Marshall Electronics

VMS Server

User Manual

Firmware Version v1.0

About this Manual

This user manual provides information on operating and managing the optimal video management software, VMS. The manual includes instructions of installation, operation and configuration of VMS as well as how to do troubleshooting.

This manual contains various applications based on network knowledge. User's basic network knowledge may be needed to fully understand this manual. This manual is designed to deliver the optimal ways to utilize various Video Management System configurations.

Legal Notice

The legal conditions of camera surveillance vary depending on regions. Unauthorized and inappropriate use may cause you to have penalties. Users have the responsibilities of legal operation of surveillance product. Please make sure to check your local laws before using this product.

Safety Notices

Do not proceed with improper operation beyond the instructions in this manual to avoid damages. Please read this manual before operation and follow instructions.

1. Introduction

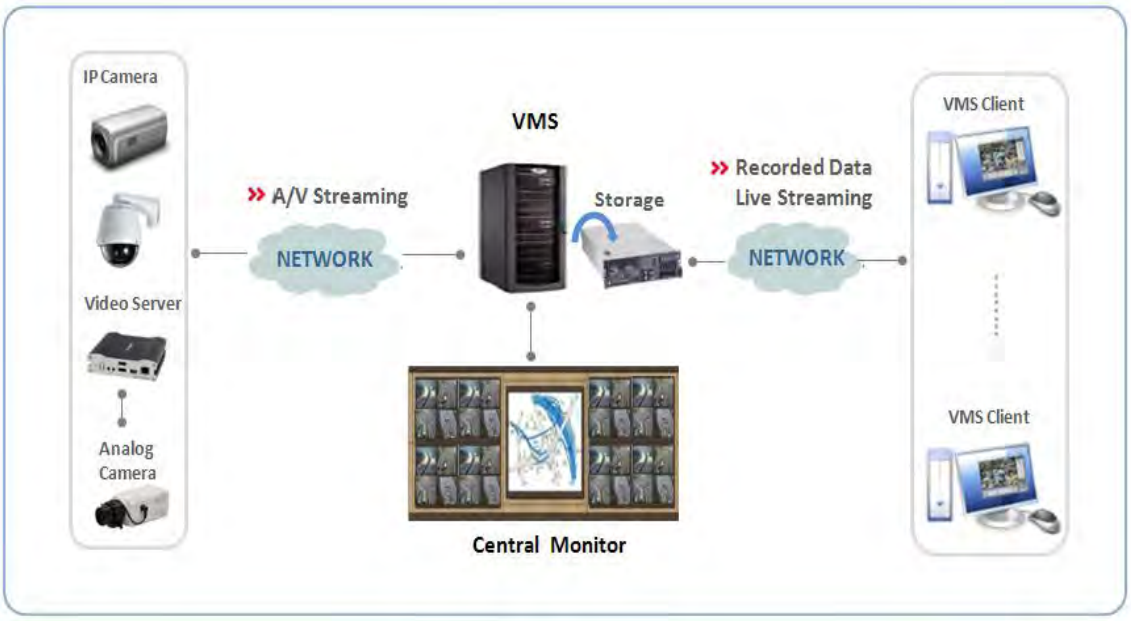
1.1 Overview

VMS is a complete monitoring and recording system for IP Cameras and Video Encoders. VMS is comprised of:

• VMS Server — handles all communication between the cameras, video encoders and recordings. Each server can communicate with up to 128 cameras/encoders.

• VMS Server Client — graphical interface enabling remote viewing and control from anywhere on the Internet or corporate network.

Several Clients can be connected to the same Server, and each Client can be connected to several Servers.



1.2 Features

VMS is a powerful IP video surveillance application providing rich features.

• Connect to a number of IP cameras (or video encoders) which monitor live video and audio in real-time.

• Record camera streams into local storage and provide a convenient search, playback and export to video clips of stored data.

• Monitor various events from the camera and associate various event actions.

• Provide stream relaying service to remote clients.

2. Installation and Start Up

2.1 Minimum System Requirements

The following minimum requirements should be met for normal VMS functioning:

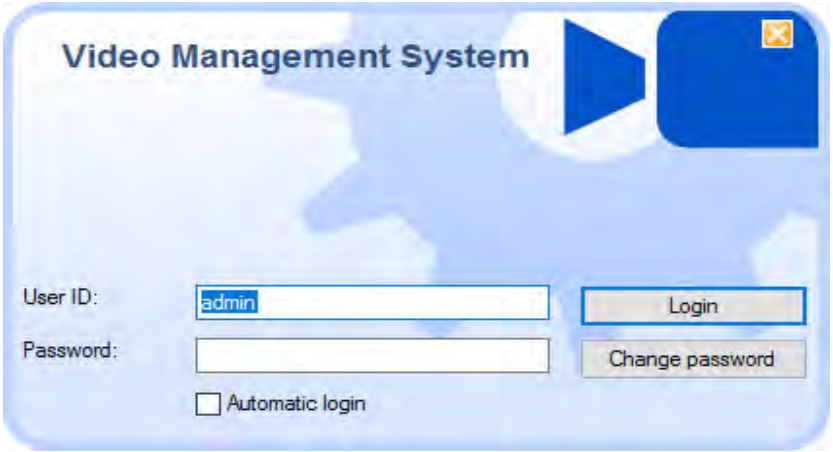
- Operating system: Windows 10/8.1/8/7, Windows XP Professional, Vista Business, Server 2003, Server 2008
- CPU: Intel Pentium 4, 2.4GHz or higher
- RAM: 1GB or larger
- Network: Ethernet 100Mbps or higher
- Graphics:
- Graphics memory: 128MB or larger
- DirectX9.0c installed
- Screen resolution: 1024x768 or larger

Note: Above minimum requirements are for normal functioning cameras. The requirements to support more cameras vary depending on the number of channels, video resolution, framerate, bitrate etc. Please contact MEI technical support to get the recommendation for a specific configuration for supporting a large number of cameras.

2.2 Installation

Installation of the VMS is started by double-clicking the installation package. During the installation, administrator credentials will be prompted.

Default Login:
User ID: **admin**
Password: **1234**



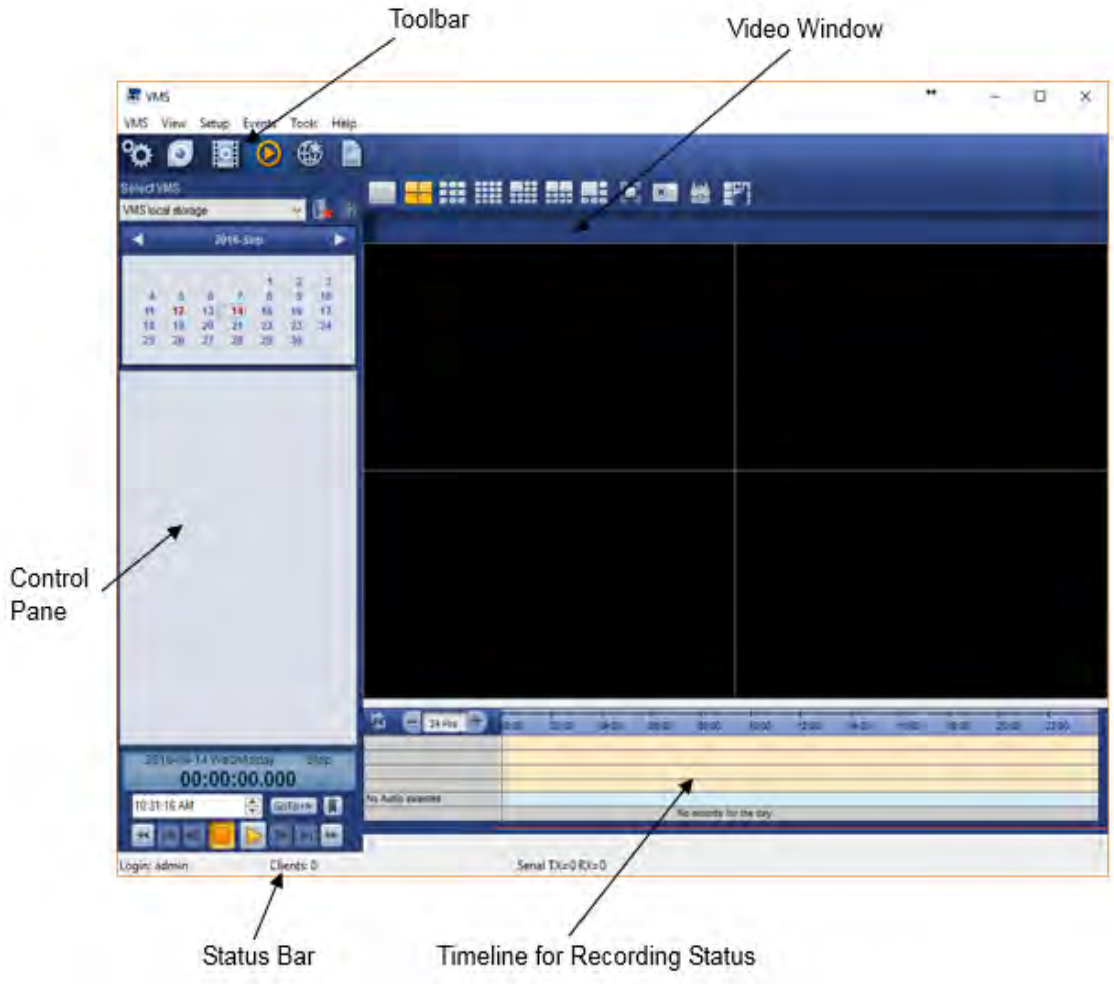
After entering the **Default User ID and Password**, the user will be prompted to change the login credentials.

When **Automatic login** is checked, the VMS doesn't require a login in the next startup. **Automatic login** settings can be changed in the **Security** setup also.

3. Overview of Application Interface and Functions

3.1 Application Interface

VMS Application Interface consists of several parts as shown below:



Tool Bar

The Tool Bar provides shortcuts to frequently used functions or applications.

- **Setup**

Manages the VMS Settings. Individual dialog can be accessed also from the corresponding menu.

- **Live Mode / Record Mode**

Changes the UI Mode of the application.

3. Overview of Application Interface and Functions

- **Search**

Changes the UI Mode of the application to **Search** Mode.

- **E-Map**

The **E-Map** application provides geographical management of camera locations, etc.

- **Event Log**

Logs real-time monitoring of events and has the capability to search stored events.

Control Pane

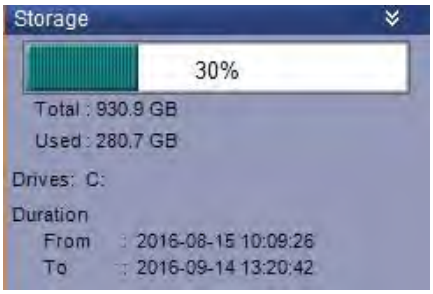
The Control Pane provides most of the controls for the VMS including camera connection management, PTZ control, audio control, and color control. It also shows storage status briefly. Each pane can be hidden or shown using corresponding menu in **View** menu group.

- **Camera Tree**

Shows registered cameras and provides the connection for operations. Sensor and alarm device status is attached to the camera. This provides a way to start a recording instantly.

- **Storage**

Shows the storage status and recorded duration. This collects the information from the disks which are selected for recording.



- **PTZ**

Provides PTZ control interface. Circular control provides full control for pan and tilt including the speed. Speed control applies to zoom and focus control. Preset also can be selected here. Further PTZ camera controls are available on the PTZ control dialog.

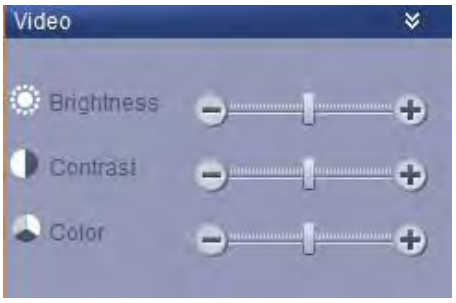
- **Audio**

Provides audio controls for the PC input and output. Speaker volume and mute can also be controlled. The audio wave format file can be played on the camera instead of live input.

3. Overview of Application Interface and Functions

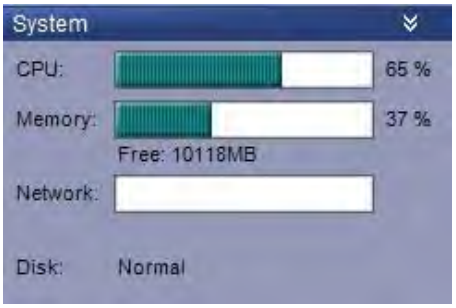
- **Color**

Provides video input color controls for the selected camera.



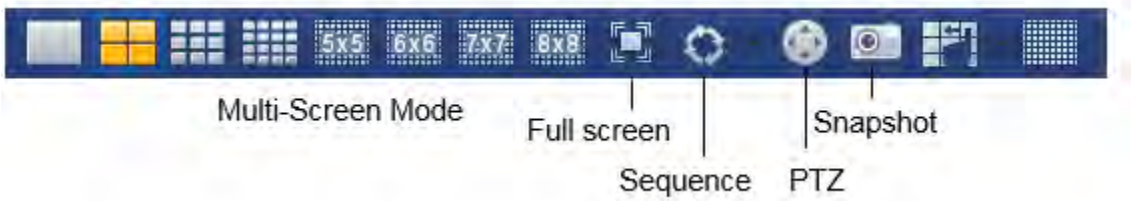
- **System Health Monitoring**

Displays CPU load, memory status, network load and status of disk writing.



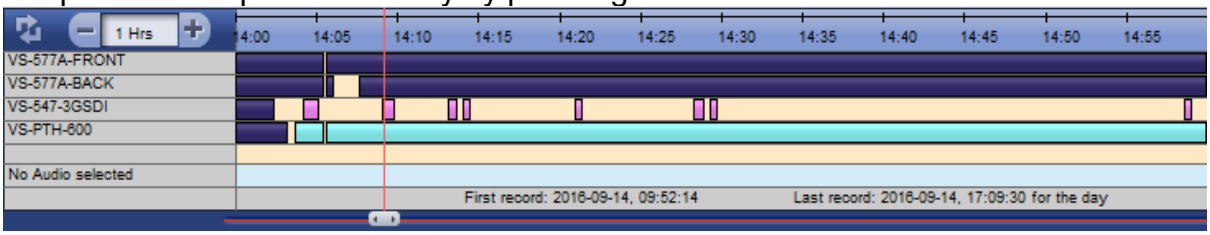
Video Window

Video Window is the display area for the cameras. It consists of different display units (DU). The toolbar above the video window provides various display configurations.



Timeline for Recording Status

Timeline shows the recording status with multiple colors based on the recording modes of a selected camera. Detailed view can be obtained by changing the scale of the timeline using the + or – button. Although the timeline is updated periodically, it is possible to update manually by pressing the refresh button.



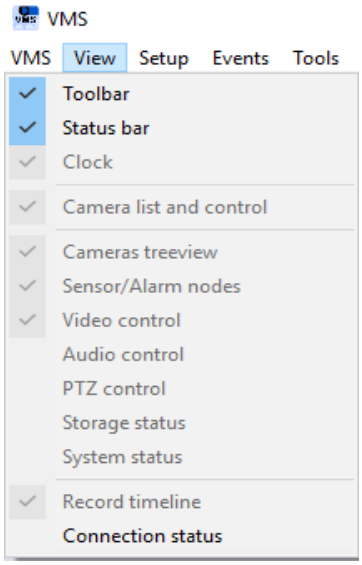
Status Bar

The Status Bar shows additional information such as login ID, the number of currently connected viewing clients, and statistics for serial TX/RX activity.

3. Overview of Application Interface and Functions

Showing / Hiding the User Interface Components

Visibility of each user interface component is controllable using the corresponding menu in **View** menu. When some features are not used, corresponding components can be hidden. **Sensor/Alarm nodes** menu control if the sensor and alarm nodes in the tree are to be shown or hidden. In case sensor/alarm devices are not used, more concise tree can be obtained by hiding the nodes.



Two User Interface Modes: Live Mode and Record Mode

VMS provides two user interface modes: **Live Mode** and **Record Mode.** These toolbar buttons can be used for switching modes.

Live Mode

Live Mode is used when interactive monitoring of live video is required. Decoding and video display takes essential CPU loading so the number of cameras to be viewed simultaneously can be limited according to the video encoding settings for camera and PC's performance. In terms of functionality, Live Mode supports the recording function.

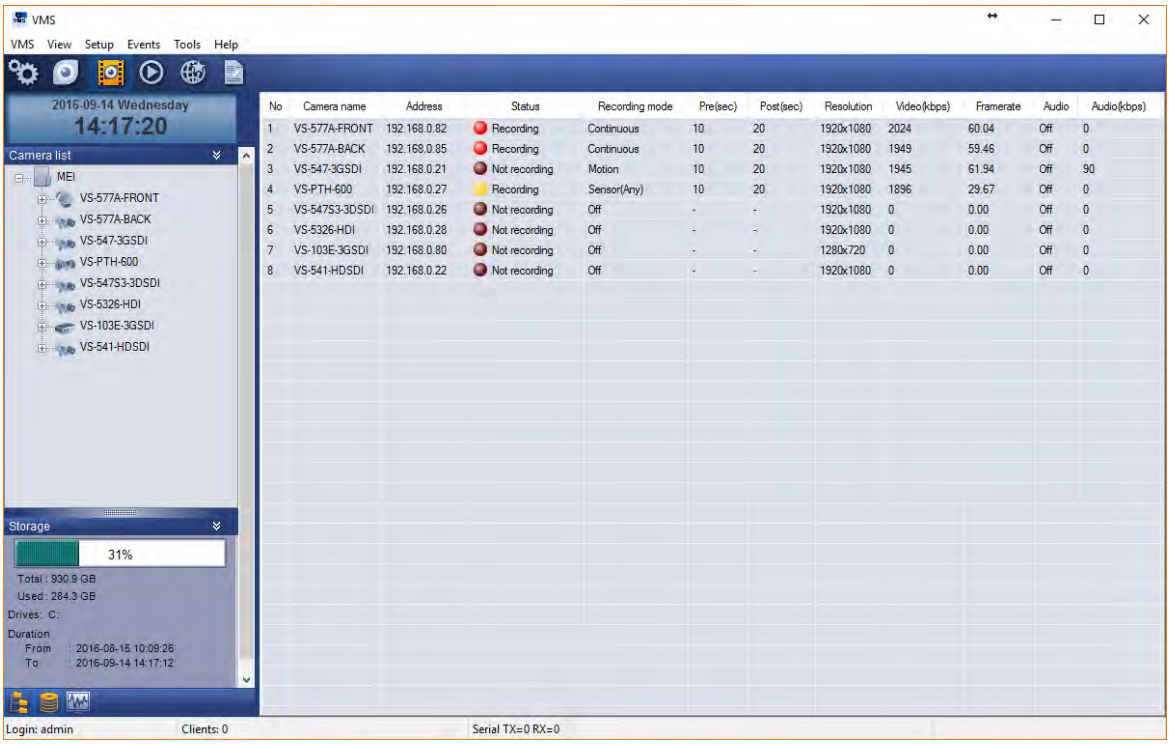
Note: If the Graphics Mode of the PC is not configured to support video display in Live Mode, a "Display initialization Error" will be shown in video area. Live Mode requires the following:

- Minimum 128MB graphics memory
- DirectX9.0c installed and maximum H/W acceleration
- 32-bit color mode

Record Mode

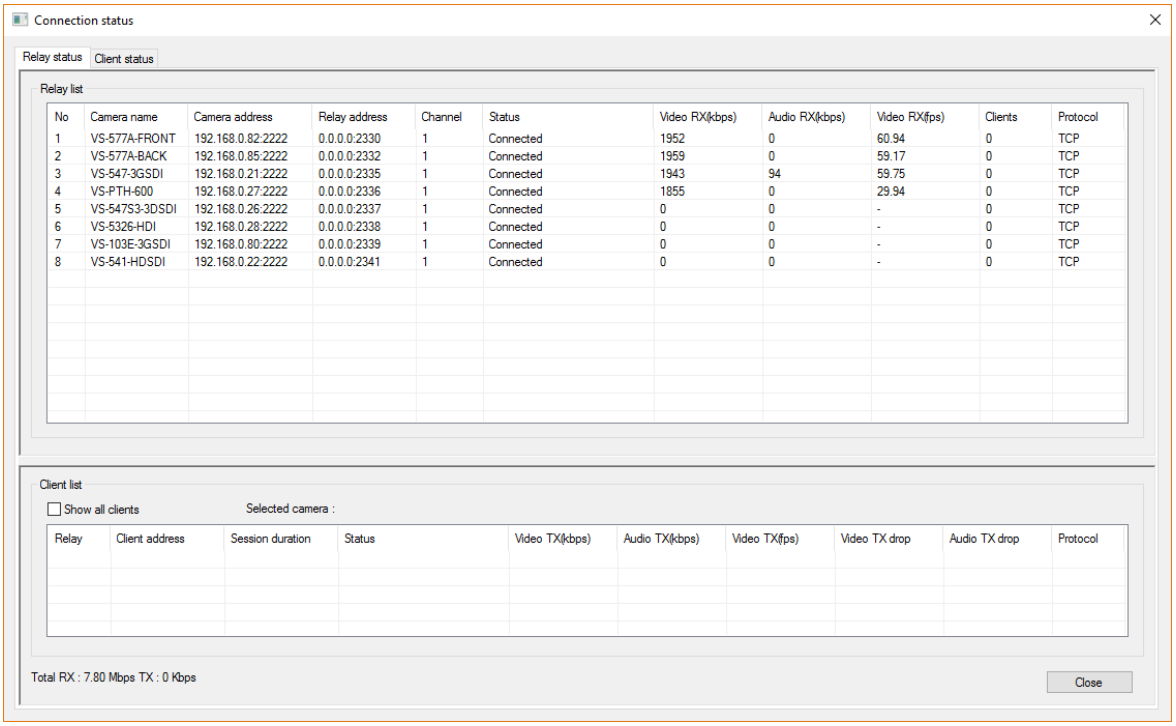
When live monitoring in the VMS PC is not essential, Record Mode is preferred. This doesn't require CPU loading for decoding and display and more cameras can be accommodated for recording and streaming. Another advantage of Record Mode is that it can run in any display mode with any kinds of graphics cards.

3. Overview of Application Interface and Functions



Streaming to Remote Clients

VMS internally provides streaming capability for remote client viewers. Remote clients can connect to VMS to get video, audio and event data. This indirect relaying reduces the camera streaming load as well as the network load. VMS Status can be viewed in the **Relay Status** sub menu within the **View** menu.

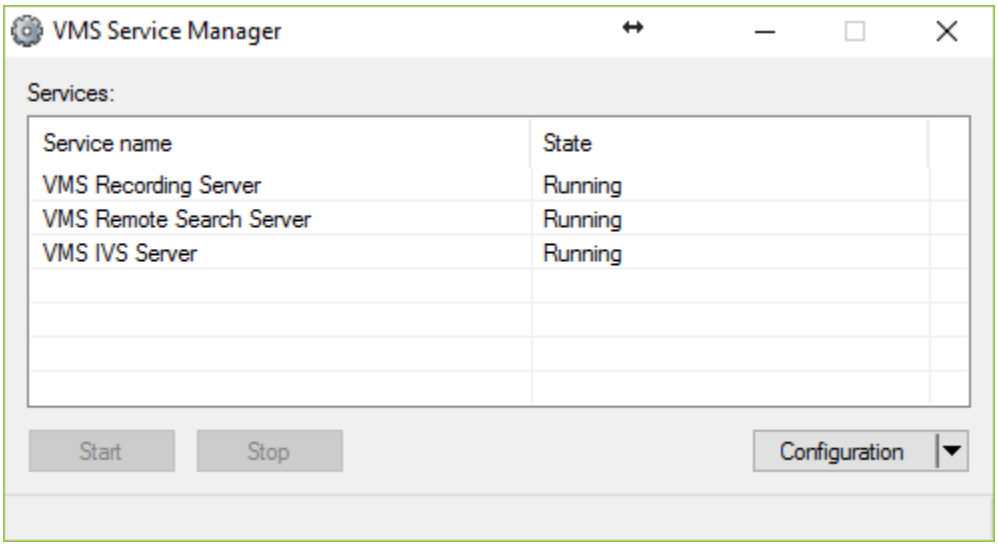


3. Overview of Application Interface and Functions

Controlling Services

VMS internally runs two services: **VMS Recording Server** (recording and streaming) and **VMS Remote Search Server** (remote search and playback). They are automatically started by VMS installation and run even when the VMS application is terminated.

