated into Video Watchdog software.

## **3.3 CoreTec Software Applications**

### **3.3.1 Watchdog Software**

CoreTec provides distributed client/server applications as an advanced CCTV integration and control solution for the Video Watchdog system. Installed on existing hardware using readily available PC hardware, the Watchdog software provides advanced features found in the larger more costly systems. These software features include drag-and-drop camera selection, camera PTZ control, bandwidth allocation, user management and a defined set of automation and integration capabilities. The Video Watchdog Software application supports the following characteristics:

### **3.3.2 Easy To Install & Use**

The software is easy to install, configure and use. In addition, the system provides a simplified user interface that is intuitive to use. The Video Watchdog software exhibits compatibility with a wide range of today's most popular CCTV surveillance equipment.

### **3.3.3 External Device Support**

In addition to the interactive video image provided on the workstation monitor, the software is able to manage an unlimited number of external cameras and monitors with drag-and-drop ease. It is also possible to add multiple VCRs and DVRs to the system to provide a required level of continuous recording capabilities.

### **3.3.4 Networkable Controls**

The Video Watchdog workstations can be networked with other workstations to create a multi-user control system in single or multiple locations. The software is designed to communicate all device controls over the network.

### **3.3.5 Notebook Platforms**

A high performance notebook computer running the workstation software is able to provide a complete mobile CCTV viewing and management workstation. A notebook computer running the Watchdog client workstation software can quickly and easily download the client's system configuration when connected to the Watchdog server.



### **3.3.6 Base System Features**

- Client supplied PC or turnkey hardware for server and workstations
- Bandwidth Allocation
- Secure User Management
- Interactive camera control/display window
- Interactive site map window
- Unlimited input source (camera) capacity
- Unlimited external monitor support
- Unlimited VCR/DVR support

### **3.3.7 System Requirements**

- Windows 2000/XP operating system

## **3.4 Third Party Components**

### **3.4.1 Cameras**

Any Video Surveillance System starts with CCTV cameras. The images you see and record can only be as good as the images produced by your CCTV cameras. Good cameras produce good images and vice versa. Several critical specification factors affect the performance of your cameras and consequently, the quality of your camera images. These factors also affect the price of cameras.

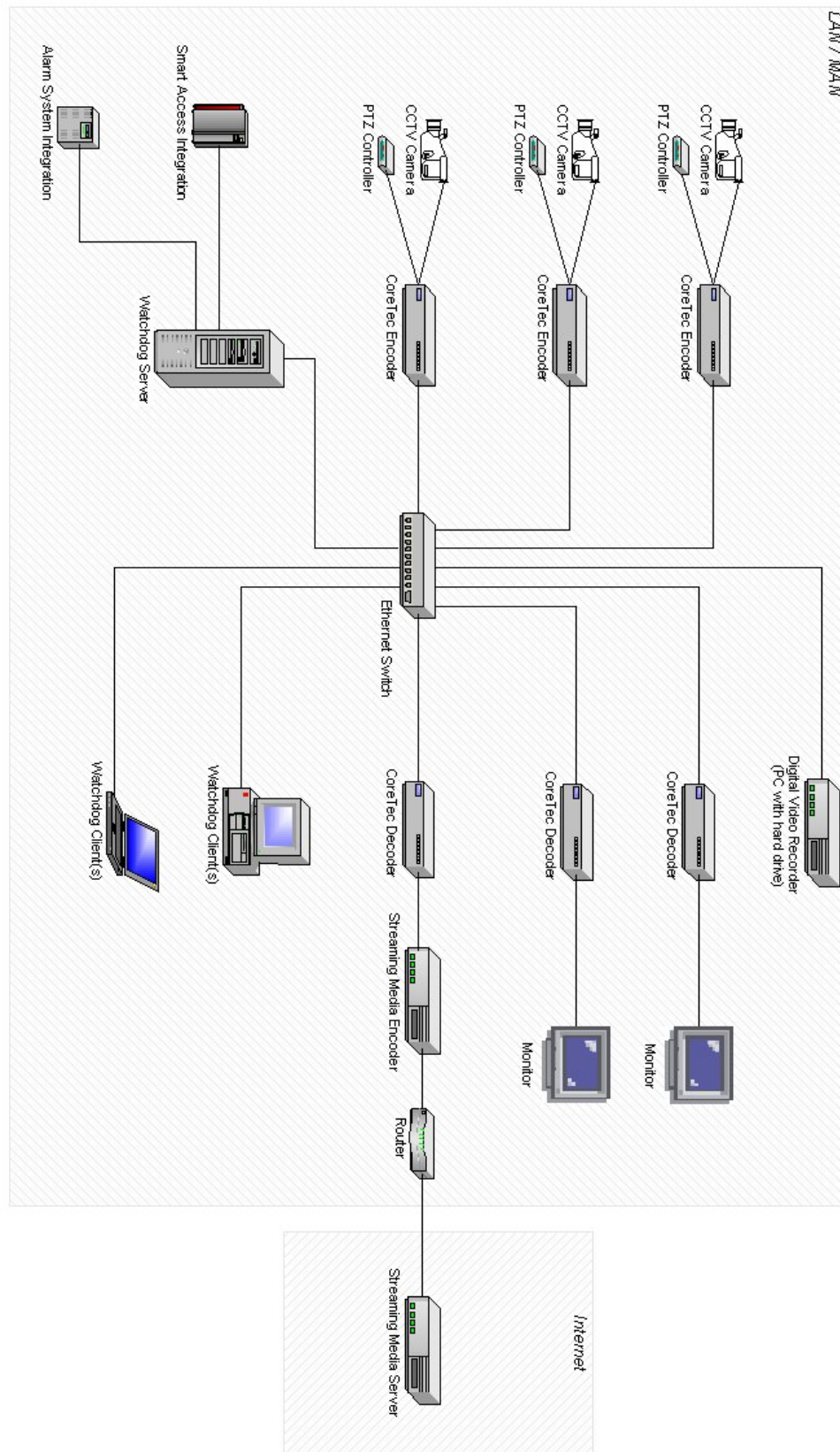
### **3.4.2 PTZ Units**

PTZ (Pan, Tilt, Zoom) units provide the ability to control camera settings. Many brands of PTZ units exist, many of them using proprietary protocols. Popular brands of PTZ units include Pelco and Cohu.

### **3.4.3 Monitors**

Monitors provide the ability to view video content on a large display. A standalone monitor can display a single stream of uncompressed video while a monitor used in conjunction with a video switcher or multiplexer can be used to view multiple streams (cycled or concurrent).

Figure 3.1 – Typical Video Watchdog Configuration



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## **4 User Interaction**

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## 4.1 Configure Hardware

Hardware configuration includes setting up the hardware that makes up the system. This includes setting up the network, computers, cameras, and the encoders/decoders. Third party equipment such as secure access systems, alarm systems, and video recorders shall be easily integrated and configured to work with the Video Watchdog system. Standard off-the-shelf equipment will be used where possible.

## 4.2 Configure Software

Software configuration includes setting up the computer software that makes up the system, including setting up the network and the software for the cameras and encoders/decoders. Third party equipment such as secure access systems, alarm systems, or video recorders are easily integrated and configured to work in the Video Watchdog software.

### **4.3 View Site Maps**

The Watchdog system provides a graphical user interface depicting site location maps for the cameras, alarms and other system components. The site maps acts as a facility for site navigation and camera selection.

### **4.4 View Video**

The system provides the ability to display the video on both the Watchdog client computers and on external monitors. Simultaneously viewing more than one video stream on the client is possible on higher end computers. External monitors will be limited to a single user-switchable video stream unless additional video switching equipment is incorporated.

### **4.5 Control Cameras**

The Watchdog software provides the ability to perform pan, tilt, zoom and focus functions with the PC mouse directly on the video image. Compatible cameras providing a serial connection shall interface with the CoreTec encoders to provide the control required to perform these operations.

### **4.6 Control Encoders/Decoders**

The Watchdog system provides the ability to control the CoreTec encoders and decoders. The system provides the ability to adjust the encoding and transmission parameters of both the encoders and decoders.

