

ernitec



Ernitec DVMS

VCA configuration

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1. INTRODUCTION

1.1. Welcome

This manual explains how to interface VCAsys settings in Ernitec DVMS software.

The VCA example is based on tripwire settings

VCAsys, the real-time video analytics engine utilizes advanced image processing algorithms to turn video into actionable intelligence. At the core of the product is an advanced object tracking engine that continually tracks moving and stationary targets. The tracking engine features built-in robustness to environmental nuisance conditions such as changing illumination, moving foliage, rippling water, etc.

VCAsys includes tracks and classifies moving and stationary targets and features a full suite of rule-based filters including: enter, exit, appear, disappear, stopped objects, directionality constraints, object counting, loitering, object type and object speed. Multiple filters are supported on any combination of multiple overlapping detection zones.

NOTE:

This manual is generated based on Ernitec EVR5000R series DVR machine DVMS 5.11.4 with VCA license installed.

Getting Started

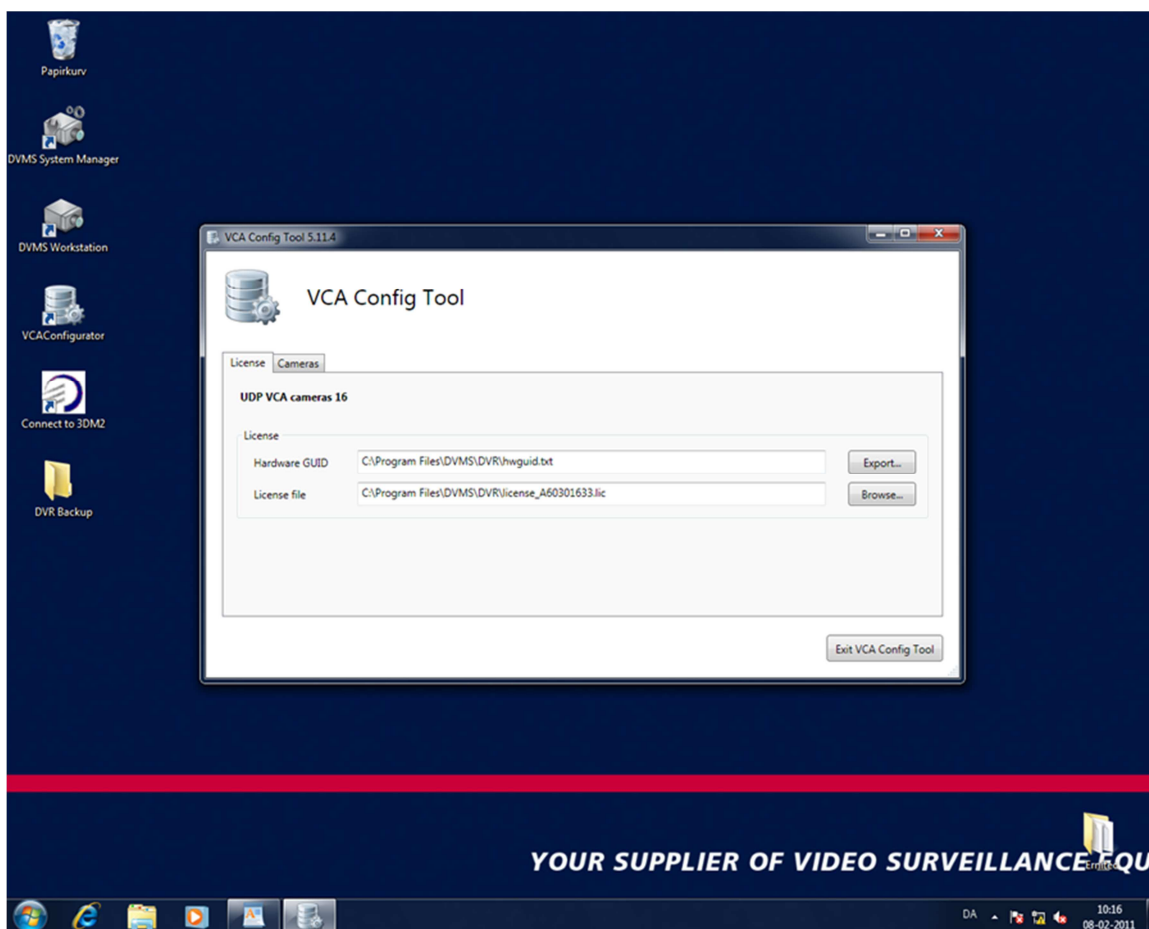
You will need to configure the recorder with cameras, I/O connections, monitors, IP address etc. before using this manual.

Refer to the Ernitec DVMS User and Installation manual supplied with the machine ore VCAsys Online help manual for more detail details.

2. VCA channel configuration

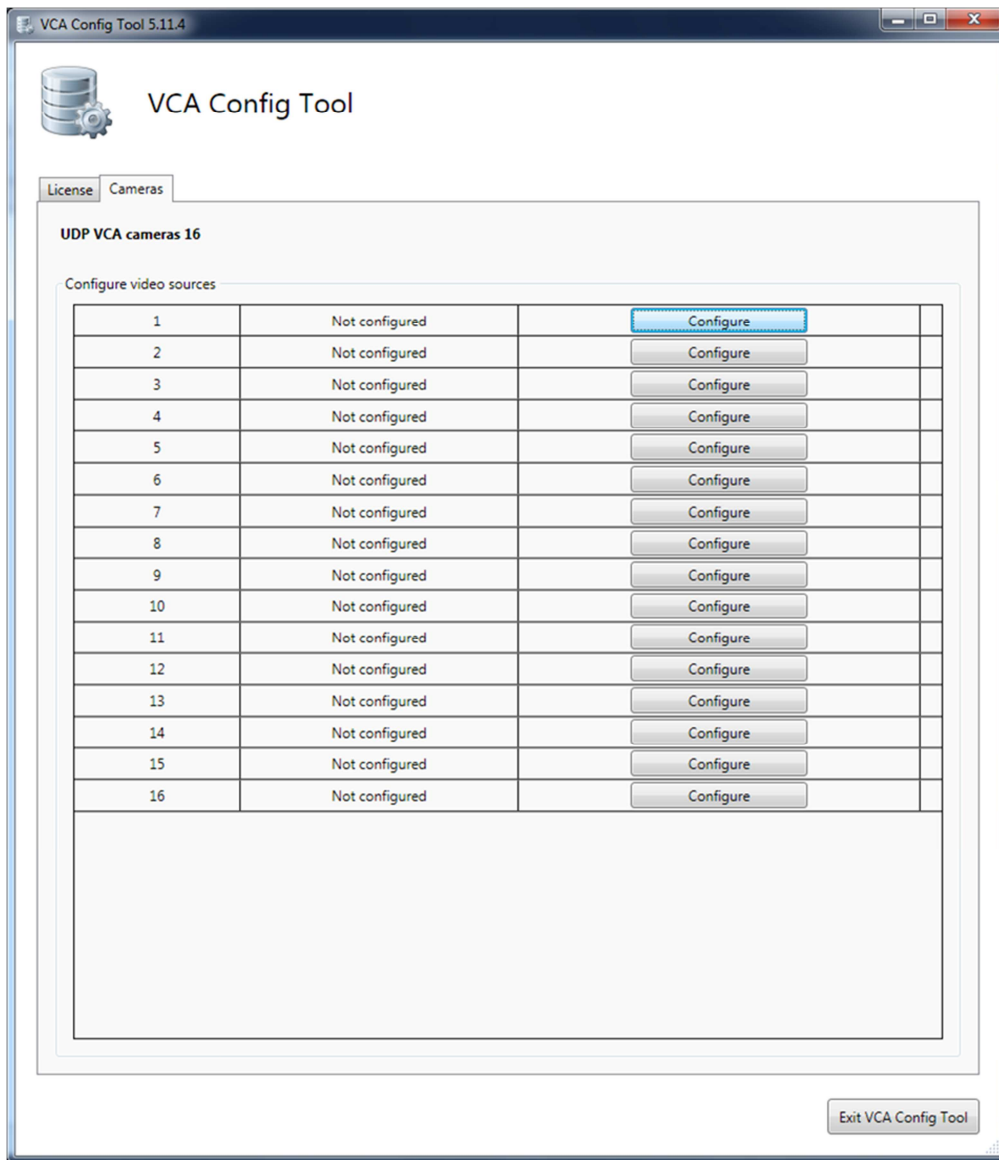
Open the VCAConfigurator on the desktop, this will stop the DVMS video streams when setting the VCA configuration.

Note: if you can't configured the VCA channels, check if you have VCA license installed on your machine. The "tap License" you can see the license information's, contact your dealer for more information.



On “Tap Cameras” start with configured the video sources channel one at the time

Note: the video sources number refers to the video channel number installed in the DVMS software – video sources 1, is video channel 1 in DVMS software etc.