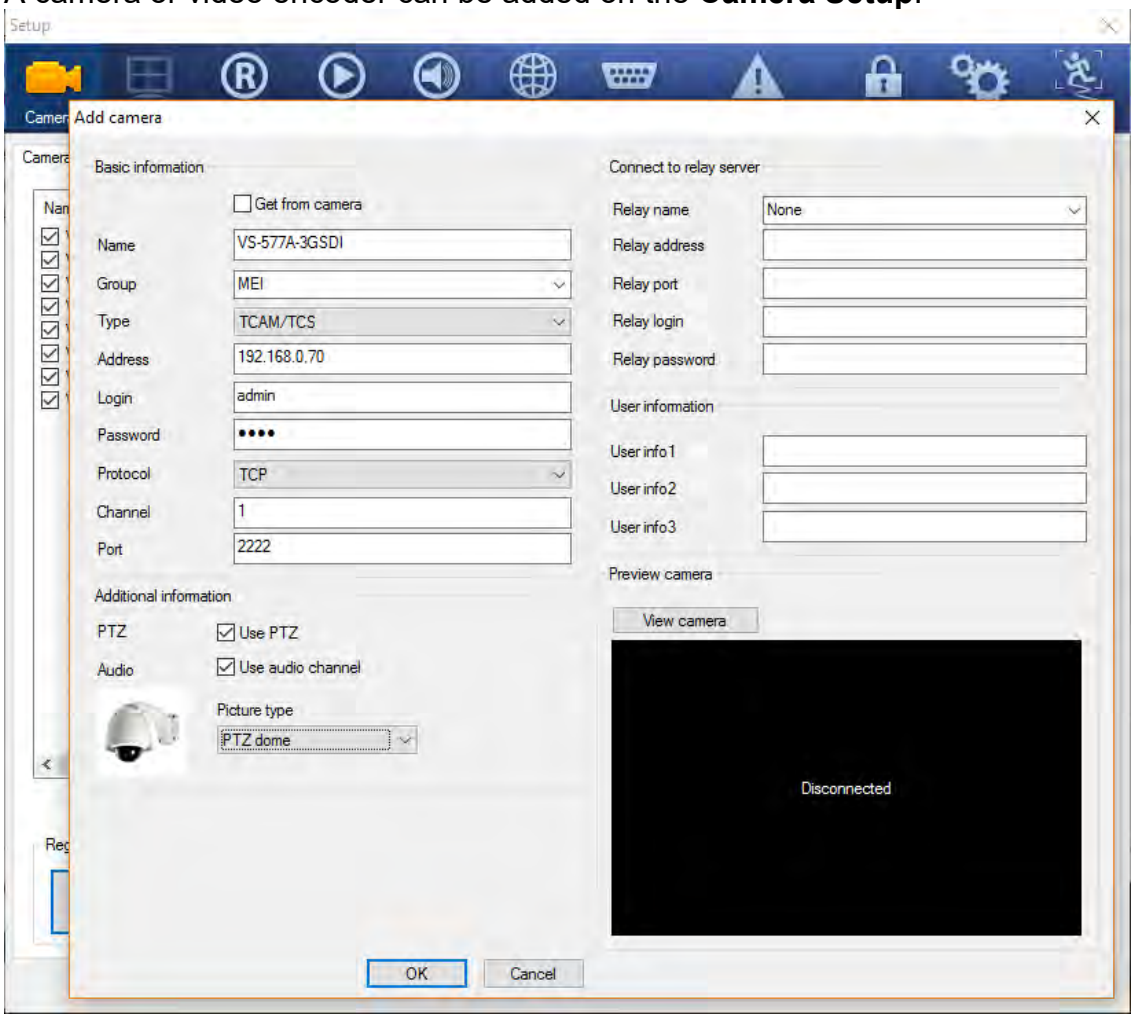
It is possible to start or stop the services manually using VMS Service Manager (icon is visible on the Windows task bar).



4. Live Monitoring

4.1 Adding Cameras or Video Encoders

A camera or video encoder can be added on the **Camera Setup**.



1) Open Camera Setup Window.
2) Click **Add Camera** button to open the camera window.
3) Enter the camera information:

   Name: Name the new camera.

   Group: Select group name for that camera. Once a group is created, it can be selected for each new camera.

   Type: Select the camera type to be added:

   - **TCAM/TCS** : MEI IP camera or MEI video server.
   - **Generic RTSP**: Supports IP camera or video server streaming based on RTSP/RTP protocol. RTSP URLs are dependent on the IP cameras or video servers. MEI products support the following types of URLs:

     rtsp://IP_Address/video1
     rtsp://IP_Address/video1+audio1
     rtsp://IP_Address/video1s
   - **Onvif**: Onvif-compliant cameras can be registered with this type.
     Onvif MEI cameras can use the following:
     http://192.168.0.117/onvif/device_service

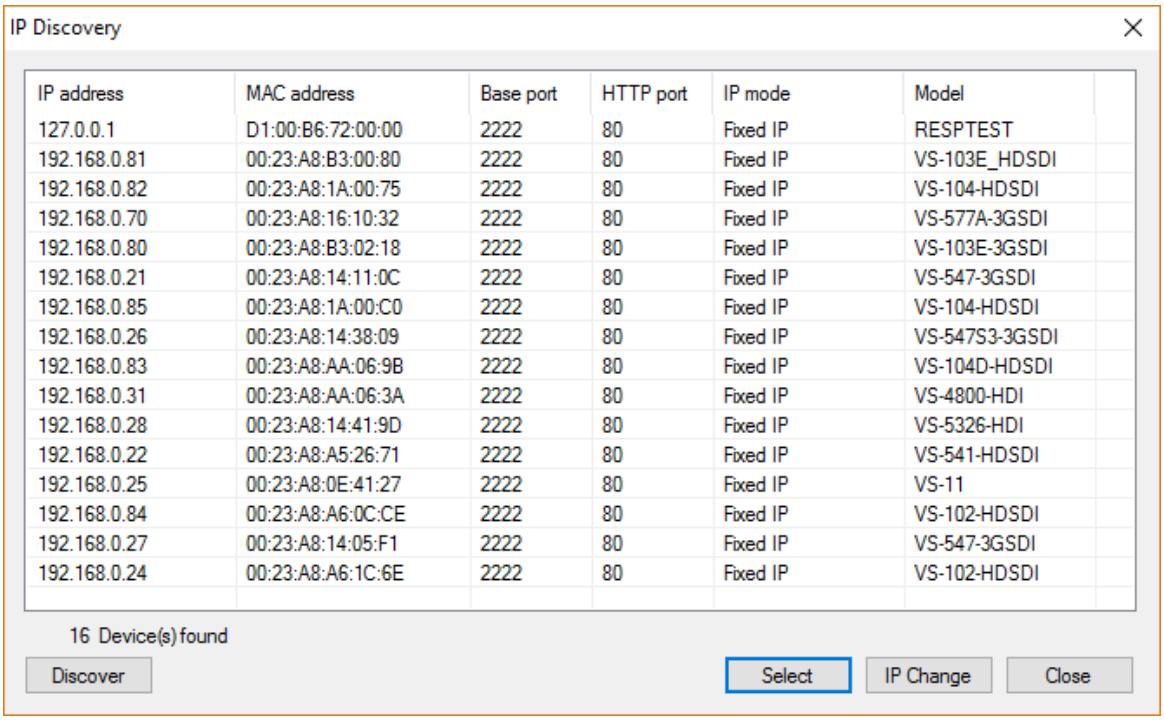
Address: IP address, domain name or URL of the camera.
Login/Password: Login ID and password of the camera.
Protocol: Protocol for streaming video/audio data.
Channel: Channel number if the video encoder has multiple channels (starting from 1).
Port: Port number to connect.
Primary (Onvif only): Profile of the primary stream.
Secondary (Onvif only): Profile of the secondary stream.
PTZ: Check if PTZ control is best for the camera.
Audio: Uncheck when audio will not be used.
Relay Name: Streaming server name when the VMS is connecting to the specified camera via streaming.
Relay Address: Address of the streaming server.
Relay Port: Port of the streaming server (default: 2222).
Relay Login: Login ID of the streaming server (default: admin).
Relay Password: Password of the streaming server (default: 1234).
User Info1~3: Additional information for the user.

- Click OK.

Camera Discovery – MEI Protocol

The **IP Discovery** function can detect the cameras, video encoders or video decoders using the same LAN for MEI products.

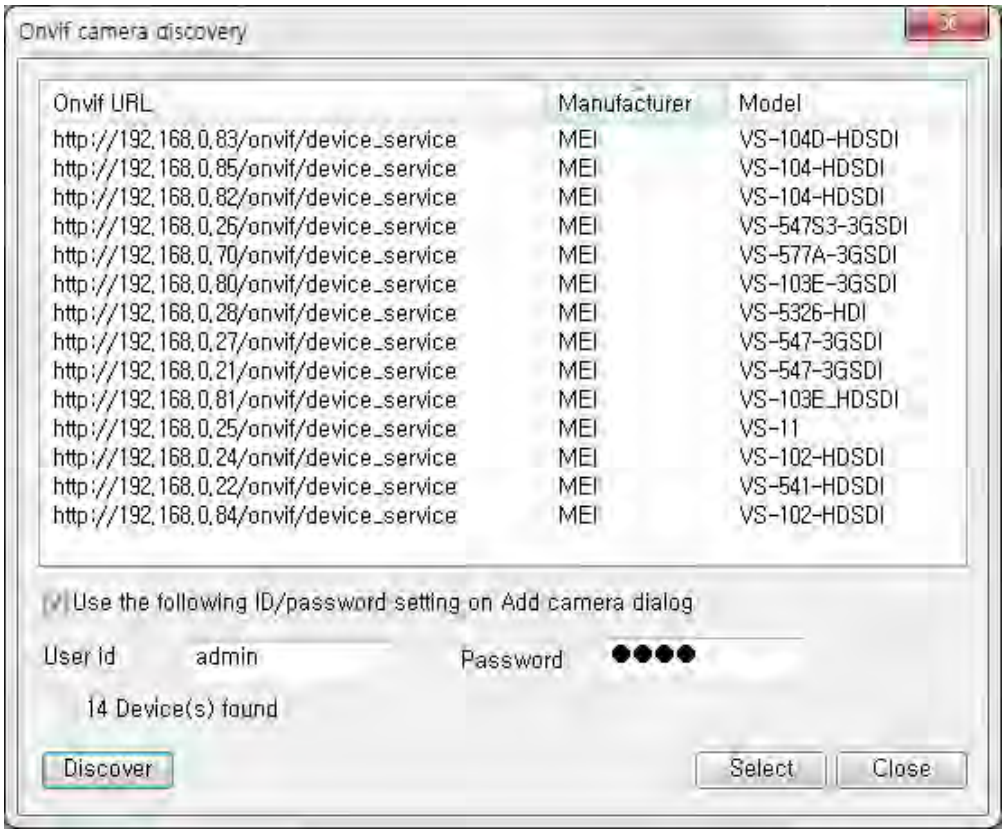
1) Click **IP Discovery** button on **Camera Setup** window.
2) Select a device to add and click the Select button.
3) Enter addition camera information in **Add Camera** window.



4. Live Monitoring

Camera Discovery – Onvif Compliant Cameras

Onvif compliant cameras can be detected by pressing the **Onvif Discover** button. Specifically, WS-Discovery is used for finding cameras. This function also works for the cameras in the same LAN.

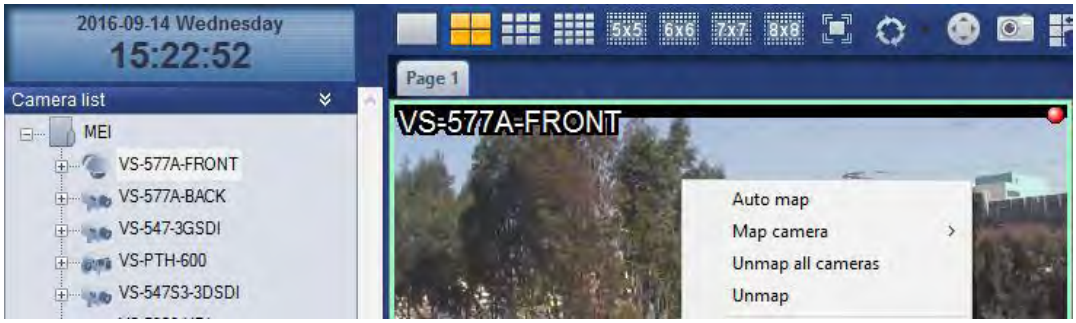


Quick Viewing of Added Camera

Once a camera is added, it will be displayed as connected if it is reachable. The camera node will turn gray in color if it is connected. The video from the camera will not be displayed on video window until the camera is mapped to a DU (display unit). The simplest way to map a camera is to use the automatic mapping function.

1. Right click on any position of the video window.
2. Select the **Auto Map** menu.
3. All cameras in the tree will be mapped to the DUs sequentially (left-to-right, top-to-bottom). If the tree has more cameras than the screen mode can accommodate, more pages will be created automatically.

4. Live Monitoring

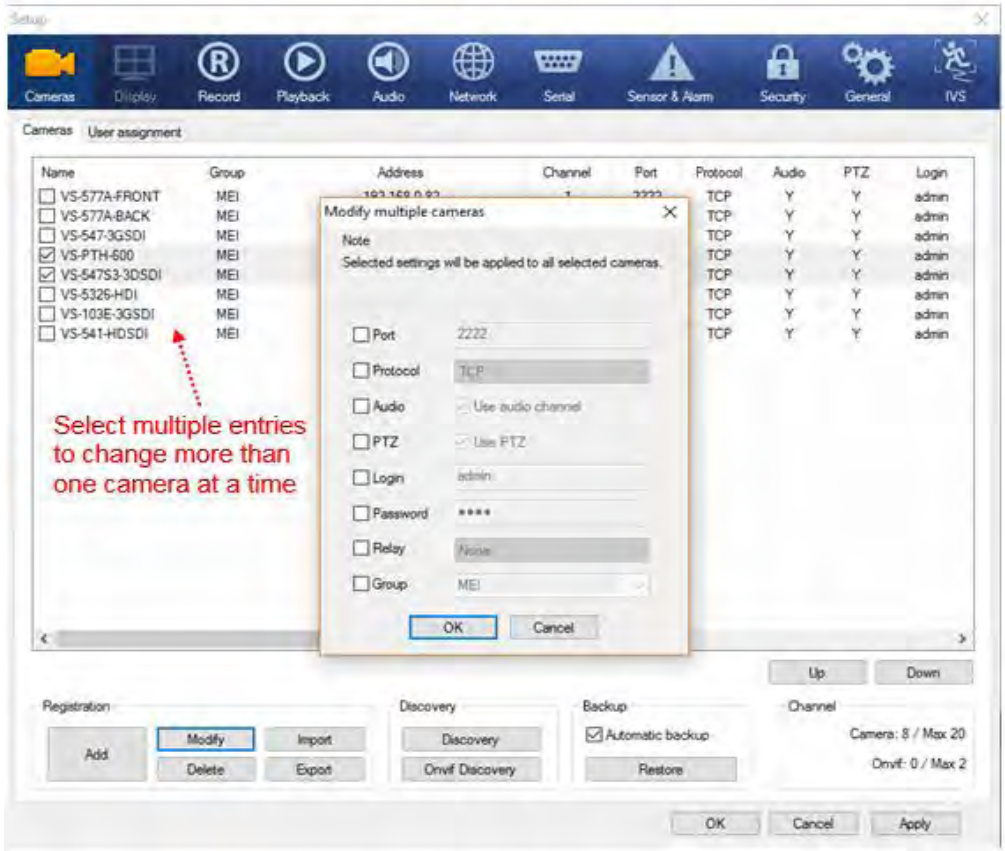


Automatic mapping operation applies only to the current screen mode.

Note: Cameras are mapped to DUs automatically without explicit mapping in 1x1 screen mode. While custom mapping is available for various configurations in multi-display modes, the mapping can be limited in 1x1 mode. Only automatic mapping is supported in 1x1 mode.

Changing Camera Information

Pressing **Modify** button on Camera setup dialog invokes **Modify camera** dialog which is similar to **Add camera** dialog. Double clicking a camera entry in the table also invokes **Modify camera** dialog. It is possible to modify some entries of multiple cameras by selecting multiple entries before pressing **Modify** button.



4. Live Monitoring

4.2 Display Management

Camera – DU Mapping

The DU (Display Unit) is a rectangular region consisting the video window.
For Example: 2x2 mode consists of 4 DUs and 4x4 mode consists of 16 DUs.
To view the camera, it should be mapped to one of the DUs.

A camera can be mapped to a DU in three ways:
(1) **Drag and Drop:** Drag a camera from the tree and drop on a DU.
(2) Use **Map Camera** menu on a DU.
(3) Use **Auto Map** to map all cameras to DUs in a screen mode.

Automatic mapping is convenient for mapping all registered cameras to all screen modes with one click. It creates required pages in each screen mode and maps cameras to DUs in left-to-right and top-to-bottom order, starting from the top-left DU.

Automatic mapping can be modified later by manual mappings according to specific needs. It is possible to map a camera to multiple pages in a screen mode.

The position of a camera in the video window can be changed instantly by dragging and dropping a DU on a different DU. If the destination DU already has another camera mapped there, the positions of the two cameras are exchanged.

A DU can be released from camera mapping by using the **Unmap** menu found by right clicking over the DU.

4. Live Monitoring

Page Operations

A page is defined as a set of DUs which can be displayed simultaneously in a specific screen mode. For Example: a 4x4 page contains 16 DUs. When the number of cameras is greater than the number of DUs on a page, more than one page is required. Automatic mapping creates required pages automatically.

More flexibility in mapping cameras to DUs can be achieved by allowing manual creation, renaming, and repositioning of the pages. A menu for the page operation can be found by right clicking over the page title tab.

Full Screen

Full Screen mode is displayed by clicking the  button. The ESC key is used for returning to the previous screen mode. For sites where the keyboard is not used, returning only with mouse operation is supported. Press the wheel of the mouse for returning to previous screen mode.

Controlling Camera Video Encoding for Effective Multi-Channel Display

- **Video Encoding Settings for Individual Cameras**

The **Video Encoding** tab within the **Display Setup** allows the camera to be set up for video encoding. When camera settings are modified, the effect will be shown on all connected clients and data will be recorded by the VMS.

Video encoding | Automatic control | Etc

Get from cameras | ☐ Get settings whenever Display setup is opened | ☑ Send modified settings only

Name	Stream	Preference	Resolution	Framerate	VBR	CBR	I-Frame
VS-577A-FRONT	Primary	CBR	1920x1080	60	N/A	2000	30
VS-577A-BACK	Primary	CBR	1920x1080	60	N/A	2000	30
VS-547-3GSDI	Primary	CBR	1920x1080	60	N/A	2000	30
VS-PTH-600	Primary	CBR	1920x1080	30	N/A	2000	30
VS-547S3-3DSDI	Primary	CBR	1920x1080	30	N/A	2000	30
VS-5326-HDI	Primary	CBR	1920x1080	30	N/A	2000	30
VS-103E-3GSDI	Primary	CBR	1280x720	60	N/A	2000	30
VS-541-HDSDI	Primary	CBR	1920x1080	30	N/A	2000	30

Use **Propagate To All** function by right clicking on a value then set the same value to all cameras.

Settings can be retrieved, saved to a local configuration file, and set on the camera.

4. Live Monitoring

Initial Settings When a Camera is Added

When a camera is added, settings are read from the camera on the first connection. These values are saved to the local configuration file. '-' is shown until it is connected.

Get From Cameras Operation

Settings can be read from the camera using the **Get From Cameras** button at any time. When several cameras are connected and/or the network connection is poor, it may take considerable time. If **Get Settings Whenever Display Setup is Opened** is checked, the VMS reads the camera settings on the display.

Applying Settings to Camera and Save Configuration File

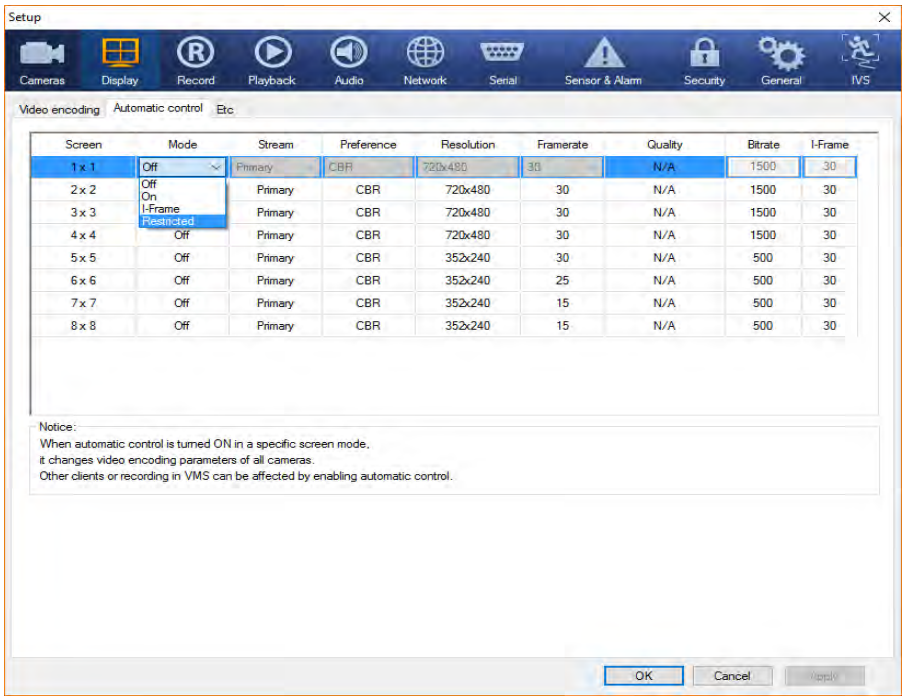
If **Send Modified Settings Only** is checked, settings can be changed manually or the **Get From Cameras** selection will be applied and saved to the configuration file by clicking **OK** or **Apply**. Otherwise all settings in the table are applied unconditionally. It is recommended to use this setting only when necessary.

The **Propagate To All** function is displayed by right clicking on a value. When selected, the same values will be set for all cameras.

Note: When the display and recordings are configured to use the same stream (primary or secondary), changing the video encoding settings in one setup will change the settings in the other. It is preferable to configure only one setup when the same stream is used for both.

- **Automatic Control of Video Encoding for Various Screen Modes**

With standard video encoding, it is not possible to view several HD videos simultaneously. But when viewing an HD video in a small NxN screen mode (not ideal), VMS controls video encoding automatically based on the current screen mode.



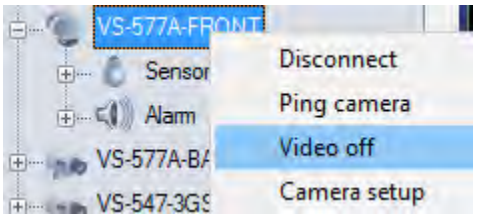
4. Live Monitoring

This feature is more useful if the camera or encoder supports dual stream encoding. One stream can be configured with fixed settings to get consistent recording quality, while the other can be controlled dynamically according to the screen mode to get smooth display with fast CPU load. **Restricted** Mode is useful when the PC display resources are not adequate. In this mode, decoded frames are dropped without display based on the framerate specified.

> **Note:** Automatic control is useful only when the **Decode Visible Channel** setting is selected. If this setting is OFF, all channels are decoded regardless of the screen mode. CPU loads will be almost the same in any mode.

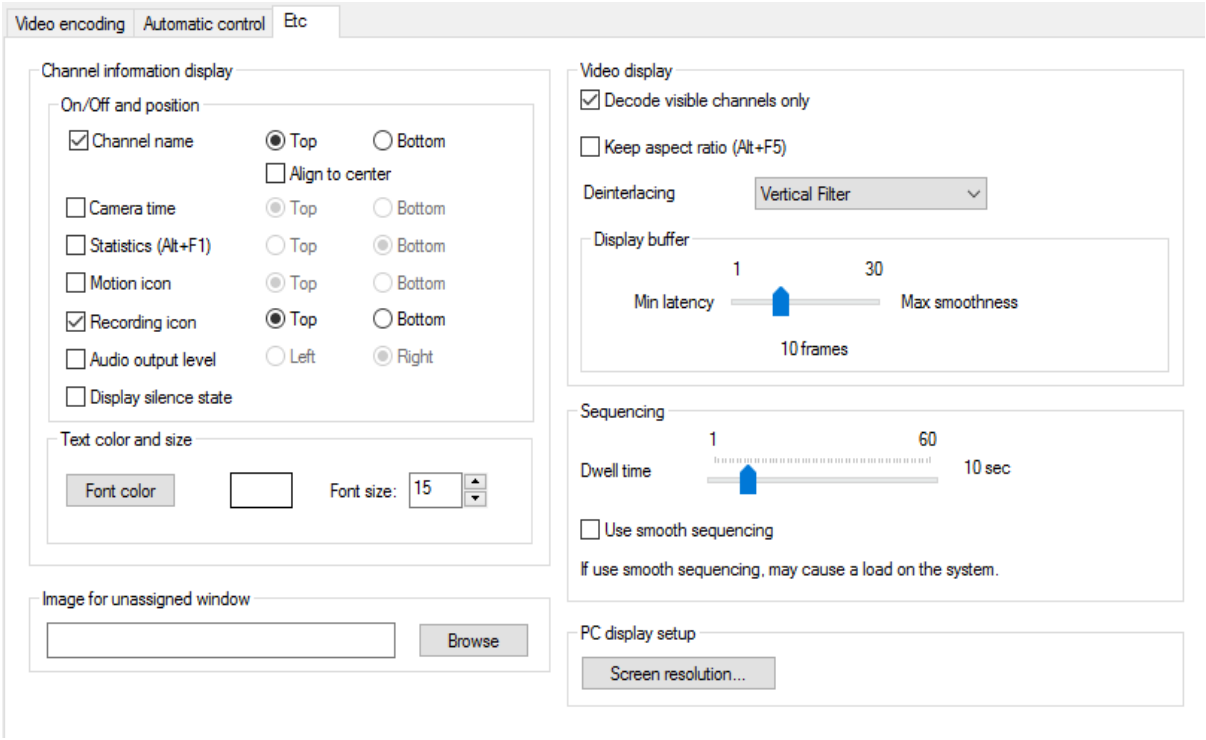
Video On/Off Control

Video streaming from a camera can be turned off using the camera menu tree or the DU. The event handler provides an option to turn on the video automatically for selected events. The Video on/off menu allows event-based video viewing.



Additional Settings for Video Display

The **Video Display** setup contains additional settings related to video viewing.



- **Image for Unassigned Window**

If no camera is mapped, the DU displays a black screen. A customized image can be displayed in this setting.