### **4.7 Control Bandwidth Allocation**

The Watchdog system provides the ability to interactive control the parameters that define the logic used for bandwidth allocation. These parameters include operator privileges, time-of-day, location, etc. The actual bandwidth can be controlled by either dynamically modifying the quality of existing video streams or by dropping video streams altogether.



## **4.8 Manage Users**

The Watchdog system maintains a database of system users and access privileges. The system provides the ability to easily add and remove users and to assign privileges based on certain criteria.

## **4.9 Control Event Automation**

The Watchdog system provides the ability to automate events. Presets and sequences are used to perform tasks in response to user control, access, alarm input or scheduled events. The Watchdog system provides a graphical user interface for automating events and configuring event responses and automated sequences.

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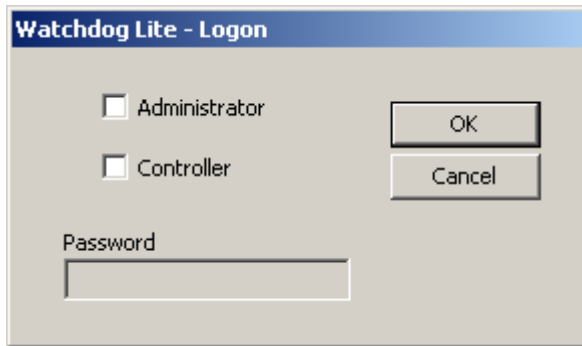
## **5 User's Guide**

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## 5.1 Logging In

The logon dialog is designed to limit the access to the system for reasons of security. All aspects of monitoring and configurations are controlled by the privileges granted by the access rights assigned through identification and passwords.



### 5.1.1 Watchdog Lite

Administrator Privileges – are granted to the user when this box is checked. The password, in most cases, will be different from the Controller (Normal User) login. The administrator is given all access rights to alter all parameters within the workstation control. These include IP addresses, channel communications and status information.

Controller Privileges – are granted to the operator when this box is checked. Controllers may select video channels and arrange video panels on the workstation.

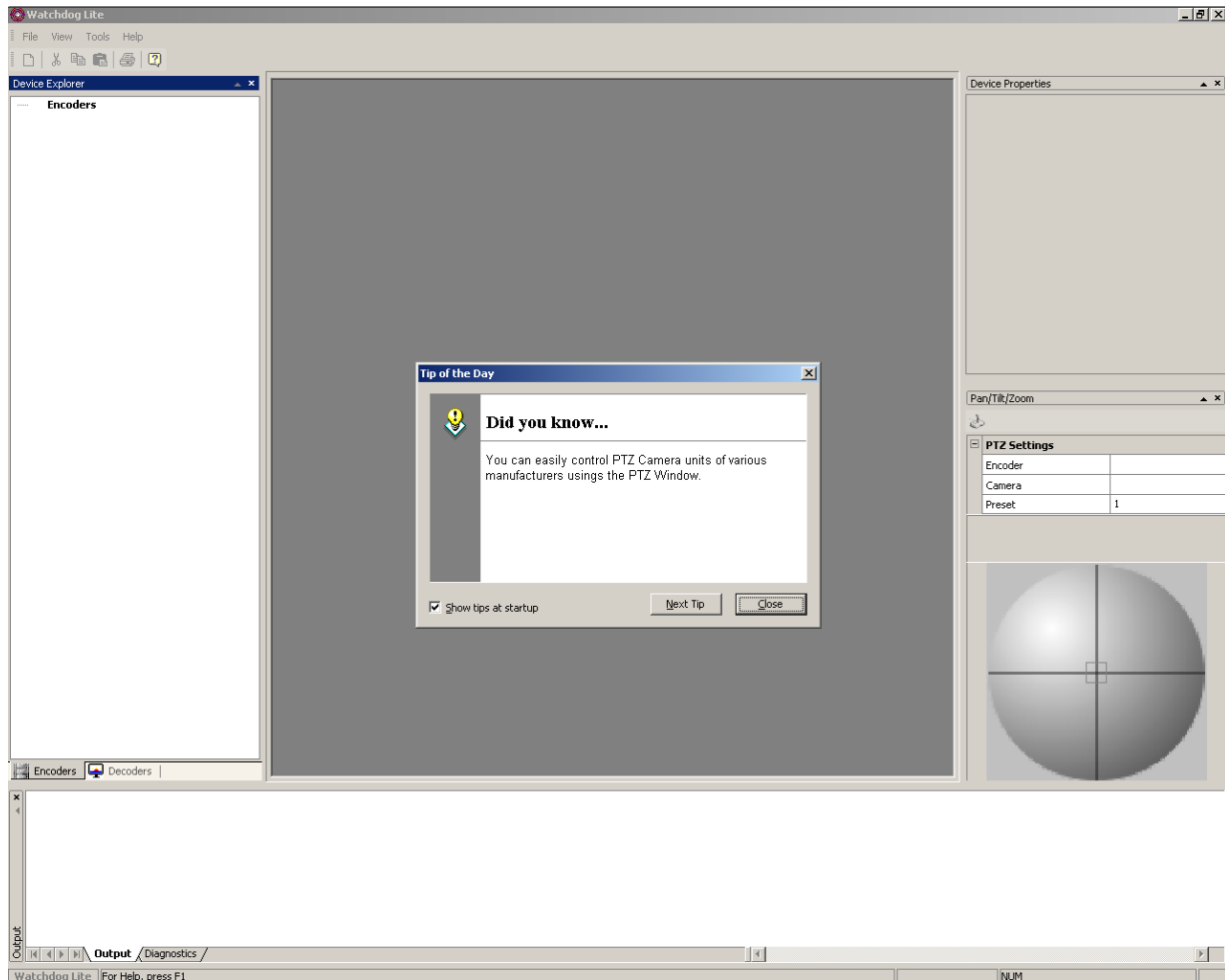
Password – may be up to eight (8) characters that may include a-z, A-Z 0-9 and other keys not used in the operating system paths and controls such as / |.

## 5.2 Main Window

The main window is divided into panels and tool bars. Generic MS Windows controls are found in the tool bars at the top of the main window as found in most MS Windows applications. The “Watchdog Client” and the “Watchdog Lite” have differing capabilities and functions. The main window on the Client has two additional panes not found in the WD/LT. Take note of the Instant Messaging and the Streaming Video control panes.

### 5.2.1 Watchdog Lite

The center viewing area is divided into five (5) separate panes each displaying a separate aspect of the selected video stream.



#### 5.2.1.1 Encoder/Decoder

These selections are performed in the pane to the left of the center viewing area labeled “Device Explorer”. All devices found during the discovery process will be displayed here. This

pane will display items as a tree like structure. At the bottom of the pane are found the selection tabs labeled Encoders and Decoders.

#### **5.2.1.2 Video Viewing Area**

This panel viewing area is the center open pane in the center of the window. This area will display the video channels selected from the tree on the left. Multiple panels may be opened positioned and sized to the operator's requirements.

#### **5.2.1.3 Device Properties**

The device properties are viewed and altered, if the administrator privileges are granted, from this pane. The specific device properties are selected from the tree pane to the far left of the window by right clicking on the device found in the tree and selecting the properties menu item from the popup dialog box.

#### **5.2.1.4 Pan Tilt Zoom (PTZ)**

The control area is located below the device properties pane on the far right side of the window. The desired device control is selected from a drop-down menu by left clicking the down arrow found in this pane. The dialog box just below the menu the PTZ control bar contains the detailed controls for the selected device. Any device found in the discovery process may be controlled from this dialog box separate from the device selected from the other windowpanes before. In this dialog box, automatic presets are selected executed and altered.

#### **5.2.1.5 Manual PTZ**

The manual PTZ control pane is found just below the PTZ control area. This ICON like pane will control the device selected from the pane immediately above this area. Panning movements, (Left-Right movements) are executed by clicking the horizontal line where left of the center vertical line will pan left while clicking to the right of the vertical centerline will pan to the right. Tilting movements, (Up-Down Movements) are executed by clicking on the vertical line where above the horizontal centerline will cause upward movement of the camera while clicking below the horizontal line will cause the camera to move in a downward direction. Clicking in the quadrant areas will execute both functions at a rate of speed depending on the distance from the center of the control field. The outer most areas of the quadrants will drive the servos at a higher rate of speed while the closer the selection is made, up to not including the small box in the very center, will be at a slower rate of speed. The box in the center will control the zoom. Left clicking within the box will execute a zoom in while right clicking within the box will execute a zoom out operation.