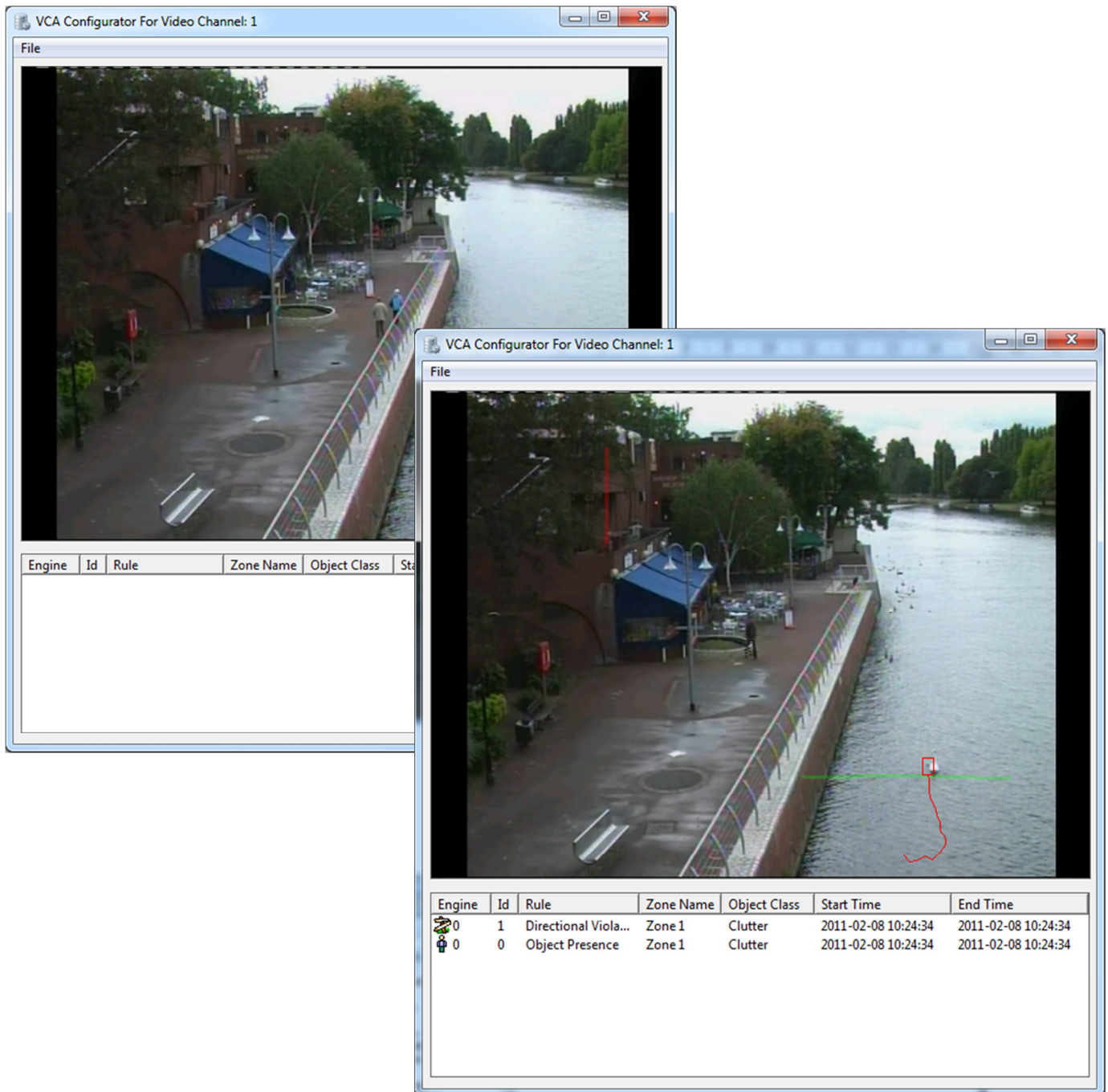


Video streams before and after the VCA setup.

The top video stream is before VCA setup

The bottom video stream is with tripwire VCA settings, you can now see the metadata text and the alarm object with red crossing the green tripwire.

See Configuration of Zones and Rules for more information



3. Configuration of Zones and Rules

Tracking Display

The tracking display window shows all moving and stationary targets that are currently being tracked by the engine. Objects that have triggered a rule are displayed in red. Conversely, objects that have not triggered a rule are displayed in yellow.

This snapshot shows a detection zone, in red and a detection line, in green.

The tracking display window is useful for prediction how the rules will operate. By examining how the trails of the objects intersect the detection zones and lines, it is possible to determine how the rule can be optimally configured.

Zones and Rules

The screenshot displays a tracking display window with a camera view of a parking lot. A red rectangular area is labeled 'Detection zone', and a green line is labeled 'Detection line'. A car is highlighted in red and labeled 'Alarmed object', while another car is highlighted in yellow and labeled 'Non alarmed object'. To the right is a 'Properties Inspector' panel with a tree view showing 'Zone 0' and 'Green Line' with a color swatch. Below the main view is an 'Event history' table with columns for Id, Rule, Zone Name, Start Time, and End Time. At the bottom are 'Apply' and 'Reset' buttons.

Id	Rule	Zone Name	Start Time	End Time
587	Object Presence	Green Line	1970-01-02 02:56:55	1970-01-02 02:56:55
586	Object Presence	Green Line	1970-01-02 02:56:50	1970-01-02 02:56:50
585	Object Presence	Green Line	1970-01-02 02:56:42	1970-01-02 02:56:42
584	Object Presence	Red Zone	1970-01-02 02:56:30	1970-01-02 02:56:36
583	Object Presence	Red Zone	1970-01-02 02:56:18	1970-01-02 02:56:18

In order to detect events of interest, detection zones and lines must be defined. Detection zones define an area of interest. Detection lines are similar to detection zones but they define a perimeter instead of a region.

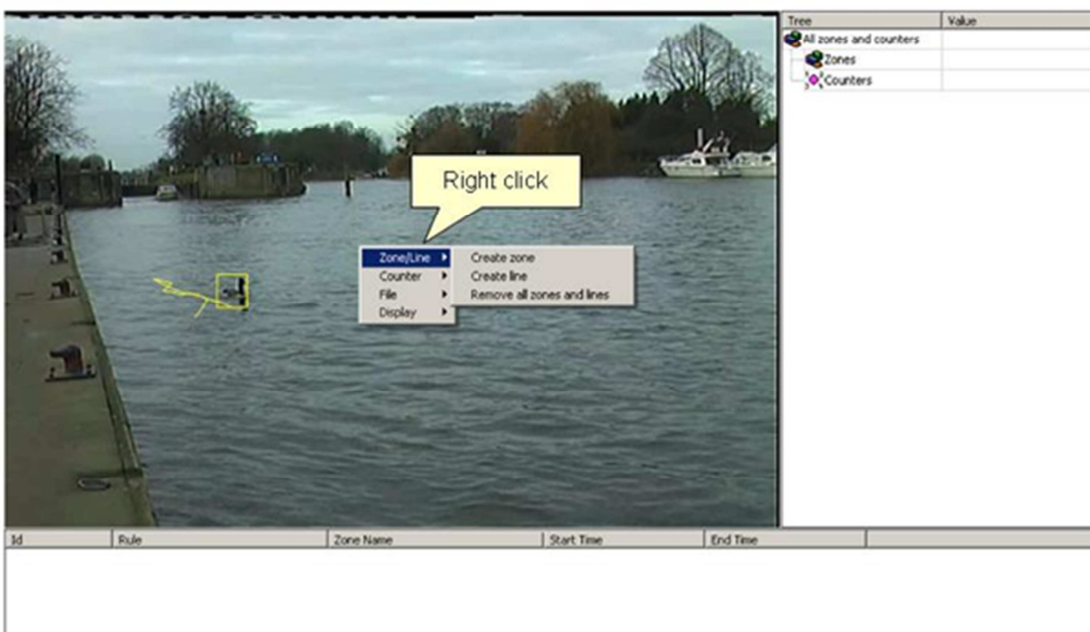
Creating a Zone or Line

To create a zone, either double click the left mouse button or right click and select Zone/Line... Create zone:

To create a line, right click and select Zone/Line... Create line:

Important Note: if using the same rule in more video channel, then add different *Zone numbers equal to the video channel to this rule – channel 1: zone 1+rule, channel 2: zone2+rule etc.*

Zones and Rules
















Editing Zones and Lines

Zones and lines can be edited to be any shape or size. Zones and lines are controlled by manipulating "nodes" that represent the zone/line vertices. To change the shape of a zone or line, simply grab a node with the left mouse button and drag it to the desired location:

Once some detection zones and/or lines have been configured, it's possible to define some detection rules that apply to the zones/lines. By default, zones and lines are automatically configured to detect object presence.

The rules are defined in the Properties Inspector:

Tree	Value
 Zone 1	
Name	Zone 1
Color	 Green
 Object Class Filter	
Include/Exclude	Include
<input type="checkbox"/>  Filter 0	
<input checked="" type="checkbox"/>  Presence	
<input type="checkbox"/>  Enter	
<input type="checkbox"/>  Exit	
<input type="checkbox"/>  Appear	
<input type="checkbox"/>  Disappear	
<input type="checkbox"/>  Stopped	
<input type="checkbox"/>  Dwell	
<input checked="" type="checkbox"/>  Direction Filter	
<input type="checkbox"/>  Speed Filter	

Available rules

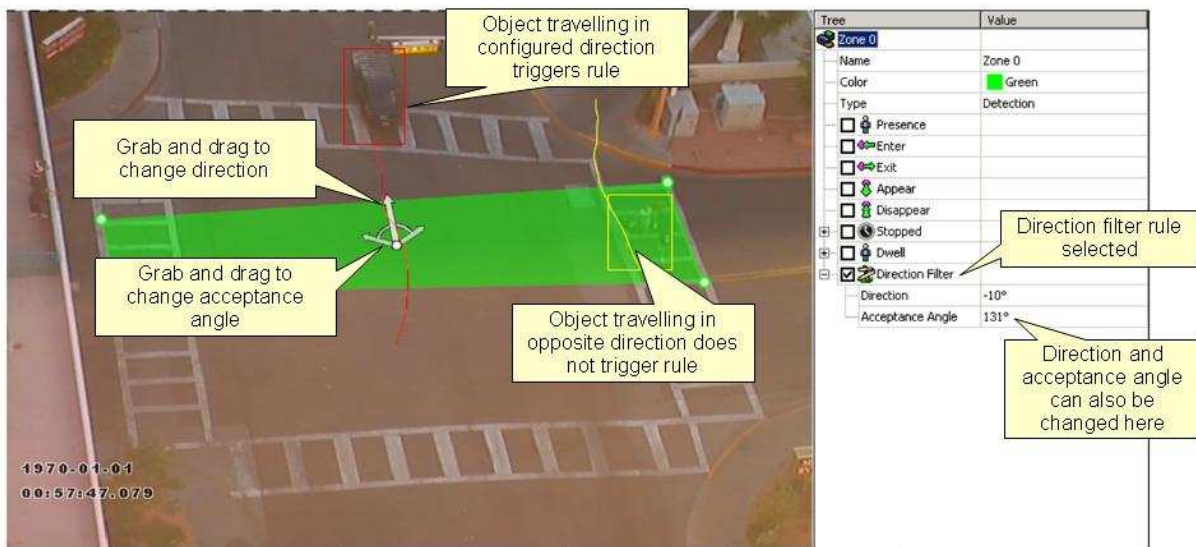
Rule-specific settings

The properties inspector is context-sensitive to the zone selected. As different zones/lines are selected, so the properties inspector changes to reflect the rules currently configured on that zone. Defining a rule is a simple matter of checking the box next to the rule required. In all cases, the rules are configured with sensible default values. Of course, these can be customized to suit the detection scenario. The selection of multiple rules on a detection zone is supported.