4. Live Monitoring

- **Decode Visible Channels Only**

When selected, the VMS doesn't decode invisible channels. For Example: the maximum of 4 channels are decoded in a 2x2 screen mode. When the screen mode is changed to view channels which are not visible, it will take a few seconds to access the video for these invisible channels in current mode. If the PC allows decoding of all the channels simultaneously, quicker video display is shown by disabling this setting.

- **Stop Video Display While Search Application is Running**

When selected, the VMS stops the displayed video if True Search application is running. This option reduces the CPU load time for efficient searching.

- **Keep Aspect Ratio (ALT+F5)**

When selected, the video display in a DU keeps the encoded steam width-height ratio instead of scaling to fit to the DU and the empty area turns black.

- **Deinterlacing**

Select the deinterlacing option.

- **Display Buffer**

Set the number of frames for decoding and display. Larger values produce a smooth display but the latency increases.

- **Sequencing**

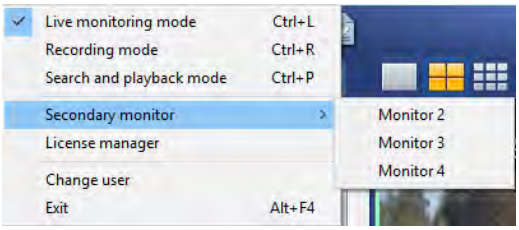
When enabled, pages in a screen mode are displayed with a specified intervals.

4. Live Monitoring

4.3 Viewing Secondary Monitors

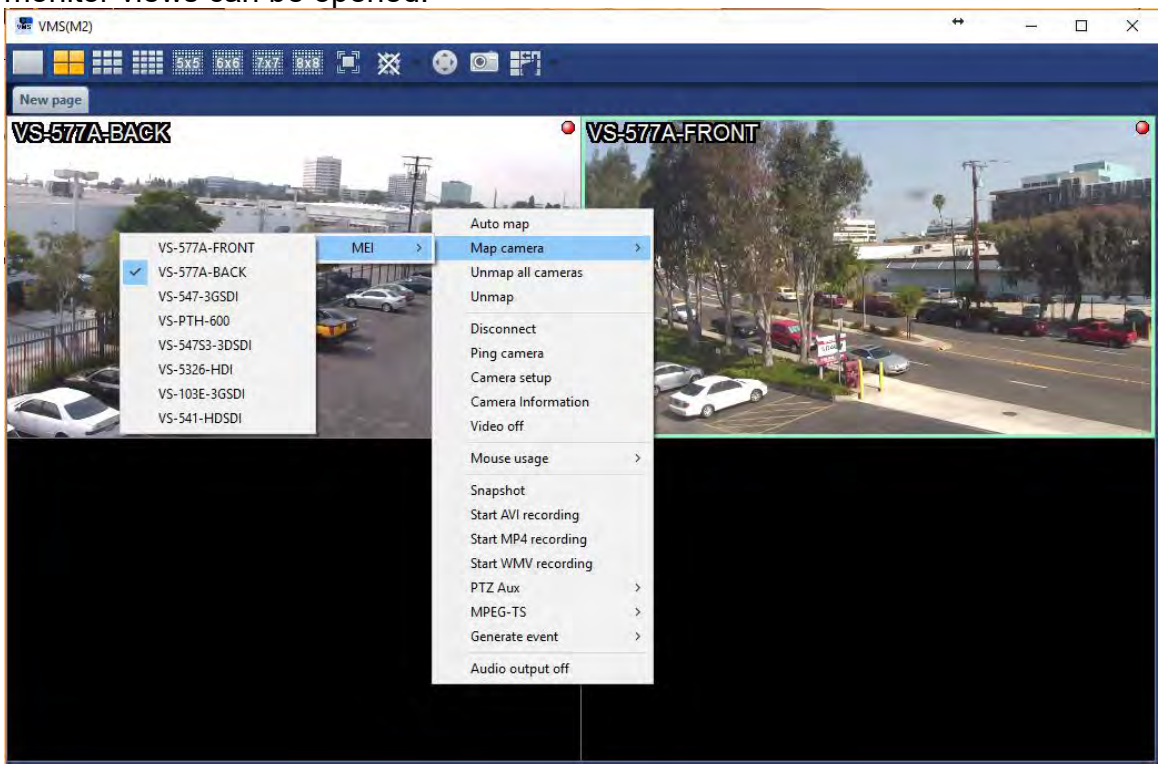
VMS allows a second video window to be moved to the secondary monitor if it is supported in the PC.

The extra video window is called the **Secondary Monitor View**. It can be opened using the **Secondary Monitor Menu** within the **VMS Menu**.



Secondary Monitor Menu in VMS Menu

The secondary monitor view is similar to the main GUI **Live** Mode but items not related to the video display are omitted. A camera can be mapped to the secondary monitor DU using the DU menu. One camera can be mapped to both to the primary monitor (main GUI in Live mode) and to the secondary monitor view. Dragging a camera from the main GUI tree to the secondary monitor is not allowed. A max of 3 additional secondary monitor views can be opened.



Sharing Display Memory Between Main Monitor and Secondary Monitors

Display memory allocated from the graphics card needs to be shared manually between main and secondary monitors. Both the main and secondary monitors have a **Reconfigure Display Memory** menu to configure.

4. Live Monitoring

Initial Opening of Secondary Monitor

When a secondary monitor is first opened and cameras are mapped, the VMS will send a message asking to reconfigure the display memory. Selecting **Yes** is mandatory to display channels on the secondary monitor. By reconfiguring the display memory, the total display memory allocated for VMS is distributed to main and secondary monitors proportionally to the number of channels on the monitors. Video resolution is also considered. 1 HD channel corresponds to 6 SD channels.

Changing Number of Channels on Secondary Monitor

When the number of cameras on the secondary monitor is changed, it is necessary to reconfigure the display memory by selecting **Reconfigure Display Memory.**

Disconnecting Use of Secondary Monitor

If a secondary monitor is disconnected and won't be used anymore, it is necessary to reconfigure the display memory by selecting **Reconfigure Display Memory on Main Monitor.** This will switch all the secondary monitor cameras to the main monitor by default.

4. Live Monitoring

4.4 Camera Connection

How to Connect or Disconnect

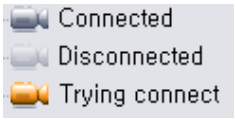
A camera can be connected or disconnected with one the following ways:

(1) Menu on the camera node of the tree
(2) Menu on the DU
(3) **Camera Setup** checkbox

The menu on a group node can be used to change the connection states of all cameras in the group in a single operation.

Camera Icons for Connection States

Depending on the connection state of a camera, the icon in the tree will be displayed in various colors. A DU displays current state in a black or blue color background window.



"Peer Lost" Display

When the VMS is connected to a Decoder and the Decoder isn't connected to a camera or encoder, the corresponding DU displays "Peer Lost" on the blue background.

4.5 Exclusive Group Connection Mode

The VMS provides a camera connection called **Exclusive Group Connection Mode**. When Exclusive Group Connection is enabled, each camera group is connected exclusively. If a camera group is connected using the **Connect** menu on the camera node, the previously connected group is disconnected automatically. Cameras that are currently connected in the group are automatically mapped to the DUs. The camera position can be changed on the DU by dragging and dropping until the VMS is terminated.

The Exclusive Group Connection Mode can be configured on the General Setup. By default, this is disabled. The Secondary Monitor function is disabled in the Exclusive Group Connection Mode.

4. Live Monitoring

4.6 PTZ Control

PTZ control for a camera is enabled only when the **Use PTZ** setting is checked when adding a camera in the **Camera** setup.

PTZ Control on the Control Pane

The PTZ tab consists of the following functions: Pan, Tilt, Zoom, Focus and Preset Selection. The PTZ button located on the toolbar above the video window allows full control of these functions.

- **Pan/ Tilt**

To move the camera to a desired location, drag the small button inside the circular plate. The distance from the center or the circle determines the speed of pan and/or tilt operation. The camera can also be moved by clicking the specific position in the circular plate.

- **Zoom/ Focus**

Zoom and Focus are triggered by pressing (-) or (+) buttons. Auto-Focus is controlled by the car sign button. Zoom and Focus operation speed is controlled by the Speed slider setting.

- **Preset**

Ability to set up and save preset selection combinations.

- **Center**

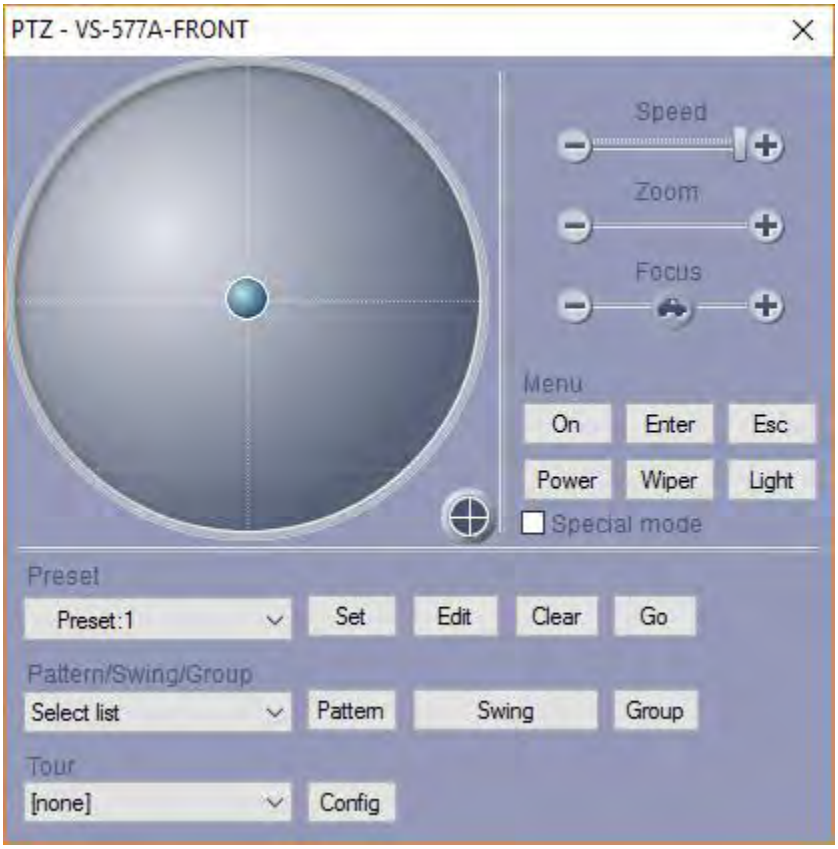
By clicking Center button and then a position on a video window, the PTZ automatically displays that view on the center of the video window zoomed at 2x the standard view. This function, called Click to Center, is supported for specific models only (TCAM-370/570).

PTZ Control Dialog

PTZ control dialog is controlled by the  button in the video toolbar. The button is enabled only when the currently selected camera is configured to have PTZ capability.

In addition to the PTZ control tab on the control pane, the PTZ control dialog provides more functionality. Some functions are effective only when those features are supported by the camera connected to the video encoder. For Example: some cameras don't support power, wiper or light control.

4. Live Monitoring



- **Preset Configuration**

Although the maximum number of preset entries is 256, the actual number varies depending on the models. Preset instructions:

1. Select the Camera View needed.
2. Assign a Preset Number for this view.
3. Press **Set** button.
4. Press **Edit** button to edit the Preset Name.

To make the Camera View a selected Preset Location, select a Preset Entry and press the **Go** button. The **Clear** button releases that Preset Entry setting.

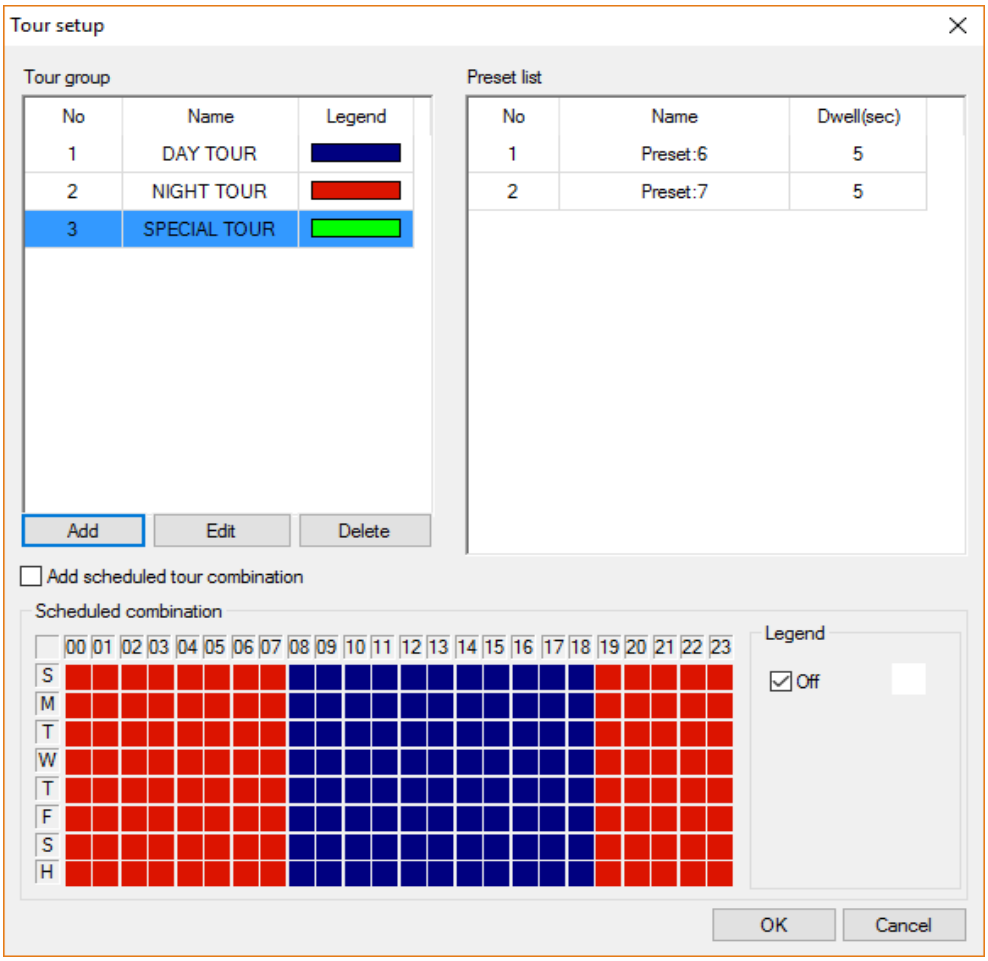
- **Pattern/ Swing/ Group Control**

Pattern/Swing/Group configured on the camera can be started by selecting an entry in the list.

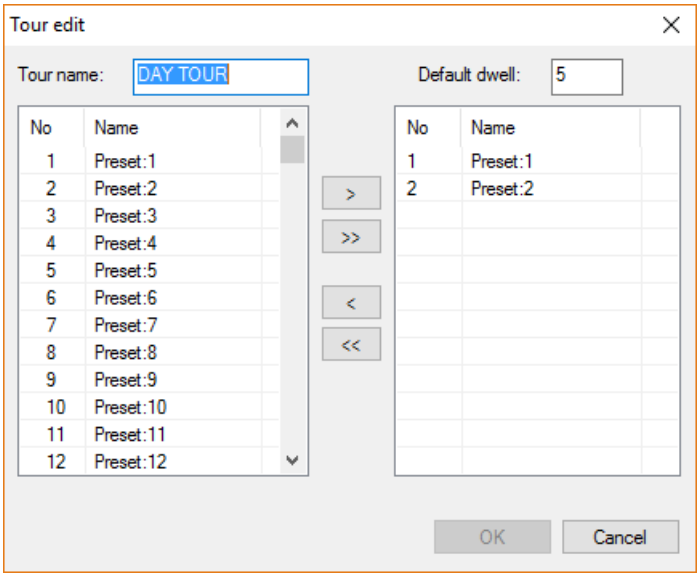
- **Tour Configuration and Selection**

A Tour is a function that visits preset locations sequentially. Tour Groups, a selected set of Preset Entries, can be configured by the **Config** button.

4. Live Monitoring



Multiple Tour Groups can be defined by selecting the entries from the Preset Lists arbitrarily. Use the Add and Edit button for Tour Group selections. A Preset Entry appear multiple times in a Tour Group.



4. Live Monitoring

Dwell time, the time to view a specific Preset Location before moving to the next Preset Location, is 5 seconds. Dwell Time for each Preset Entry of a Tour Group can be configured on **Tour Setup** menu.

A Tour is operated by selecting a combo entry in the PTZ control dialog. Tour can be turned off by selecting **none** entry.

PTZ Tour is automatically paused when:

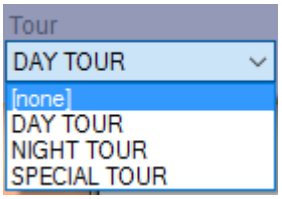
- The PTZ Control Window is opened. The Tour resumes immediately after the window is closed.
- PTZ is controlled on the Left Control PTZ Tab or by the On-Screen PTZ function. The Tour resumes when there is no user activity for 10 seconds.

• Tour Scheduling

A combination of one or more Tours associated with the daily and weekly schedule can be defined on the Tour Setup Window.

1. Define one or more Tours
2. Select **Add Scheduled Tour Combination**.
3. Fill the Schedule Table with Defined Tours or with the Off Selection.

The Scheduled Tour Combination defined on the Tour Setup appears on the PTZ Control Tour List. This type of Tour can be named.



• Camera Power/ Wiper/ Light Control

Power, **Wiper**, and **Light** settings are used for controlling camera power, wiper, and light respectively. These settings can be used when the cameras connected to a video encoder support these functions.

• Analog Camera Setup

Some analog cameras provide the configuration with an OSD menu. The PTZ Control configures the camera using the OSD menu.

Menu: To enable the OSD menu for the camera setup.
Enter, **Esc**: Menu operations.
Circular Plate Button: Directional control menu browsing.

Special Mode is for using the circular plate to generate up/down/left/right commands for some Canon camera models.

4. Live Monitoring

On-Screen PTZ Control
On-Screen mode can be selected in the DU of the PTZ control. When selected, the DU triggers the pan/tilt operation to move in the chosen direction. This works in the same way as in circular control pad. Selecting a position far away from the center will move at a faster pace.

Drag Zooming is supported. When a region is selected with the CTRL button held down, this new area will fit in the entire video window.

Joystick for PTZ Control
A Joystick can be used for PTZ Control. Any joystick used for games will be compatible.

Function Mapping:
Button 1 + Joystick: Zoom
Button 2 + Joystick: Focus
Button 3 + Joystick: Auto Focus

4.7 Snapshot

The snapshot of a video channel can be taken by clicking the **Snapshot** button  or by selecting the **Snapshot** menu in the DU. The image format can be selected when saving the snapshot. Bitmap and JPEG are supported. If JPEG format is needed, JPEG compression parameters for image quality can be configured by the **JPEG Compression** settings in the **General** menu setup.

The Snapshot window allows additional image editing before saving as an image file.

4. Live Monitoring

- **Inserting Title**

A Title of the image can be inserted.

- **Privacy Control**

Parts of the image can be hidden for privacy by using a mosaic processing option or by drawing a gray rectangle to blur.

- **Watermarking**

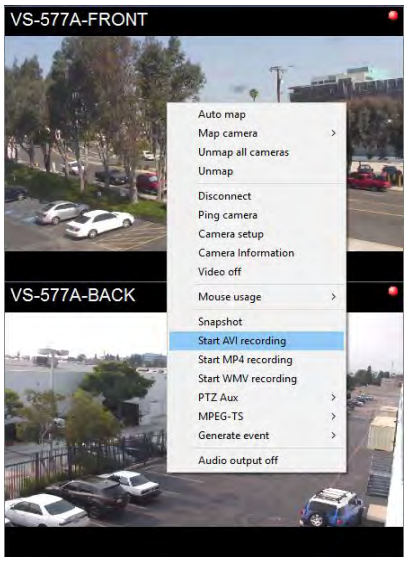
When the image is saved in JPEG format, watermark information can be inserted on the image. A customized program called **JPEGViewer**, provided, can check to see if a JPEG image was modified after saving with the snapshot function.

- **SIGNED**: the image contains a watermark and it was not modified.
- **MODIFIED**: the image contains a watermark and it was modified.
- **NOT SIGNED**: the image does not contain the watermark created by the VMS snapshot function.

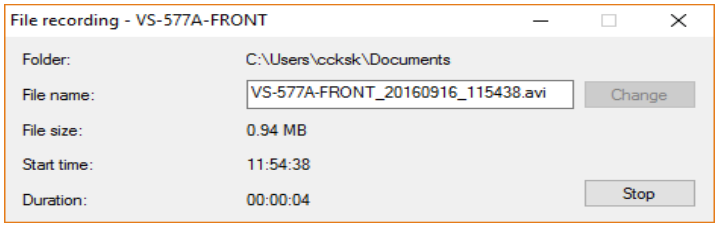
4. Live Monitoring

4.8 Live Stream AVI Recording

Recording a live stream AVI file is started by selecting **Start AVI Recording** on the DU menu. MP4 format is also supported. It is possible to change the name of the recorded files by configuring the folder in the **General** menu setup.



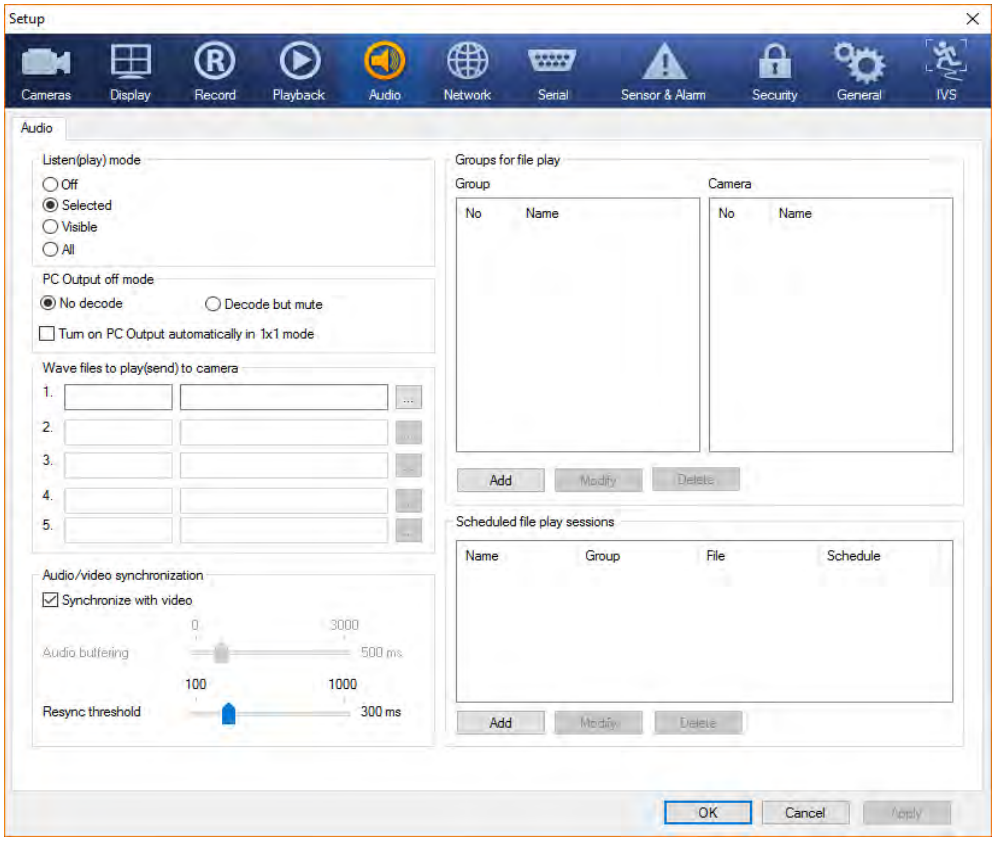
AVI recordings generate two files: .avi and .smi. The .smi file is used for capturing the time.



4.9 Audio Control

1) Audio Send Mode and Play Mode

When the VMS is connected to more than one camera, it is necessary to have audio communication options. The Audio Control menu provides settings for sending and receiving audio data.



4. Live Monitoring

- **Listen(play) Mode**

Off: Audio is turned off.
Selected: Audio from the selected camera is played.
Visible: Audio from the visible cameras are mixed and played.
All: Audio from all connected cameras are mixed and played.

Note: Listen(play) mode setting has no connection to the audio recording setting. Audio data is received regardless if audio recording is enabled and the camera is configured to send audio data.

- **Wave Files to Play(send) to Camera**

It is possible to send wave files to the camera instead of listening to the live input on audio device. Up to 5 wave files can be registered. Actual files to be sent are selected on the Audio tab of the control pane. It is also possible to send wave files to a group of cameras. Both manual and scheduled delivery of a selected file or preconfigured groups are supported.

- **Audio/Video Synchronization**

Audio/Video Synchronization is supported by default. It can be turned off or parameters can be configured on the VMS Audio setup menu.

- **Groups for File Play**

Cameras Groups can be configured to receive wave files. Configured Groups can be used in the **Audio** tab of the control pane or in scheduled file play session.

- **Scheduled File Play Sessions**

Cameras can receive wave files according to Preconfigured Schedules. A scheduled session consists of:

- **Group**: Camera Groups to receive wave files.
- **File**: Wave file to be sent.
- **Schedule**: Schedule for sending Audio files. This schedule can be configured the in the **Events**>**Schedule** setup menu

2) Audio Talk/Output Control

The **Audio** tab provides interactive control of the audio talk mode and audio output to the PC. A wave file can be selected for playback to the server instead of live input.

- **PC Input**
  When the mic button is OFF, live audio from mic stops. Wave file are not affected by this control.

