



Administrator's Guide

Auto PSIM 2.0 (english)

Last update 05/08/2026

Table of Contents

1	Administrator's Guide. Introduction.....	10
1.1	The purpose and structure of this manual	10
1.2	The purpose of the Auto PSIM software package.....	10
1.3	How to use Auto PSIM	11
2	Main software and hardware components of the Auto PSIM system.....	12
2.1	Software	12
2.1.1	Software kernels	12
2.1.2	Functional software modules.....	12
2.1.3	The internal database of the videosever	12
2.1.4	The internal database of the Auto PSIM software module	13
2.1.5	Software for the workstations.....	13
2.2	Hardware	13
2.2.1	The Guardant hardware protection electronic key.....	14
2.2.2	Communications environment	14
3	Requirements for the hardware and software platform.....	15
3.1	Software and hardware requirements.....	15
3.1.1	General requirements for base computers and operating system	15
3.1.2	Hardware and software requirements for neural analytics.....	15
3.2	General requirements for mounting and configuring of cameras.....	16
3.2.1	Camera location on the road.....	16
3.2.2	Camera location at the security sites.....	17
3.2.3	Setup of the lens focal length.....	17
3.2.4	Camera setup	17
3.2.5	General parameters of used video cameras	18
4	Installing, restoring, removing of Auto PSIM software components.....	21
4.1	General description of the Auto PSIM distribution kit	21
4.2	Installation of the Auto PSIM software package.....	21
4.3	Repairing the Auto PSIM software package.....	26
4.4	Removing the Auto PSIM software from the computer	28
4.5	Possible problems during installation	30

4.5.1	Files that need to be updated by Auto PSIM installer are used by another application	30
4.6	Remote installation, deinstallation and update of Auto PSIM	31
4.6.1	Remote installation of Auto PSIM	32
4.6.2	Remote deinstallation of Auto PSIM	33
4.7	Installation, repair, update, and removal of Auto PSIM in quiet mode.....	33
5	Configuring the Auto PSIM software package and setting up its components	37
5.1	The configuration and setup procedure of Auto PSIM	37
5.2	Configuring the program modules.....	38
5.2.1	Activating the software module used for identifying license plates	38
5.2.2	General information on Neural analytics.....	38
5.2.3	Features of Auto PSIM modules operating in VMware	39
5.2.4	ARENA	40
	The ARENA module functionality	40
	ARENA module licensing.....	41
	Setting up the ARENA module	41
5.2.5	AR-Railway.....	42
	The AR-Railway module functionality.....	42
	The AR-Railway module licensing	43
	Configuring the AR-Railway module	43
	Requirements for mounting and configuring cameras for container recognition	46
	Requirements for mounting and configuring cameras for carriage recognition.....	50
	Combining the carriages and containers SDK.....	53
5.2.6	AUTO-Uragan	57
	The AUTO-Uragan module functionality	57
	AUTO-Uragan module licensing.....	59
	Video camera mounting and setup requirements for the AUTO-Uragan software module	60
	Setting up the AUTO-Uragan module	61
5.2.7	AR-Auto.....	65
	The AR-Auto module functionality.....	65
	AR-Auto module licensing	65
	Video camera mounting and setup requirements for the AR-Auto software module.....	65
	Setting up the AR-Auto module.....	68
5.2.8	AR-Video	70

The AR-Video module functionality	70
AR-Video module licensing	71
Video camera mounting and setup requirements for the AR-Video software module	71
Setting up the AR-Video module	73
5.2.9 CIDR IV	75
The functionality of the CIDR IV module	75
Licensing of the CIDR IV module	75
Video camera mounting and setup requirements for the CIDR IV module	75
Configuring the CIDR IV module	77
5.2.10 IV	79
The IV module functionality	79
IV module licensing	82
Video camera mounting and setup requirements for the IV software module	82
Setting up the IV module	83
5.2.11 RIDR IV	84
The functionality of the RIDR IV module	84
Licensing of the RIDR IV module	84
Video camera mounting and setup requirements for the RIDR IV module	84
Configuring the RIDR IV module	87
5.2.12 RR	89
The RR module functionality	89
RR module licensing	90
Hardware requirements for the RR software module	91
Video camera mounting and setup requirements for the RR software module	91
Configuring the RR software module	92
5.2.13 VT	94
The VT module functionality	94
VT module licensing	95
Video camera mounting and setup requirements for the VT software module	99
Configuring the VT software module	101
5.2.14 External Plates DB	104
The External Plates DB module functionality	104
Connecting and setting up of the external LP number database	104
LP database replication	120
5.2.15 Remote recognition	121