Object Direction

Enable the object direction rule on the selected zone by checking the Direction Filter box in the properties inspector. Adjust the direction and acceptance angle to suit the detection scenario.

Objects that travel in the configured direction (within the limits of the acceptance angle) through a zone or over a line trigger the rule and raise an alarm.



4. Camera Calibration

In order to estimate object parameters such as height, speed, area and classification, the camera must first be calibrated. Camera calibration involves establishing a reference to the ground plane in the scene.

To calibrate the camera for the scene, select the Calibration setup page:

Calibration

Click and drag grid to change camera tilt angle
 Use mouse wheel to change camera height
 Click and drag mimics around to verify size of people

Interactive help

Calibration status

Camera parameter configuration

Preset configurations

Restore default configuration

Pause/Play video

Vertical field of view configuration

Calibration Status
 Calibrated side-on

Camera Setup
 Height 4.36 meters
 Tilt Angle 14.58 deg

Preset Setup
 Select

Camera Intrinsic Parameters
 Vertical Field of View 40.00 deg

Restore Defaults
 Restore

Video Control
 Play

Diagram labels: Tilt Angle, Field of View, Height, Ground plane

Calibration Mimics

The calibration mimics are used for verifying the size of a person in the scene. Place one in the foreground and one in the background and adjust the camera height and tilt angle until both mimics are the same size as a real person at that position in the scene. Click and drag the ground plane to change the tilt angle and use the mouse wheel to adjust the camera height.

Verify the tilt angle and camera height are correct by dragging the mimics around the scene and making comparisons with real people or people sized objects at as many places as possible.

Calibration Status

Reports the status of the camera calibration. Check this area after applying a new camera calibration for errors or warnings.

Camera Setup

Shows/sets the camera height and tilt angle (see picture in the top right hand corner of the web page).

Preset Configurations

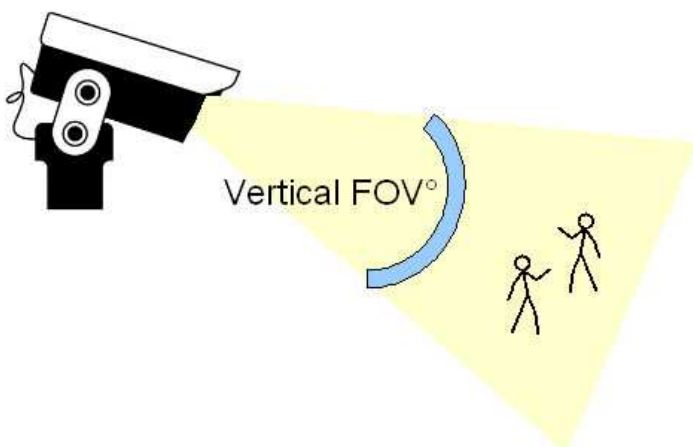
A selection of preset configurations are supplied for common calibration scenarios. These are:

- Overhead. The camera is mounted directly overhead. This preset may be suitable for overhead people-counting applications.
- 60° Lookdown. The camera is mounted with a look-down angle of 60°.
- 30° Lookdown. The camera is mounted with a look-down angle of 30°.

Camera Intrinsic Parameters

In order to calibrate a given camera for a particular scene, information about the camera must be supplied.

The vertical field of view of the camera can be adjusted by changing this setting. The vertical field of view is illustrated below:



If you don't know the vertical field of view for your camera, you can look it up in the vertical field of view table in the end of this chapter

Restore Defaults

It is possible to re-center the mimics and reset the ground plane to a default position by clicking this button. This can be useful if the current calibration parameters are inappropriate for the intended application.

Video Control

This button can be used to pause/play the video. This can be useful when trying to line a mimic up with an object in the scene.

Calibrating a Camera

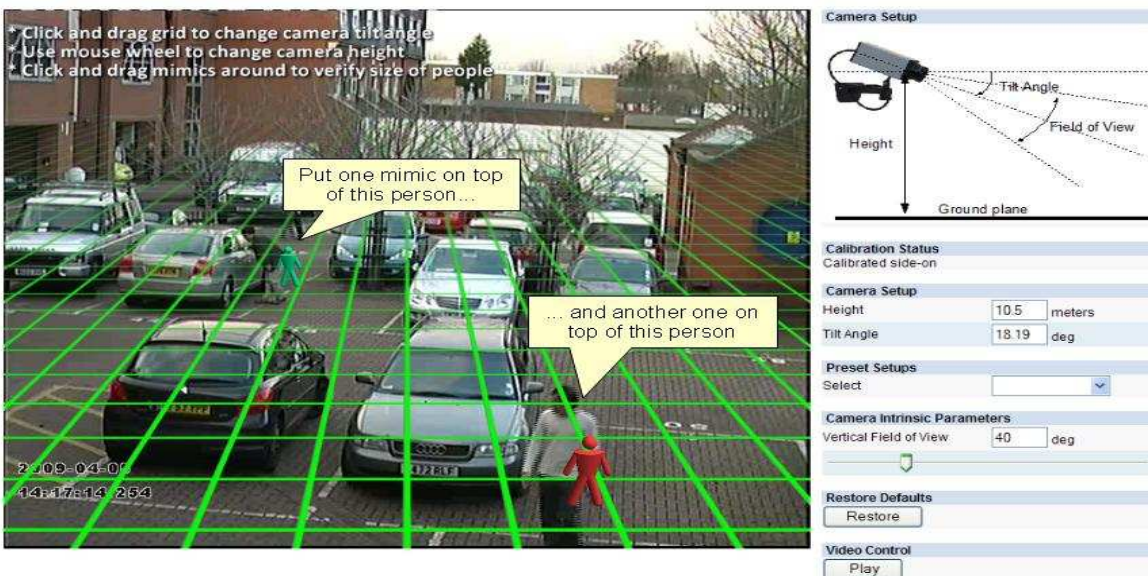
Calibrating a camera is necessary in order to estimate object parameters such as height, area, speed and classification. If you know the height, tilt angle and vertical field of view corresponding to your installation, you can simply type the parameters in the appropriate boxes and apply the changes.

If however, you do not know, or are unable to find out the camera parameters, this topic provides a step-by-step guide to calibrating a camera.

Step 1: Find some people in the scene

Find some people, or some people-sized objects in the scene. Try to find a person near the camera, and a person further away from the camera. Place the mimics on top of or near the people.

Calibration



The screenshot displays a video feed of a street scene with a green grid overlay. Two yellow callout boxes provide instructions: "Put one mimic on top of this person..." and "... and another one on top of this person". The control panel on the right includes a diagram of a camera with labels for "Height", "Tilt Angle", and "Field of View". Below the diagram, the "Calibration Status" is "Calibrated side-on". The "Camera Setup" section shows "Height" set to 10.5 meters and "Tilt Angle" set to 18.19 deg. The "Preset Setup" section has a "Select" dropdown menu. The "Camera Intrinsic Parameters" section shows "Vertical Field of View" set to 40 deg. The "Restore Defaults" section has a "Restore" button. The "Video Control" section has a "Play" button. The video feed shows a timestamp of 2009-04-01 14:17:14.254.

Step 2: Adjust tilt angle and camera height

Now, adjust the camera tilt angle and the camera height until the mimics are approximately the same size as the people in the scene.

To adjust the tilt angle, click and drag the ground plane with the left mouse button. To adjust the camera height, scroll the mouse wheel up and down. The actual tilt angle and camera height will be reflected in the edit boxes in the Camera Setup section of the web page.

It is useful to use the Video Control button to pause the video so the mimics can be accurately placed.

Apply the changes:

Calibration

The screenshot displays the VCA configuration interface. On the left, a video feed shows a street scene with cars and a person. A green grid is overlaid on the scene, and two 3D human-like figures (mimics) are placed on the ground plane. Callout boxes provide instructions: 'Click and drag grid to change camera tilt angle', 'Use mouse wheel to change camera height', and 'Click and drag mimics around to verify size of people'. Two callouts point to the mimics, stating 'This mimic the same size as person'. A callout points to the ground plane grid, stating 'Ground plane'. In the bottom left of the video feed, the date and time '2009-04-09 14:28:49.431' are visible.

