Matrix Viewer

User's Guide

Release 1.0

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Welcome to Matrix Viewer Video System manual. This manual describes the fundamental ideas of the video, CCTV and support systems. This manual encompasses both hardware device descriptions and software control concepts covering the "Client" version of the product. We do not try to direct the user as to how the product should be used on site as this is a user preference.

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.
Please visit our website at www.GoCoreTec.com this and other documentation and product information.

Contents

About this document

This document contains product specification information about the CoreTec Matrix Viewer system in the following sections:

1. *User's Guide* – Covers the usage of all screens, forms and commands within the Matrix Viewer system
2. *Hardware Requirements* – This section describes the hardware requirements and the physical environment in which the Matrix Viewer will be used, including any other systems that the product will interface.

1 User's Guide

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1.1 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 application tool bar is located just below the widows control bar as in most other application programs running under MS Windows. When the Matrix Viewer is started up the application will perform the discovery process and locate all encoders on line. (See the Discovery section in this manual for details on the process). The encoder view pane will not be shown by default, however the operator may enable it by using the View command on the application tool bar and select Show Encoders.

1.1.1 Matrix Viewer

The center viewing area is divided into two (2) separate panes each displaying a separate aspect if the selected video stream. The left side (if selected) panel displays the encoders found in the discovery process when the software connected to the network. The right side is divided into the separate assigned video streams.
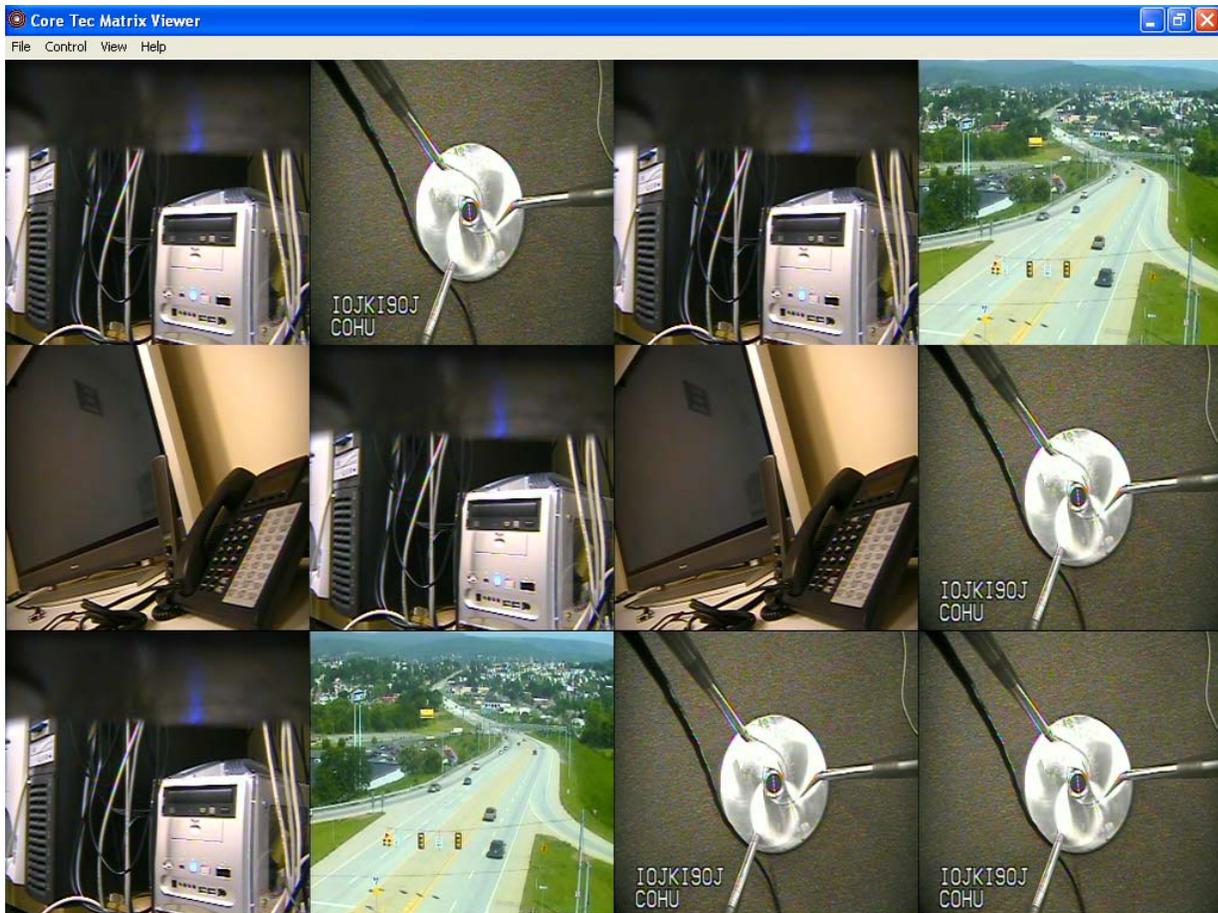
1.1.1.1 Encoder Selection

To view the encoder pane, the operator needs to enable the pane by executing the command View-Show Encoders. The encoder pane will occupy the left side of the application window.

The encoder pane is shown as a close up and one on the encoders is in the expanded view to show the details of the encoder configuration.
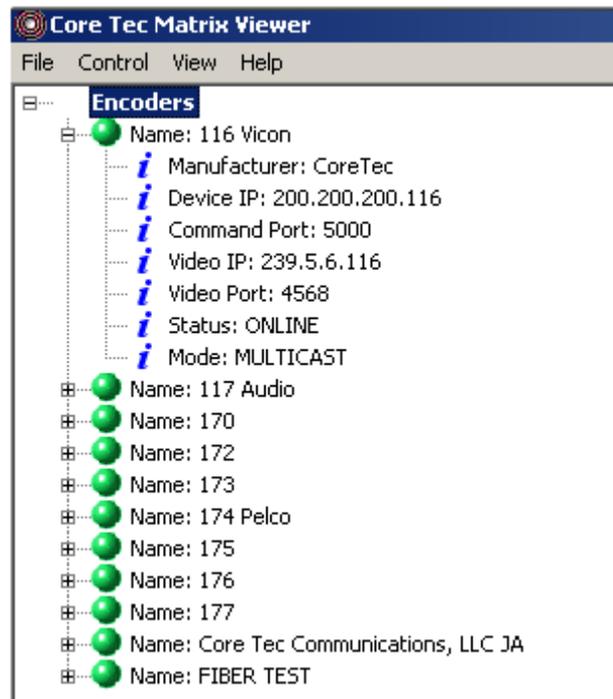
The details of the encoder may be viewed by clicking on the "+" next to the "Green" sphere.

The encoder status is displayed as a sphere between the encoder name and the tree expansion symbol. Take note of the sphere color as:

Green   indicates the encoder is on-line
Yellow   the device is on-line but stopped or busy
Red   the device is off-line.

To assign the encoder source to a window the operator need only click and hold the Name line from the menu frame and drag it to the display window of choice.