- **PC Output**
  When the speaker button is OFF, audio data play stops.

- **Target**
  The Target to receive audio data is specified. Sending to a Camera Groups can be supported by defining a Group in the **Audio** setup menu.

- **Audio Source**
  The Source where audio data comes from. If a wave file is selected and the play button is pressed, the playback indicator shows the progress of the wave file being sent.

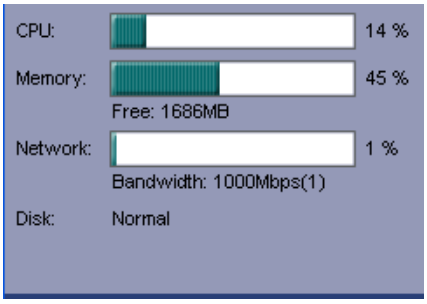
4.10 Video Input Color Control

The camera's input video color properties are configured on the **Video** menu of the control pane. Some cameras or encoders don't support all property controls.

Settings changed using these controls are effective on the camera's web setup.

System Health Monitoring

The **System** window displays CPU load, memory status, network load and disk writing status. When any dangerous or abnormal state is detected, the indicator and/or text are displayed in red. When the PC has more than one network card, only the bandwidth for the first card is shown and it indicates more network cards are connected by displaying an (N) at the end of the bandwidth text.



4. Live Monitoring

4.11 Sensor State and Alarm Control

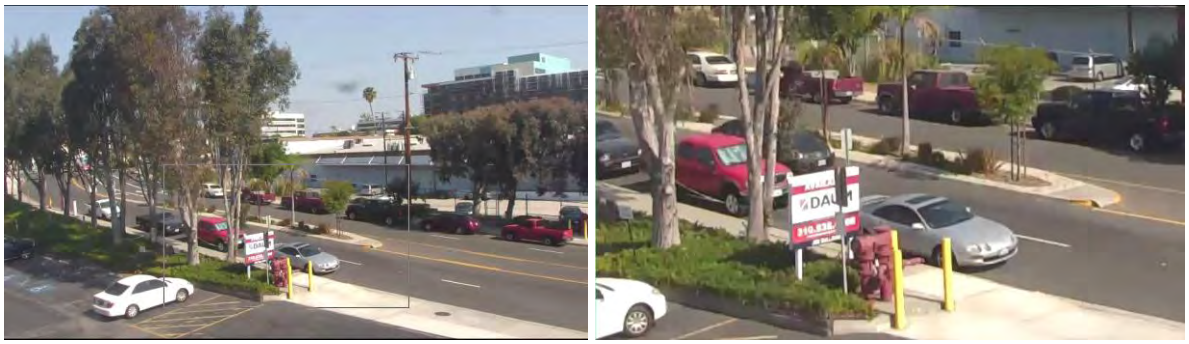
When a sensor device connected to a camera changes its state, a corresponding event is generated and the icon changes to yellow.

The Change On/Off state allows the control of the alarm(relay) state. This can be changed by right clicking over an alarm node.

4.12 Digital Zoom

To use this function, the DU should be mapped to **Digital Zoom**. An alternative option is to use the On-Screen PTZ Control. These can be selected in the DU menu by right clicking. Settings are saved for individual channels.

The region for digital zoom can be selected by the drag and drop feature. Selected regions will be enlarged. Left clicking will display the original state again. The four arrow keys on the keyboard can be used for shifting in the digitally zoomed state.



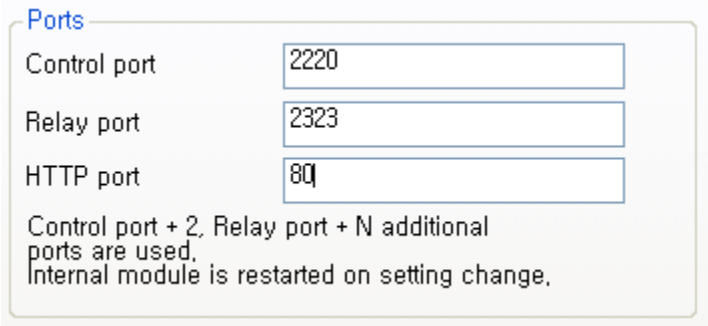
4. Live Monitoring

4.13 Streaming to Clients

When used as a Server, the VMS provides three kinds of streaming or relaying. The following table describes how it can be used:

Streaming	Description
Proprietary Protocol	Allows clients with MEI Proprietary Protocol to connect to VMS. - VMS Client - SDK-Based Application - Decoder(TCS) System
RTSP/RTP	RTSP/RTP client receives stream from VMS.
MPEG-TS	MPEG-TS is sent to specified address in a one-way broadcasting fashion.

Proprietary Protocol Streaming is enabled. Proprietary Protocol clients can connect to specific channels in the VMS at any time. Network Port settings should be configured the same as the clients.



- **Control Port**

Control port is used to establish the TC connection with VMS Client or SDK Based Client. The connection is used for exchanging control information. Control+1 Port is also used for serving remote search and playback from the VMS Client.

- **Relay Port**

Relay Port configures the relaying channels for the base port. Each camera has one relay port used for serving clients. For Example: if 4 cameras are connected, port 2232, 2324, 2325, 2326 are used for relaying each camera.

- **HTTP Port**

HTTP Port is used to access the HTTP connection from the web client.

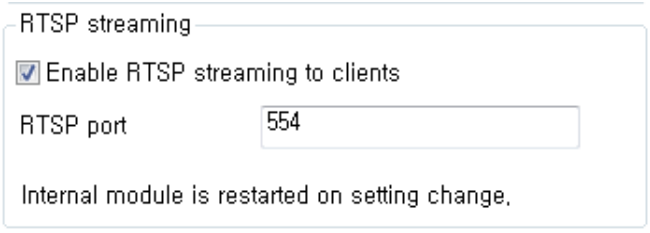
4.14 Proprietary Protocol

Streaming in Proprietary Protocol is enabled always. Clients in proprietary protocol can connect to specific channel in VMS anytime to get the stream and send control data to cameras via VMS.

4. Live Monitoring

4.15 RTSP/ RTP Streaming

The VMS steam is accessible by using the RTSP/RTP Protocol. This function is disabled by default. It is necessary to enable on the Network setup menu. The RTSP Port should be configured appropriately. When this setting is changed, the internal VMS model is restarted and all channels are reconnected.

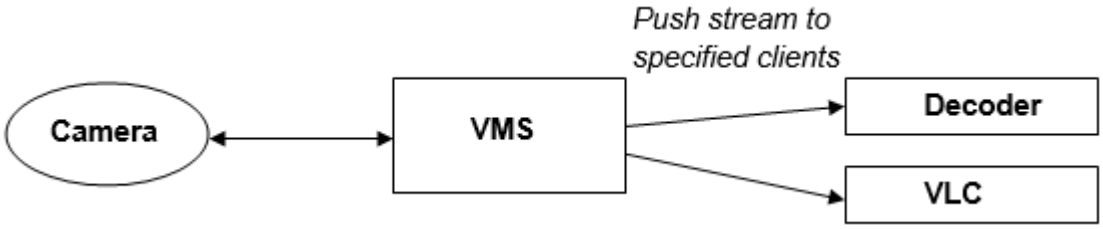


A camera can be connected using the following RTSP/RTP URLs:

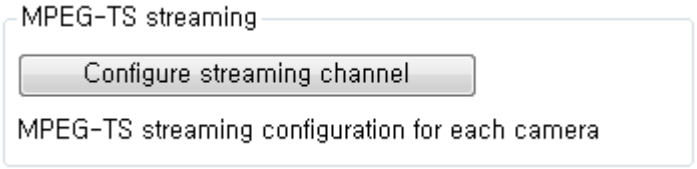
- rtsp://VMS-IP/camera-IP/video1 //Primary Stream
- rtsp://VMS-IP/camera-IP/video1s //Secondary Stream
- rtsp://VMS-IP/camera-IP/video1+audio1 //Primary Stream with Audio

4.16 MPEG-TS Streaming

VMS supports MPEG-TS streaming. Whether using MEI Proprietary Protocol, RTSP/RTP or Onvif streaming, this setting converts the stream to MPEG-TS and sends to a specified destination. The following configuration is possible:

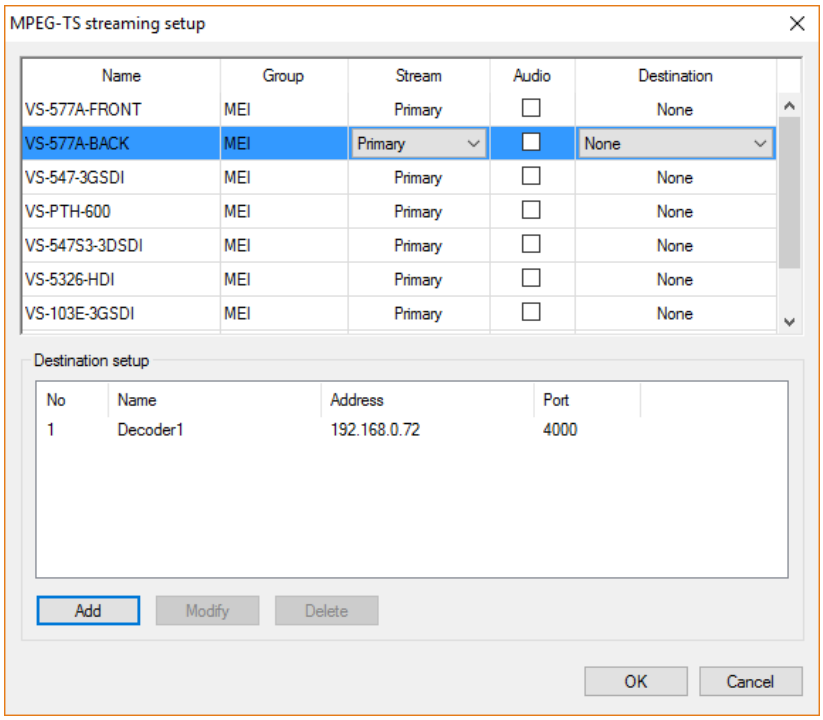


The VMS Network setup menu configures the streaming channel to MPEG-TS streaming.



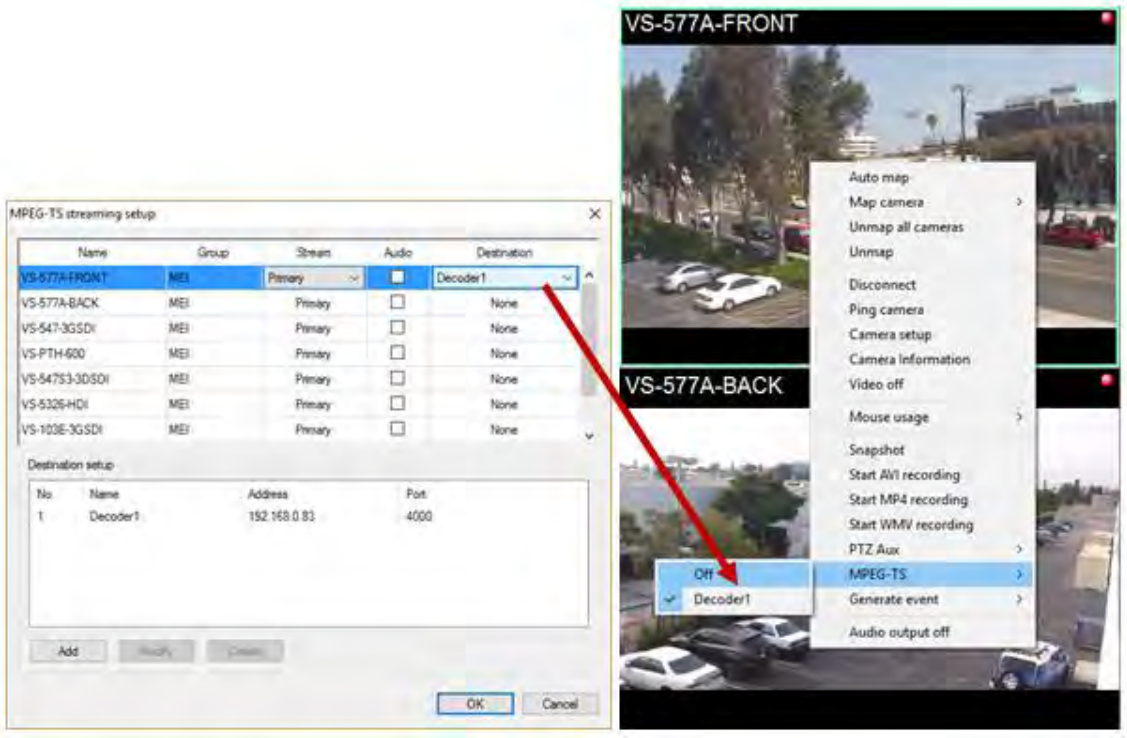
The MPEG-TS streaming window configures the streaming destination. Audio can be included or excluded by checking the corresponding column. The Destination is selected from a dropdown list of Decoders (address/port combination).

4. Live Monitoring



It is possible to enable or disable MPEG-TS streaming using the video setup menu. However, multiple streaming to a decoder is not allowed. The menu will show which Decoders are occupied already.

The Destination Configuration Menu is shown below:



4. Live Monitoring

4.17 Channel Information Display

Channel Information is displayed on the video. Visibility and Positioning can be configured in the Display setup menu.

The Statistics Bar shows the operational statistics used for diagnosing video issues.

- **RX=2011**

The Video Data Bitrate is shown in kbps units. If these stats are lower than the settings in the camera, the network or PC performance could be the cause. This also happens when too many devices are connected to one camera.

- **fps=59(1)**

The Video Framerate is shown in fps. The number inside the parenthesis is the number of frames skipped due to lack of display resources or late frame delivery. Frame skipping can be avoided by increasing the **Display Buffer** in the Display setup menu.

- **Buf=7**

Number of frames in the Buffer. This value is set in the **Display Buffer** menu.

- **(114, 0)**

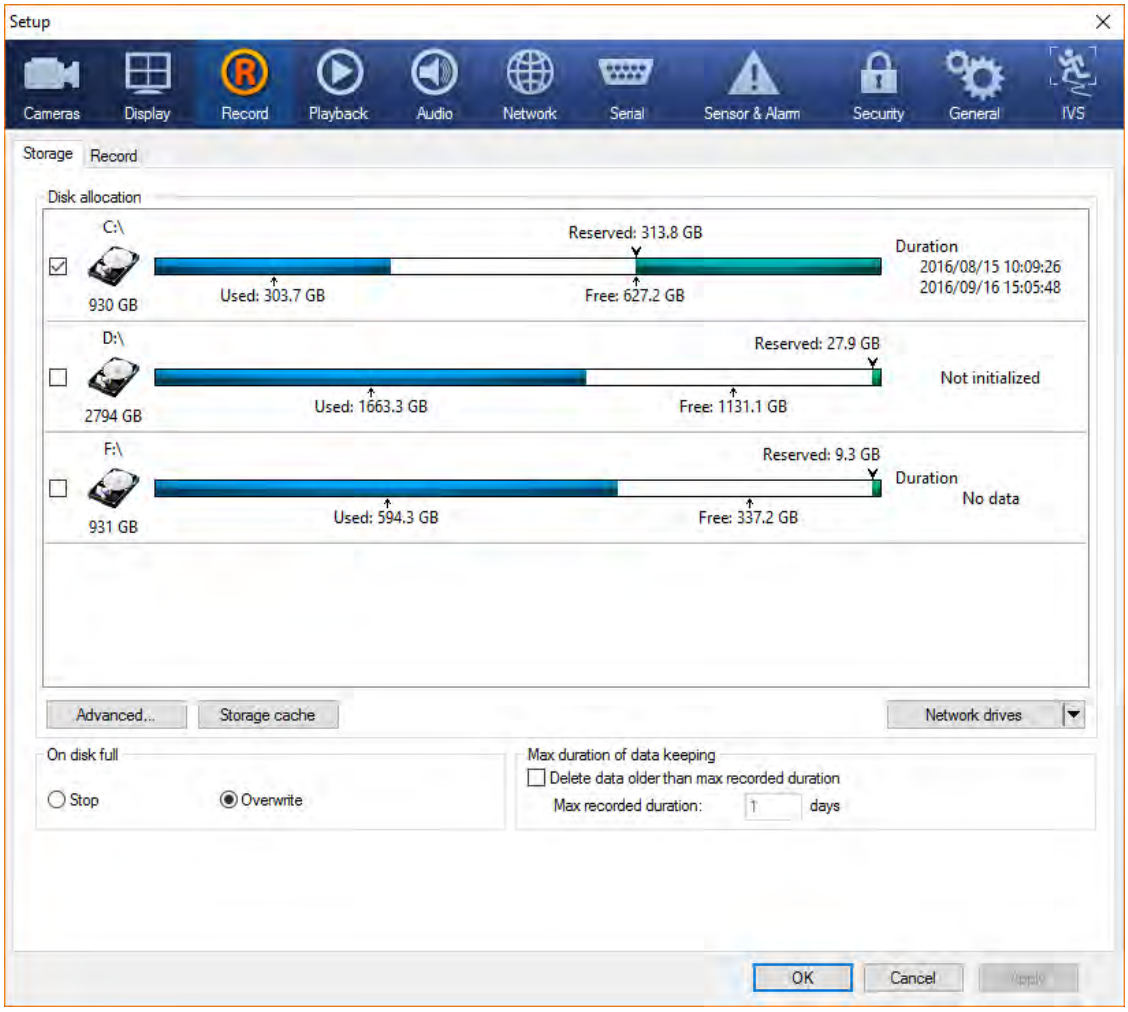
The Audio TX Bitrate and RX Bitrate is shown in kbps units. With G.711, the normal range is 50 - 70.

5. Recording

VMS supports simultaneous camera recordings consisting of storage files. Each storage file is optimized for supporting long pre-event and post-event recordings and synchronized playback in multiple channels.

5.1 Storage Setup

Storage needs to be configured first before recording. The drives must be selected for recording.



1. Open **Storage** tab of **Record** setup.
2. Check the drive to be used for recording. Network drive needs to be configured manually on a dialog accessible with Network drives button.
3. Adjust **Reserved** size if necessary **Reserved** size is the amount of space to be left without writing record data for other purposes like keeping backup data. If the drive will be fully used for recording, this setting need not be touched.
4. Click **Advanced** button to open Advanced setup dialog if necessary. Advanced setup dialog provides a way to change the interval and/or size of storage file generation. Generally, it is not necessary to change the default setting. However, it may be necessary if the pattern of recorded data generation is unusual.

5. Configure **On disk full** action.
6. Configure Maximum duration of recorded data using **Max duration of data keeping** setting.
7. Click **OK** or **Apply**

Disk information and recorded duration is displayed in the storage menu.

- **Total**

Total size of the drive.

- **Used**

Amount of space with recorded data.

- **Free**

Space available for recording. If this size is smaller than the size of the storage file. VMS doesn't write data to the disk.

- **Reserved**

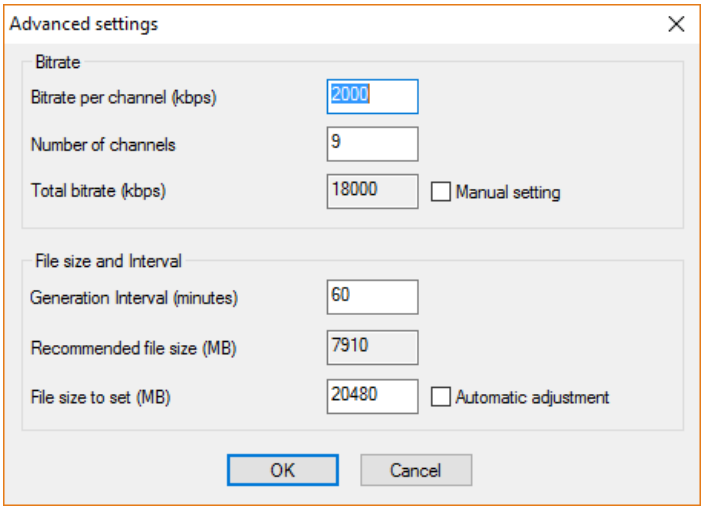
Amount of space to be saved for other purposes than recording data.

- **Duration**

Duration of time shown on the disk data.

- **Advanced**

The Advanced settings menu configures the interval and the size of a storage file generation. The **Bitrates** section calculates the total bitrates of all channels. When the total bitrate is calculated or configured manually in **Manual** setting menu, the size of a storage file is recommended. The **Recommended File Size** is calculated for a 1-hour duration. This recommended value or any other value preferred by the is entered in the **File Size To Set** field. The VMS generates a new file when either interval and/or size is entered.



- **On Disk Full**

Action when all selected drives become full. Generally, **Overwrite** is selected to recycle the storage. Other actions such as sending an email can be configured in the **Event Handler** settings menu.

5. Recording

- **Data Storage Uploaded from Camera**

VMS can search and play AVI files uploaded from cameras. For each camera, it is necessary to specify the AVI folders to be searched.

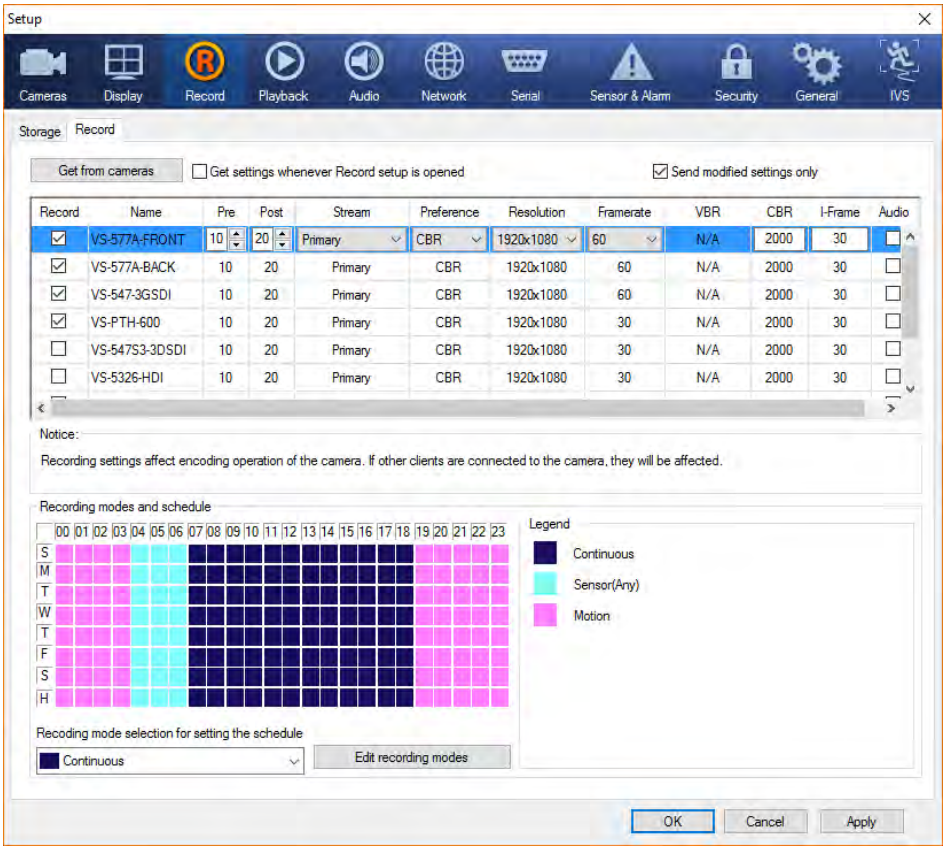
VMS doesn't have an FTP server function. It is necessary to install an FTP server to allow AVI file uploads from cameras.

5.2 Recording Mode and Schedule

Three kinds of Recording Modes are supported: **Continuous**, **Event-Based**, and **Manual Recordings.** Event-Based Recordings allow user-defined combinations of various events. While Manual Recordings work independently from the Schedule Setting, Continuous Recording and Event-Based Recordings can be set to 1 hour increments on a weekly, 24 hour formatted schedule.

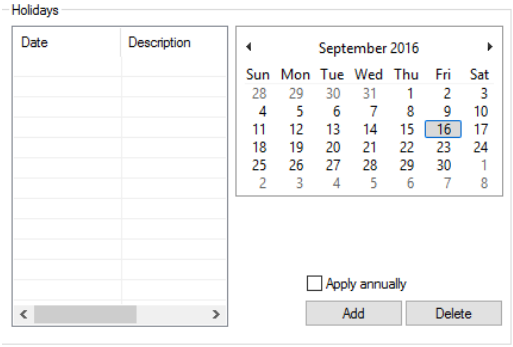
Camera Recording Mode and Schedule can be configured on the **Record** setup menu.

1. Select a Camera to configure.
2. Chose the Recording Mode at the bottom of the window.
3. Fill in the times on the Schedule Table by dragging or clicking the mouse.
4. Click **OK** or **Apply**.



5. Recording

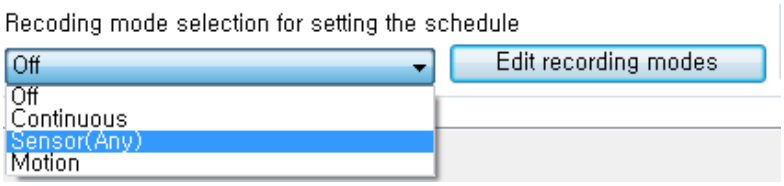
The last row, “**H**”, in the schedule table is for holidays. Holidays can be configured in the **General** setup menu.