#### **5.2.1.6 Output and Diagnostics**

The output and diagnostics pane is found at the bottom of the system window. This pane is controlled by the tabs found at the bottom of the pane. When in the "Output" tab is selected, the pane displays all devices found in the discovery phase and other messages relayed to the workstation. The diagnostics tab will display all messages on the status of the devices and operations during the last diagnostic run.

### 5.3 Tip Of the Day (TOD)

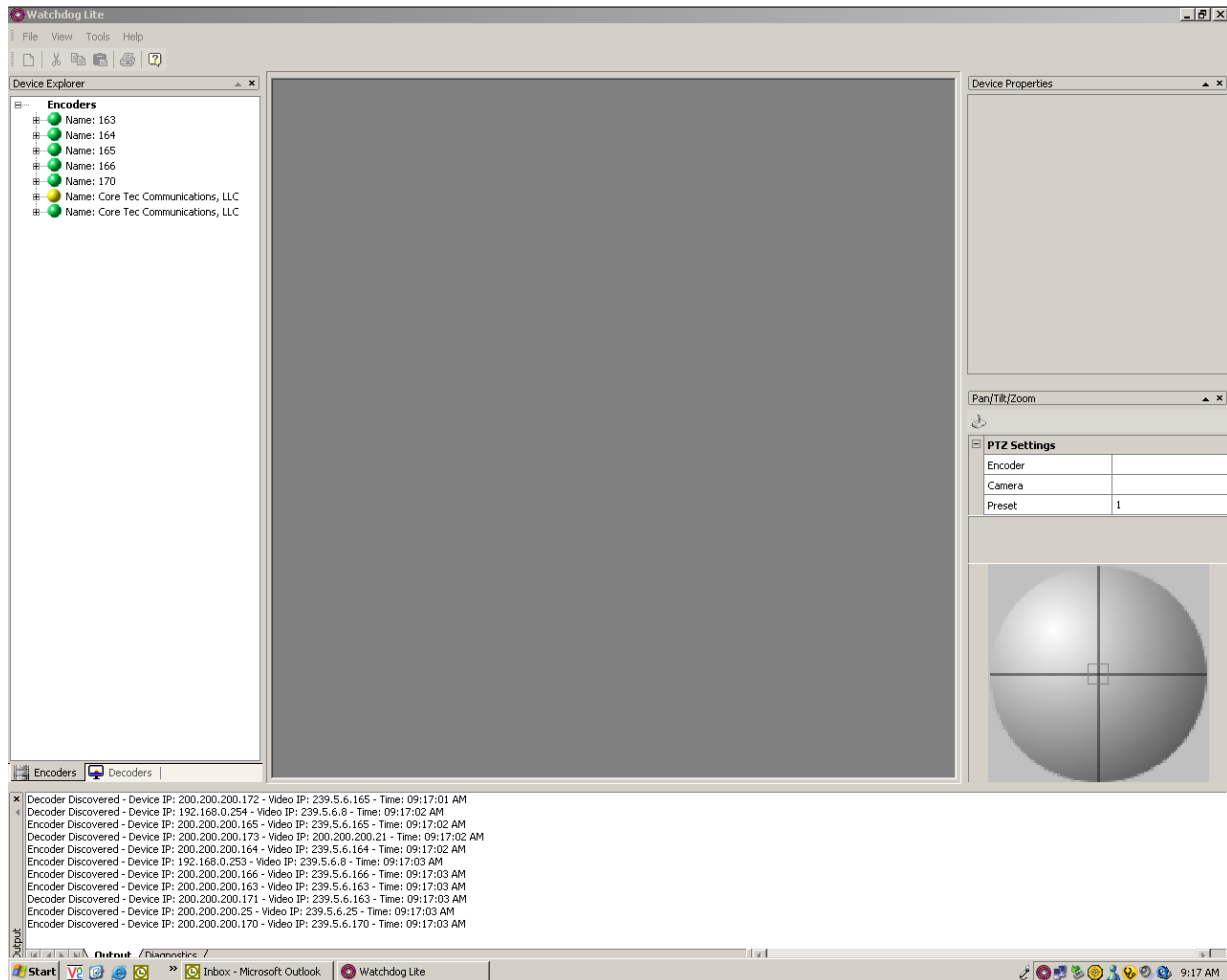


This window will pop up when the software is first loaded on the workstation. The tips are a convenience to the system operators and may be viewed or closed. The user may elect to browse through the tip by clicking on the “Next Tip” button. If the TOD dialog is not desired the operator may click on the “Show tips at startup” turning off the check mark and the TOD dialog will not occur again.



## 5.4 Device Discovery

The device discovery process is the same for both the Client and the WD/LT therefore the Watchdog Client window is shown below.



The device discovery is a process by which the software may scan the device network and find all devices connected to the network. This process is performed automatically on software startup. By default, this process is configured to execute automatically. The tools button on the tool bar contains two options to control this process, Discovery and Auto Discovery. At any time, the operator may request a new discovery process to start by left clicking on the discovery button if the Auto Discovery button is not checked. If the operator desires to have this process occur automatically, the “Auto Discovery” button is checked.

All devices found will be displayed, in a tree like structure, in the Device Explorer pane on the left side of the main software window.

“Green” Icons denote the device is online and ready to receive commands.

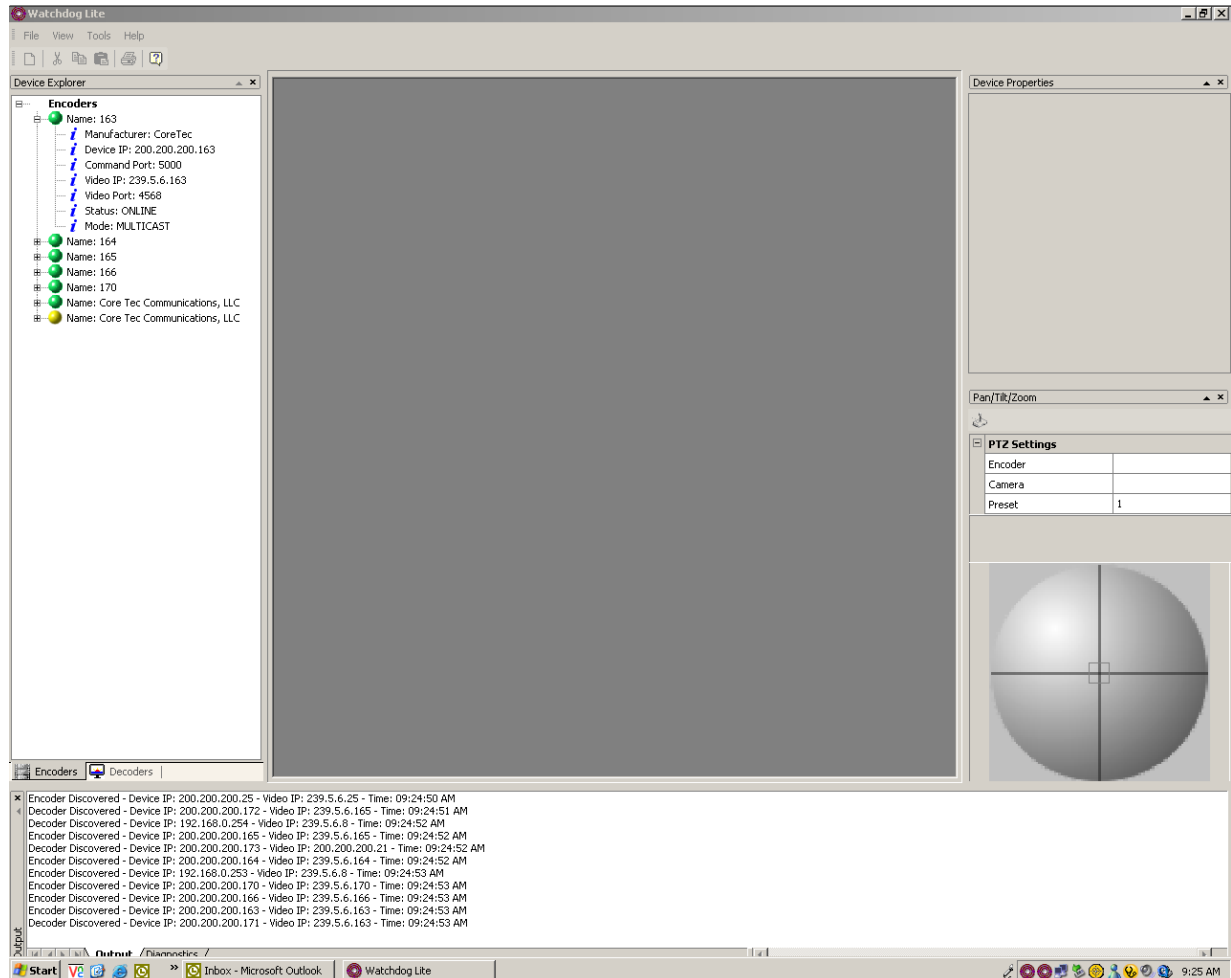
“Yellow” Icons denote a device found in the discovery phase but is not communicating.  
“Red” Icons denote a device was found in the discovery phase but is now offline