The Remote recognition module functionality	121
Configuring the cameras with LP recognition and vehicle speed detection	121
5.2.16 Traffic violations detection.....	127
Video camera mounting and setup requirements for the Traffic violations detection.....	127
The Traffic violations detection functionality	128
Setting up the Traffic violations detection module	128
5.2.17 Parking violation detection	136
The Parking violation detection functionality.....	136
Setting up the Parking violation detection module.....	137
5.2.18 Camera of recognition upon request.....	137
Setting up the Camera of recognition upon request module.....	137
5.2.19 Vehicle Type Recognition module.....	141
The Vehicle Type Recognition Module functionality.....	141
Video camera mounting and setup requirements for the Vehicle Type Recognition Module	142
Setting up the Vehicle type recognition module.....	142
Saving the frames processed by the Vehicle Type Recognition module.....	144
5.2.20 RR vendor and model recognizer	144
The functionality of RR vendor and model recognizer module.....	144
Licensing of the RR vendor and model recognizer module	145
Hardware requirements for the RR vendor and model recognizer module	145
Video camera mounting and setup requirements for the RR vendor and model recognizer module	146
Configuring the RR vendor and model recognizer module	146
5.2.21 Information-gathering subsystem	148
The Information-gathering subsystem functionality.....	148
Video camera mounting and setup requirements for the IV vehicle detection module	149
Traffic data gathering subsystem setup	150
5.2.22 Speed traps server	156
The Speed traps server module functionality	156
Speed-trap mounting and setup requirements for the Speed traps server module.....	156
The Speed traps server software module setup.....	157
Joint operation of the LPR channel and Speed traps server module	163
5.2.23 Traffic analysis module.....	165
Functionality of the Traffic analysis program module.....	165
Licensing of the Traffic analysis program module	166
Requirements for installation and configuration of cameras for the Traffic analysis program module.....	166

Configuring the Traffic analysis program module.....	166
5.3 Set up the LPR channel.....	182
5.3.1 Select cameras to work with the LPR channel	183
5.3.2 Set up the video recording parameters	185
5.3.3 Configuration of the LPR channel detector	186
5.3.4 Set the borders of the license plate search area	189
5.3.5 Select the country and license plate recognition SDK.....	192
General information.....	193
Select the country for license plate recognition	193
5.3.6 Select a device for license plate recognition	195
5.3.7 Select the traffic direction for license plate recognition.....	197
5.3.8 Set up the storage of license plates and depth of record storage in a database.....	199
Configuration of archive size in the database	199
Methods of storing images of recognized license plates and images of vehicles.....	200
Set up storage of images of recognized license plates and vehicles in the Auto PSIM database	201
Set up storage of images of recognized license plates and vehicles on disk.....	202
5.3.9 Set up the results filtering	203
5.3.10 Set up frame processing	204
5.3.11 Configuration of speed estimation by video	205
5.3.12 Set up license plate processing.....	207
5.3.13 Set up the display of license plate recognition results	210
5.3.14 Set up the frame caption	212
5.3.15 Set up license plate recognition by macros and motion detection	220
5.3.16 Set up ports for notification and XML notification	222
5.4 Setting up the joint operation of Auto PSIM and Axxon One	223
5.5 The Vehicle Tracer interface module	224
5.5.1 The Vehicle Tracer functionality.....	224
5.5.2 The Vehicle Tracer setup procedure	224
5.5.3 Setting up the position of the Vehicle Tracer components on the screen	225
5.5.4 LPR channels selection	227
5.5.5 Selecting the External Plates Database	228
5.5.6 Setting up the Vehicle Tracer interface window.....	229
5.5.7 Setting up audio notification when registering alarm events	230
5.5.8 Selecting the External Plates DB as the Active tracking databases.....	232
5.5.9 Setting up color for LP recognition events	234