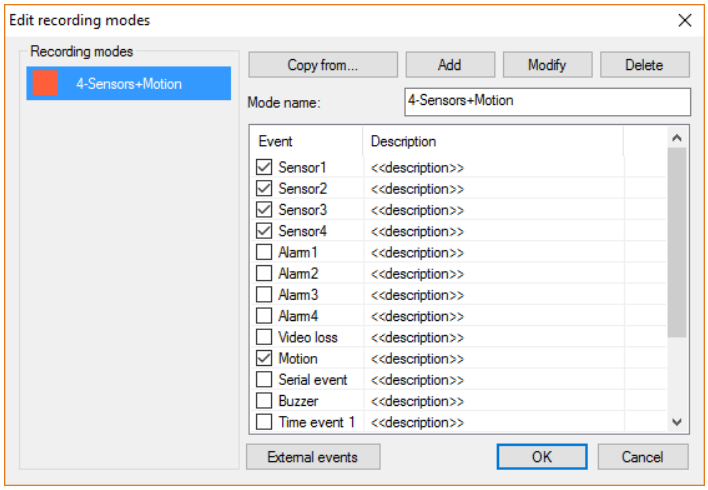
1. Select a day.
2. Click **Add** at the bottom.
3. Edit the description.
4. Check **Annual** if the day is fixed for every year.

Continuous Recording
In Continuous Recording mode, the VMS records the channel continuously. When a camera is added, the recording mode of the camera is automatically set to **Continuous** by default.

Event-Based Recording
Event-Based Recording works only when a specified event condition happens in the camera. Most frequently used events are sensor and motion detection. For these two types of events, VMS provides a pre-defined event mode selection.



• **Defining Recording Modes**
User can define various recording modes by combining event types in extremely flexible ways. Recording modes are defined by arbitrary combinations of primitive events: sensor, alarm, video loss, motion and serial event. Recording modes are defined for individual camera. Thus different recording modes can be defined for different cameras depending on the situations in the sites.



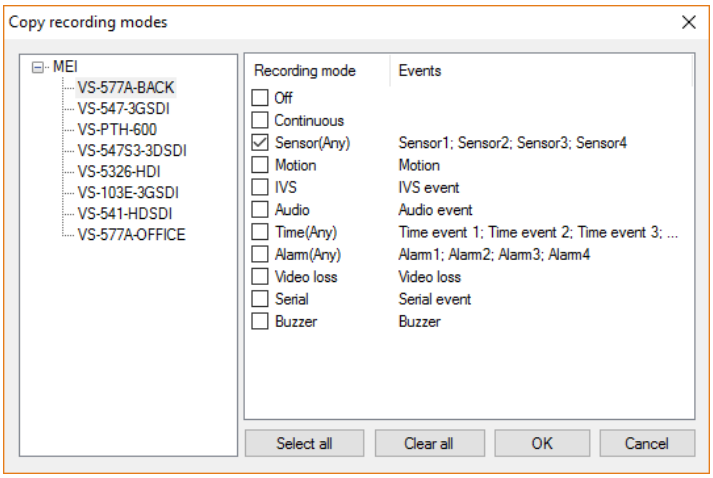
1. Select **Edit Recording Modes** to open the window.
2. Select the appropriate Event Type combination.
3. Select the **Add** tab and the new recording is added to the **Recording Modes** section with another color.
4. Change the Mode Name if necessary to describe the new Recording Mode.
5. Edit the description of the Event if necessary.
6. Click **OK**.
7. New Recording Mode will appear on the **Recording Mode** tab.

5. Recording

• Copying Recording Modes

When several cameras have the same recording modes, it is possible to copy these recording modes. Defining the recording modes multiple times can be avoided, while still allowing the flexibility of different recording modes for different cameras.

Selecting the **Copy From** button on the **Edit Recording Modes** menu allows the selected modes used for other cameras to be copied.

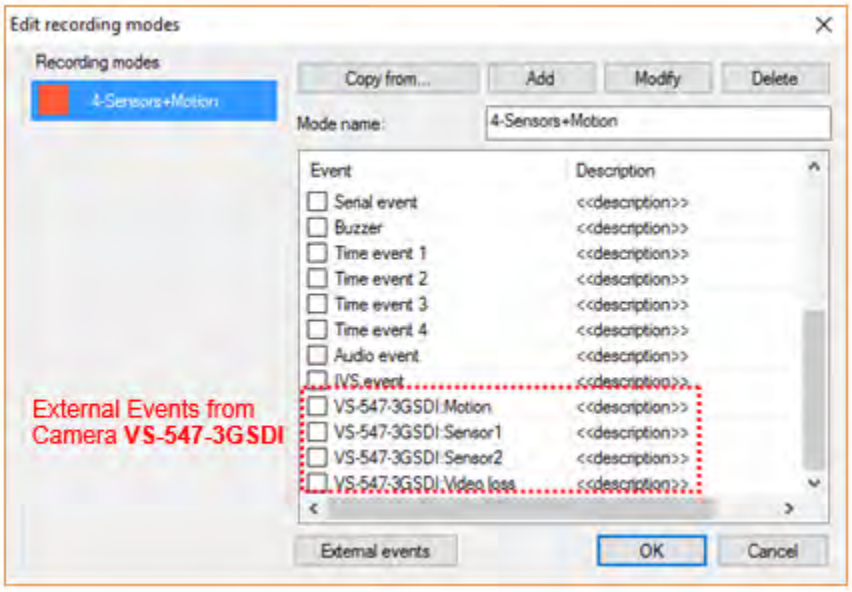


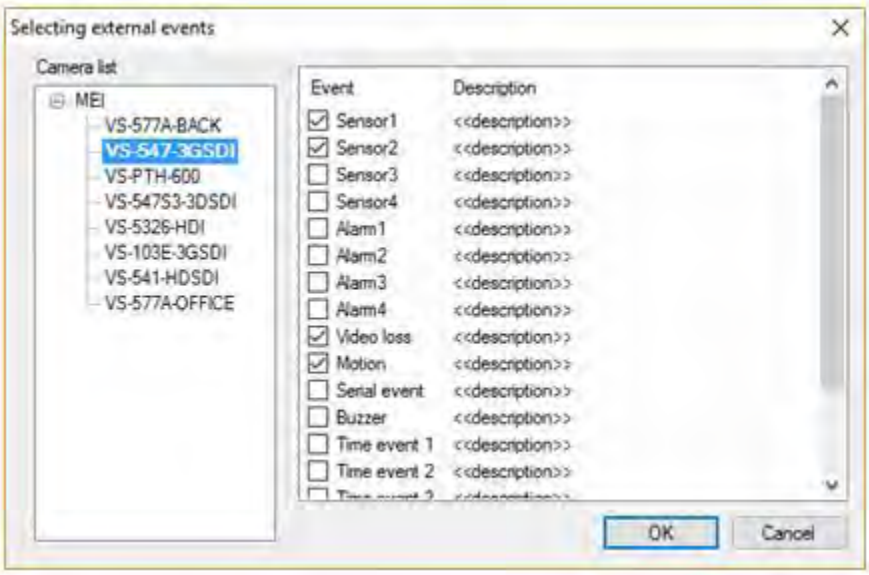
• External Events

It is possible to trigger the camera recording when an event from a different camera occurs. For Example: Camera A will start recording if Camera B goes into the Video-Loss State. Another Example: Cameras will record simultaneously when a Sensor Event is detected on one camera.

1. Select **External Events** to open the **Selecting External Events** window.
2. Select the External Camera and the Event Types to be used for recording.
3. Click **OK**.
4. Selected External Events will appear in the **Edit Recording Modes** window.
5. The External Events can be selected to define the Recording Modes.

5. Recording

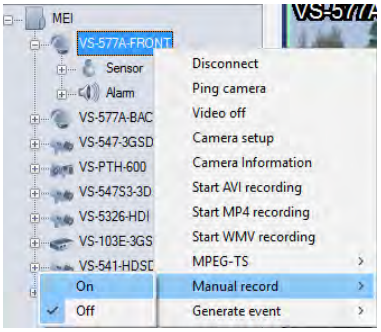

Edit recording modes
Recording modes
4-Sensors+Motion
Copy from...
Add
Modify
Delete
Mode name:
4-Sensors+Motion
Event
Description
Serial event
Buzzer
Time event 1
Time event 2
Time event 3
Time event 4
Audio event
IVS event
VS-547-3GSDI:Motion
VS-547-3GSDI:Sensor1
VS-547-3GSDI:Sensor2
VS-547-3GSDI:Video loss
<<description>>
External Events from Camera VS-547-3GSDI
External events
OK
Cancel


Selecting external events
Camera list
MEI
VS-577A-BACK
VS-547-3GSDI
VS-PTH-600
VS-547S3-3DSDI
VS-5326-HDI
VS-103E-3GSDI
VS-541-HDSDI
VS-577A-OFFICE
Event
Description
Sensor1
Sensor2
Sensor3
Sensor4
Alarm1
Alarm2
Alarm3
Alarm4
Video loss
Motion
Serial event
Buzzer
Time event 1
Time event 2
<<description>>
OK
Cancel

5. Recording

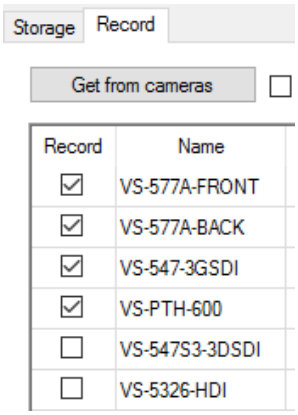
5.3 Manual Recording

Manual Recording is defined by beginning the recording of a specified camera immediately without setting a recording mode and schedule. Manually starting or stopping the recording is selected on the camera menu. Manual recordings work independently from the recording mode and schedule. When manual recording is turned off, the recording mode settings will becomes effective again.



5.4 Recording Control

The Recording Channel can be turned on or off while the recording mode and schedule remain untouched by selecting with the check boxes in the first column in the **Record** tab. This setting doesn't affect manual recording which works unconditionally.



5.5 Checking Recording Status

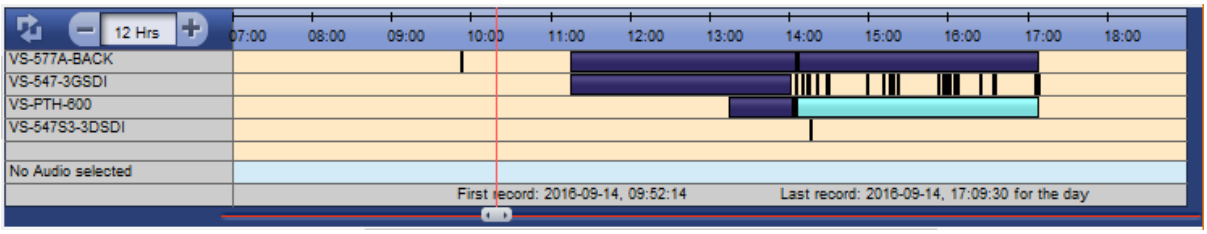
Recording status can be checked several ways:

Storage Tab

The Storage Tab in control pane shows the storage status and recorded duration briefly. The recording is periodically updated with the most recent time. Information such as the recorded amount and duration is obtained only from the drives selected on **Storage** setup. Drives that are not selected do not contain this information.

Timeline

The Timeline shows the recorded status of the selected channel. A detailed status view can be obtained by adjusting the scale of the time using the  and  buttons. Although the Timeline is periodically updated, it is possible to refresh at any time using the  button. The Timeline displays recorded durations with multiple colors according to the Recording Modes used. The colors used for Recording Mode Scheduling are used here also.



5. Recording

Recording Icon in Live Mode and Status in Record Mode
If the Recording Icon Status is selected in the Display setup menu, the Recording Icon will be visible on the DU in Live Mode.

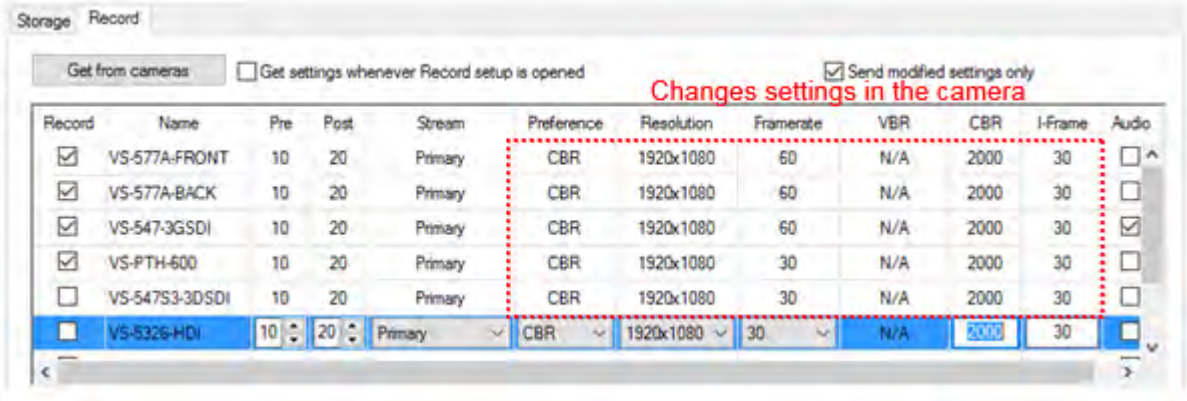
In Record Mode, **Status** fields show the connection state as well as recording status.

No	Camera name	Address	Status	Recording mode
1	VS-577A-FRONT	192.168.0.82	Recording	Continuous
2	VS-577A-BACK	192.168.0.85	Recording	Continuous
3	VS-547-3GSDI	192.168.0.21	Not recording	Motion
4	VS-PTH-600	192.168.0.27	Recording	Sensor(Any)
5	VS-547S3-3DSDI	192.168.0.26	Not recording	Off
6	VS-5326-HDI	192.168.0.28	Not recording	Off
7	VS-103E-3GSDI	192.168.0.80	Not recording	Off
8	VS-541-HDSDI	192.168.0.22	Not recording	Off
9	VS-577A-OFFICE	192.168.0.70	Disconnected	Off

Search and Playback with Search Mode
Search and Playback operations can be selected in the **Search Mode** toolbar.

5.6 Setting Recording Parameters

The **Record** tab contains various parameters which can affect the recording stream. It is not possible to change the video stream properties such as resolution and framerate once the stream is encoded, however, the record parameters can change the camera settings. As a result, the record settings are selected for all devices as well as the video display in Live Mode.



5. Recording

- **Record**
  Check to turn on the recording. Manual recording works regardless of this setting.

- **Pre**
  Pre-event recording duration in increments of seconds.

- **Post**
  Post-event recording duration in increments of seconds.

- **Stream**
  Select the stream to record. Single stream camera shows **Primary** entry only.

- **Preference - I-Frame**
  Video encoding parameters of the camera. Refer to the camera or the video encoder user manual.

- **Audio**
  Select to record audio & video stream simultaneously.

All Camera Parameters in the grid can be changed at once using the **Propagate To All** function displayed by right clicking on an entry.

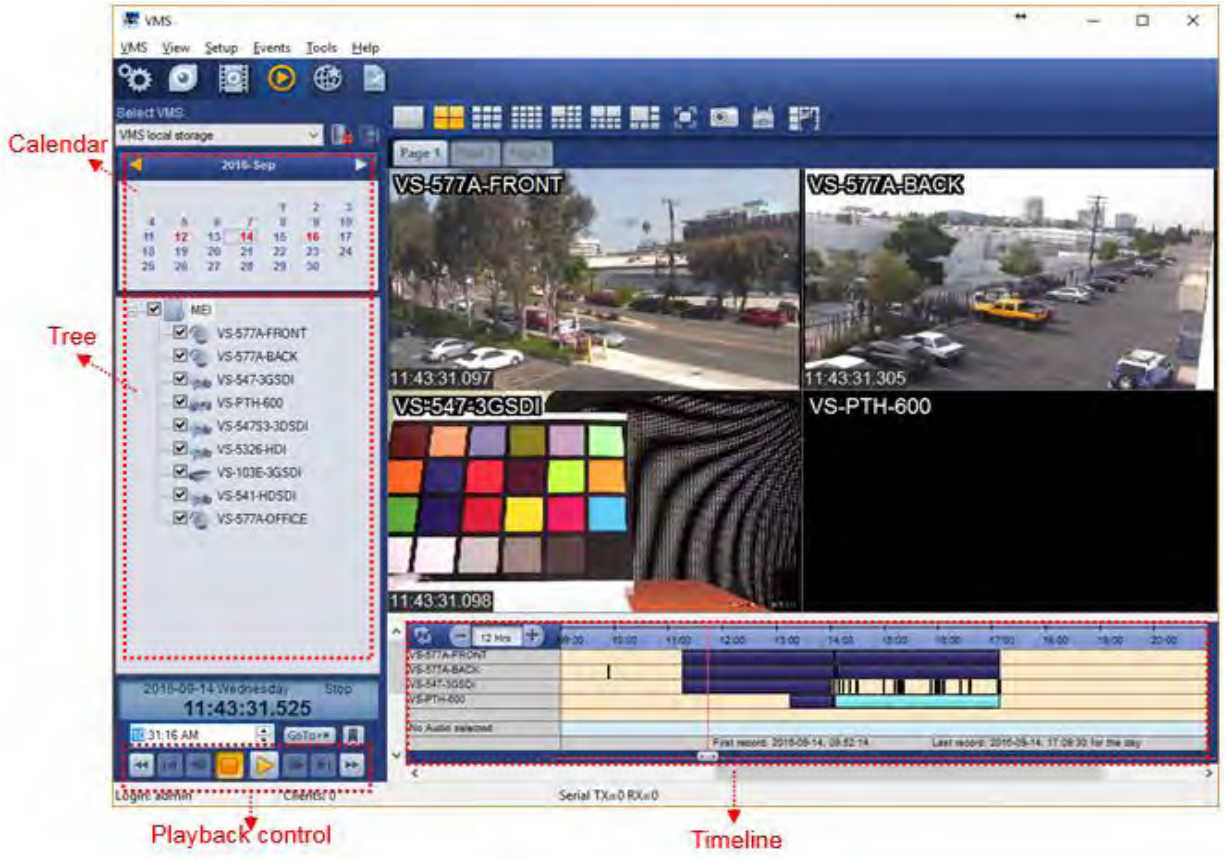
Note: Allowing video encoding within the VMS is useful for multiple cameras without opening a web-based setup. However, this should be used carefully as it modifies the camera encoding settings. So it is possible for the Display setup to be invalid by the Record setup if both are using the same stream. With a dual stream camera, it is ideal to use one stream for display and the other for recording. These two setups will not affect the other.

5.7 Record Mode Interface

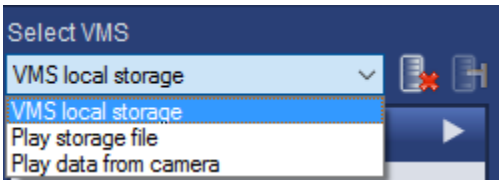
When continuous camera viewing is not necessary, running the VMS in **Record Mode** is preferable. In Record Mode, the CPU load is less because the decoding and display are not performed. This mode also shows more detailed recording statistics. This can also run on any graphics cards.

6. Search and Playback

Search and playback of recorded data are supported in the Search Mode. The **Search** button can be found on the toolbar while in Live Mode.



Select VMS/NVR for Search and Playback



The first step for search and playback is to select a VMS. The combo menu above the calendar provides the available VMS list. Unlike Live Monitoring mode where cameras from multiple VMS can be viewing at the same time, only one VMS can be connected at a time. When a VMS is connected, the calendar will display the days with recorded data, and the tree will display cameras with data on the selected day.

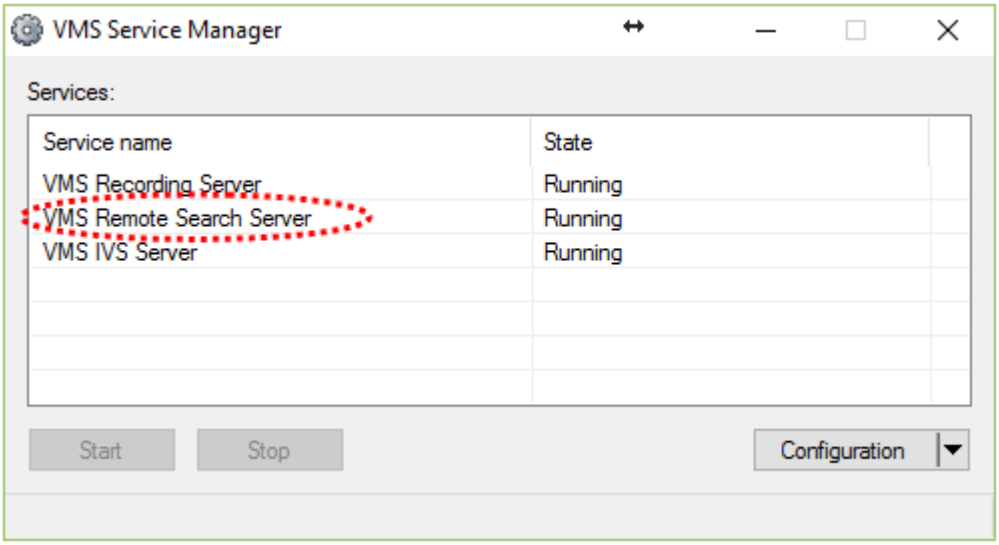
The Connection to a VMS can be controlled by clicking Connect button and the disconnection button.

A storage file or native backup file can be played by selecting **Play Storage File**.

When using remote search and playback, the **Remote Search Server** application should be running. This is automatically started when the VMS server is turned on. However, it is possible to manually start using **Start Remote Search Server** menu on VMS Server.

6. Search and Playback

VMS Remote Search Server appears as a tray icon at the bottom section of Windows. The user interface of Remote Search Server can be opened by double clicking the tray icon. Default settings can be modified here. It also shows the current connected clients.



Note: VMS Client Search Mode may fail to connect due to the following reasons:

- VMS System is actually unreachable in the network.
- VMS System is reachable but protected by the firewall. Port 2221 should be open.
- The Remote Search Server application is not running in the VMS System or it is configured with different settings (port, login, password).

6.1 Search by Date and Time

A scene of interest can be found by selecting date, camera, and the time.

1. Select a day in the calendar. Days with recorded data are marked in red. The month can be changed by the arrow buttons in the calendar. When a day is selected, the channel will show the data for that day. When several cameras are being used, loading the tree can take some time.
2. Select the channels to search. Up to 16 channels can be selected. Only one audio channel can be selected at a time.
3. When channels are selected, the timeline will be updated to show recorded status.
4. Move the current position bar in the timeline to select where to play.
5. Press **Play** button.

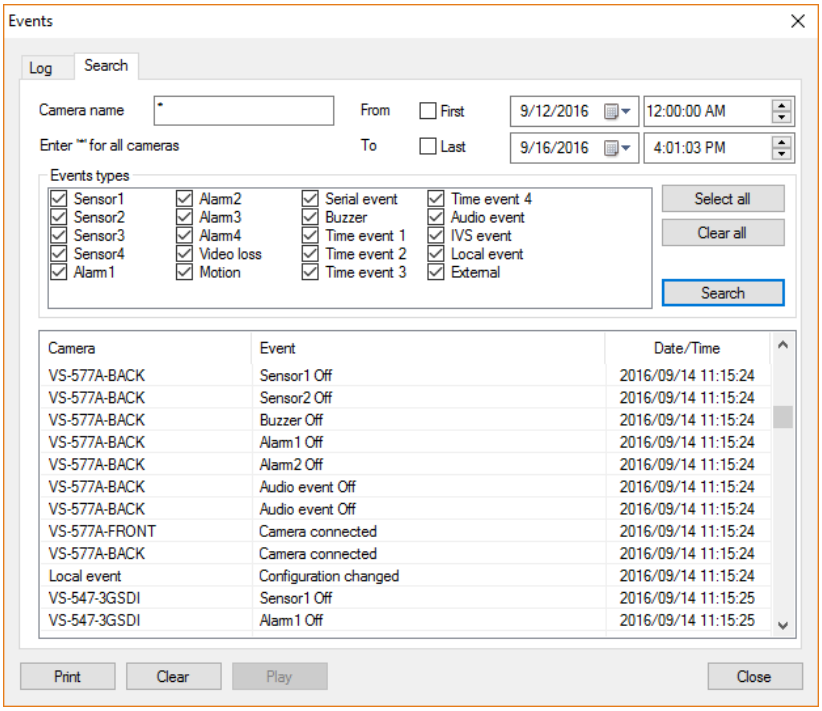
6. Search and Playback

Instead of moving the position bar, it is possible to set a specific time in the time display. Specify the time to search and click the **GoTo** button. The current time bar will move to the specified time on the timeline.

The scale of the timeline can be changed by the - and + buttons. Five different scales are supported: 24 hours, 12 hours, 6 hours, 3 hours, and 1 hour.

6.2 Search by Event

Events in one or more channels can be searched in the **Event Search** menu.
Note: the Searched Camera Events are saved in the VMS Server, not in VMS Client.

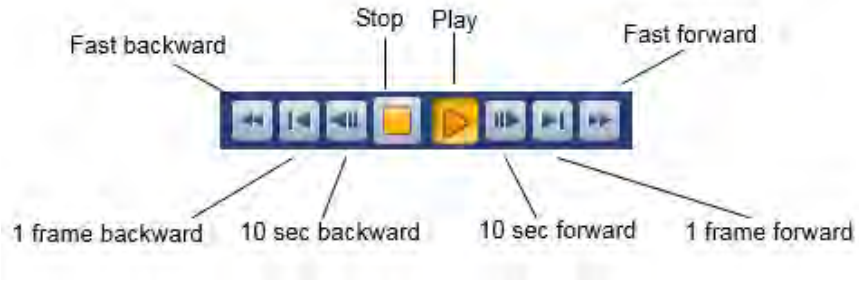


1. Enter the Camera Name to search. All cameras can be searched using an asterisk (*).
2. Specify the Duration to Search.
3. Select the Event Types.
4. Click the **Search** Button.
5. A list of Selected Events will appear.
6. Event Playback can be started by pressing the **Play** Button.