1.1.1.2 Video Viewing Area

This area is divided into the pre-selected panel configuration. The configuration of the display is selected by the "View-Window Groups" drop down menu. When the Window Groups menu item is selected, the dialog box opens to give the user the selection menu.
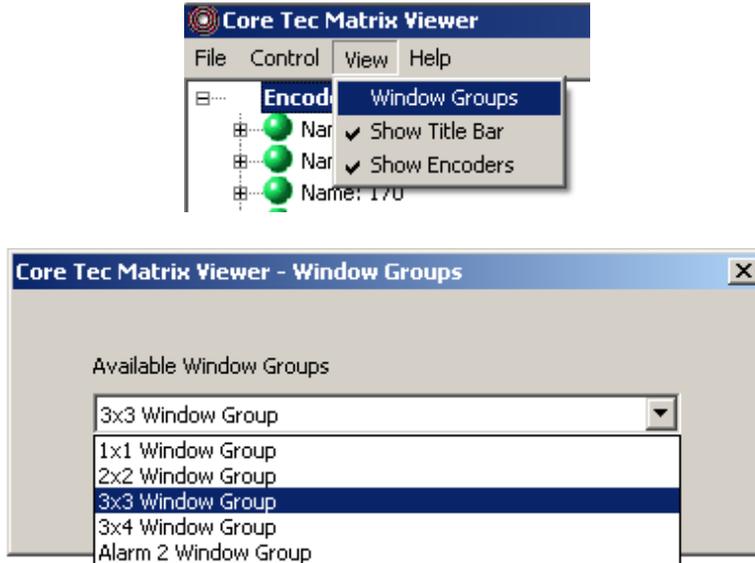
1.1.2 Viewing the XML Configuration

The configuration of the display area is controlled by the .xml file in the install subdirectory. By default, the directory path is as follows:

    C:\Program Files\CoreTec\MatrixViewer\MatrixConfig.xml

If a custom install was performed, the user will need to navigate to the installed area to find the file. Using an XML editor such as "XMLspy" will greatly ease the manual effort of changing the system configuration.

Using XMLspy, load the MatrixConfig.xml file. The file will be displayed in text mode and will be very hard to identify items of interest. It will be necessary to re-order the display into areas that can be readily identified, therefore set the display to grid mode by selecting the grid tab at the bottom of the text area.
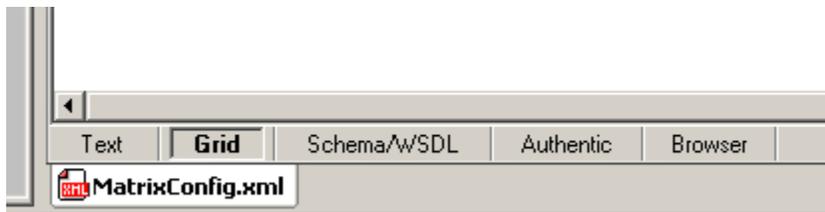
The text file is reorganized into groups of sectional comments and pull-down menu items as shown below. Take notice of the lines that have the down arrow buttons. These allow the operator to view additional information on the selected topic. Click the arrow next to the "MatrixSwitch" label to begin the decent into the details of the video sources.

Comment	edited with XMLSpy v2005 rel. 3 U (http://www.altova.com) by Smart Access, Inc. (Smart Access, Inc.)
Comment	edited by Michael Denczek (Core Tec Communications)
▼ **MatrixSwitch** ID=1 xmlns:xsi=http://www.w3.org/2001/XMLSchema-instance xsi...	

The expanded view will appear as the figure below. Locate the "VideoSource" menu item.

Comment	edited with XMLSpy v2005 rel. 3 U (http://www.altova.com) by Smart Access, Inc. (Smart Access, Inc.)
Comment	edited by Michael Denczek (Core Tec Communications)
▲ **MatrixSwitch**	

= ID	1
= xmlns:xsi	http://www.w3.org/2001/XMLSchema-instance
= xsi:noNamespac...	MatrixConfig.xsd
{} MatrixSwitchNa...	Matrix 1
{} MasterAutoEve...	true
{} VideoWindowGr...	true
{} OperatingMode	Standalone
{} DiscoveryIpAdd...	239.5.6.252
{} DiscoveryPort	5006
{} ServerIpAddress	200.200.200.83
{} ServerPort	7734
{} DatabaseServer...	show2
{} DatabaseBacku...	show2
{} DatabaseName	Watchdog
{} OperatorID	999
{} WorkstationID	999
Comment	Video Sources
▼ **VideoSource** (9)	
Comment	Window Text
▼ **VideoWindowText** (2)	
▼ **MatrixApp** ID=1	

When the operator clicks on the arrow next to the "VideoSource" menu, the following dialog will open displaying the details of the video sources.

	= ID	() VideoSourceNa...	() NetworkMode	() NetworkIpAddr...	() NetworkPort	() VideoType
1	116	116 Vicon	Multicast	239.5.6.116	4568	MPEG2
2	117	117 Audio	Multicast	239.5.6.117	4568	MPEG2
3	170	170	Multicast	239.5.6.170	4568	MPEG2
4	172	172 Cohu	Multicast	239.5.6.172	4568	MPEG2
5	173	173	Multicast	239.5.6.173	4568	MPEG2
6	174	174 Pelco	Multicast	239.5.6.174	4568	MPEG2
7	175	175	Multicast	239.5.6.175	4568	MPEG2
8	176	176	Multicast	239.5.6.176	4568	MPEG2
9	177	177	Multicast	239.5.6.177	4568	MPEG2

The entries in the section will have labels and configuration data needed to address the source on the network. The video sources displayed are not added automatically by the discovery process and must be added to this list manually.

1.1.3 Editing the XML Configuration

The xml file is an active part of the matrix viewer and changes made to this file while the viewer is running will have immediate ramifications. Therefore, close the matrix viewer before editing the xml file.

If the encoder is not found in the list the operator may add it by following the procedure below.

Open a network analyzer or utility that will list the devices found on the network, such as "vxnetconfig" shown here or the operator may log into the encoder with telnet and retrieve the required information. In this case, the device highlighted is the same one selected in the utility. Take notice of the information displayed.
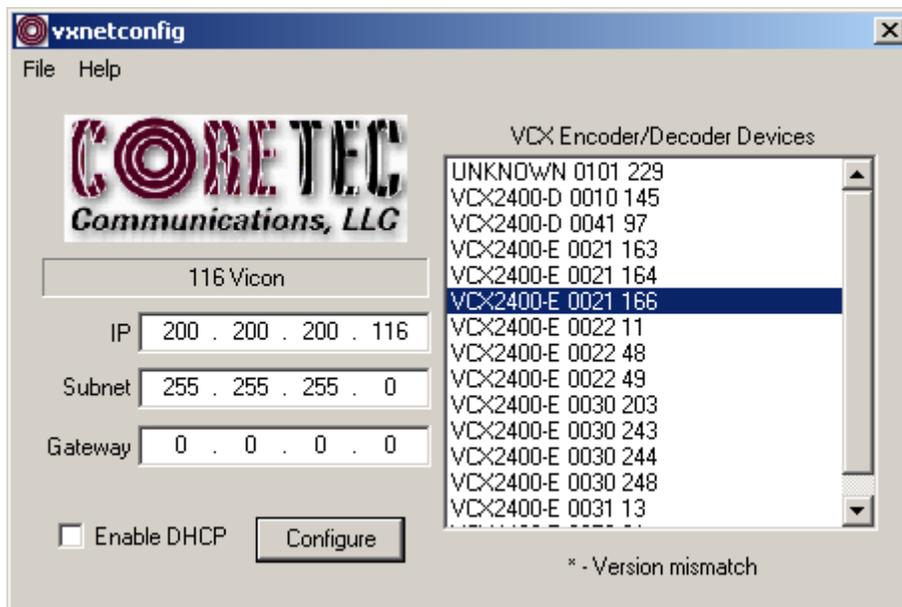
The Video source name shown in the XMLspy menu is the same as listed in the vxnetconfig label window, 116 Vicon. The IP listed just below is the **network** IP address of the encoder and is not the **video** IP address. The video IP address is needed in the xml file. In this case and as an example only, the network subnet is 200.200.200.116 and is used to communicate, control and status configurations using a program such as "telnet", with the encoder. The video subnet is 239.5.6.116 and is used to supply the video channel to the requesting receiver. To gather the correct information the operator should contact the network administrator for the correct configuration data.