Devices connected to the network have a common “Discovery IP” address, which is used to locate them and start the communication process. The workstation request a status update on the discovery IP address, as a broadcast request command, and all devices, which have the same discovery IP address, will relay to the workstation the status and configuration back to the requesting workstation. The “Discovery IP Address” is not the device address or any other network address assigned to the device. Discovery IP addresses are special purpose communication channels on the common network.

The responding devices are displayed in both the Device Explorer pane on the far left side of the software window and in the “Output” pane at the bottom of the window if the output tab is selected.

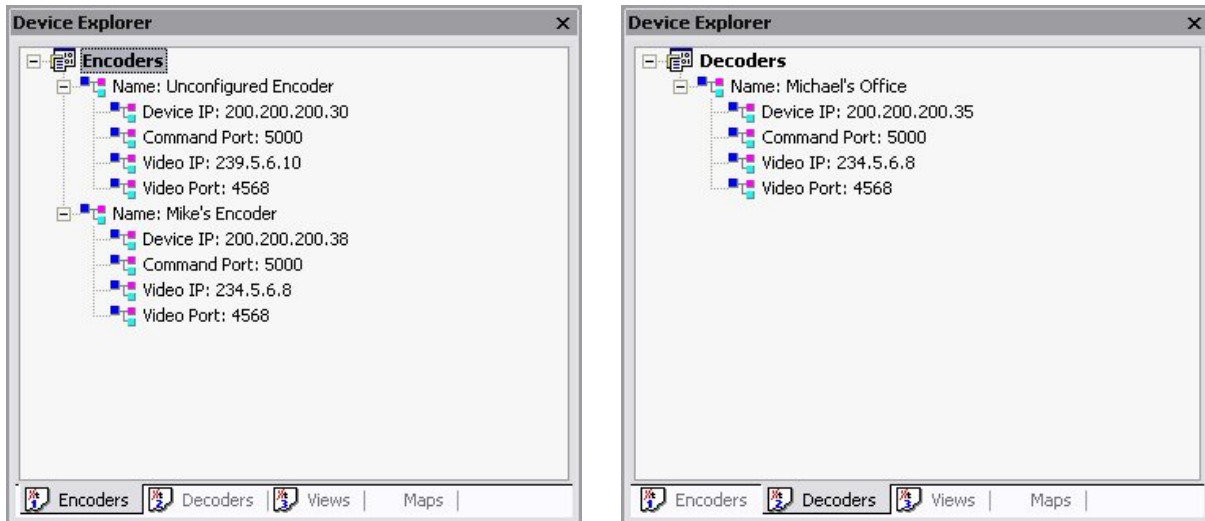
## 5.5 Device Explorer

The device explorer functions the same for both the Client and the WD/LT therefore the Watchdog Client window is shown below.



The device information may be obtained by clicking on the device name in the device explorer pane. When the device information is expanded, left clicked, device configuration is presented. If the user right clicks on the device name, the detailed device parameter.

## 5.6 Device Explorer Expanded



The device explorer pane is opened by left clicking on the menu item. The tabs at the bottom of the pane group together the device types found in the discovery phase. The tree is expanded and the device parameters are displayed as follows.

Device Name – is the name assigned when the device is configured as a network device.

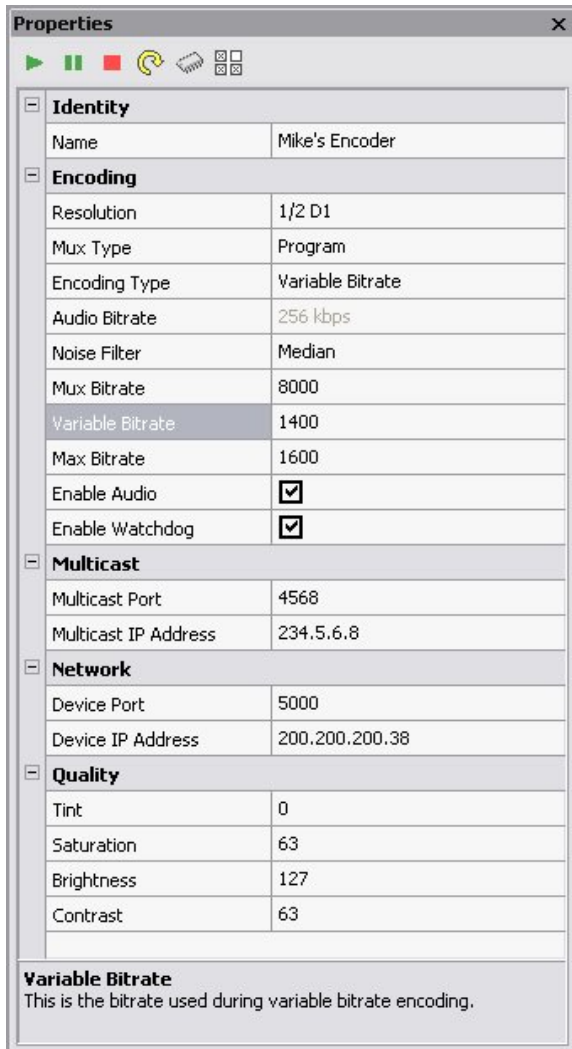
Device IP – is the base communication address.

Command Port –

Video IP –

Video Port –

## 5.7 Device Properties



The detailed device parameters are displayed in the pane at the far right side of the window by right clicking on the device name in the window to the far left. The pane is divided into three sections. The top section is the tool bar and contains the icons of the basic device operations. The next section is the main display area shown here fully expanded for descriptive purposes. Take notice of the highlighted item, in darker gray, within the main display area and the description of that item at the bottom of the pane. This is the third section, the parameter description.

## Device Tool Bar



This ICON will start the device from the current mode of operation.



This ICON will suspend current operations and is a toggle function.



This ICON will stop the device operation.



This ICON will reset the device.



This ICON will write the adjusted parameters to the selected device.