6. Search and Playback

6.3 Playback Control

Buttons in the Playback Control Group allow sophisticated control of the playback.



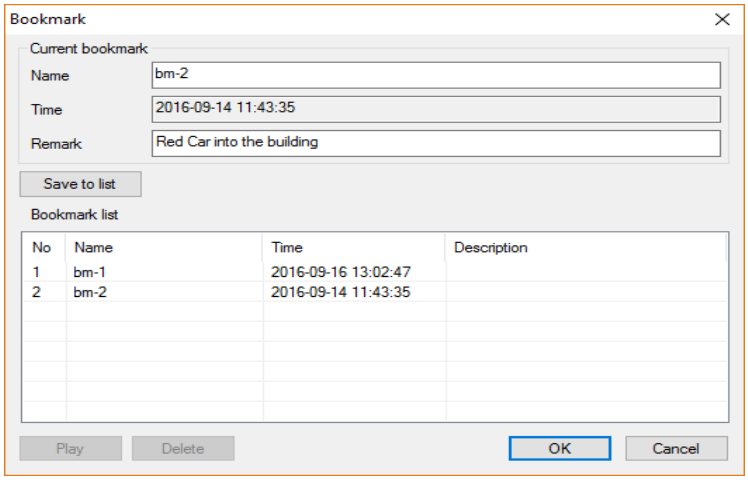
All playbacks in a backward direction play only one frame at a time. So, a jumping effect is shown. **Fast Forward** in multi-screen mode also plays only one frame at a time. For 1x1 mode, all frames or just one frame can be played using the setting **Decode Only Key Frames in FF Playback in 1x1 Mode** in the **Playback Setup** menu. Smooth playback can be obtained when this setting is not selected.

6.4 Playback Time

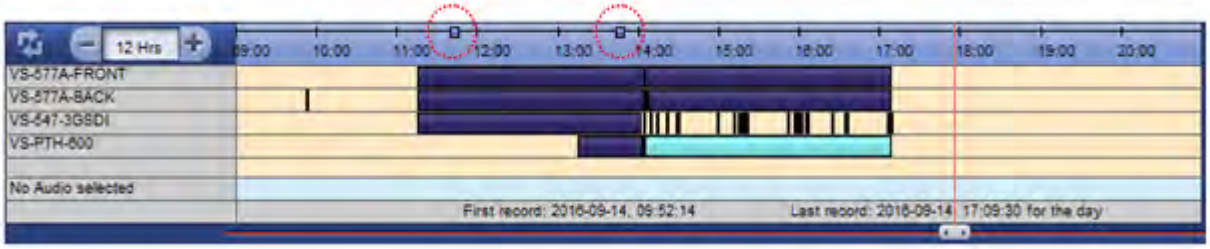
Playback Time can be displayed for playback. The Playback Time can be turned off by deselecting the **Display Playback Time** in the **Playback Setup.**

Bookmarks

Bookmarks can be used to mark positions of interest during search and playback. Option to visit later for playback and/or backup. When a **Bookmark** is selected, it displays the current playback time. That current playback time is saved by specifying a name and saving to the list.



When a bookmark is selected, the playback is started from that point. Double-clicking a bookmark on the timeline also starts the playback from that point. Defined bookmarks are displayed on the timeline. When clicking a bookmark, the current playback position is changed to the bookmark position.



6.5 Backup

Backup provides a way to copy recorded data to a file. Four backup file formats are supported: AVI Files, MP4, Native Format and Native+Player. The format can be selected by the Backup Button  .

AVI Format

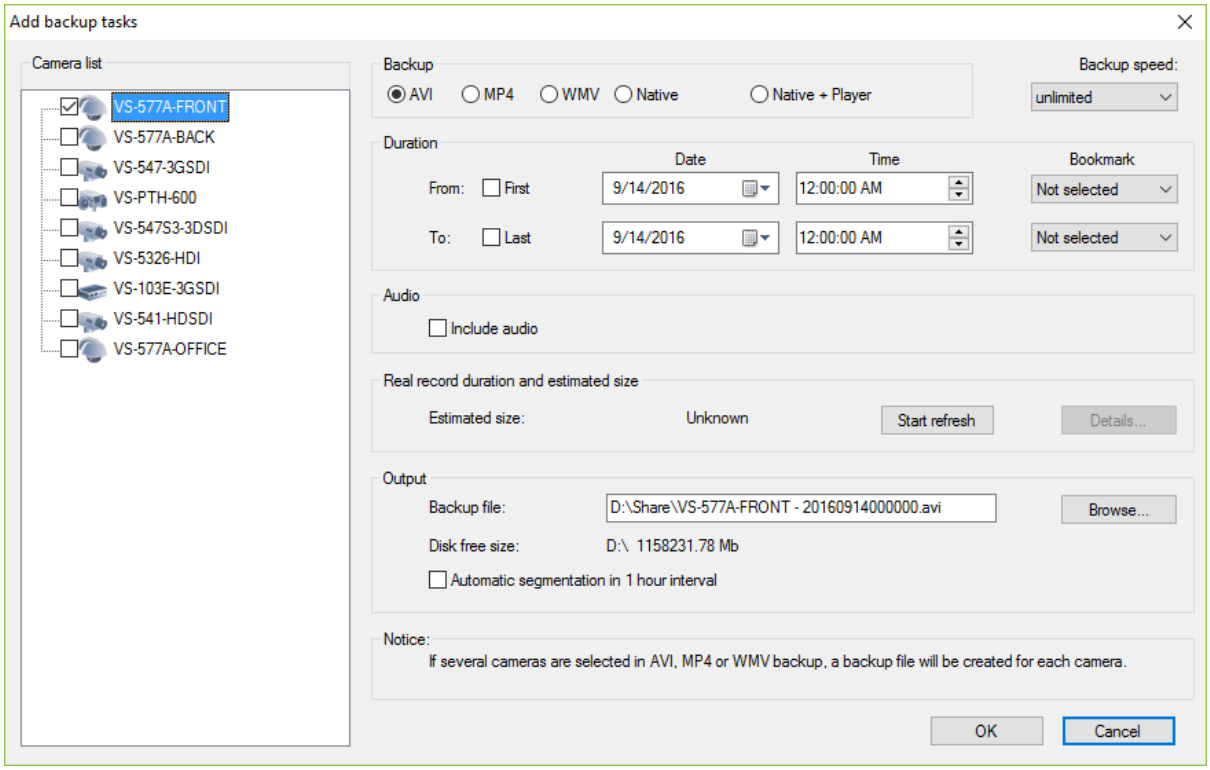
AVI format is used for a casual media player such as Window Media Player, GOM Player, or VLC Player for backup file playback. As AVI doesn't allow multi-channel video streams, a backup for each channel needs to be taken separately.

1. Select a camera for backup on the camera list.
2. Select **AVI Backup**.
3. Specify the duration. Bookmarks can be used for a convenient selection.
4. Select **Include Audio** if necessary.
5. The **Start Refresh** button will estimate the size of the backup file. This can take a significant amount of time if the duration is lengthy. This step is optional.
6. If remote access to the VMS system is used, **Remote Backup Speed** can be configured to limit the backup bitrate sharing the network bandwidth with others.
7. Change the name of the backup file.
8. **Click Start Backup** button.
9. Progress will be shown.

When multiple channels are selected, the VMS makes the backup for each channel one by one. The names of the backup files are automatically generated in this case.

Note: Currently, duration backup of AVI files is not supported. AVI files in the configured folders should be exported manually.

6. Search and Playback



MP4 Format

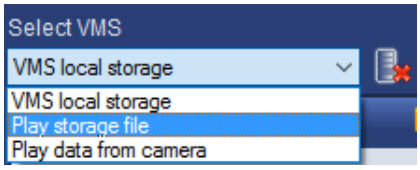
In addition to AVI file and Native format, backup can be done in MP4 file format.

WMV Format

WMV format is also supported. As transcoding is performed for WMV backup, this takes much more time than another format.

Native Format

Native format is the format used for recording in the VMS. This format is generated by the VMS when storing files. Multiple channels can be backed up in a single file. The usage is basically the same as the backup in AVI format. Backup .tsf storage files can be played in Search Mode by selecting the storage type to **Play Storage File**.



Native+Player

When “Native + Player” format is selected, a backup file with the True Search.exe is generated. When this backup file is executed, True Search is automatically selected to play the backup file.

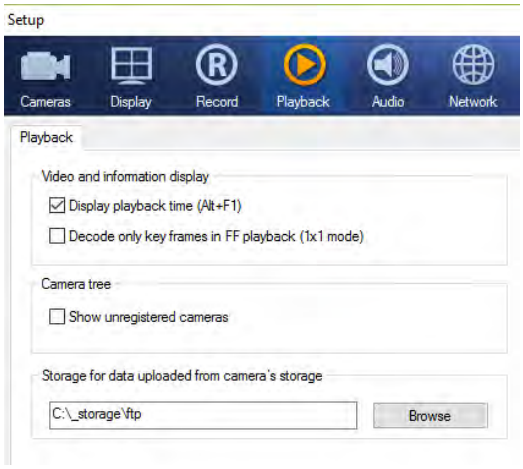
6. Search and Playback

Snapshot

A snapshot can be taken while the file is being played. The snapshot window opened by the **Snapshot** button  is basically the same as the Live Mode. Please refer to the **Snapshot** section of the chapter for Live monitoring.

6.6 Playback Settings

The Playback Setup menu contains several settings related to search and playback.



- **Display Playback Time**

Display the playback time on the display unit.

- **Decode Only Key Frames in FF Playback (1x1 mode)**

By default, FF playback works as follows:

- 1x1 Mode: all frames are displayed and video is smooth.
- Other Screen Modes: only key frames are displayed. Video might be jumpy. This is inevitable due to performance limitation of the PC. When this setting is selected, only key frames are displayed in 1x1 mode also.

- **Show Unregistered Cameras**

By default, Search Mode displays the cameras which are registered in Camera setup. When this setting is selected, all cameras are displayed in the storage regardless of their presence in Camera Setup. This is useful for playing a camera which could have been removed.

- **Monitor Remote Search Server**

When this setting is selected, the VMS will monitor the Remote Search Server Program (trss.exe) to see if it is running normally and will start if it is not found.

7. Event Handling

7.1 Event Monitoring and Search

Events monitored in the VMS are classified into two categories: Camera Events and VMS (or local) Events.

Camera Events

Camera events are created by cameras or encoders when a specific situations happens.

Camera Event	Description
Sensor On/Off	Delivered when the sensor device attached to sensor (DI) port of a camera's state changes.
Alarm On/Off	Delivered when the alarm (DO) port of a camera's state changes.
Motion On/Off	Delivered when a camera detects motion in the scene or the motion stops.
Video Loss On/Off	Delivered when a camera losses the video input signal. Since the video input module is tightly assembled with other parts in IP camera, this event is rare in the IP camera. However, this can happen if the video cable is disconnected.

VMS Events

VMS Events represent some situations in the VMS which need to be logged for interpretation of the recorded status. VMS Events are sometimes called Local Events.

VMS Event	Description
VMS Started VMS Terminated	Startup and termination of the VMS generated events. Forced or accidental termination can occur. These VMS Events can be used to check whether the VMS was terminated due to error or not.
Camera Connected Camera Disconnected	Generated when the connection to a camera is established or lost. These events are useful to check failure in the network or the camera.
Config Changed	Generated when the VMS configuration is changed.
Disk Full	Disk becomes full when Overwrite Mode is not enabled.
Disk Write Failure	Any disk failure when writing data.
No Selected Disk	No selected disks are found for recording.
Initialization Storage Failed	Initialization of storage fails.
Drive Initialization Failure	Initialization of a single drive fails.
Drive Lost	A network drive is lost.
Drive Restored	A network drive is restored.
Time Event	An event which happens according to a schedule. Max of 4 events can be defined.

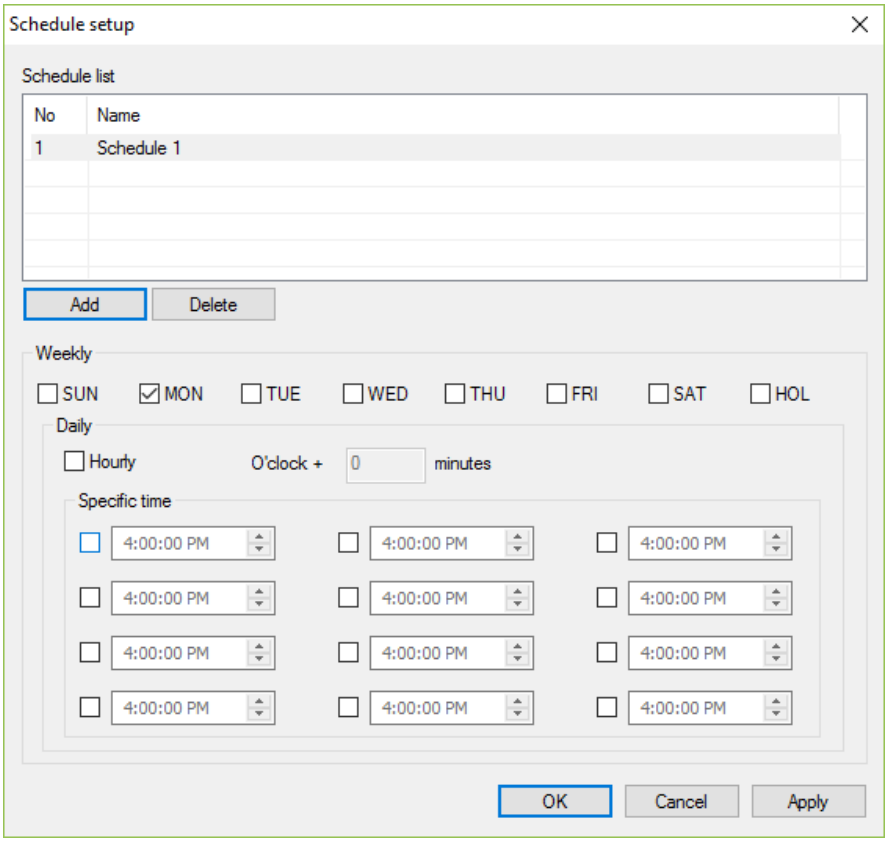
7. Event Handling

Time Event
A Time Event is a special type of event that is generated according to a schedule configured by user or by manual triggering of the menu. Time Events can be used for various purposes including the following:

- Control camera's alarm on specific times of a day.
- Send wave files to the camera on specific times of a day (to play warning sound etc.).
- Play wave file on VMS for alarming the monitoring center.
- Generate snapshot images periodically.
- Control PTZ presets based on a schedule.

Any actions supported in the Event Handler can be mapped as Time Event actions.

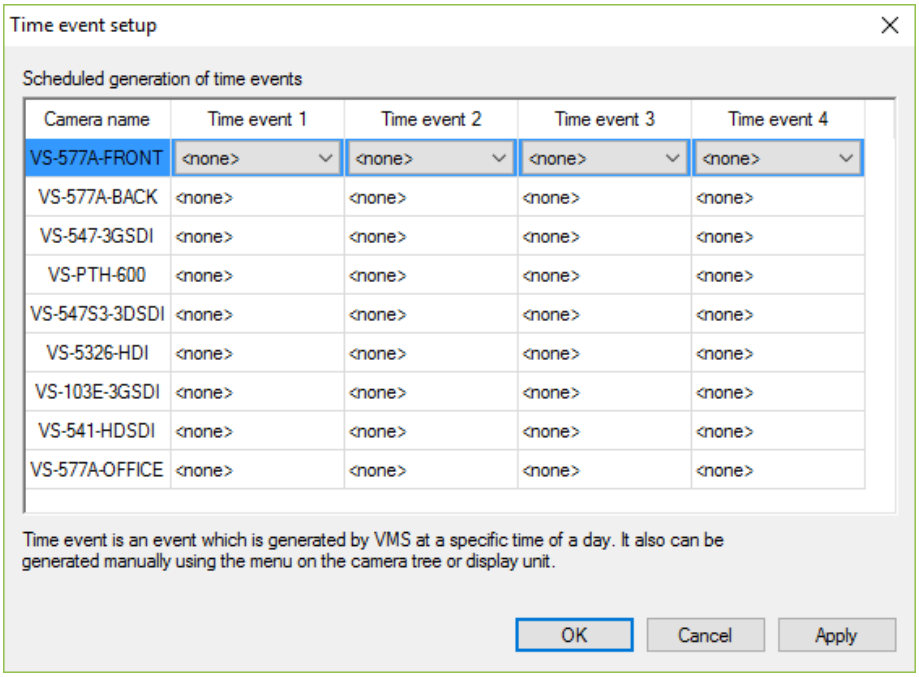
Time Event Setup
Time Events are configured on the **Events** menu under the **Time Event** menu.



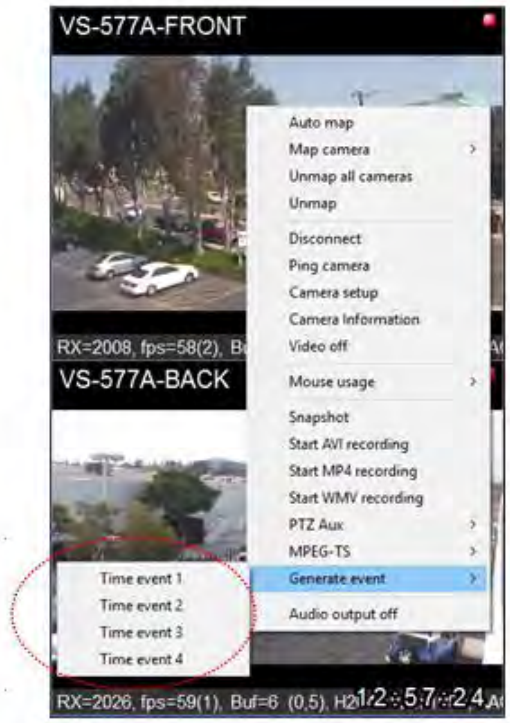
The **Schedule Setup** menu provides the interface for creating schedules according to generated Time Events. Weekly, Daily, and Hourly Time Events can be scheduled. If **Hourly** is selected, a Time Event is triggered hourly at specified minutes. Up to 6 times can be specified for **Hourly Time Events** in a day. However, a max of 30 Time Events can be generated in a day.

7. Event Handling

Once schedules are created, they are mapped to Time Events for each camera. A max of 4 Time Events are supported for each camera. Although Time Events are generated in the VMS regardless of the camera, it is designed to provide camera-specific event handling.



Time Events can be generated manually using the camera or video context menu.



7. Event Handling

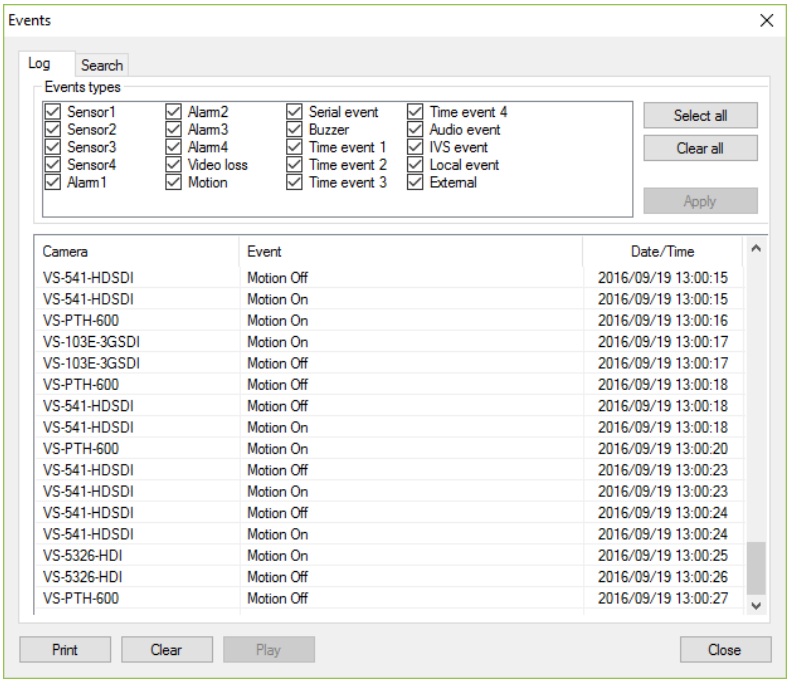
Monitoring Events
Camera Events are monitored in more than one way. Sensor Events and Alarm Events change the icon status in the camera tree. The motion icon in a DU reflects the motion detection state of a camera. The DU also displays a **Video Loss** message when the camera loses the video signal.

Events are monitored in the same location where stored events can be searched. The **Event Log** menu or **Event Search** menu displays the dialog when the corresponding menu is opened.

The **Event Handler** can be configured to be executed when a specific action happens.

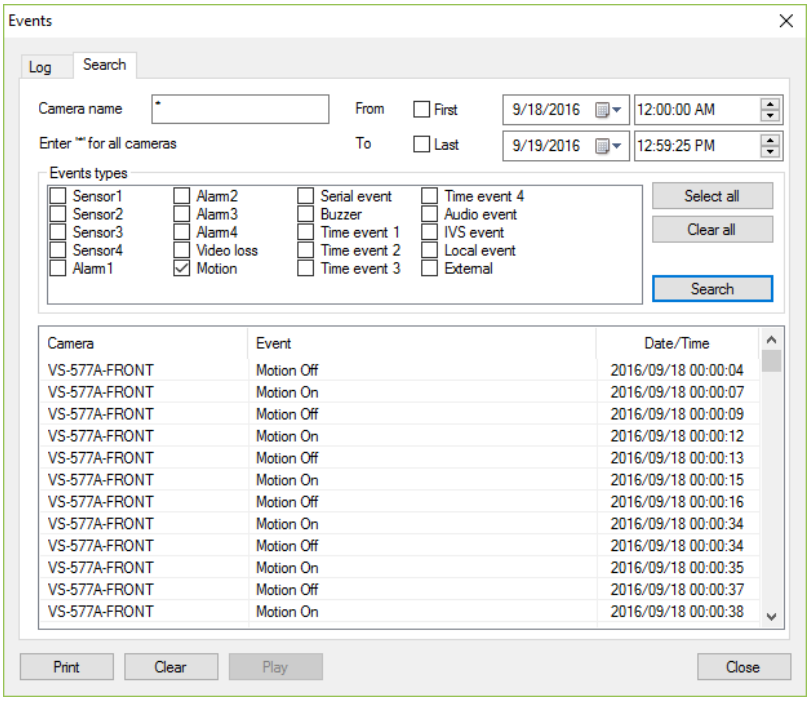
7.2 Event Log and Search

The **Event Log** menu displays a dialog where both Camera Events and VMS Events can be monitored in realtime. This dialog shows the events only after it is opened. Event types can be selected to include only the events of interest.



7. Event Handling

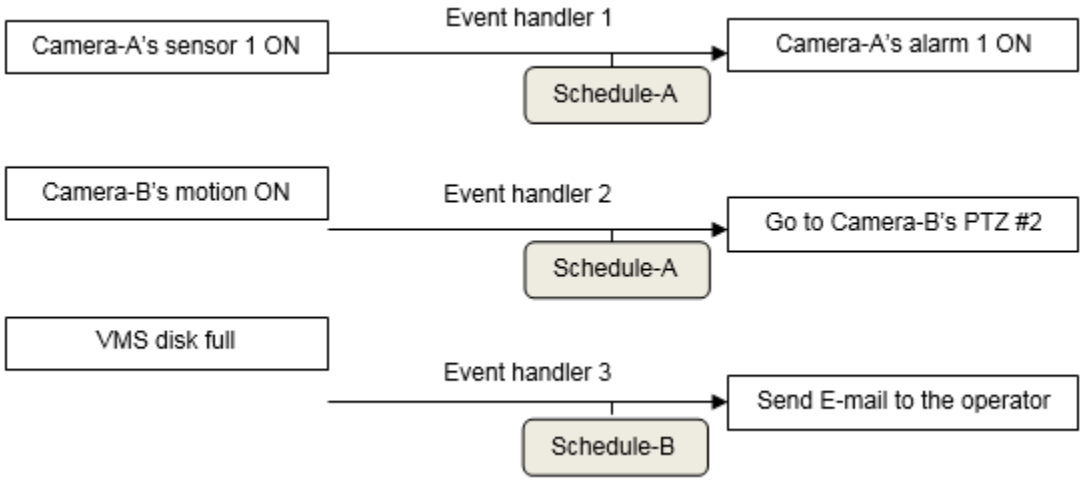
The **Event Search** menu displays a dialog where stored events can be searched.



7.3 Event Handler

VMS provides a versatile Event Handler to associate various event actions generated by the VMS as well as the cameras. Each action can have independent schedules which are controlled based on days and times.