To add a new line to the XML file the operator need the following information on the encoder. The XML labels are used below to ease the identification process:

ID – usually the last number in the network IP address xxx.xxx.xxx.116 as an example
VideoSourceName – The name assigned to the channel to describe location and function
NetworkMode – Multicast (default)
NetworkipAddress – This must be the "Video IP address assigned to the encoder (see above)
NetworkPort – The default port number is 4568 unless changed by the network administrator

With the encoder data collected, the operator may now add a new encoder entry into the XML file. Navigate through the menu selections shown below using the command bar at the top of the XMLspy editor. XML-Insert-Element will open a space at the current cursor location in the grid view of the xml file.
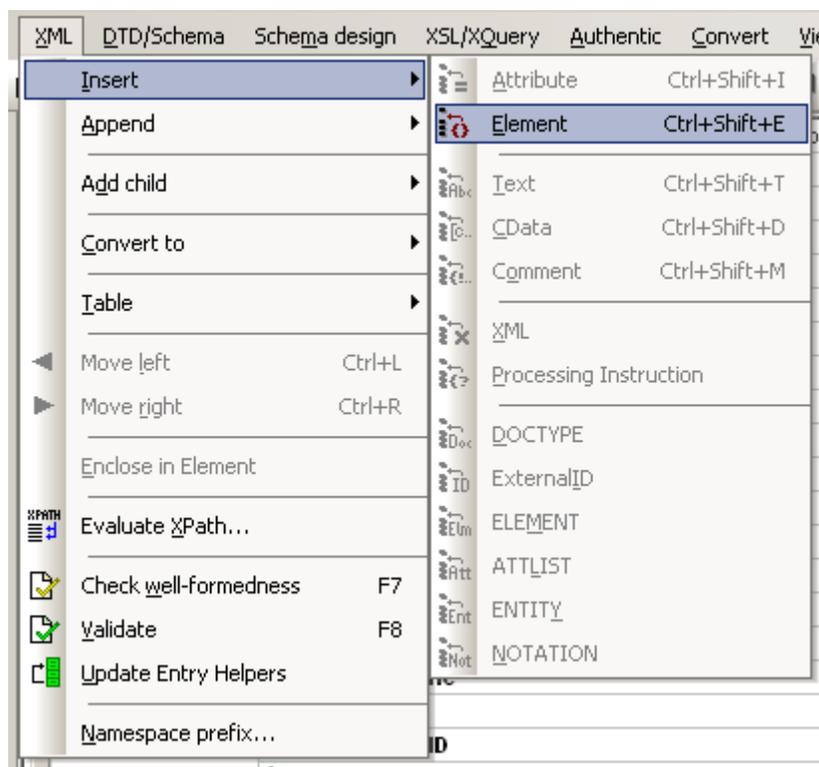
In this case, the new line is going to be added before the first entry in the form. The current entries will be renumbered with the blank line as number 1. The operator may enter the encoder information at each field then save and close the editor.

	= ID	() VideoSourceNa...	() NetworkMode	() NetworkIpAddr...	() NetworkPort
1					
2	116	116 Vicon	Multicast	239.5.6.116	4568
3	117	117 Audio	Multicast	239.5.6.117	4568
4	170	170	Multicast	239.5.6.170	4568
5	172	172 Cohu	Multicast	239.5.6.172	4568
6	173	173	Multicast	239.5.6.173	4568
7	174	174 Pelco	Multicast	239.5.6.174	4568
8	175	175	Multicast	239.5.6.175	4568
9	176	176	Multicast	239.5.6.176	4568
10	177	177	Multicast	239.5.6.177	4568

1.1.4 Configuring Individual View Ports

To access the status and configuration forms for each view port, the operator need only move the cursor into the view port area and right click to open the dialog forms. The tabs across the top of the form show the items the operator may view. Not all of the items are variables that may be changed. Many of the items are status and current configuration items and are not alterable from this view. Areas the have the right down arrow will offer the operator options that are valid for that entry. This section will show some redundancy in the form displays allowing for the viewing of as many options as possible.

Core Tec Player Properties   ✕

Network │ Video │ Quality │ Overlay │ Audio │ Resolution │ Touring │

Network Mode   Multicast ▼

Mux Type   Program Stream ▼

Video Type   MPEG2 ▼

Network IP Address   239 . 5 . 6 . 175

Network Port   4568

Connection Timeout   10000

HTTP URL   /video/1/0/ivc.mpg

Restart

OK   Cancel   Apply
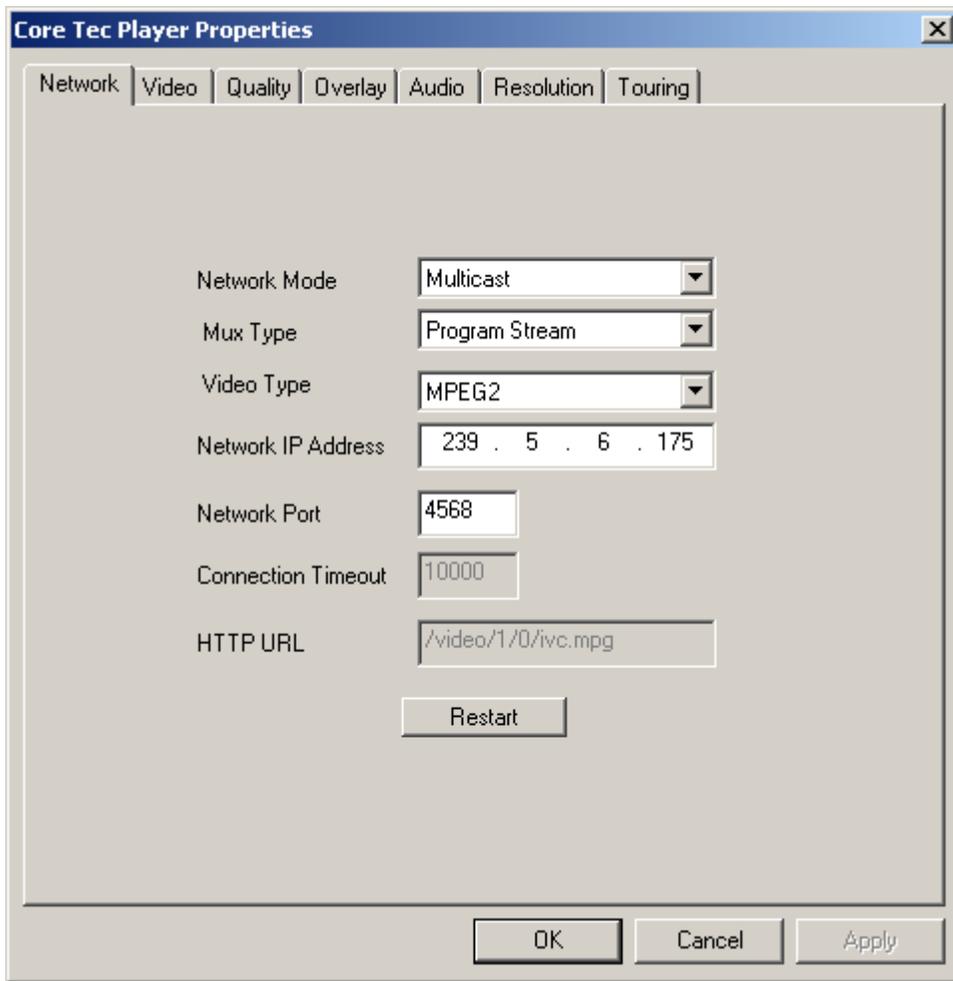
1.1.4.1 Network
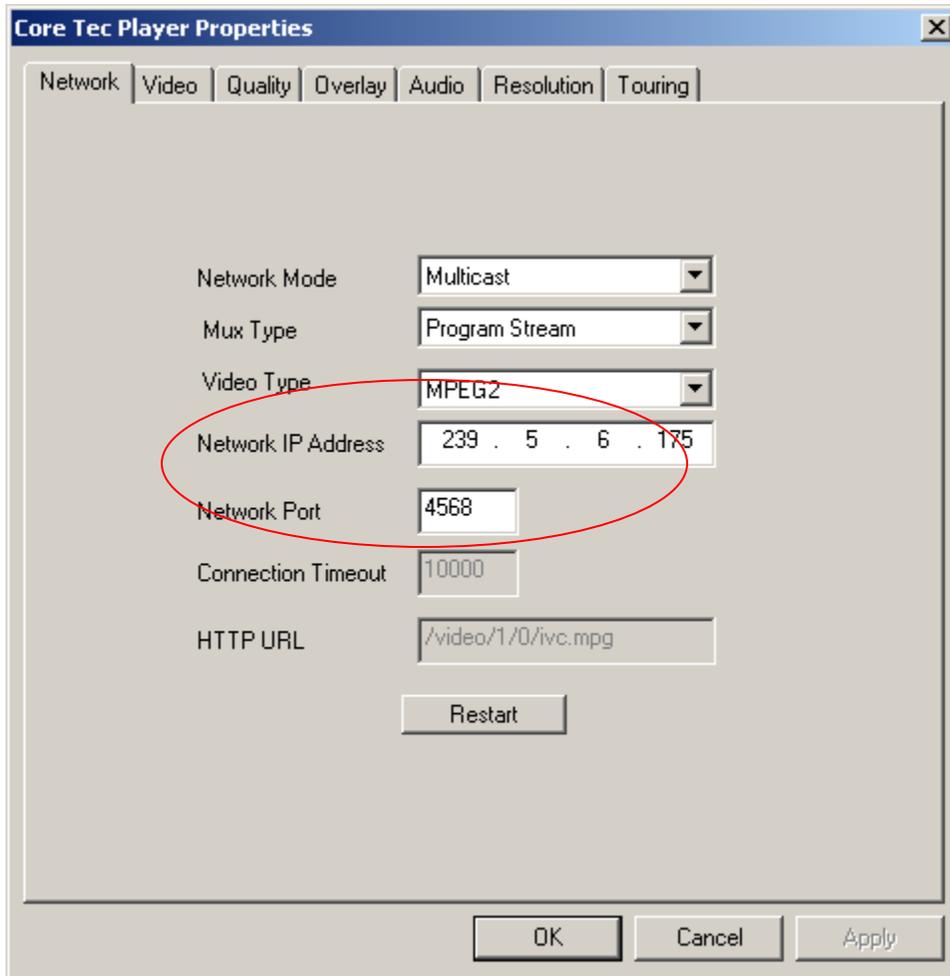
When the dialog form opens for the first time, the Network tab is selected by default. From this form, the operator may alter many of the encoder defaults as they pertain to the network interface. The parameters are Network mode, Mux type, Video Type as well as the Network IP Address and Network Port number.