5.5.10	Selecting the Monitor object for playing back the video archive	237
5.5.11	Setting up the font of the recognized LP number	238
6	Appendices	241
6.1	Appendix 1. Interface description	241
6.1.1	The settings panel of the LPR channel object	241
6.1.2	The External Plates DB object settings panel	263
6.1.3	The IV vehicle detection settings panel	268
6.1.4	The Parking violation detection module settings panel	269
6.1.5	The Speed traps server object settings panel	271
6.1.6	The Traffic violations detection module object settings panel	274
6.1.7	The Vehicle processor settings panel	278
6.1.8	The Vehicle Tracer object settings panel	282
6.1.9	The ARENA module object settings panel	288
6.1.10	The AR-Railway module object settings panel	290
6.1.11	The AUTO-Uragan module object settings panel	296
6.1.12	The AR-Auto module object settings panel	300
6.1.13	The RR module object settings panel	302
6.1.14	The settings panel of the VT module object	305
6.1.15	The CIDR IV module object settings panel	312
6.1.16	The RIDR IV module object settings panel	314
6.1.17	The IV module object settings panel	318
6.1.18	The settings panel of the RR channel object	322
6.2	Appendix 2. Examples of widely used scripts	324
6.2.1	General information about scripts	324
6.2.2	Scripts used in the Auto PSIM software package	324
6.3	Appendix 3. Database replication via MS SQL Server	328
6.3.1	Introduction to database replication	328
6.3.2	Replication setup	329
	Replication setup features	329
	Publication setup	330
	Subscription setup	331
6.3.3	Example of setting up the Traffic replication database	331
	Setting up the replication on the publishing server	332
	Setting up replication on the subscriber server	340

6.4	Appendix 4. Procedures for the Auto PSIM database and software for fine imposing interaction	349
6.5	Appendix 5. Setting up the External plates database in DBF format.	353
6.6	Appendix 6. The Debug windows	357
6.6.1	ULPR server debug window.....	357
	The launch of the ULPR server debug window	357
	The ULPR server debug window interface.....	358
	The operations in the ULPR server debug window	359
6.6.2	UrlServer debug window	362
	The launch of the UrlServer debug window	362
	The UrlServer debug window interface	362
6.7	Appendix 7. The utilities description to work with Auto PSIM software	364
6.7.1	The utilities to work with AUTO-Uragan recognition module	364
	KeyInfo.exe utility for reading the Uragan keys	364
	PatCgfr.exe utility for active patterns configuration of Auto-URAGAN module	365
	RTKeyUpdate.exe utility for updating the Uragan keys.....	370
6.7.2	The utilities to work with VT recognition module	374
	LicenceViewer.exe utility for reading the VT keys	374
	PresetEditor.exe utility for active patterns configuration of VT module	377
6.7.3	LprFsTool.exe utility for loading images of recognized license plates from database to disk	379
	General information about the LprFsTool.exe utility.....	379
	Starting and closing the LprFsTool.exe utility.....	379
	Using the LprFsTool.exe utility.....	379
6.7.4	TestAppTMD.exe utility for setting up the IV vehicle detection.....	380
	General information about TestAppTMD.exe utility and its licensing	380
	Starting and closing the TestAppTMD.exe utility	381
	Using the TestAppTMD.exe utility	382
6.8	Appendix 8. Auto PSIM. REST API	396
6.8.1	UrlServer.....	396
	Initializing UrlServer	396
	Removing the UrlServer instance.....	397
	Unloading UrlServer	398
	UrlServer frame recognition.....	398
6.8.2	ULPR Server.....	406
	Searching for a license plate by image	406

Receiving an image by ID	407
Receiving search results by a license plate.....	408
Search for a license plate by image for the VT recognition module.....	412
6.8.3 General information about HTTP API in Auto PSIM.....	413
6.9 Appendix 9. LPR channel integration via TCP/IP.....	413
6.9.1 TCP port 35555	413
6.9.2 TCP port 55555	414
6.10 Appendix 10. Selea CPS (Car Plate Server) configuration guide.....	415
6.10.1 Brief description of Selea CPS	415
6.10.2 Configuring the Selea CPS server	415
6.10.3 Configuring the Selea cameras	418
6.10.4 Configuring Axxon PSIM to work with the Selea CPS	418
6.11 Appendix 11. Examples of correct and incorrect video images for the IV software module.....	422

1 Administrator's Guide. Introduction

On the page:

- [The purpose and structure of this manual](#)
- [The purpose of the Auto PSIM software package](#)
- [How to use Auto PSIM](#)

1.1 The purpose and structure of this manual

The *Auto PSIM* Software Package. The Administrator's Guide document is intended to be used as a reference by videocamera, radar and other devices installation and setup specialists, and administrator users of the *Auto PSIM* software responded for connection of program modules and their configuration.

This manual includes the following:

1. General description of the *Auto PSIM* software.
2. Main software and hardware components of *Auto PSIM*.
3. Technical requirements for the software and hardware platform.
4. Personnel qualification requirements.
5. Installing the components of *Auto PSIM*.
6. Configuring *Auto PSIM* and setting of its components.
7. Appendix 1. Description of the interfaces.
8. Appendix 2. Examples of high-usage scripts.
9. Appendix 3. Procedures for the *Auto PSIM* database and software for fine imposing interaction.
10. Appendix 4. Database replication via MS SQL Server.
11. Appendix 5. Setting up the External plates database in DBF format.
12. Appendix 6. The utilities description to work with *Auto PSIM* software.