An Event Handler is an association between a specific camera or VMS event and a specific action:



7. Event Handling

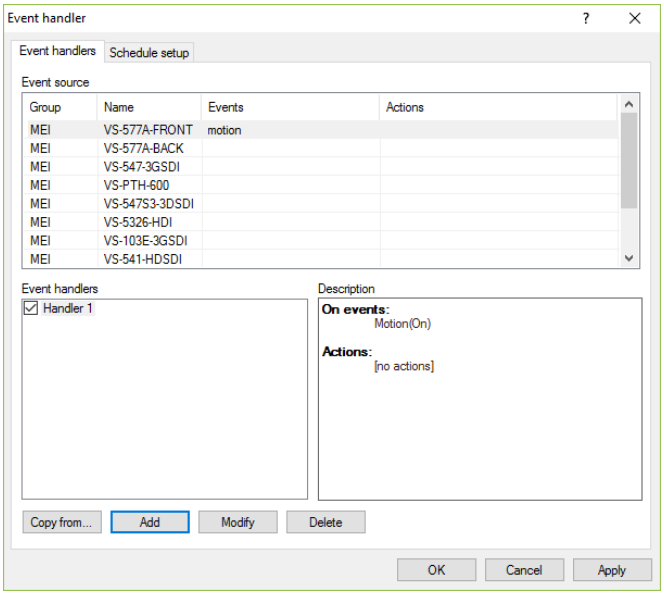
The schedules that control the actions are defined independently and associated to an event handler arbitrarily. As a result, it is possible to use the same schedule for multiple event handlers.

Event Actions
Various actions can be associated to the camera or VMS events:

Action	Operation	Parameters
Popup Video Window	A popup video window from the camera is displayed.	Duration of the popup window display.
Blink Video Channel	Border of the DU will blink in a red color.	Duration of the blinking.
Change Screen Mode to 1x1	The screen mode is changed to show the camera in 1x1 mode.	
Video Stream Control	Control video-on/off mode of the camera.	
Play Wave File	Play a specified wave file.	-Wave file to play. -Once or repeat.
Send Wave File to Camera	Send a specified wave file to the camera to play to the camera's audio output port.	-Wave file to play. -Once or repeat.
Control PC Mic	Control audio playing on PC; controls PC Output on Audio tab of main UI.	On/Off
Control PC Speaker	Control audio playing on PC; controls PC Output on Audio tab of main UI.	On/Off
Camera Alarm Control	Turn on or off a specific alarm of the camera.	Duration and On/Off.
Go To PTZ Preset	Control the camera to view a specified preset position.	Preset item.
Activate PTZ Tour	Activate a specific PTZ tour configured by PTZ control.	Tour item.
Send Email	Send email to the operator	Email title and text.
Snapshot	Capture and save a snapshot image.	

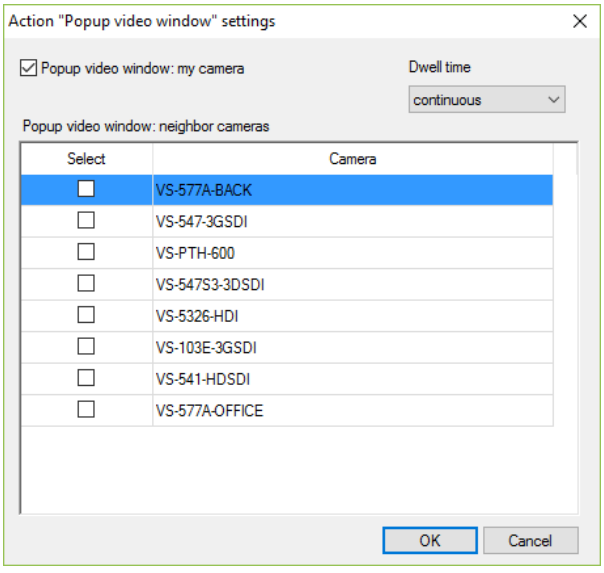
Event Handler Dialog
The **Event Handler Dialog** is displayed on the **Event Handler** submenu. The dialog shows the current configured event handlers for each camera. By clicking on an event source, a specific event handler will display the detailed relationship between the events and actions.

7. Event Handling



Creating an Event Handler
An event handler for an event source is added on the **Event Handler** menu.

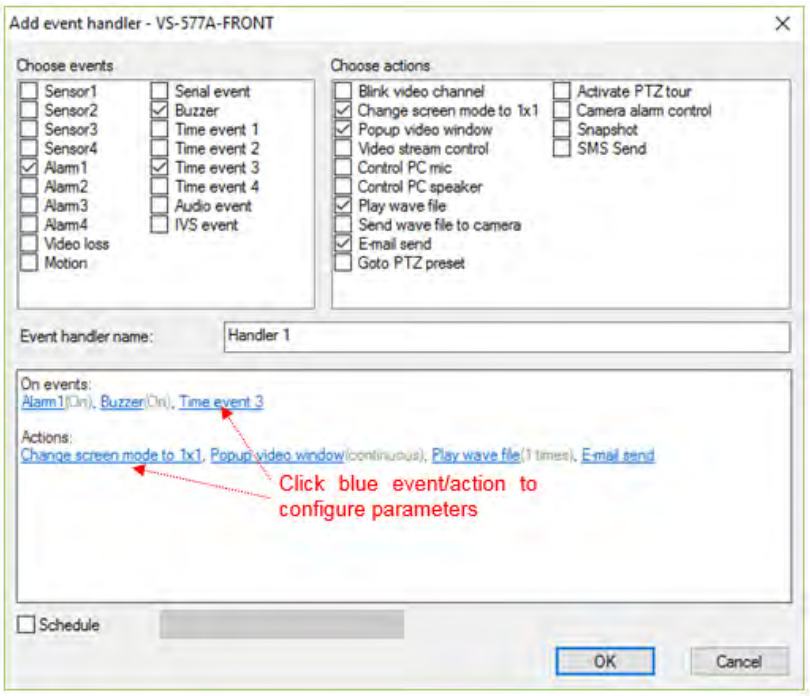
1. Choose actions to be associated with the events. Multiple events can be selected to trigger the action on any of selected events.
2. Choose one or more actions.
3. Edit the name of the event handler.
4. Configure the parameters of the events. Select the event state (ON or OFF) to trigger the action selected. **"On"** is mostly used to configure the event action.
5. Configure the parameters for actions. Parameters for actions are specific to each action. The most common parameter is the duration in which the action is to be continued. For Example: Action Settings are configured for the Camera Popup Video Window below:



7. Event Handling

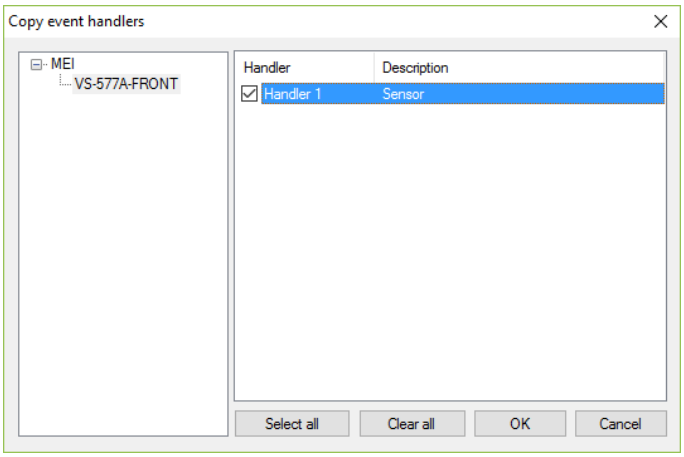
The duration of the popup window display time is configured. It is possible to activate multiple cameras on a specific camera event. This feature is useful for monitoring related cameras in a site. Typical usage controls other cameras' PTZ presets to view a position of interest when an event happens on a specific camera.

6. Select the schedule to be used for this action. The action is triggered only when the schedule is configured in the **"On"** state at the time when the event is generated. If **Use Schedule** is not selected, the action happens without checking the schedule.
7. Click **OK** button.



Adding Event Handlers by Copying from Another Camera

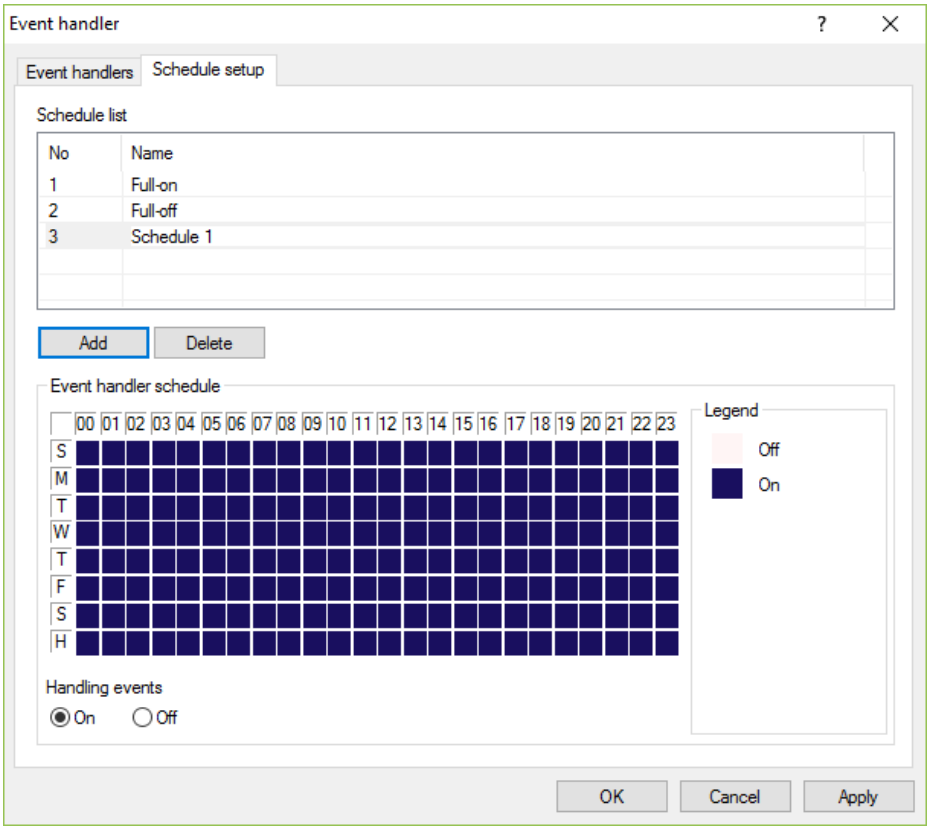
If multiple camera events are going to use the same actions, an event handler can be configured and copied to be used for multiple cameras. For Example: All cameras can be configured to play a wave file when any of the sensors in the camera detect a status change. The VMS allows event handlers defined for other cameras to be copied.



7. Event Handling

Defining Schedules

The schedules to be associated with event handlers are created independently from event handlers. A schedule is selected when an event handler is created or modified. This allows flexible association between event handlers and schedules. A specific schedule can be shared among many event handlers or each event handler can have different schedules.

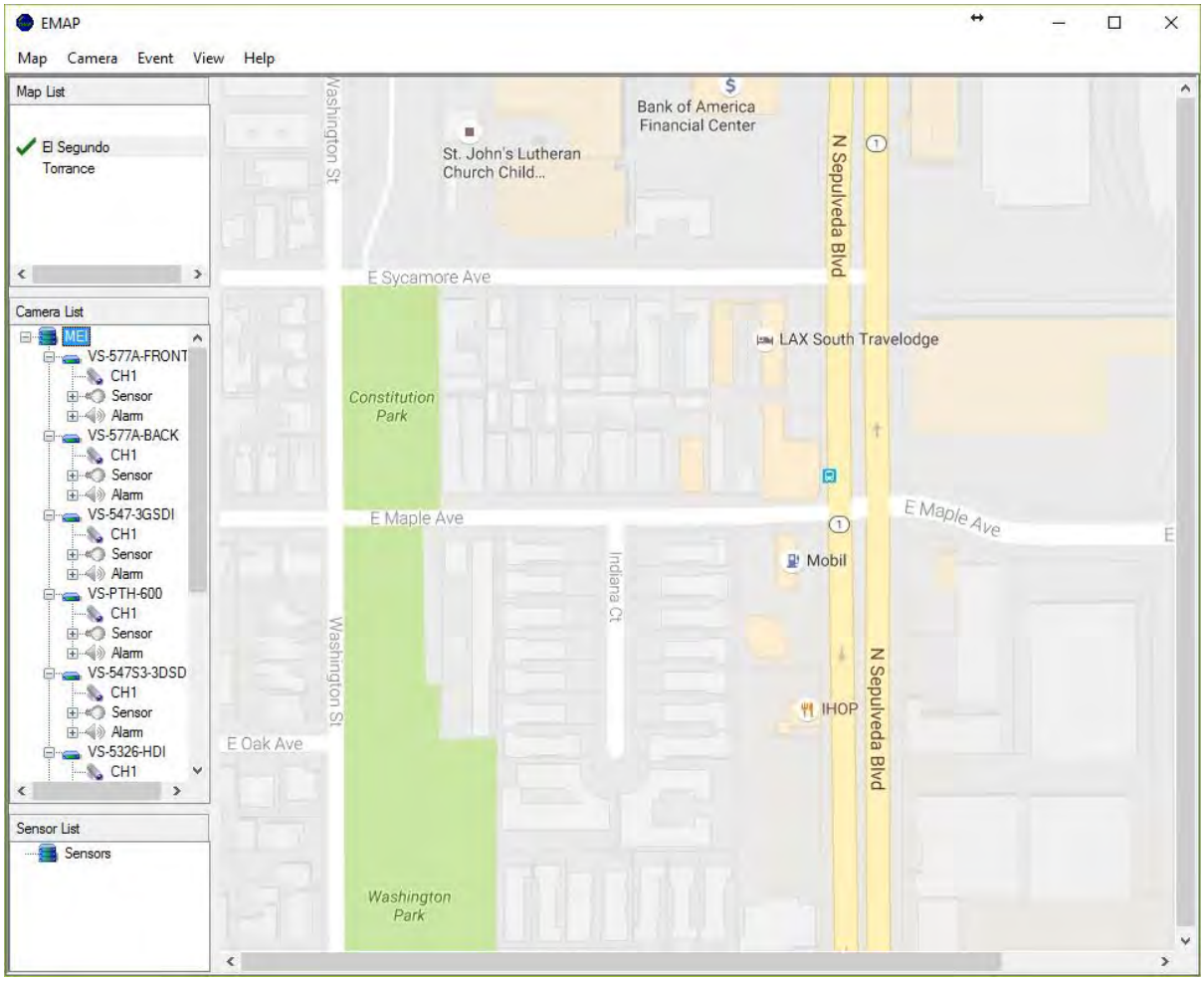


A schedule is created in the following steps:

1. Edit the name of the schedule.
2. Click the **Add** button.
3. Configure the weekly (+ holiday) schedule table by dragging and/or selecting with the mouse.
4. Click **OK** or **Apply** button.

8. E-Maps

E-Map (Electronic-Map) functions is supported in a separate application: **EMAP**. Select the **EMAP** button on the toolbar.



EMAP provides the following functions:

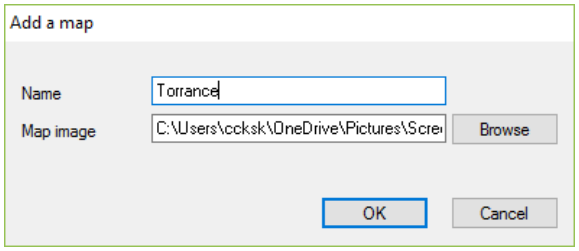
- Displays image-based maps and allows camera placements on specific positions.
- Camera's video can be manual or event-driven.
- Various actions such as marking a camera upon receiving camera events.
- Two-way audio communication with a camera.

8. E-Maps

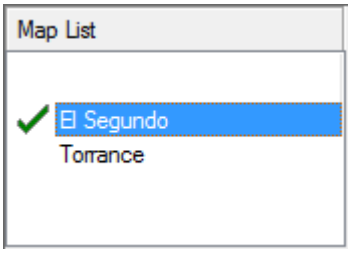
8.1 Importing Maps

The first step to use EMAP is to import map images. Bitmap or JPEG format maps can be imported by using the **Add a Map** menu.

1. Choose Bitmap or JPEG image format. Using an image that is a similar size to the map area is recommended.
2. Enter the map name.
3. Click the OK button.



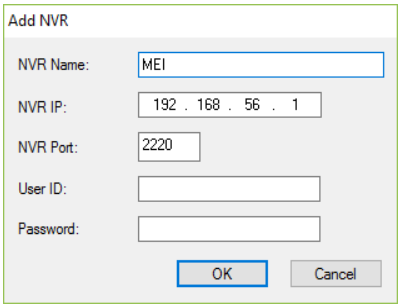
EMAP displays the added maps appear on the Map List. Select the map to view. A large area can be divided into multiple regions (maps). Maps can be imported at different scales for a macro view as well as a detailed view of the area.



8.2 Connecting to VMS

EMAP is designed to operate with one or more VMS or NVR. It can't work alone. When connected to a VMS, the camera list is displayed.

1. Add an NVR using the **Add NVR** in the **Camera** menu.
2. Enter the information for the VMS or NVR to connect. Currently the port is fixed to 2220. Click OK.
3. More than one VMS or NVR can be added for sharing the EMAP with multiple VMS or NVR.

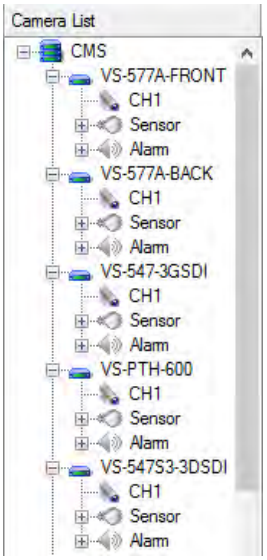


Added VMS with cameras are listed on the Camera List menu. VMS and camera nodes show the connection state by color:

- **Grey**
  VMS is disconnected by the user. The menu on the VMS node provides menus for connection and disconnection.

- **Violet**
  'Trying connection' state to the VMS.

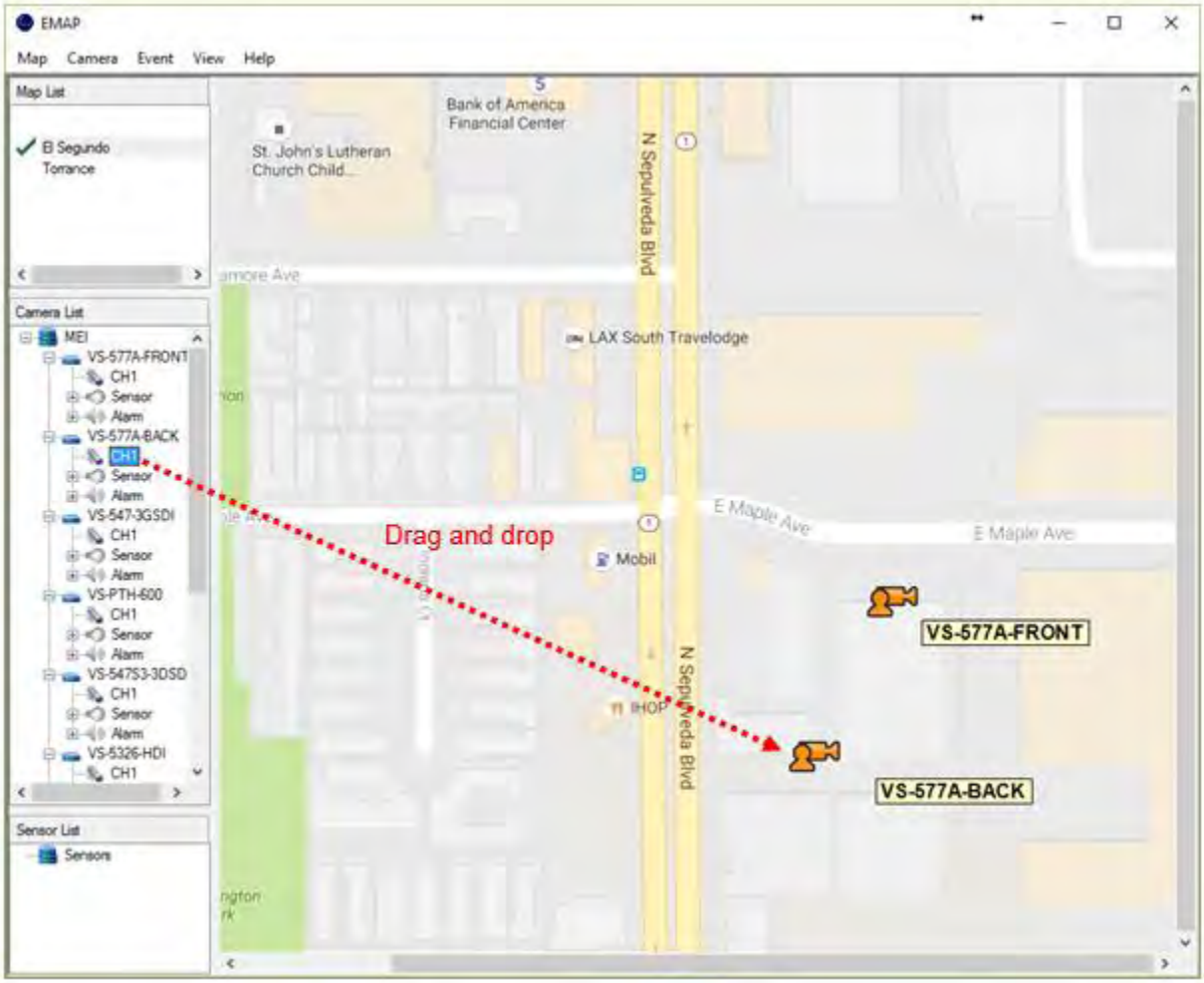
- **Blue**
  EMAP is connected to the VMS.



8. E-Maps

8.3 Placing Cameras on a Map

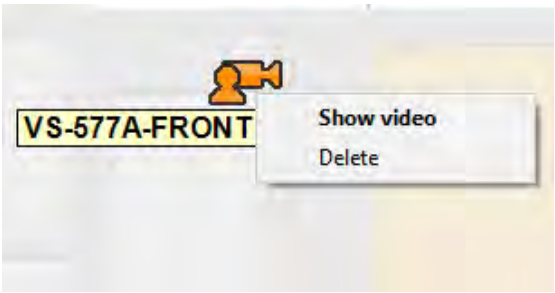
A camera can be placed on a map by dragging and dropping from the camera tree. The location of the name tag (yellow rectangle) can be adjusted after placing the camera.



A camera can be deleted on the map by selecting the camera icon on the map or the camera node on the tree, then delete.

8.4 Pop-Up Video

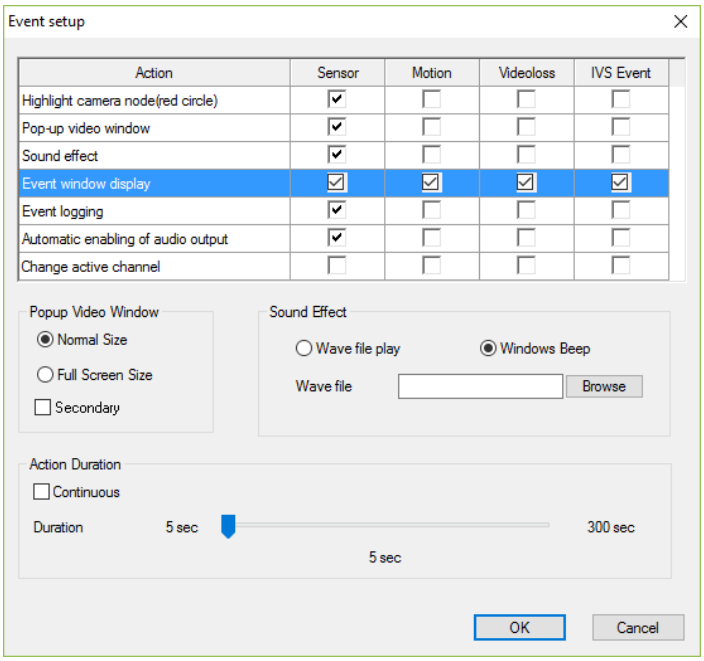
A Pop-Up Video for a camera on the map can be opened with the **Show Video** menu on the icon. Double clicking the camera icon will have the same effect.



8. E-Maps

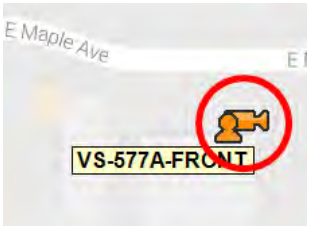
8.5 Event Handling

EMAP will map an event to one or more actions. Sensor, motion and video loss events can be selected. The following **Event Setup** menu shows how events are mapped to actions and how the parameters for each action are specified.



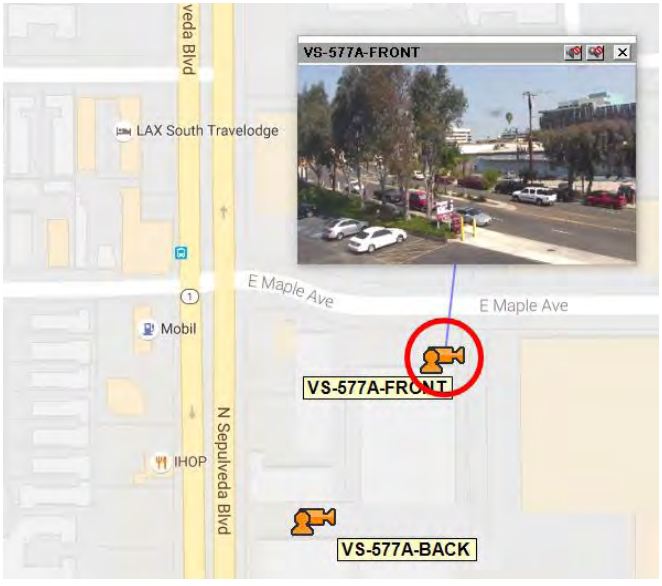
- **Highlight Camera Node**

A blinking red circle is displayed around the camera icon on the map. The circle disappears if the user selects the node or if the action expires.