From the viewpoint of the operator, wanting to see a particular video stream the "Video IP Address" is the source of the video stream to be viewed. This address is not used to communicate to the unit by telnet or some other interface to change the configuration and receive status of the operating condition of the encoder.

The Video Port number is designated 4568 by default and should not be changed without knowledge of the network configuration.

1.1.4.1.1 Network Mode
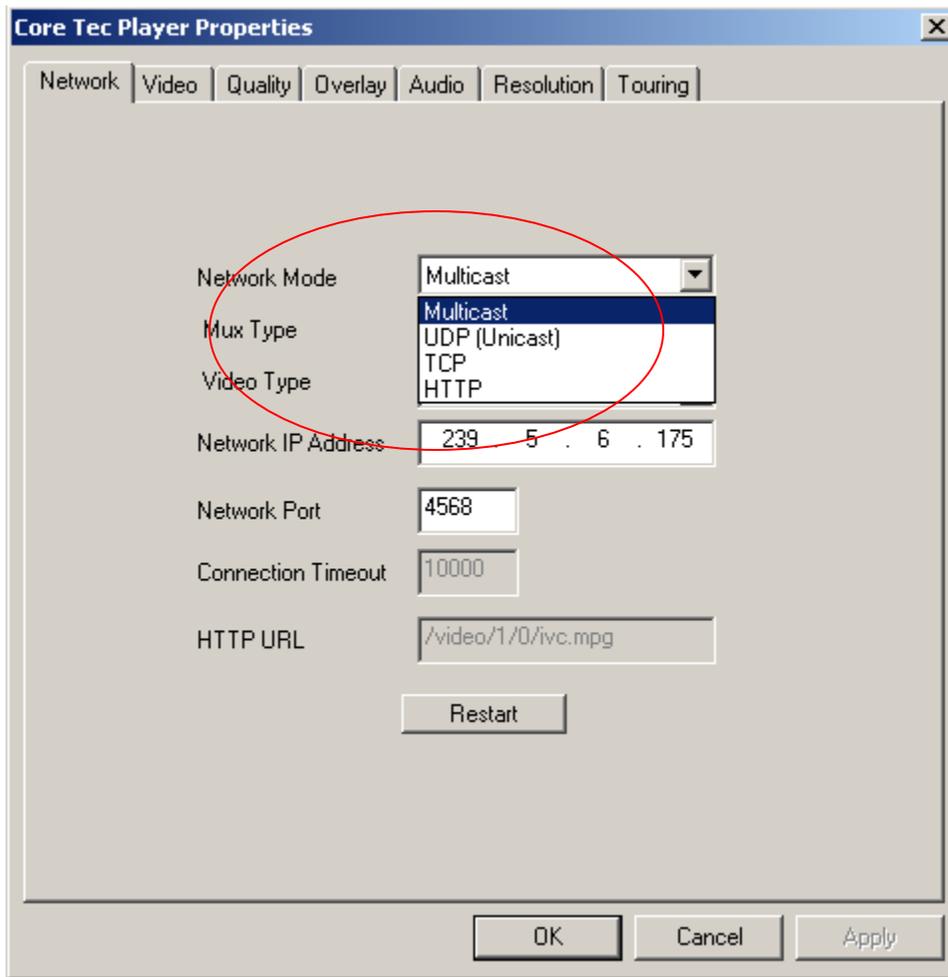
When the down arrow to the right of the Network Mode line is clicked, the Network Mode selection drop-down menu supplies the operator with the following choices:

        Multicast – this mode offers the video stream to multiple destinations at once

        UDP (Unicast) – this mode supplies the video stream to only one end-point destination