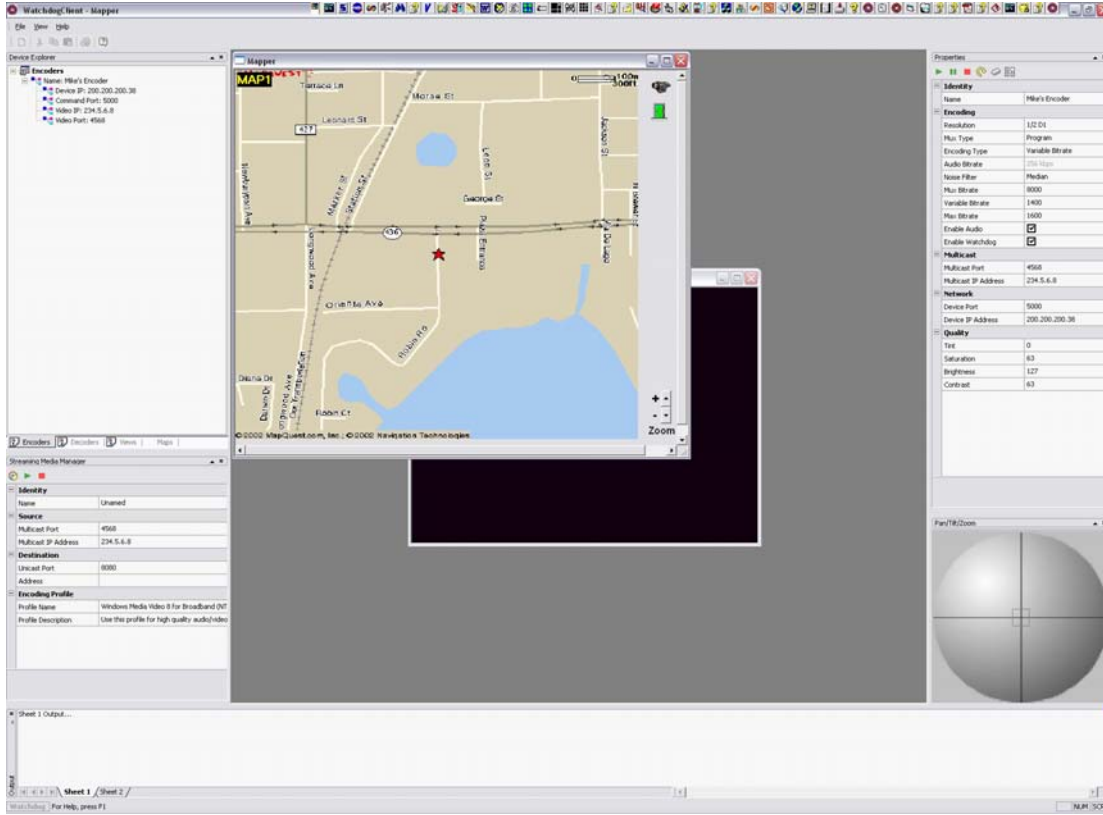
This ICON will load the device presets that are stored at the device. There can be several presets stored in a device

**Properties** [X]

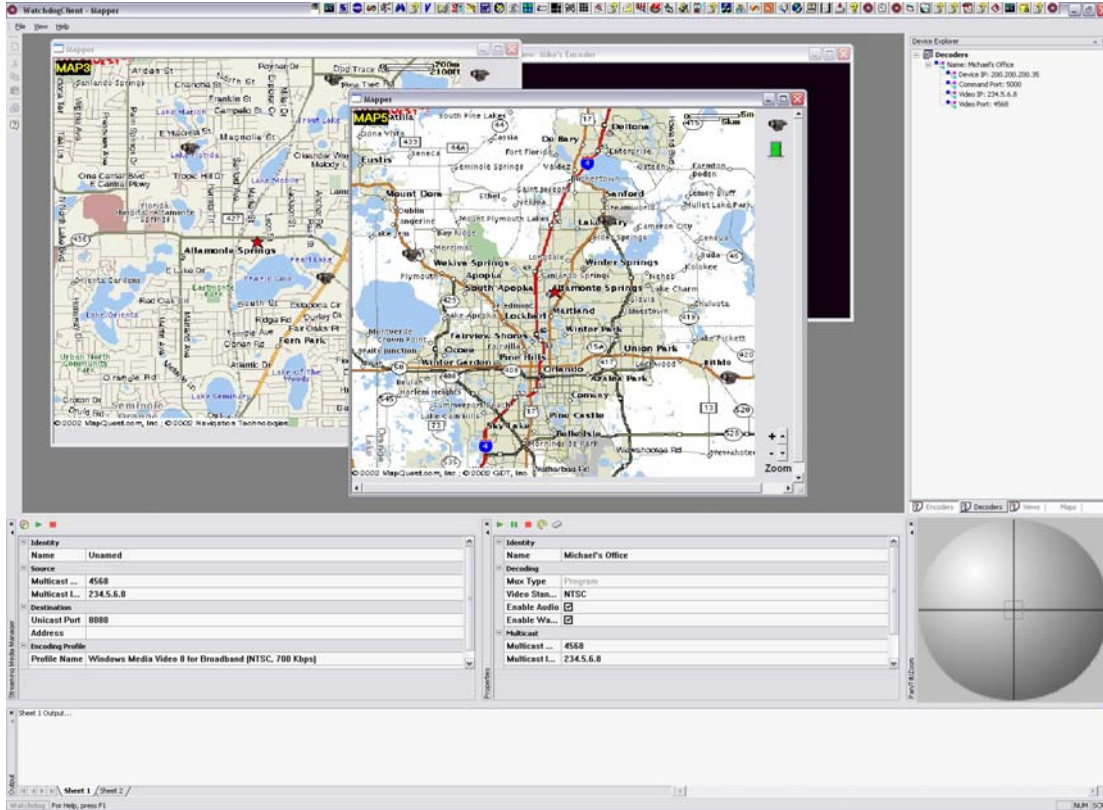
▶ || ■ ↻ 🖨

<b>Identity</b>	
Name	Michael's Office
<b>Decoding</b>	
Mux Type	Program
Video Standard	NTSC
Enable Audio	<input checked="" type="checkbox"/>
Enable Watchdog	<input checked="" type="checkbox"/>
<b>Multicast</b>	
Multicast Port	4568
Multicast IP Address	234.5.6.8
<b>Network</b>	
Device Port	
Device IP Address	200.200.200.35

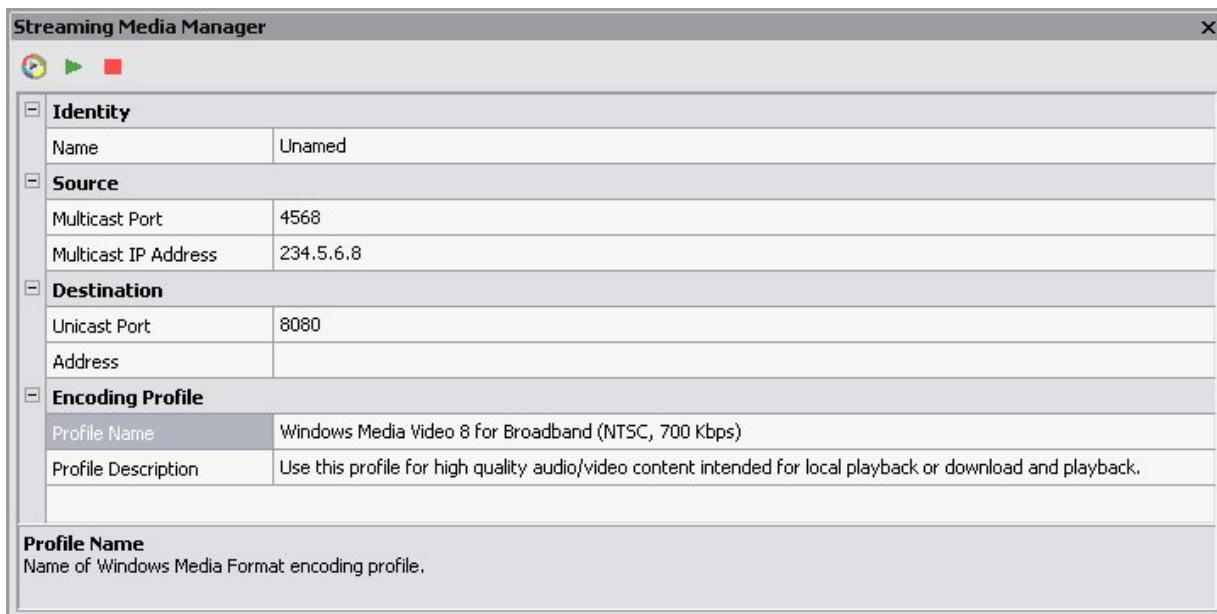
**Multicast IP Address**  
This is multicast group IP address used for the transmission.