On the right, the 'Camera Setup' control panel is shown. It includes a diagram of a camera with 'Tilt Angle' and 'Field of View' labels. Below the diagram, a callout box states 'Calibration status reported'. The 'Calibration Status' section shows 'Calibrated side-on'. The 'Camera Setup' section has input fields for 'Height' (4.58 meters) and 'Tilt Angle' (15.07 deg). The 'Preset Setup' section has a 'Select' dropdown menu. The 'Camera Intrinsic Parameter' section has a 'Vertical Field of View' field. A callout box points to the 'Height' and 'Tilt Angle' fields, stating 'Actual camera height and tilt angle displayed'. At the bottom, there are 'Restore Defaults' and 'Restore' buttons, and a 'Video Control' section with a 'Play' button.

Once the changes have been applied, the Calibration Status reflects whether the operation was successful, and if so, in which mode the camera is calibrated.

Step 3: Verify the setup

Once you are happy that the scene is correctly calibrated, verify the settings by dragging the mimics around and comparing them to other people or people-sized objects in the scene. The more locations in the scene where the calibration is verified, the more accurate the calibration will be.

The tilt angle and camera height can be fine-tuned in the same way as detailed in Step 2.

Once the settings have been successfully applied, objects in the scene are annotated with height, area, speed and classification:

Calibration

The screenshot displays a street scene with a grid overlay and three calibration mimics (green, red, and yellow). The mimics are annotated with their respective height, area, and speed. The control panel on the right includes a camera setup diagram, calibration status, camera setup parameters, preset setups, camera intrinsic parameters, restore defaults, and video control options.

Calibration Status: Calibrated side-on

Camera Setup:

Height	4.58	meters
Tilt Angle	15.07	deg

Preset Setups: Select [Dropdown]

Camera Intrinsic Parameters:

Vertical Field of View	40	deg
------------------------	----	-----

Restore Defaults: Restore

Video Control: Pause

Tip: If it all goes wrong

If you find that the mimics get lost or disappear due to an odd calibration configuration, the process can be restarted by clicking the "Restore" button.

Vertical Field of View

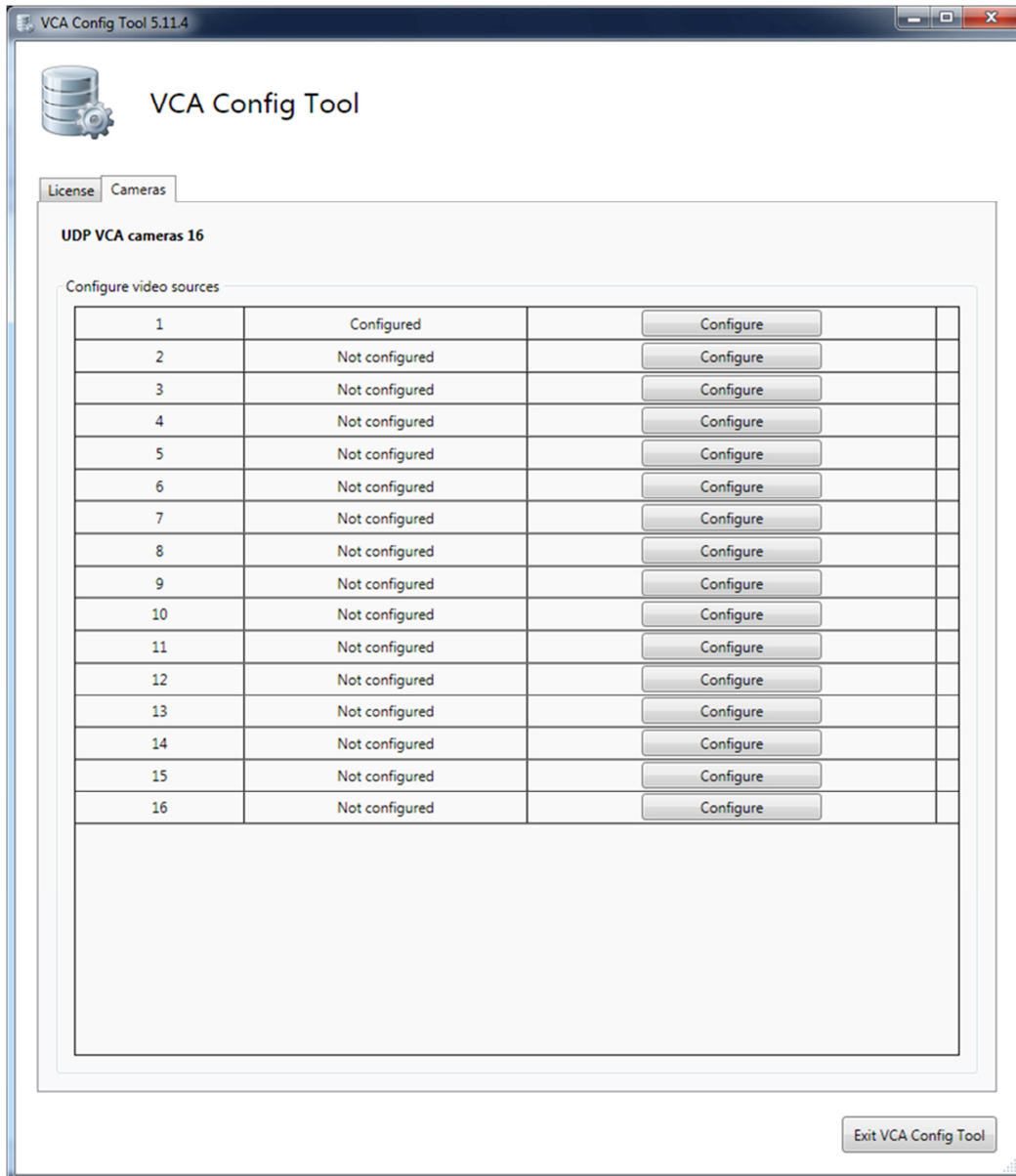
The vertical field of view is required when calibrating a camera. If you know the vertical field of view of the camera it can be entered directly. If however, you don't know the vertical field of view, it can be determined from the following table, given the vertical image dimension and its focal length:

Image Format (in)	Vertical Image Dimension (mm)	Focal length (mm)																		
		1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3	4	6	10	15	20	30	40	50
1/4"	2.4	100.39	90.00	81.20	73.74	67.38	61.93	57.22	53.13	49.55	46.40	43.60	33.40	22.62	13.69	9.15	6.87	4.58	3.44	2.75
1/3"	3.6	121.89	112.62	104.25	96.73	90.00	83.97	78.58	73.74	69.39	65.47	61.93	48.46	33.40	20.41	13.69	10.29	6.87	5.15	4.12
1/1.8"	5.32	138.79	131.44	124.48	117.95	111.83	106.12	100.81	95.88	91.31	87.06	83.12	67.25	47.82	29.79	20.11	15.15	10.13	7.61	6.09

If you are unable to determine the vertical field of view for your camera from the above table, leave the field of view at its default setting, 40°.

5. Save and Exit VCA settings

Save the VCA setup, and configured the rest of the video sources in the same way and then exit the VCA Config Tool.



6. DVMS setup of 1-9 video VCA channels per machine

Configure the metadata driver metadata. The configuration is done through System Manager by adding a new text channel (see Administrator's Guide for further details).

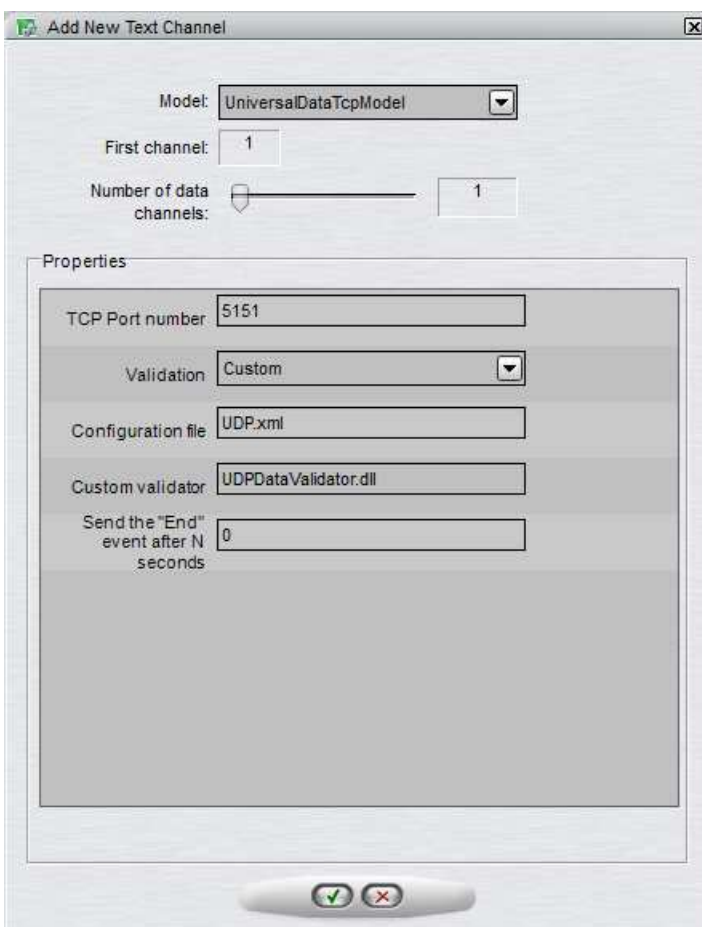
NOTE: The port 5151 is used in Ernitec recorder configuration files and should not be changed without consulting Ernitec first.