        TCP – Not Supported

        HTTP – Not supported

1.1.4.1.2 Network – Mux Type
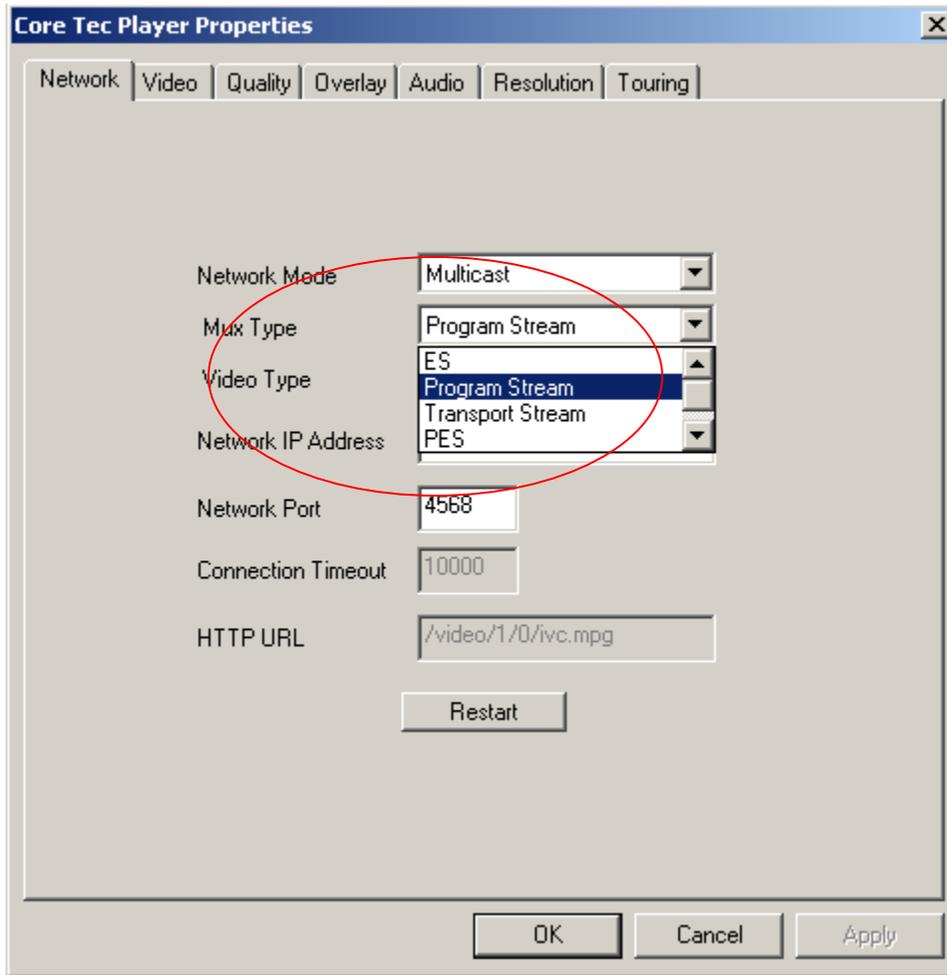
The Mux type defines the communication mode of the transmission. The types are:

Elementary Stream – this stream type supports only one kind of stream type at a time such as video, audio or control

Program Stream – this stream type incorporates variable length packets

Transport Stream – uses fixed length packets of 188 bytes each

PES – Packetized Elementary Stream (See Appendix for detailed definition)

Pack – ***

1.1.4.1.3 Network – Video Type
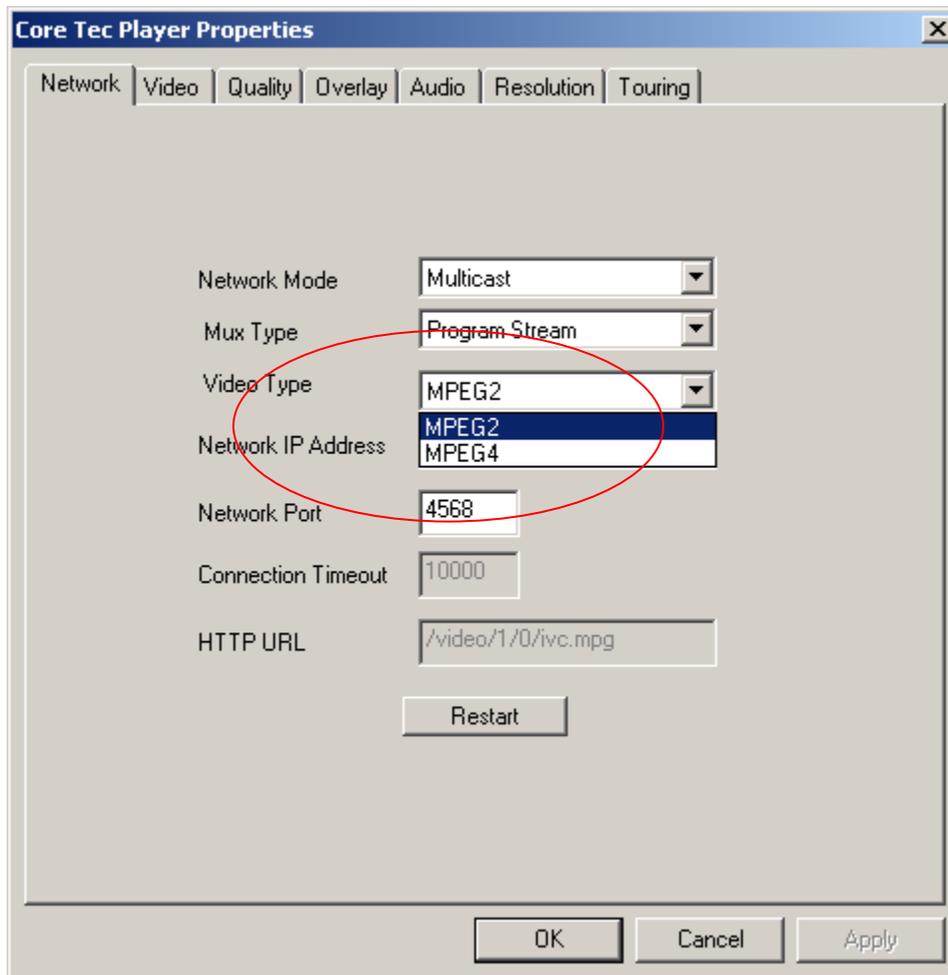
These options permit the selection if the type video encoding performed by the selected encoded. The choices are ether MPEG-2 or MPEG-4, if the encoder support is available. The VCX-2400 series is MPEG-2
VCX-4400 series is MPEG-4
VCX-6400 series will provide ether format on request

1.1.4.2 Video
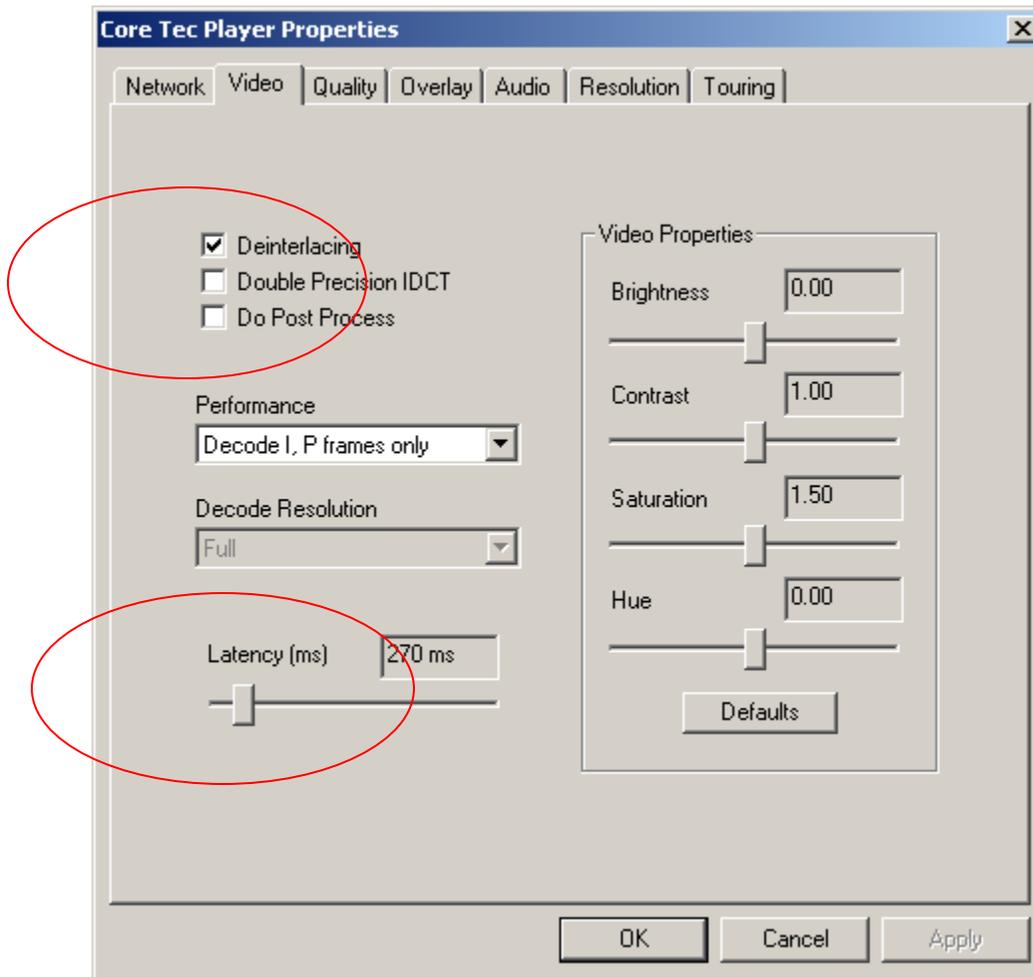
This control dialog provides video control for each view port.

Deinterlacing – This function will display the video frames one after the other without using the alternate lines (NTSC) on the display, as this will remove the jitter effects of the interlaced video when freeze frame control is applied. Deinterlacing is the process of converting interlaced video (a sequence of fields) into a non-interlaced form (a sequence of frames). This process is also called *line doubling* or *I to P conversion*. (See Appendix for detailed information)

Double Precision IDCT – Using double precision Inverse Discrete Cosine Transform will be used to extract finer detail from the encoded video stream. This function is very compute intensive.