## 5.8 Streaming Media Manager

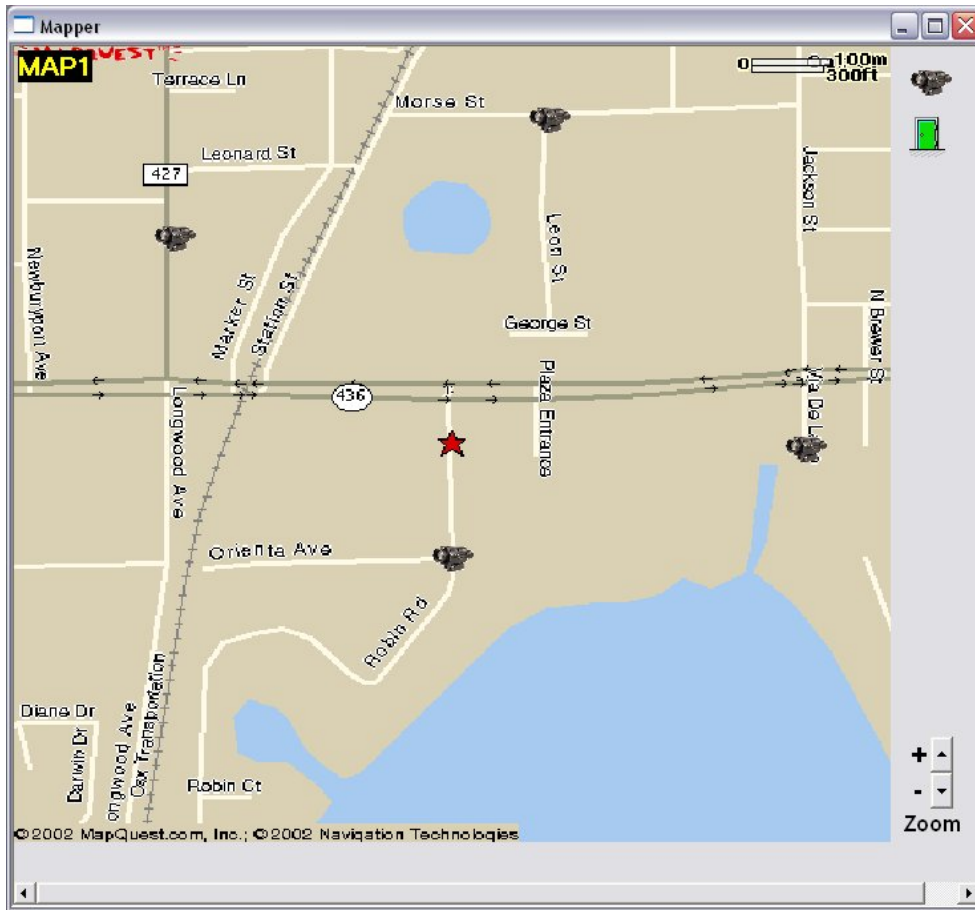


The screenshot shows the 'Streaming Media Manager' application window. It features a standard Windows-style title bar with a close button (X) and three window control buttons (minimize, maximize, close). Below the title bar is a toolbar with three icons: a play button, a stop button, and a refresh button. The main content area is organized into four expandable sections, each with a minus sign icon on the left:

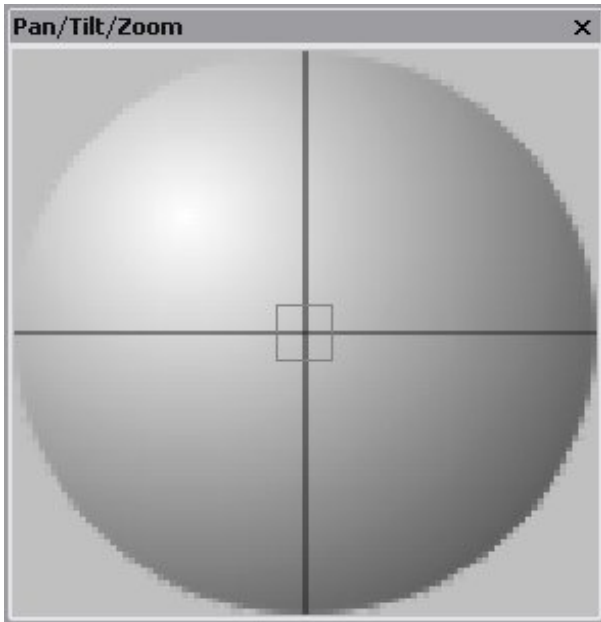
- Identity**:
  - Name: Unnamed
- Source**:
  - Multicast Port: 4568
  - Multicast IP Address: 234.5.6.8
- Destination**:
  - Unicast Port: 8080
  - Address: (empty field)
- Encoding Profile**:
  - Profile Name: Windows Media Video 8 for Broadband (NTSC, 700 Kbps)
  - Profile Description: Use this profile for high quality audio/video content intended for local playback or download and playback.

At the bottom of the window, there is a section titled **Profile Name** with the text: Name of Windows Media Format encoding profile.

## 5.9 Mapper



## 5.10 PTZ



Manual PTZ control pane is found just below the PTZ control area. This ICON like pane will control the device selected from the pane immediately above this area.

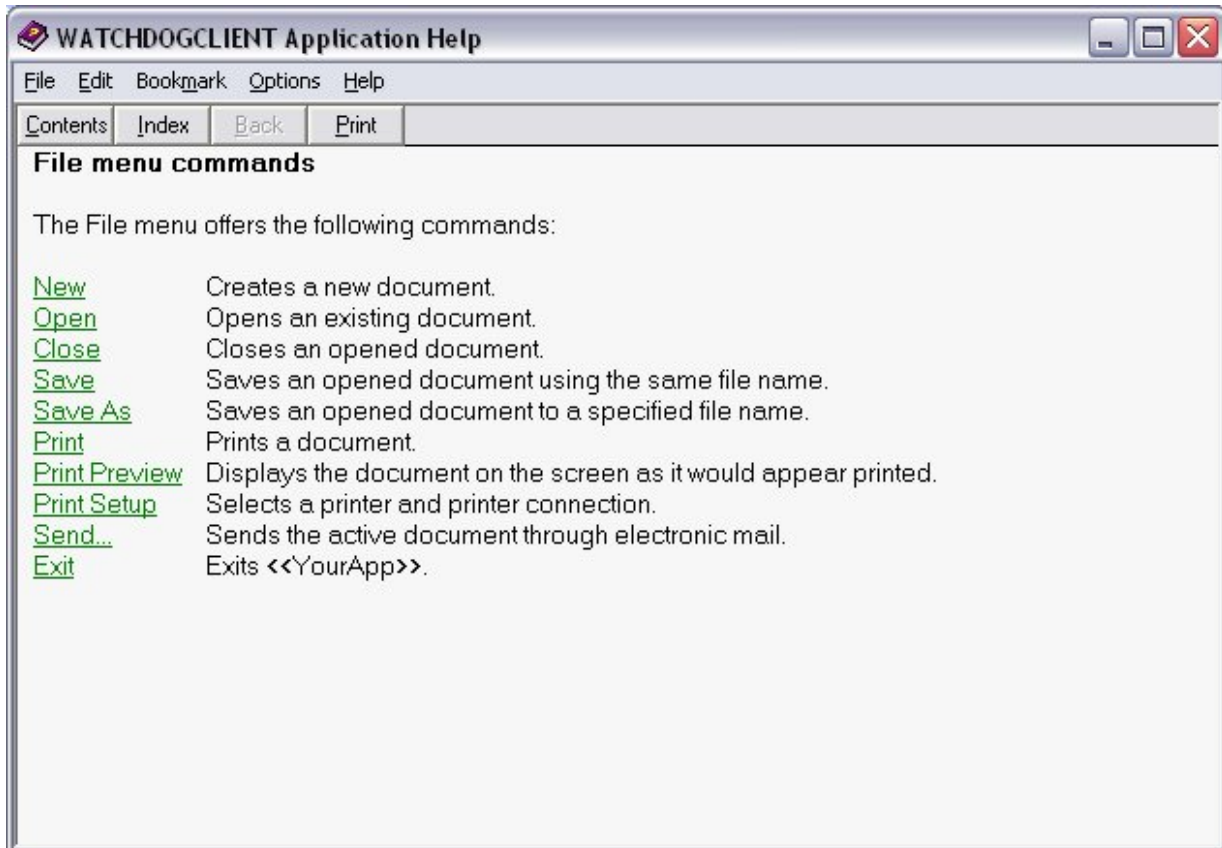
Panning movements, (Left-Right movements) are executed by clicking the horizontal line where left of the center vertical line will pan left while clicking to the right of the vertical centerline will pan to the right.