TCP Port number: 5151

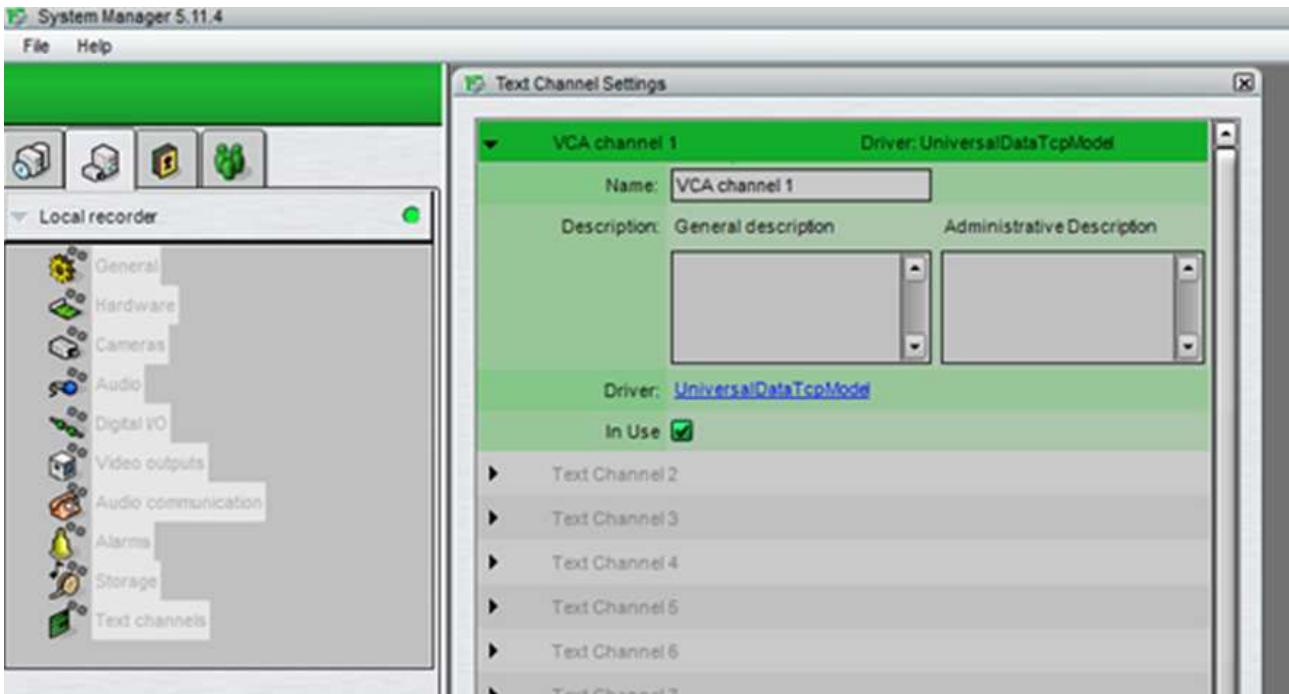
Validation: Custom

Configuration file: UDP.xml

Custom validator: UDPDataValidator.dll

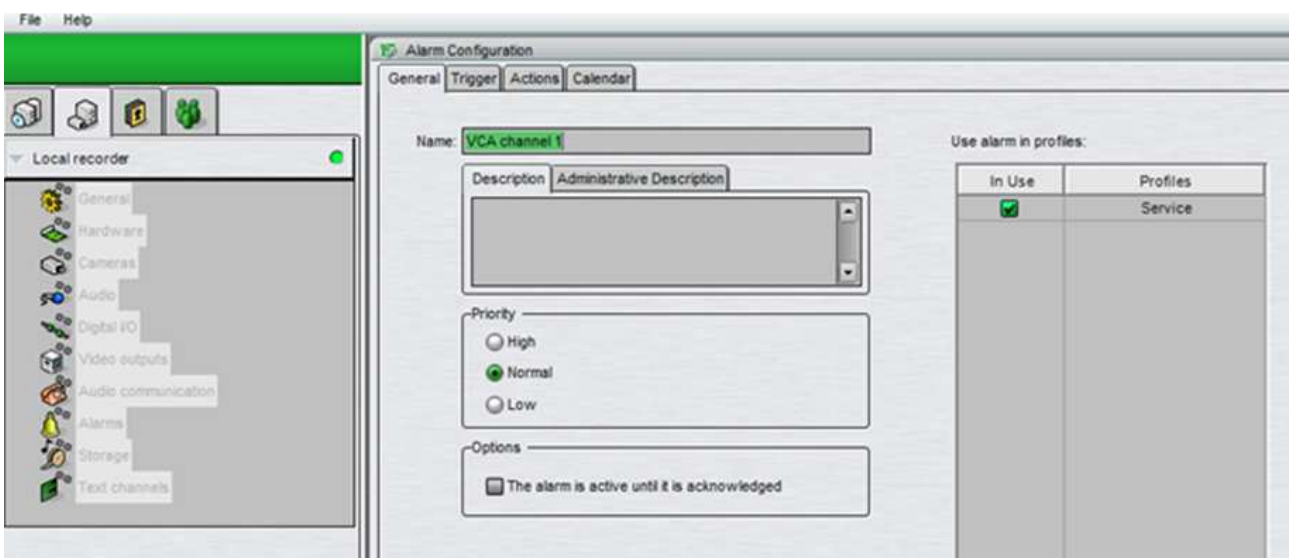


Step 1: Change the text channel 1 to VCA channel 1etc.

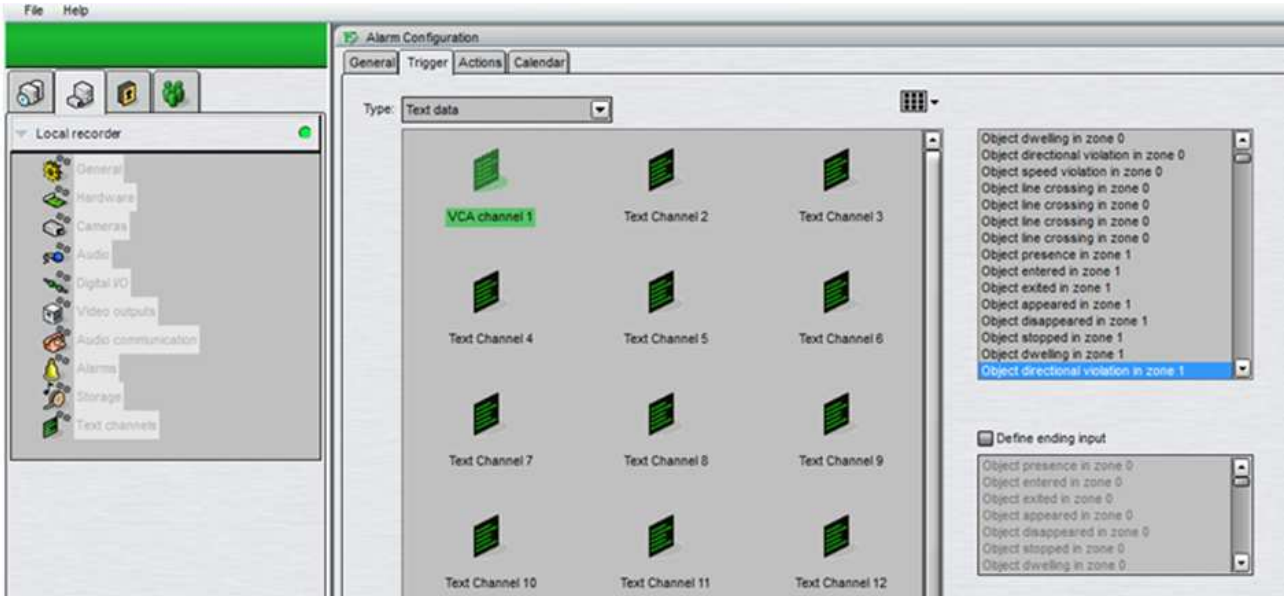


Step 2: Setup the VCA alarm action the configuration is done through System Manager by adding a new text channel (see Administrator’s Guide for further details).

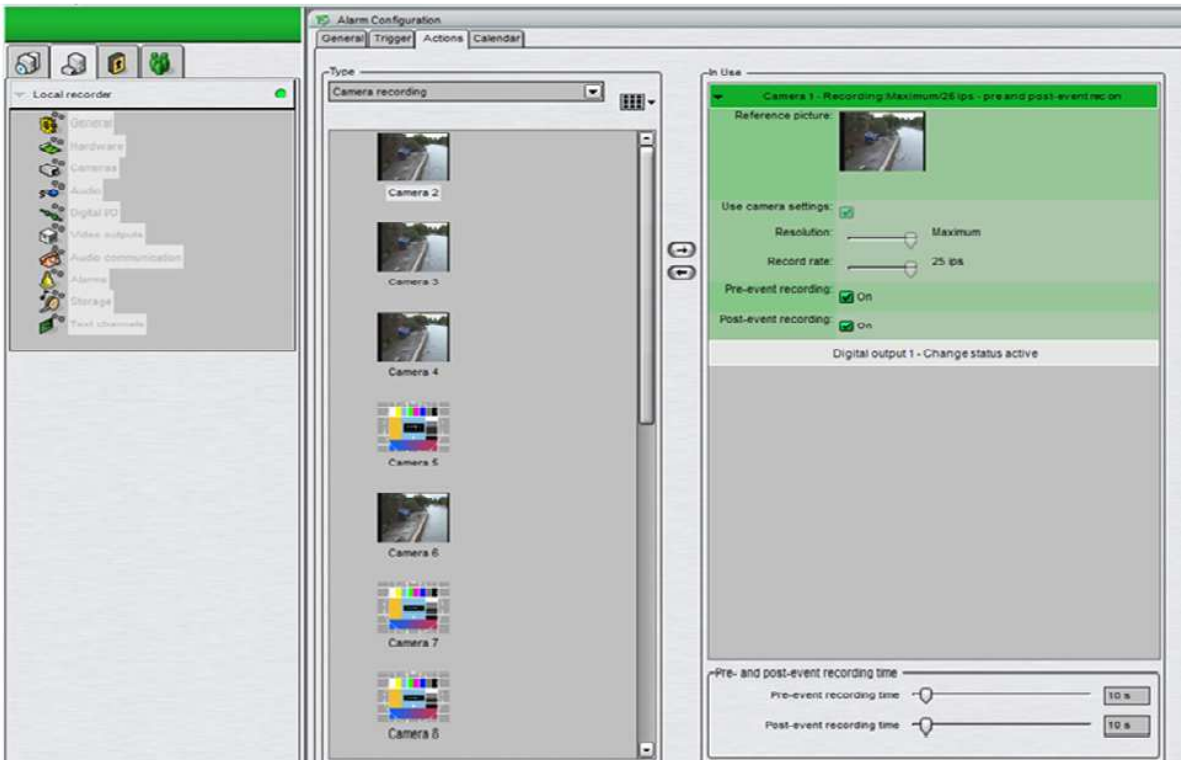
Change the Alarm name to VCA channel 1



Step 3: set the Trigger input to text channel 1(see Administrator’s Guide for further details).