Do Post Process –

Latency – Is the amount of delay inserted in to the arrival of the video stream due to buffering. This value will slow the controls of the PTZ camera controls
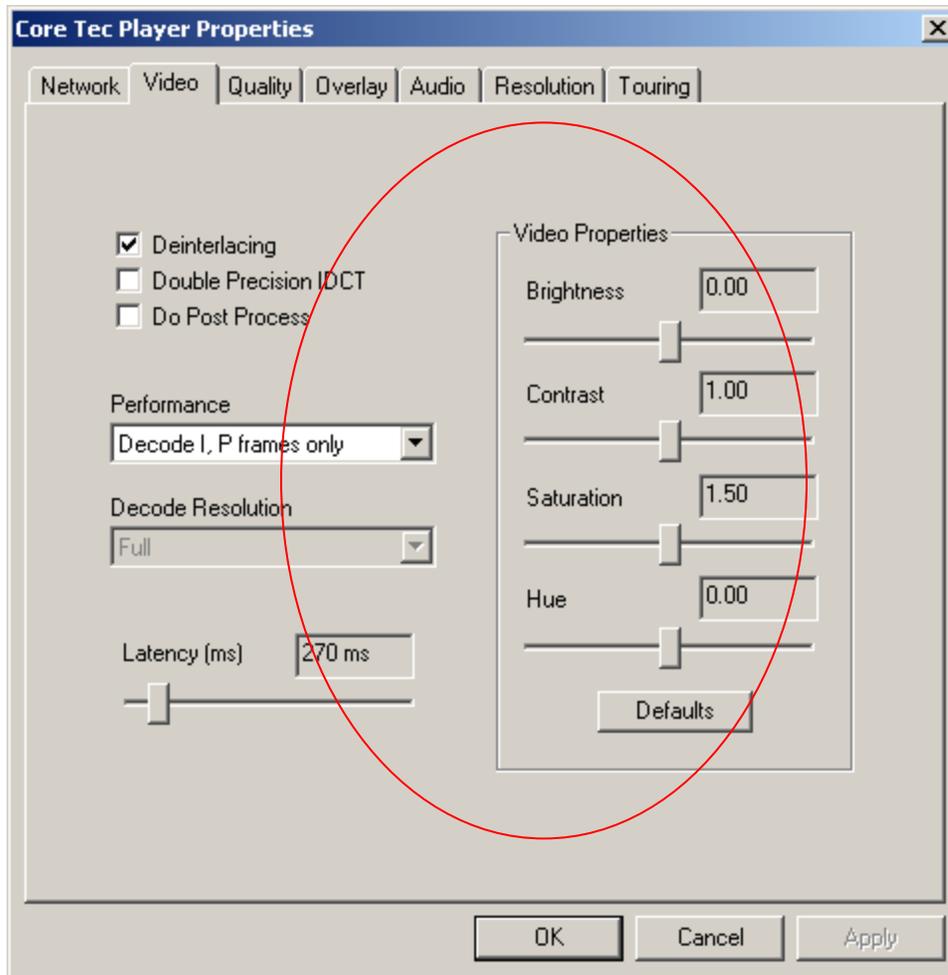
The video properties allow the operator to adjust the attributes of each individual view port as needed. The sliding controls give a range of control needed to the stream with out blanking or otherwise distorting the video.

Brightness will adjust the total frame in brightness, light level.

Contrast will adjust the range of the bright areas with the dark areas. Increasing this property causes the bright areas to become brighter in addition; the dark areas will become darker.

Saturation control will adjust the total amount of color in the frame. From near, black and white to full color near red flooding.

Hue will adjust the green to red balance if the frame. Used in adjusting natural flesh tones.
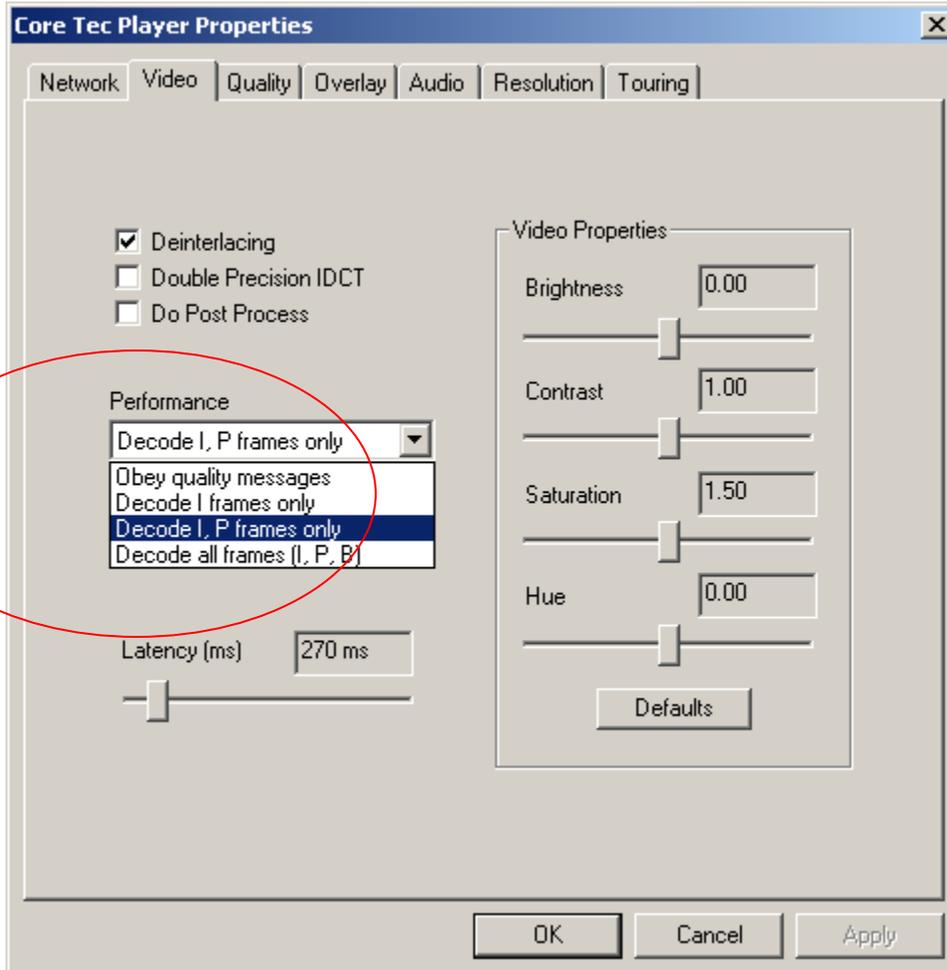
The performance dialog will allow the operator to select the frames in the video stream to display. Each of the options offers increasing real-time viewing of the incoming video. The video stream in encoded using three type of video frames I, P and B. As additional frames are used the quality of the video increases and so does the bandwidth. If many channels are being viewed and details are not important then selecting, I or I and P frames will supply the needed video monitoring at reduced frame rates.