Tilting movements, (Up-Down Movements) are executed by clicking on the vertical line where above the horizontal centerline will cause upward movement of the camera while clicking below the horizontal line will cause the camera to move in a downward direction.

Clicking in the quadrant areas will execute both functions at a rate of speed depending on the distance from the center of the control field. The outer most areas of the quadrants will drive the servos at a higher rate of speed while the closer the selection is made, up to not including the small box in the very center, will be at a slower rate of speed.

The box in the center will control the zoom. Left clicking within the box will execute a zoom in while right clicking within the box will execute a zoom out operation.

## 5.11 Integrated Help System



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## **6 Hardware Requirements**

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Describe in detail are the hardware requirements for the Watchdog system. The physical environment, which includes all network connections and configurations, must be in place before hardware can be verified. Typical nonfunctional requirements deal with communication efficiency, reliability, sub-system portability, data storage, response time, expandability, and so on.

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## 6.1 Physical

### *Watchdog Client Computer*

- Windows XP/ 2000 operating system

### *Watchdog Server Computer*

- Windows XP/ 2000 operating system

### *Cameras*

- Any camera capable of providing a video feed with the following characteristics:
  - 360x240 or 720x480 resolution.
  - RGB24 color scale.

### *CoreTec Encoders*

- Model#

### *CoreTec Decoders*

- Model#

## 6.2 Environmental

- Ethernet based LAN (Local Area Network)
- Ethernet based MAN (Managed Area Network)

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## **7 Product Options and Accessories**

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## **7.1 Options**

- Camera control.
- External device control.
- Internet video server

## **7.2 Standard Equipment**

- Cameras
- Watchdog Client Software
- Watchdog Server Software
- CoreTec Encoders
- CoreTec Decoders

## **7.3 Optional Accessories**

- Video Recording Equipment
- Access Control Systems
- Alarm Systems
- Custom Sensors
- Monitors
- A/V Cat-5 Cable System
- Turnkey Watchdog Server
- Turnkey Watchdog Client
- Lenses
- Distribution amplifiers
- Camera housings
- Pan, tilt units
- Multiplexers
- Matrix switchers
- Telemetry receivers
- Video printers
- Cabling

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## **8 Appendices**

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## **8.1 Third Party Software**

### **8.1.1 Controller Software**

- Camera Cameleon (<http://www.360surveillance.com/products.html>)
- Axxess 202 ([http://www.maxxesssystems.com/axxess202\\_xp\\_lt.html](http://www.maxxesssystems.com/axxess202_xp_lt.html))
- StreamWise ATMS (<http://www.naztec.com/products.htm>)
- OnGuard ([http://www.lenel.com/software/og\\_video.htm](http://www.lenel.com/software/og_video.htm))
- NetCAMS (<http://www.cohu-cameras.com/pdf/netcams30a.pdf>)

### **8.1.2 MPEG-2 Multicast Decoding Software**

- Moonlight (Elecard) NetSource and NetRenderer DirectShow® filters (<http://www.moonlight.co.il/products/udpstreaming.shtml>)

## 8.2 Ethernet Over SONET Overview

System vendors are welcoming new technologies for carrying Ethernet over synchronous optical networks (SONET), a development that will enable additional services on their previously SONET-only platforms. This means that end customers will finally get a wide area network (WAN) interface that looks just like one of their familiar LAN ports. The immediate value is high: a reliable, high-performance WAN connection that is as simple to manage as any other port on their LAN.

The benefit of Ethernet over SONET is that it is evolutionary, using existing protocols and networking equipment at customer premises. No changes are required to the data packets being transported between a customer's sites, or between a customer site and a service provider's point of presence. The majority of network data today exists at some point as an Ethernet packet most often originating from a PC. Network servers (file servers, application servers or Web hosting servers) typically connect to networks with 100 or 1000 megabit per second Ethernet.

Today's networks already span metro areas, countries and continents — these networks are based on SONET / SDH technology, standards adopted in North America and the rest of the world respectively. It has taken significant investment to build out these networks and carriers will be reluctant to rebuild the networks again to support new services. Instead, the requirement is to add new services without increasing, and even reducing, capital expenses.

However, interconnecting the LAN to the WAN has traditionally been awkward, needing a router to convert the LAN Ethernet packets into Packet over SONET (POS) for transport across the WAN. The router must have knowledge of all protocols that are being carried on the Ethernet LAN and must be configured to handle IP as well as any enterprise-specific legacy protocols. Fortunately, standards now exist that enable Ethernet packets to be carried directly over the SONET/SDH WAN with no protocol conversion.

Two new standards have been developed that increase the efficiency of Ethernet over SONET/SDH. The first, a technique called Virtual Concatenation (ITU-T G.707 2000), enables SONET/SDH bandwidth to be better partitioned to efficiently carry Ethernet traffic. Rather than using contiguously concatenated SONET payloads, Virtual Concatenation uses the base SONET/SDH payloads and groups these payloads to create a larger "right-sized" aggregate payload. In addition to right-sizing the payload to match the data rate of the client service, Virtual Concatenation enables the payload capacity to be varied. This sizing allows a greater number of Ethernet channels to be mapped into the SONET/SDH signal. These subrate channels allow carriers to offer a tiered transport service where customers only pay for the required bandwidth, yet they still use the same connection into the WAN.

The second standard recently developed is the Generic Framing Procedure (GFP, ITU-T G.7041) to provide a means of delineating packet data in a SONET/SDH payload without variable bandwidth expansion. Each data packet has an 8 byte header added which indicates

the start, type and length of the data frame. GFP supports an extended header, for future uses that may need addressing and multiplexing functions.

SONET Virtual Concatenation and Generic Framing Procedure together with necessary Ethernet and SONET path processing functions can be handled in a single device, which will sit on a line card in an Add/Drop Multiplexer (ADM) or a SONET/SDH cross connect. This adds Ethernet transport services to the existing SONET network. The expensive alternative is replacing the SONET network with an all-packet infrastructure, requiring that every box in the network be replaced, and each and every packet be inspected and switched at every node.

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## **9 Glossary**

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## ADM

A Synchronous Optical Network (SONET) ring consists of individual network elements connected to form a closed loop. Rings can cover a metropolitan area (San Francisco, for example) or a larger geographic area such as the western United States. The network elements can be gateways or they can be add-drop multiplexers.

An add-drop multiplexer (ADM) provides access to a SONET network much like exit and entrance ramps provide access to a freeway. ADM systems combine all traffic that will exit the ring into one lane, which will be dropped. All other lanes will be reserved for through-traffic. Similarly, associated add traffic will enter the system through the associated entrance lanes. Before exiting the system, the traffic can be reorganized back into the lane distribution relationship it had when it entered the system.

While SONET ADMs have been a fixture in metro ring networks for many years, a new generation of multi-protocol capable ADMs are becoming available. As user demand grows for broadband Internet access, video-on-demand, videoconferencing, and other applications, the need for optical ADMs will increase.

## NTCIP

Historically, each vendor of microcomputer control devices and software used in management systems adopted a different, proprietary protocol for data communications. This required extensive integration projects to mix equipment and software from different vendors in the same system and to communicate between systems operated by adjacent agencies. The National Transportation Communications for ITS Protocol (NTCIP) provides common protocol standards that can be used by all vendors and system developers to help overcome these differences.

The NTCIP is a family of standards that provides both the rules for communicating (called protocols) and the vocabulary (called objects) necessary to allow electronic traffic control equipment from different manufacturers to operate with each other as a system. The NTCIP is the first set of standards for the transportation industry that allows traffic control systems to be built using a "mix and match" approach with equipment from different manufacturers. Therefore, NTCIP standards reduce the need for reliance on specific equipment vendors and customized one-of-a-kind software. To assure both manufacturer and user community support, NTCIP is a joint product of the National Electronics Manufacturers Association (NEMA), the American Association of State Highway and Transportation Officials (AASHTO), and the Institute of Transportation Engineers (ITE). The NTCIP originated as the National Transportation Communications for Intelligent Transportation System (ITS) Protocol (NTCIP).