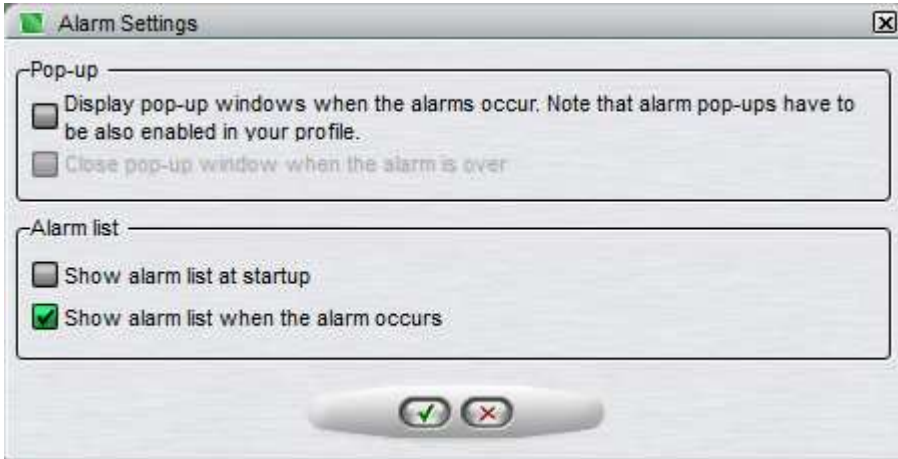


Step 4: set action to record from camera 1(see Administrator’s Guide for further details).



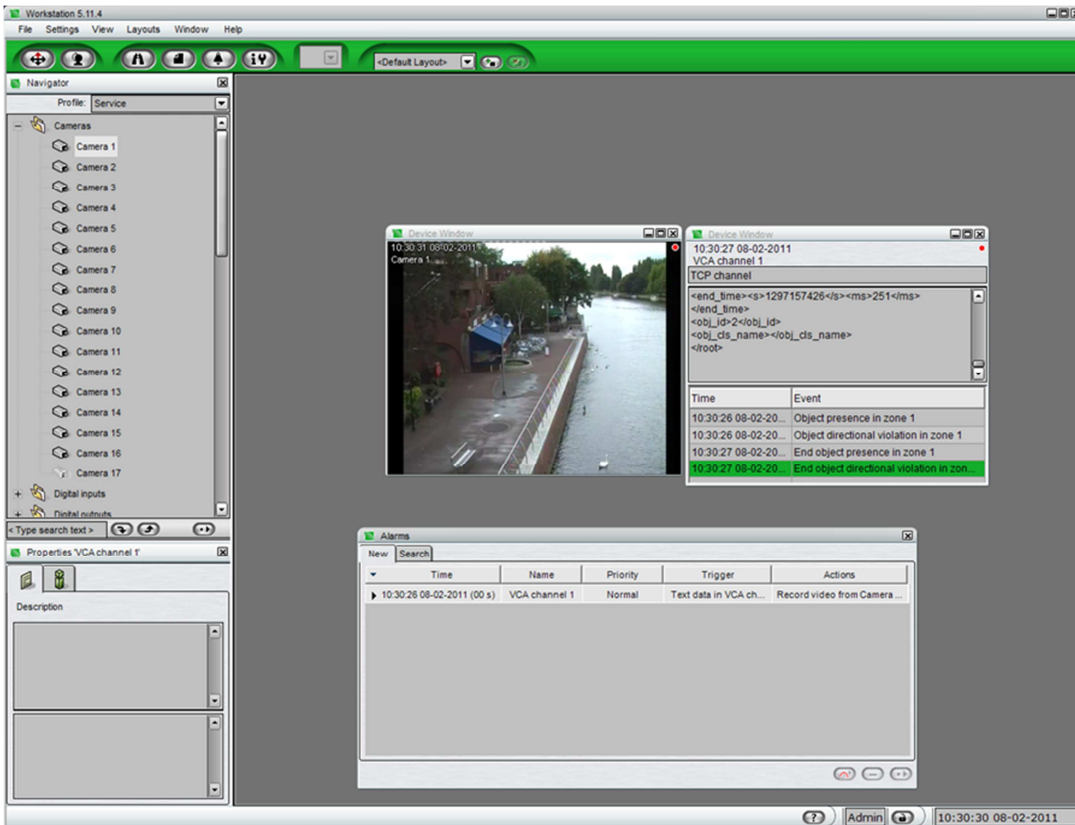
7. VCA input in workstation

Step 1: open workstation, settings / alarm settings and set the check marks



Step 2: drag and drop the text channel 1 and wait for a VCA alarm, you will now see this window .

VCA configuration fro 1-9 channels is now over if you have more that 9 channels on the same machine, go to next chapter.



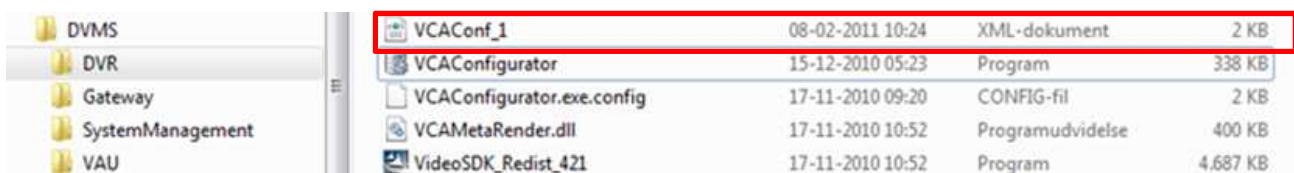
8. DVMS setup more than 10 VCA channels per machine

Start with chapter 2, 3, 4 and 5 for configuration the VCA channels.

Step: 1 start windows explorer and find the VCAconf_1.xml, VCAconf_2.xml etc. CUT them out of the folder and place them in a sub folder on the desktop.

You will find the VCAcon_1.xml file in this subfolder;

C:/Program files/DVMS/ DVR_VCAconf_1.xml, VCAconf_1.xml ec.



Step 2: open / edit the VCAconf_1.XML etc. files and look after the *Rule Id="number"* and *Type="number"*

In this example it is

Rule Id="20" Type="8" for VCAconf_1.xml

Rule Id="32" Type="8" for VCAconf_2.xml etc.

The reason for *Type="8"* is because it is available rule number 8, - NR. 1 is presence....NR. 8 Directions filter