- **Pop-Up Video Window**

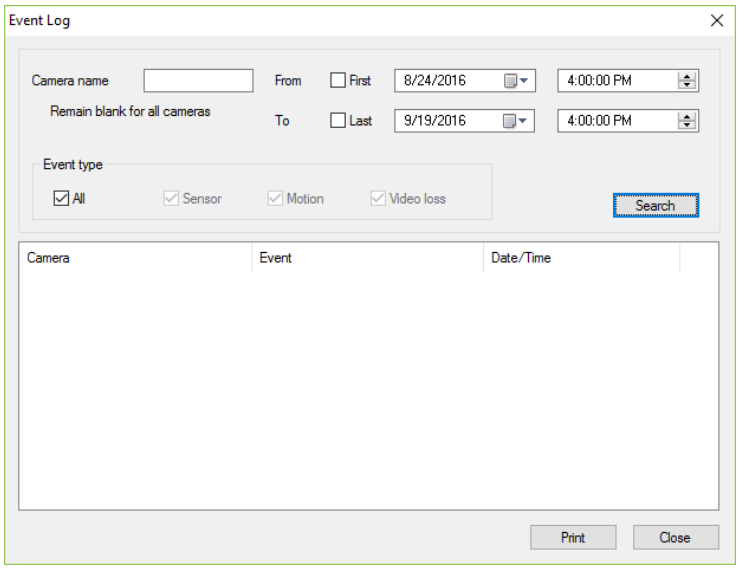
The Pop-Up Video is displayed on the map.



- **Sound Effect**
  A wave file or the Windows sound is played.
- **Event Window Display and Logging**
  Events are displayed on the Event Window at the bottom of the EMAP GUI and logged for file searching later.
- **Automatic Enabling of Audio Output**
  If audio output (to PC) is turned off, the event turns on the audio output automatically.
- **Change Active Channel**
  The active channel is changed to the channel where the event happened.

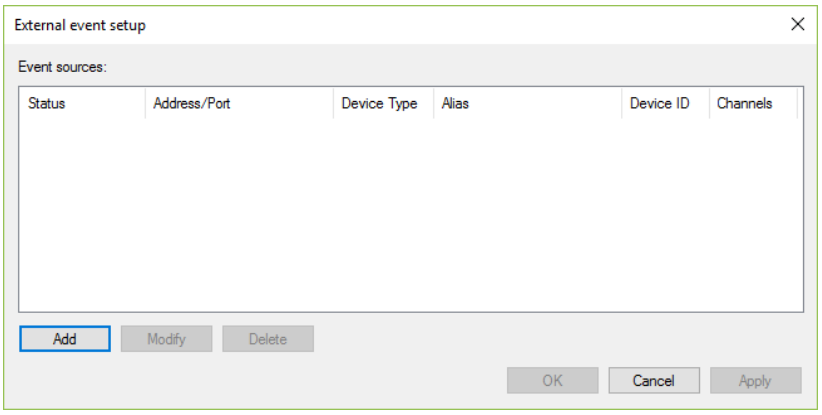
Event Search

The **Event Log** menu allows events searching with various conditions. EMAP stores events independently from the VMS event logging.



External Event Handling

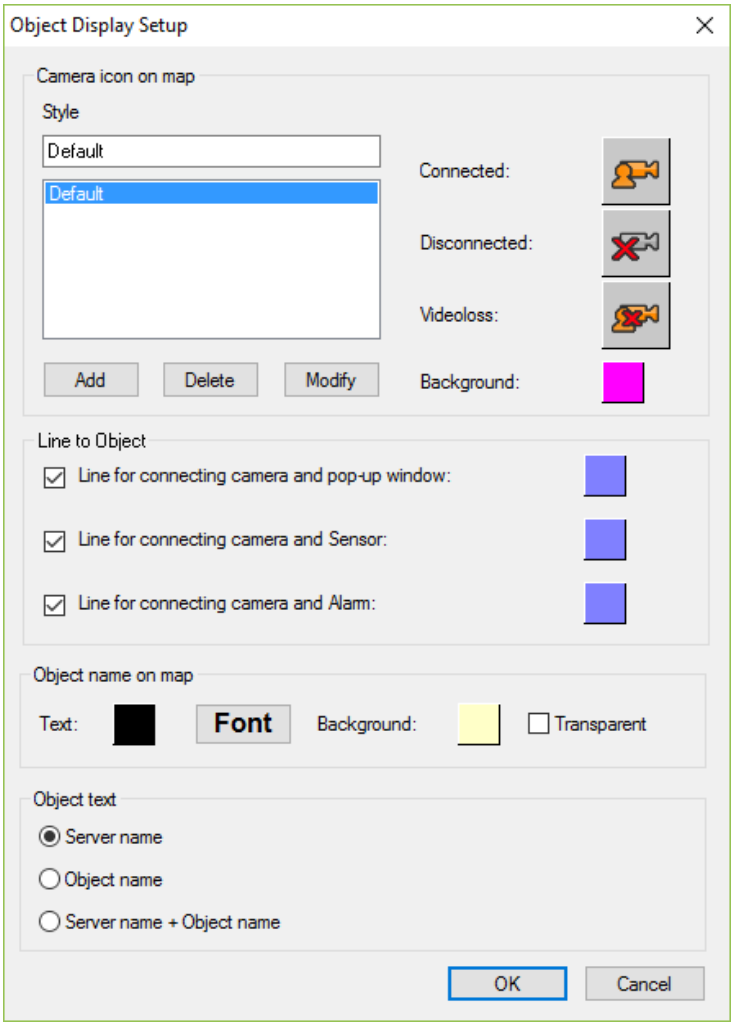
The VMS can receive events from the external IP network event source. The protocol for delivering external events can be obtained from the Technical Support Team. Generally, a special server called the Event Relay Server is used to deliver events from the event sources to the VMS while translating the event messages (Example: gateway function).



8. E-Maps

8.6 Configuring the Object Display

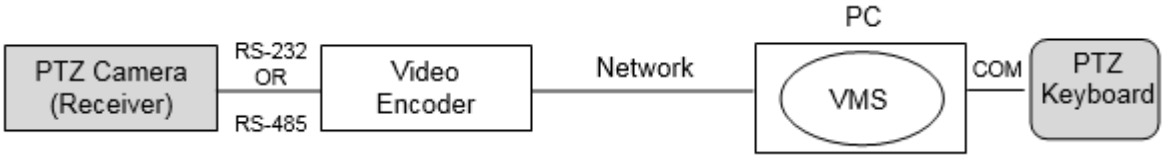
EMAP allows changing the view of the objects on the map. **Object Display Setup** is configured in the in the Maps menu. User-defined camera icons for different states can be specified. The color for the connection state of the camera icon and pop-up video can be changed. Camera name tags can be fully customized also.



9. Additional Functions

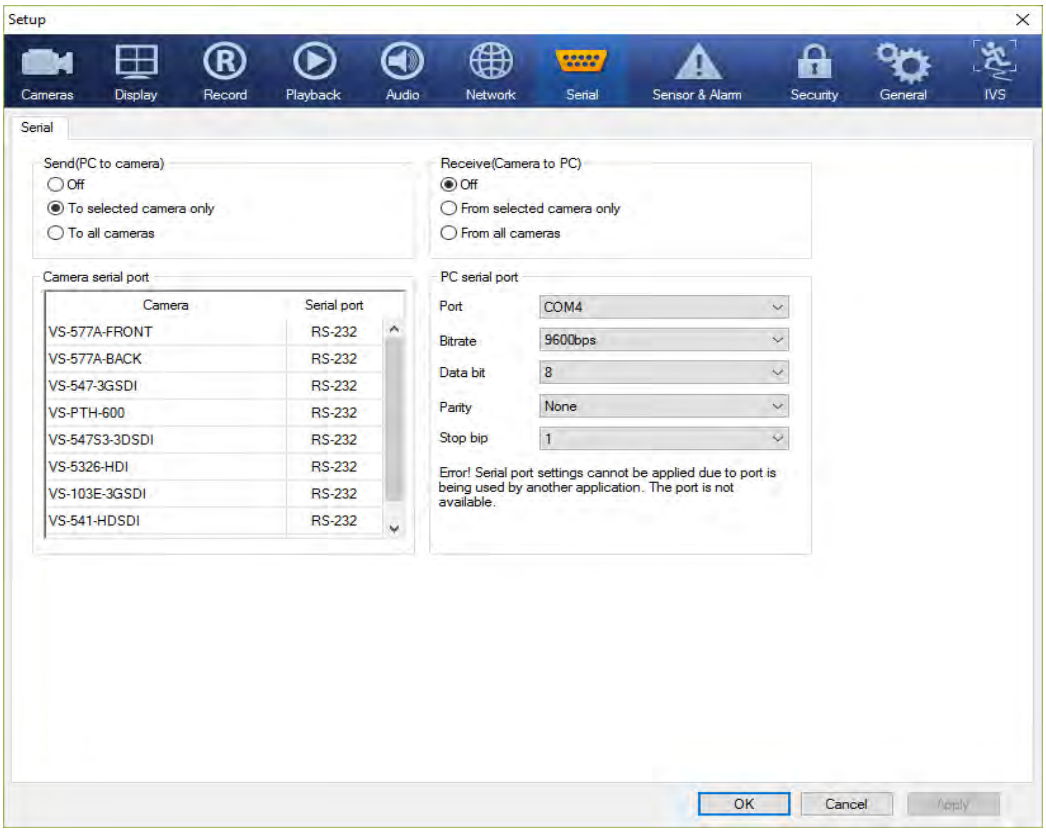
9.1 Serial Data Pass-Through

Serial Data Pass-Through is a function used to deliver the serial data transparently between the camera's (or video encoder's) serial port and PC's COM port. Typical usage is to control the PTZ camera using a PTZ keyboard connected to the PC.



Serial Data Pass-Through function doesn't modify the data between the PTZ keyboard and the PTZ camera. It just delivers data bi-directionally.

The **Serial Setup** provides the settings for the Serial Data Pass-Through operation.



- **Send (PC to Camera)**

  Send Mode: Send to all connected cameras or currently selected camera only.
- **Camera Serial Port**

  Camera's serial port where serial data from PC's COM port will be sent and serial data from external equipment will be read.
- **Receive (Camera to PC)**

  Receive Mode: Receive from all connected cameras or currently selected camera only.
- **PC Serial Port**

  Camera's COM port where serial data from the camera will be sent and serial data from external equipment attached to the PC will be read.

9. Additional Functions

Note: Some camera models or video encoders have only one serial port typically RS-422/485, although the combo for serial port selection provides both RS-232 and RS-422/485. The serial port supported by the camera or video encoder should be selected appropriately.

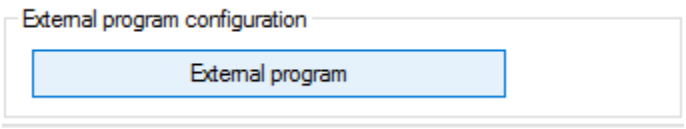
When any mode (Send, Receive) is enabled, the status bar of the main GUI shows the bitrate of the serial TX and RX through the PC's COM port.

9.2 Synchronizing Camera Time with VMS PC

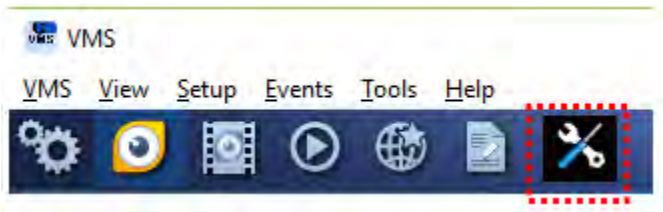
The connected camera time can be synchronized with the PC. The General Setup allows synchronization as well as enabling the function. This feature is useful when cameras can't be synchronized with an NTP server.

External Program

It is possible to add an external program to the toolbar. Registering an **External Program** can be completed in the General Setup.



The Registered External Programs icons are shown on the right side of the toolbar.



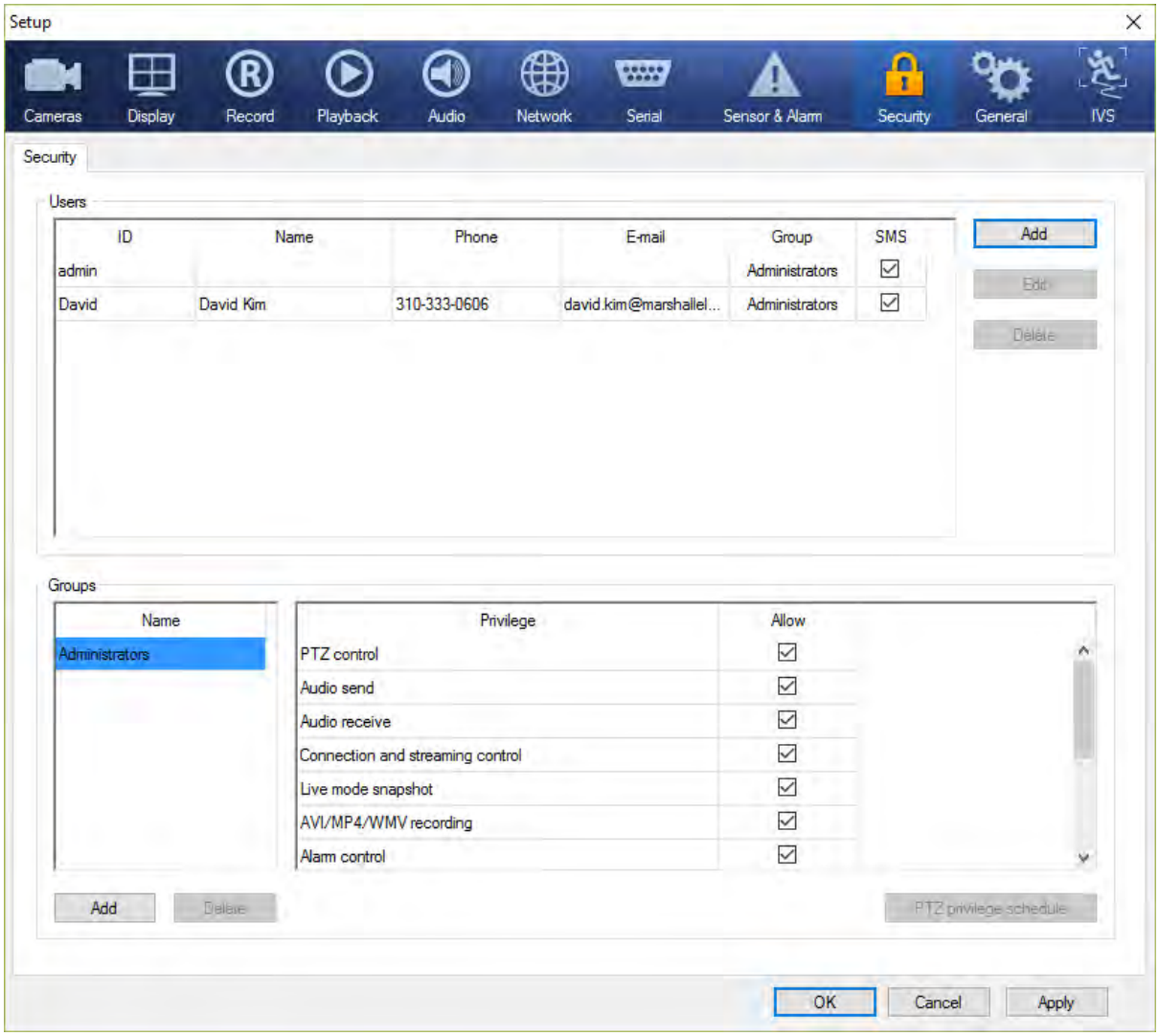
10. Security

10.1 Overview

VMS enables users to create several user accounts and assign restricted monitoring and control rights. Therefore, it is possible to assign the appropriate security levels to each user account.

10.2 User Account and Privilege

One Admin User is created automatically by the VMS installation. All control rights are given to the admin level. Additional accounts can be added in the Security Setup.

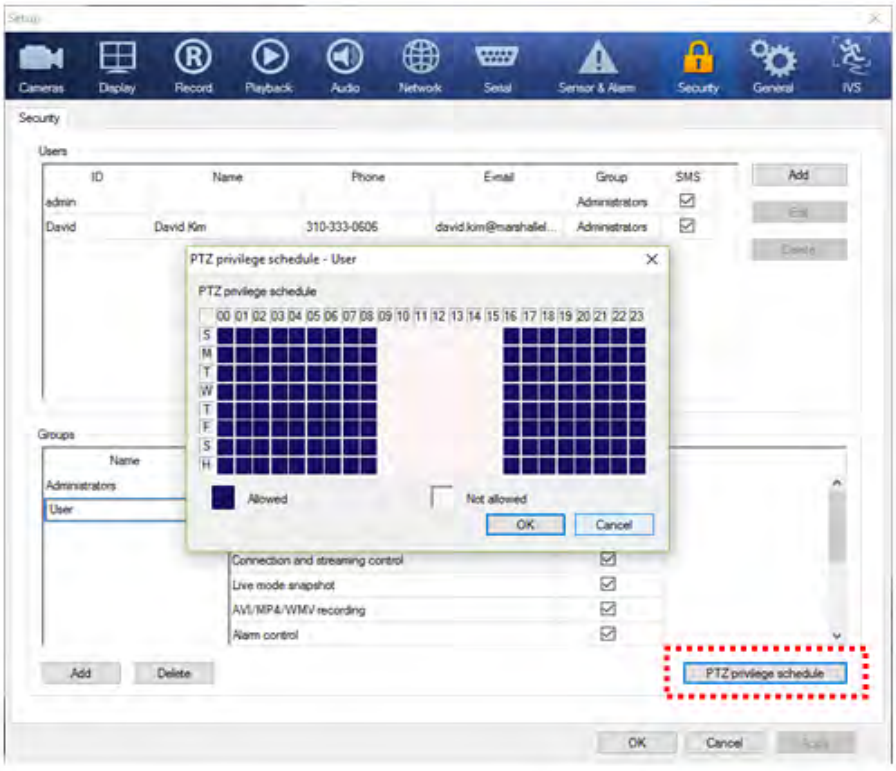


After a user is added, user privileges can be configured by selecting appropriate functions in the setup menu. Group configurations can be setup as well.

10. Security

Function Group	Restricted Operations Unchecked
Setup	Setup can be opened for read-only purposes, but setup changes are not allowed.
Event Handler	Event Handler can be opened for read-only purposes but changes are not allowed.
PTZ Control	PTZ control is not allowed.
Search	Search and playback of recorded data are not allowed. The Search button is disabled in the VMS. In VMS Client, a message is displayed stating the user has no privilege for search and playback.
Event Log	Opening the Event Log/Search is not allowed.
Audio Control	Audio in the left control pane is hidden.
Camera Remote Setup	Camera operation setting changes are restricted: - Color menu in the left control pane - Camera remote setup menu
Connection and Streaming Control	Connection/Disconnection of a camera and video on/off menus are disabled on the tree and the DU.
DU Mapping	Camera mapping to a DU is not allowed.
View Control	View menu is disabled.

After adding additional users, control rights can be given to the each user. PTZ user control (typically connected from Client) can be allowed or disallowed according to the schedule below. This is useful when a user is granted PTZ control during the day time while other users are allowed control during the night time.



10. Security

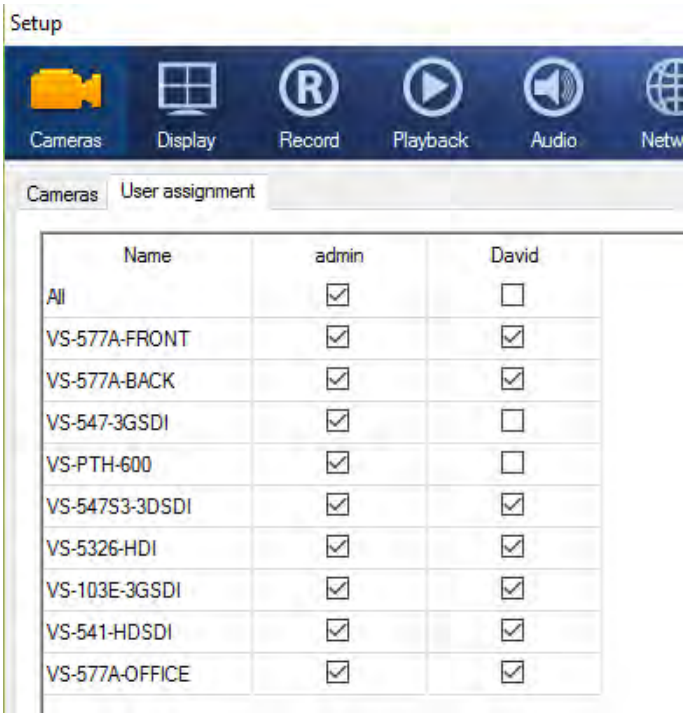
Note: Functions such as Audio Control and PTZ Control are defined as Event Handler Actions. When an Event Handler is allowed, the following functions are allowed automatically:

- PTZ Control
- Audio Control
- Camera Remote Setup
- Connection and Streaming Control

Restricting Functions
The User Accounts are defined in the Security Setup. VMS servers are registered in the VMS Client. Depending on the user privileges for the VMS server connection, the following function groups are restricted in the VMS Client:
- PTZ Control
- Audio Control
- Camera Remote Setup

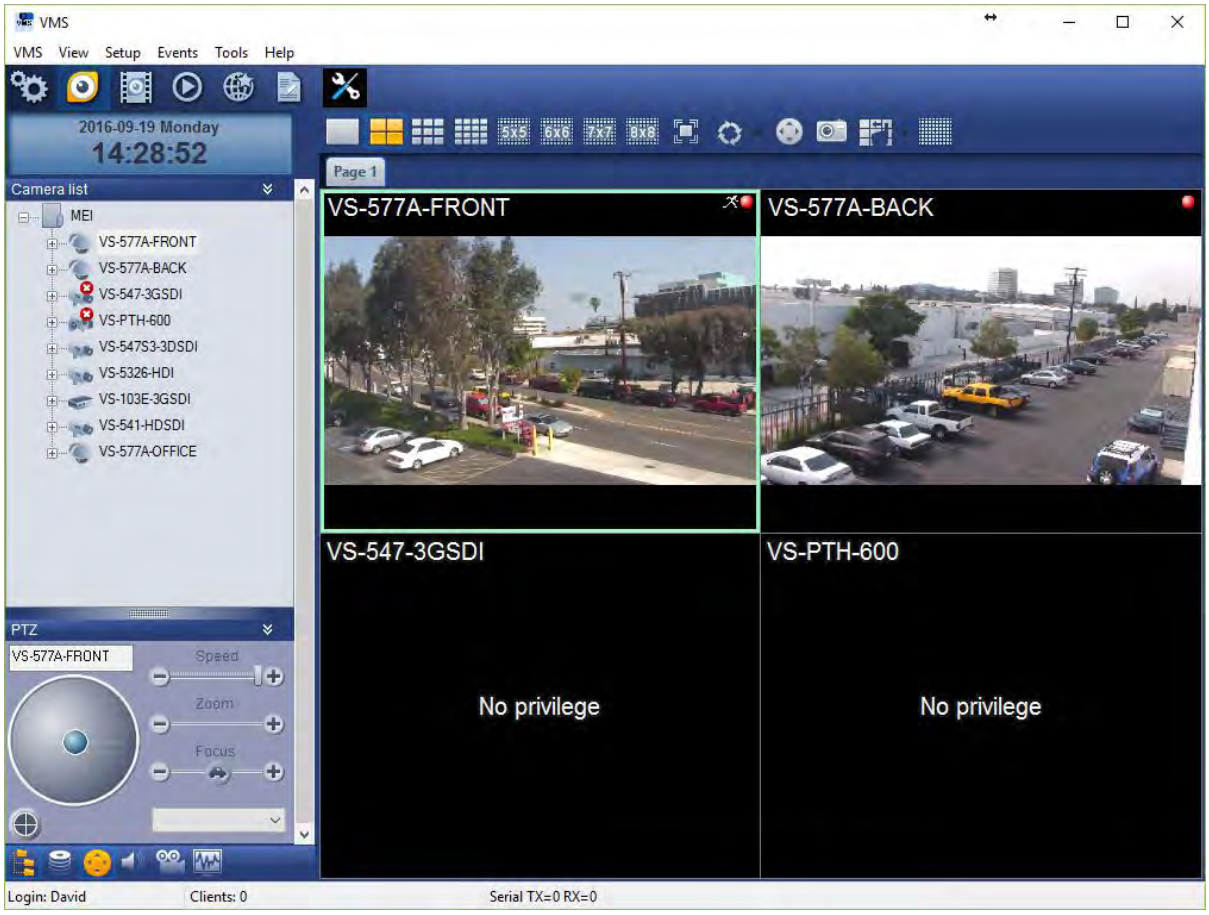
10.3 Restricting User Camera Access

The VMS configures user accesses for each camera. The **User Assignment** menu within the **Camera Setup** provides ability to select camera users. The following menu displays the user's camera access:



When a camera is restricted to a specific user, the view remains in the **Trying Connect** state and the DU displays "**No Privilege**" sign.

10. Security



Restricting Access to Cameras

When a user account does not have access to some cameras, those cameras don't appear in the server tree configuration.

11. Troubleshooting

11.1 Max Number of Display Channels and "No Memory" Message

A max of 30 HD channels are allowed for decoding and displaying. 1 HD channel corresponds to 4 SD channels in terms of system memory usage. So, a max of 120 SD channels can be displayed simultaneously. When more channels are mapped to the DU, a "No Memory" warning is displayed on the DU due to the limited system memory allocated to VMS (2GB for 32-bit application).

It is possible to increase this limit to 128 HD channels by configuring the Windows OS parameters. Please contact the MEI technical support team (support@marshallelectronics.net) to configure.

This manual is based on the date shown below and is subject to change without notice for quality improvement.

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