NTCIP is a family of communications standards for transmitting primarily data and messages between microcomputer control devices used in Intelligent Transportation Systems (ITS). An example of such a system is a computer at city hall monitoring and controlling the operation of microprocessor-based roadside controllers at traffic signals within a city. The computer may

send instructions to the traffic signal controllers to change signal timings as traffic conditions change and the controllers send status and traffic flow information to the computer.

NTCIP is intended for use in all types of management systems dealing with the transportation environment, including those for freeways, traffic signals, transit, emergency management, traveler information, and data archiving. NTCIP is intended for use between computers in different systems or different management centers, and between a computer and devices at the roadside. The current NTCIP standards are not intended for use in devices owned by individual travelers; other standards either currently exist or are in development for that purpose.

There have been numerous problems historically associated with the deployments of management systems. Before describing some of these issues we will first define two terms. The term interchangeability reflects the ability to use multiple brands of a device on the same communications channel, along with the ability to swap them out. For example, the ability to put any brand of NTCIP compliant traffic signal controller in the same system at the same time reflects interchangeability. The term interoperability reflects the ability to use many different types of devices on the same communications channel. For example, using the same communications channel to interconnect a management system with traffic signal controllers, dynamic message signs, video surveillance controls, and other devices, reflects interoperability.

One common problem historically encountered results from the use of proprietary communications protocols in management systems. These protocols are often proprietary to the specific project, as well as to the specific manufacturers involved in the project. As a result, expansion of the system after initial deployment can generally only be done using equipment of the same type and brand as in the initial deployment. There is no opportunity for realistic competitive bidding as additional field devices are added to the system (due to the lack of interchangeability), nor is there any opportunity to add additional types of field devices to the system (due to the lack of interoperability).

The proper use of NTCIP in a management system will allow the future expansion of the system to benefit from true competitive bidding, as well as allow other types of field devices to be added.

The Transportation Equity Act for the 21st Century (known as "TEA-21") requires that federally funded ITS projects "conform" with the National ITS Architecture. As defined in TEA-21, the term "intelligent transportation system" means "electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system". The National ITS Architecture defines both the functions performed in implementing ITS, and the information flows between transportation subsystems. In its October 2, 1998 report entitled "Interim Guidance on Conformity with the National ITS Architecture and Standards", the US DOT stated "Highway Trust Fund recipients shall take the appropriate actions to ensure that development of the project(s): (a) engages a wide range of stakeholders, (b) enables the appropriate electronic information sharing between shareholders, (c) facilitates future ITS expansion, and (d) considers the use of applicable ITS standards."



Although NTCIP is a great standard, there is no certification process in place for manufacturers to validate NTCIP compliance. There is also a lack of 100% compliant NTCIP devices available on the market which reduces the opportunity for interoperability and interchangeability in a cross vendor system.

## SONET/SDH

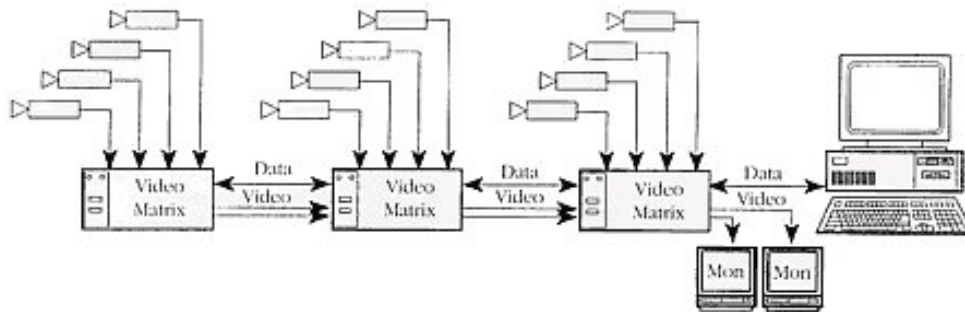
The Synchronous Optical Network (SONET)/Synchronous Data Hierarchy (SDH) standard was approved in 1988 to allow interconnection of equipment from different vendors. The SONET/SDH network is reliable, manageable, flexible, scalable, and can utilize the high bandwidth of fiber. SONET is the name of the U.S. implementation while SDH is the European standard. Both use the term Optical Carrier (OC) in reference to signals in fiber. The electrical equivalents for OC in SONET and SDH are the Synchronous Transport Signal (STS) and Synchronous Transport Mode (STM) respectively. The following table shows the relationship between these standards at the popular speeds.

**SONET/SDH Bit Rates**

Medium	STS/STM Equivalent	Bit Rate
OC-1	STS-1/STM-0	51.84 Mbps
OC-3	STS-3/STM-1	155.52 Mbps
OC-12	STS-12/STM-4	622.08 Mbps
OC-48	STS-48/STM-16	2.48 Gbps
OC-192	STS-192/STM-64	9.95 Gbps
OC-768	STS-768/STM-256	39.8 Gbps

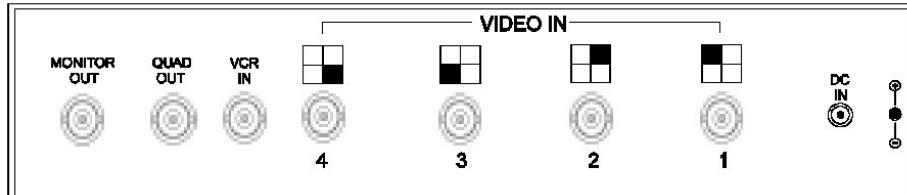
## Video Matrix Switchers

Video matrix switchers provide the ability to route multiple video inputs to multiple video outputs. Along with providing video switching capabilities, many matrix switchers incorporate serial communications protocol switching capabilities for device control. The following diagram depicts the use of a typical video matrix switcher.



## Video Splitters

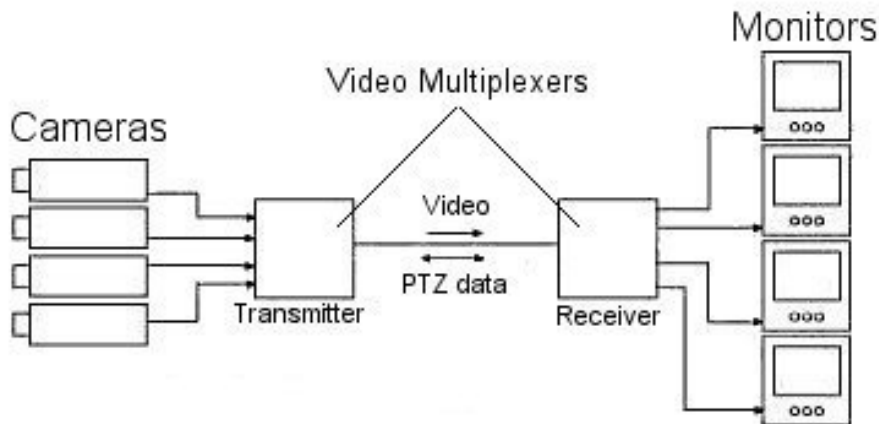
A video splitter is a hardware component that accepts multiple video inputs to provide one or more outputs that contains the combined video signals each reduced in size and combined in a single video signal. The following diagram shows the connections on a typical quad video splitter.



## Video Multiplexers

Analog video multiplexers allow you to view or record all cameras at once (not missing any views like a sequential switch will). Playback allows you to see all cameras or any single camera view "full-screen". This feature is very advantageous when an incident has occurred, and the review is critical as to determining the facts.

Digital video multiplexers are designed to multiplex multiple video signals, and serial communication protocols for device control (RS-232, RS-422, etc), onto a communications medium, usually optical fiber. Digital video multiplexers come in transmitter/receiver pairs. The following diagram depicts the functionality of a typical digital video multiplexer.



## Video Switcher

Video switchers are hardware components that accept multiple video inputs and provide switching capabilities to one or more video outputs. The following diagram shows a typical video switcher.