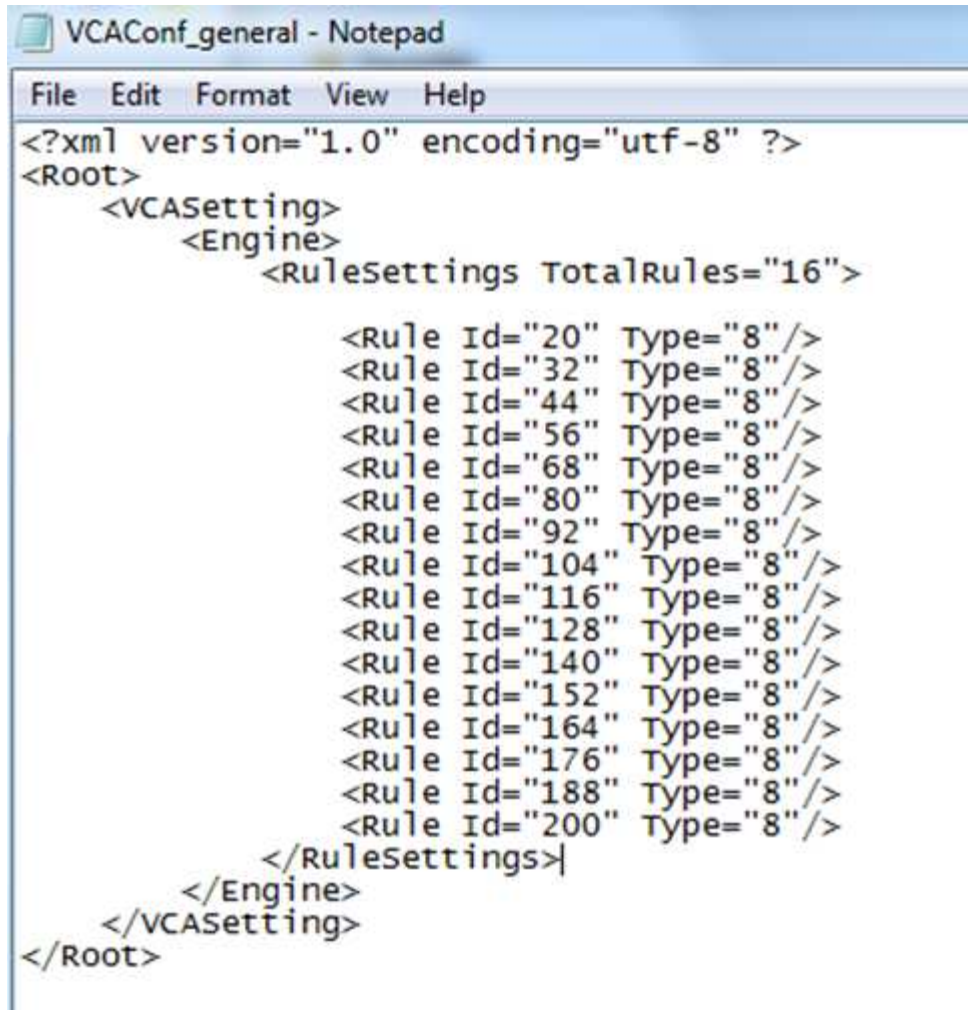
```

VCAConf_1 - Notepad
File Edit Format View Help
<Root><VCASetting TotalEng="1">
<Engine id="0">
<ZoneSettings TotalZones="1">
  <Zone id="0" Type="1" style="1" colour="ff" Name="Zone 0" TotalPoints="2">
    <Pointer X="18320" Y="36357"/>
    <Pointer X="18137" Y="49236"/>
  </zone>
</ZoneSettings>
<RulesSettings TotalRules="2">
  <Rule id=1 type=1 ZoneID="0" TotalTrkObjClses="0"/>
  <Rule Id=20" Type="8" ZoneID="0" TotalTrkObjClses="0" StartAngle="2695" FinishAngle="4497"/>
</RulesSettings>
<CounterSettings TotalCounters="0">
</CounterSettings>
<CalibSettings fHeight="1000" fTilt="3000" fRoll="0" fFOV="4000" HeightUnits="0" SpeedUnits="0">
</CalibSettings>
<ClsojectSettings TotalClsojects="3">
  <Clsoject Id="0" Name="Person" Enable="1" AreaLo="5" Areaup="20" SpeedLo="0" Speedup="20"/>
  <Clsoject Id="1" Name="Vehicle" Enable="1" AreaLo="30" AreaUp="60" SpeedLo="0" SpeedUp="200"/>
  <Clsoject Id="2" Name="Clutter" Enable="1" AreaLo="0" AreaUp="4" SpeedLo="0" Speedup="50"/>
</ClsojectSettings>
</Engine>
</VCASetting>
</Root>

```


Step 3: make a new .xml file named VCAConf_general with all the *Rule Id="numbers"* and *Type="numbers"* like this example and copy it in to the DVR folder

C:/Program files/DVMS/ DVR



```
VCACConf_general - Notepad
File Edit Format View Help
<?xml version="1.0" encoding="utf-8" ?>
<Root>
  <VCASetting>
    <Engine>
      <RuleSettings TotalRules="16">
        <Rule Id="20" Type="8"/>
        <Rule Id="32" Type="8"/>
        <Rule Id="44" Type="8"/>
        <Rule Id="56" Type="8"/>
        <Rule Id="68" Type="8"/>
        <Rule Id="80" Type="8"/>
        <Rule Id="92" Type="8"/>
        <Rule Id="104" Type="8"/>
        <Rule Id="116" Type="8"/>
        <Rule Id="128" Type="8"/>
        <Rule Id="140" Type="8"/>
        <Rule Id="152" Type="8"/>
        <Rule Id="164" Type="8"/>
        <Rule Id="176" Type="8"/>
        <Rule Id="188" Type="8"/>
        <Rule Id="200" Type="8"/>
      </RuleSettings>
    </Engine>
  </VCASetting>
</Root>
```

Step 4: Configure the metadata driver metadata. The configuration is done through System Manager by adding a new text channel (see Administrator's Guide for further details).

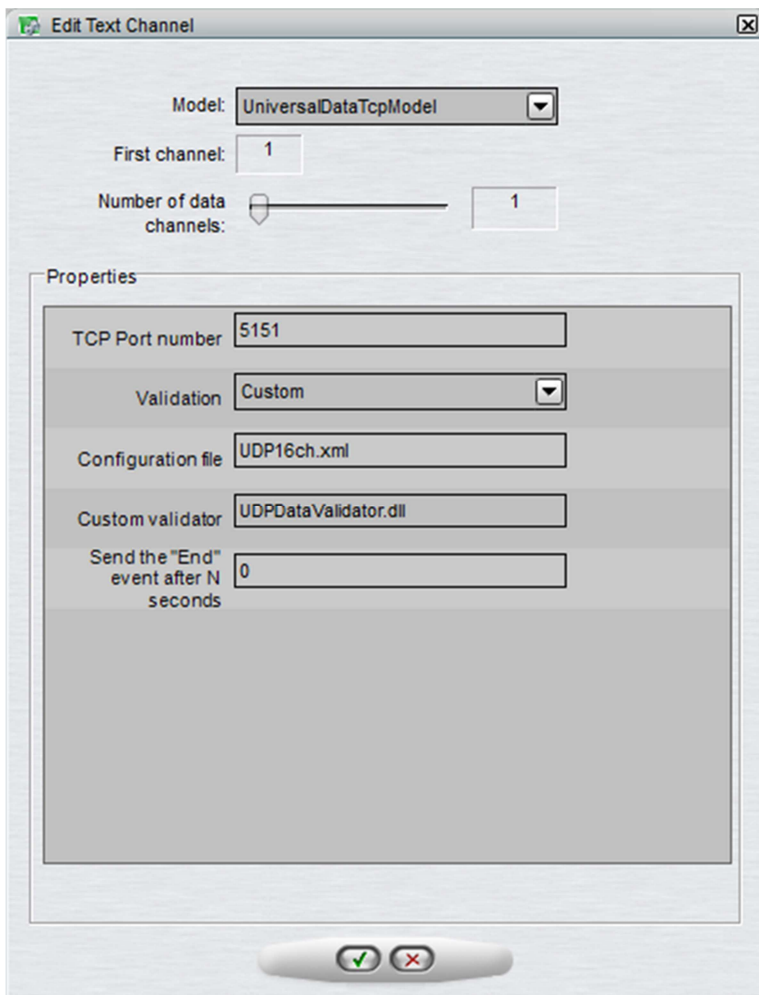
NOTE: The port 5151 is used in Ernitec recorder configuration files and should not be changed without consulting Ernitec first.