1.1.4.3 Quality
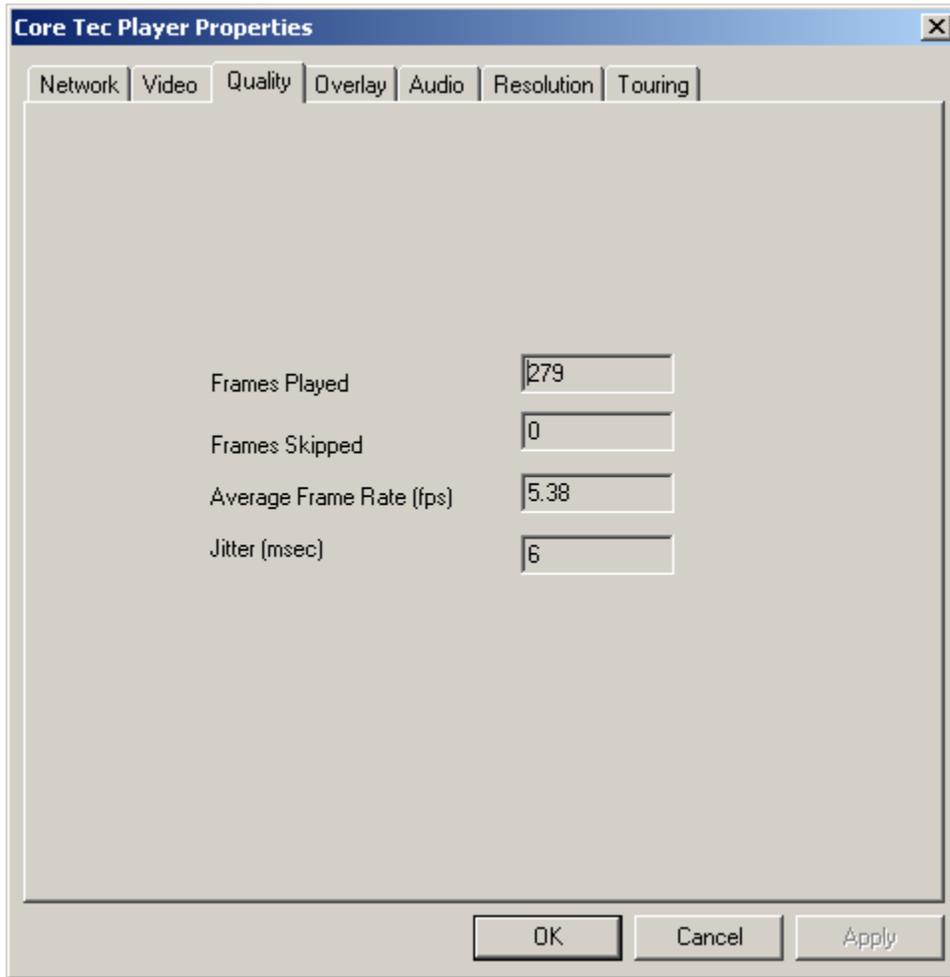
The Quality window will show the real-time status of the video port. The parameters displayed are informational in nature only and cannot be altered.

Frames Played – This parameter is the total number of frames delivered to the view port.

Frames Skipped – If frames are skipped, for any reason, the number is displayed in this field.

Average Frame Rate (fps) – The average frames displayed in one second is displayed in this field. This information is a good indicator of the communication quality. (Not the video itself)

Jitter (msec) – Delays in the arrival of the video packets is calculated and displayed in this field. Such inconsistencies are usually due to switching and routing of the video streams.

1.1.4.4 Overlay
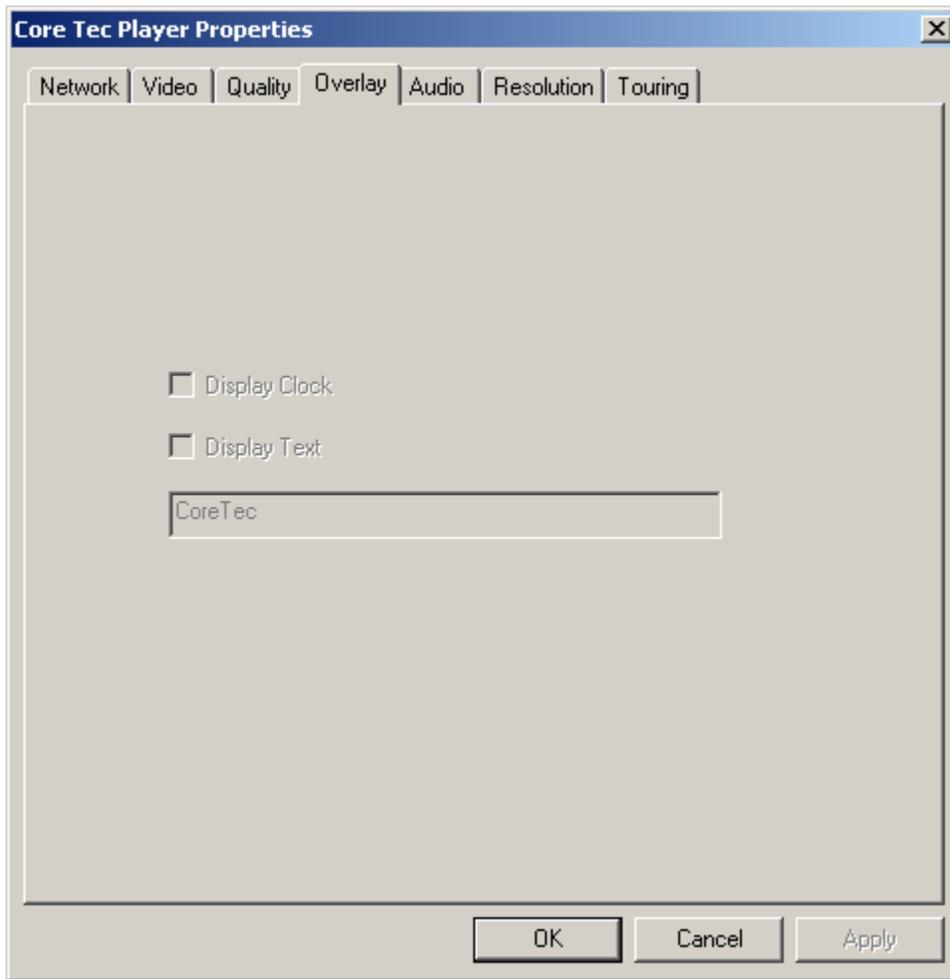
This section will allow the operator to put text and clock data on the screen. This action is as if a clear sheet was laid over the video stream and a description, data and time were added.