TCP Port number: 5151

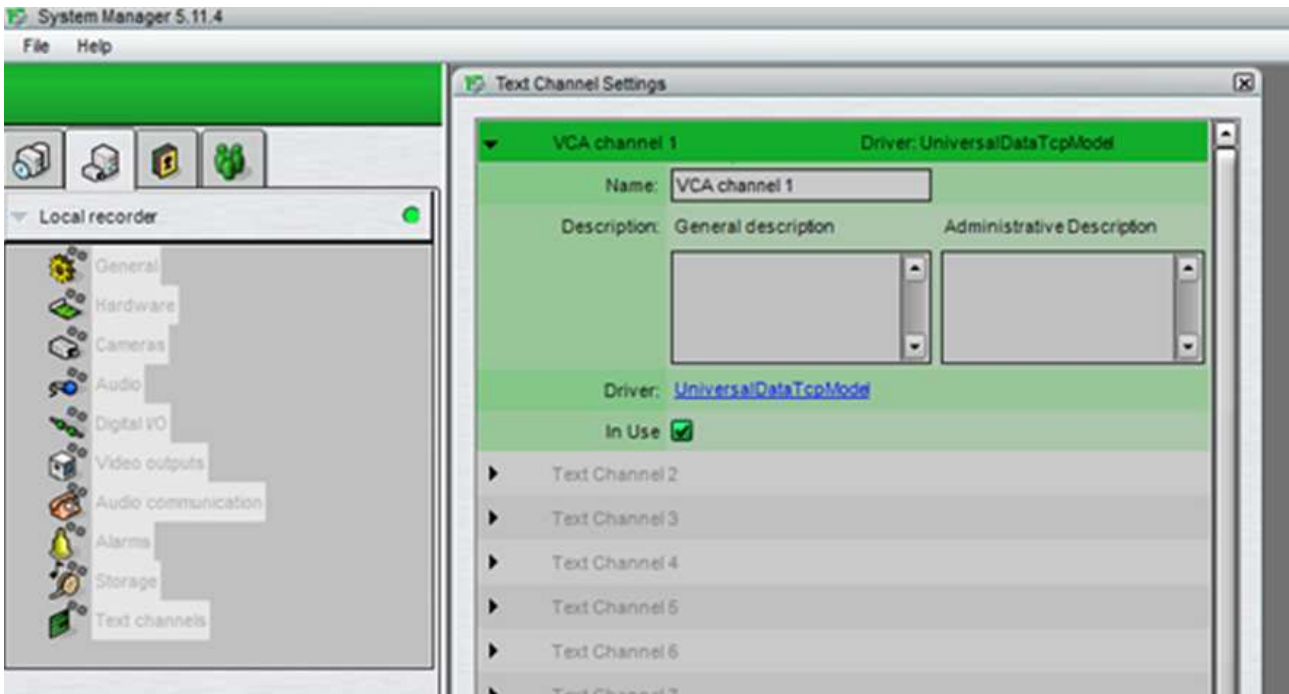
Validation: Custom

Configuration file: UDP16ch.xml

Custom validator: UDPDataValidator.dll

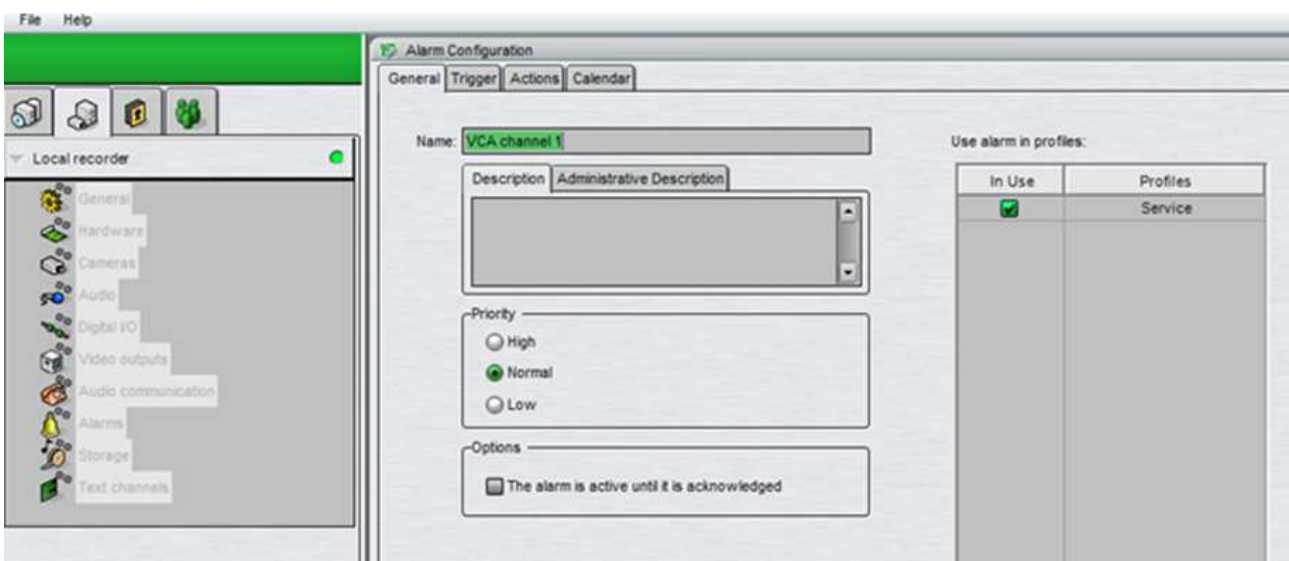


Step 5: Change the text channel 1 to VCA channel 1 etc.

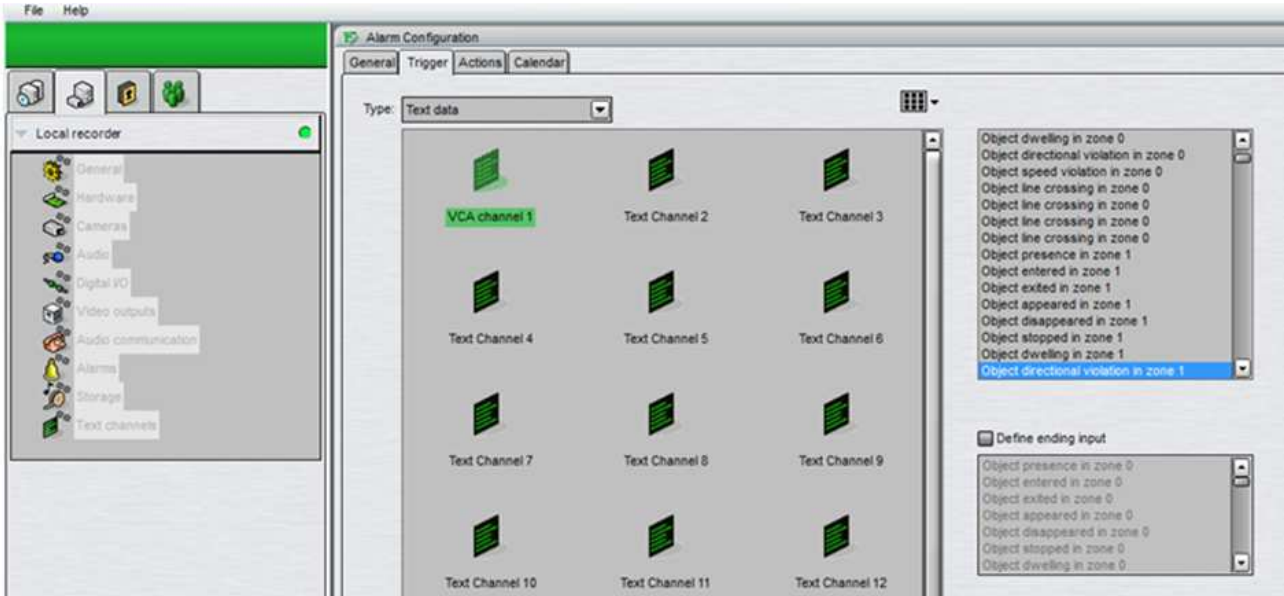


Step 6: Setup the VCA alarm action the configuration is done through System Manager by adding a new text channel (see Administrator’s Guide for further details).

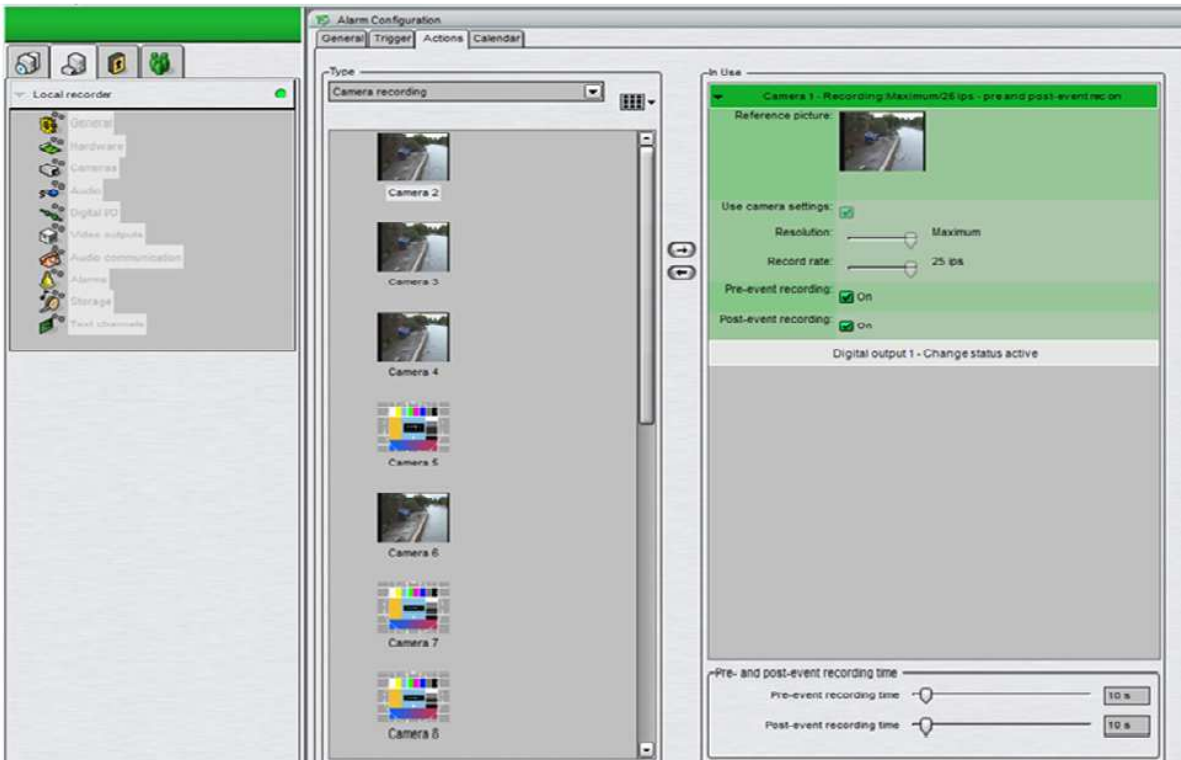
Change the Alarm name to VCA channel 1



Step 7: set the Trigger input to text channel 1(see Administrator’s Guide for further details).

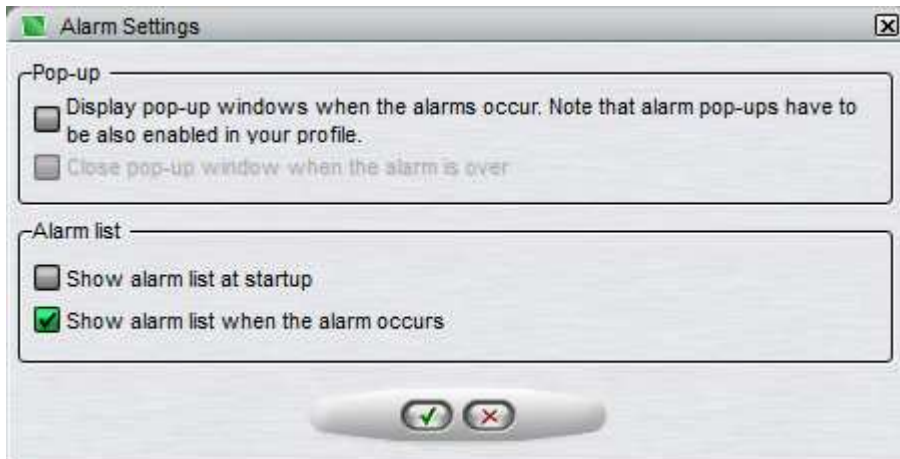


Step 8: set action to record from camera 1(see Administrator’s Guide for further details).



9. VCA input in workstation

Step 1: open workstation, settings / alarm settings and set the check marks



Step 2: drag and drop the text channel 1 and wait for a VCA alarm, you will now see this window.

VCA configuration for 10+ channels is now over.