1.1.4.5 Audio
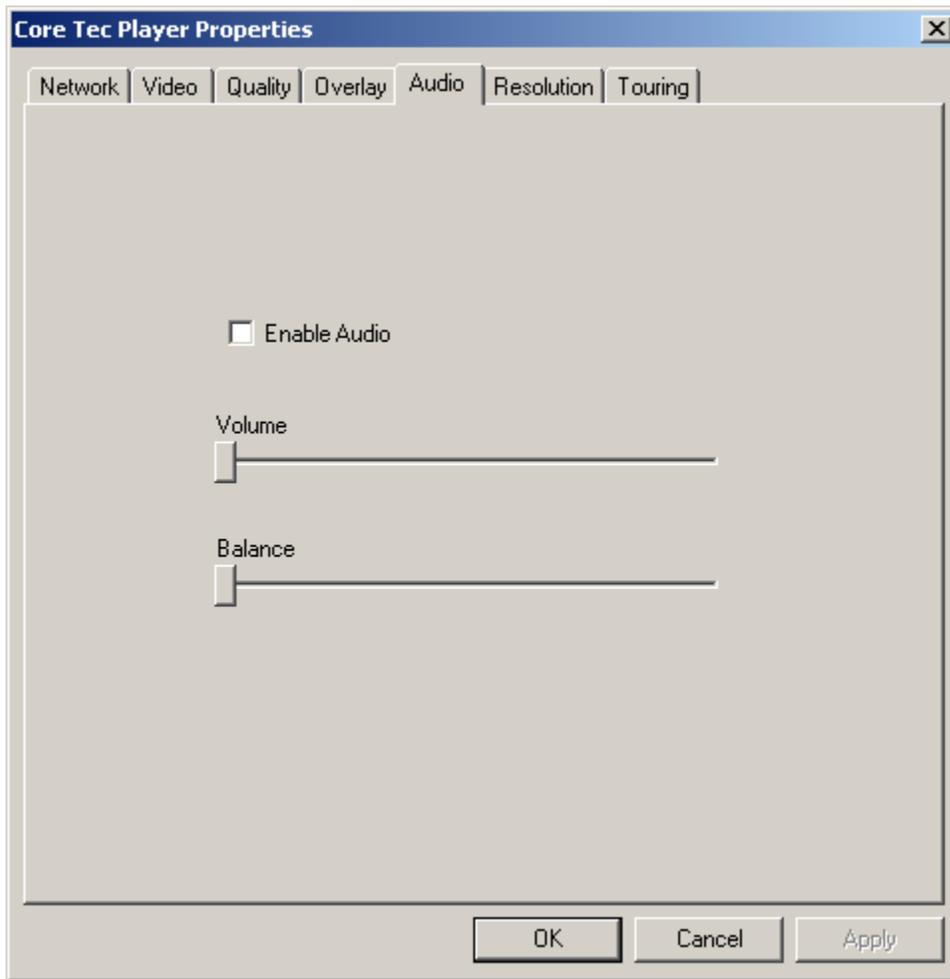
1.1.4.6 Resolution
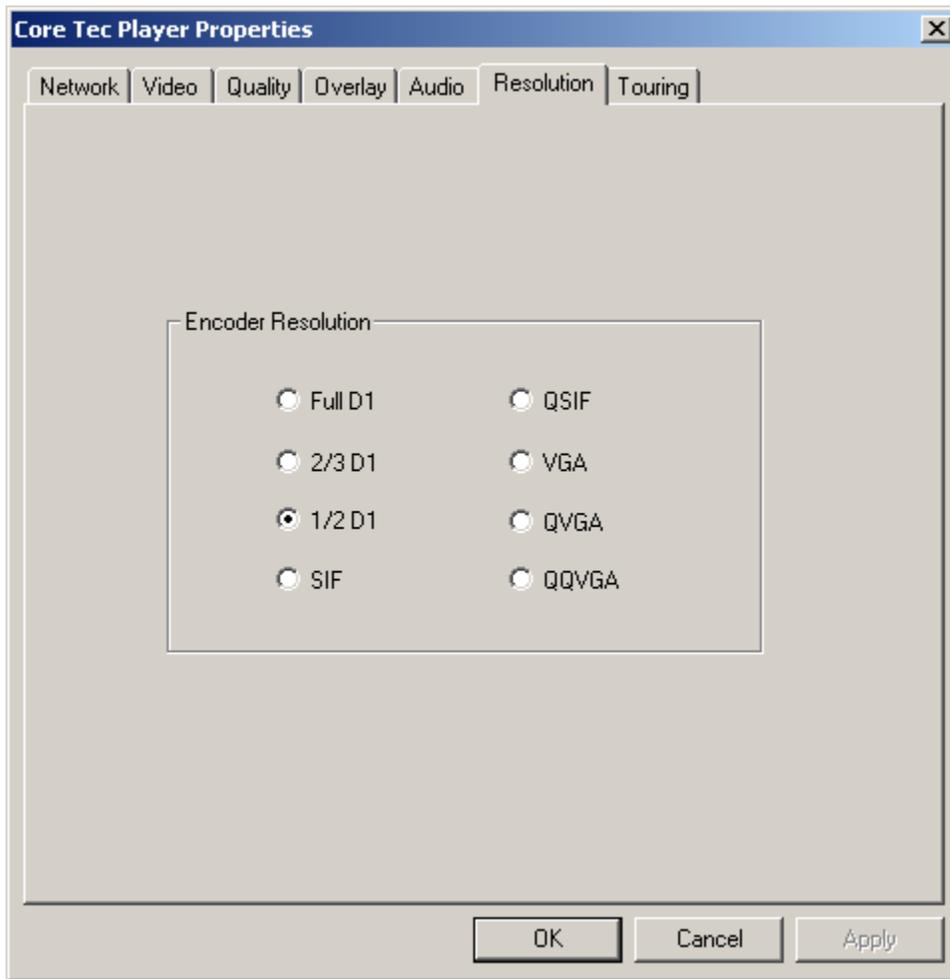
This form displays the resolution of the encoder. This dialog is for informational purposes only and cannot be changed. Communication with the encoder through the Network IP port is necessary to alter these parameters.

1.1.4.7 Touring

Touring is the ability for the operator to program the video port to receive multiplexed streams from multiple sources or encoders. This is performed by time on station controls in the above fields. The operator need only select the IP address and port number and assign time to the duration field. The Name field is a verbose description of the source being viewed. With the editing commands to the right of the form, the operator may alter the program assigned to the view port. Clicking the Start Tour will activate the program.

1.2 Device Discovery
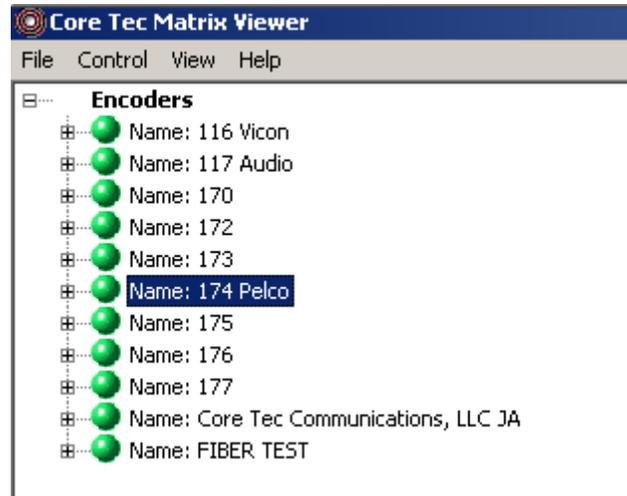
The device discovery is a process by which the software may scan the device network and find all devices connected to the network. The MMS suite of programs will broadcast a "Who's There" message and all devices, provided they are listening on the discovery IP address and the appropriate command port is selected. In response, the connected devices will provide the configuration streams needed to complete the communications links. This process is performed automatically on Matrix Viewer software is started.

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. Each entry begins with the "+" denoting additional information on the device. The device status is displayed next as a colored sphere next to the device name followed by the label assigned to the device.

"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.
          i.e. busy or rebooting
"Red"   Icons denote a device was found in the discovery phase but is now offline or
            communications link failure.

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.

1.2.1 Device Parameters

The device parameters will displayed in the pane will change according to the type of device selected. Many of the entries will change or will have a slightly different meaning. The operator should be aware of the changes implied when altering the device parameters.

1.2.1.1 Encoder Parameters

The following parameters apply, in general, to the encoder devices. Check other device parameters for the appropriate descriptions. Most of the parameters displayed in the drop-down menus are configured from the data collected in the discovery process. The menu items and parameters will change according to the type device and the software revision level of the selected device.

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1.3 Integrated Help System

2 Hardware Requirements

Describe in detail are the hardware requirements for the Matrix Viewer 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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2.1 Physical

Matrix Viewerr 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#

2.2 Environmental

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

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