1.2 The purpose of the Auto PSIM software package

The *Auto PSIM* software package was designed for automated traffic monitoring including the following functionality:

1. License plate recognition.
2. Matching the recognized license plate numbers with the numbers in the *Auto PSIM* database.
3. Determining the speed of the vehicles.
4. Determining general parameters of traffic as a whole and determining traffic characteristics of each particular vehicle.
5. Centralized event registration and processing, as well as notification and action generation according to flexible algorithms.
6. Photo and video archive building.
7. The scalability of the software package.

1.3 How to use Auto PSIM

The *Auto PSIM* software package is installed as an extension for the *Axxon PSIM* software package.

To operate the software properly, please, follow these recommendations:

1. Fulfill your job description accurately.
2. Use the software for the intended purpose.
3. Do not use the computer with *Axxon PSIM* installed, to run other software which is not part of the *Axxon PSIM* package.

It is not recommended to use the same logical disk for recording the *Axxon PSIM* (basic) video archive as for storage of the *Auto PSIM* database. It can cause the data loss. Detailed information about setting up the disks for recording the *Axxon PSIM* video archive is given in [Axxon PSIM Software Package. Administrator's Guide](#) document.

2 Main software and hardware components of the Auto PSIM system

2.1 Software

2.1.1 Software kernels

Auto PSIM is delivered in the following configuration versions:

1. Based on the full-scale *Axxon PSIM* software kernel (the `psim.exe` software module). The full-scale software kernel supports the videosever, administration workstation and operator workstation functionality.
2. Based on the reduced software kernel (the `psim_host.exe` software module). The reduced kernel supports the operator workstation functionality only.

The operator workstation software does not support system administration functions (object creation, deletion or setup, user registration, user rights management), as well as local database maintenance. The operator workstation module uses the remote database owned by the videosever or the administration workstation and controlled by the `psim.exe` kernel.

The `psim.exe` full-scale executable module is used as the main software component. Other functional modules comprise the subsystems and interact with the main system kernel.

The distributed surveillance system is integrated using the interaction of the software kernels.

2.1.2 Functional software modules

The functional software modules are responsible for actual interaction with the hardware and produce the data about the status of the controlled objects. The kernel processes the information received from the software modules and integrates them.

The list of available functional modules depends on the delivery configuration of the system. The executables of the functional subsystems are launched automatically by the kernel during the system configuration.

For example, if a **Video camera** object is created, the `video.run` subsystem executable is launched immediately after the corresponding settings are configured.

2.1.3 The internal database of the videosever

The videosever internal database contains the following information:

1. System settings (information about the objects created in the system, their properties, the users and user rights, and other data).
2. Events registered by the system (event logs) during the time period set in the configuration.

The internal database of the server has the MS SQL format. The MS SQL Server 2014 is supported in *Auto PSIM* software.

The object data, the settings of the surveillance systems and the event logs may be automatically replicated from a videosever or administration workstation to all databases of other videosevers and administrator workstations in the system. The full-scale *Axxon PSIM* kernels communicate with each other using the TCP/IP protocol (if such communication is enabled during the system configuration).

The object information is initially saved in the database of the videosever or administration workstation which owns the corresponding objects. The information is automatically replicated when the data changes, the kernel is

launched or the connection restored.

The replication is used to maintain common event space across the distributed surveillance system.

The replication process is hidden from the user.

2.1.4 The internal database of the Auto PSIM software module

The *Auto PSIM* module internal database contains the following information:

1. The settings of the system objects.
2. Events registered by the system (event logs) during the time period set in the configuration.

The internal database of the *Auto PSIM* module has the MS SQL format. The free MS SQL Express version is used. The technical characteristics and the limitations of the free version can be found on the vendor's site (see <http://www.microsoft.com>).

Note.

The *Auto PSIM* software requires permanent connection to the MS SQL Server (see the [Axxon PSIM Software Package. Administrator's Guide](#) document).

A commercial version of MS SQL Server can be used to overcome the limitations of the free version of Microsoft SQL Server 2014 Express Edition.

See the site of the vendor to learn about the versions of Microsoft SQL Server 2014 (<https://docs.microsoft.com/en-us/sql/sql-server/sql-server-2014-release-notes?view=sql-server-2016>).

2.1.5 Software for the workstations

The digital video surveillance system based on the *Auto PSIM* software package can include the following workstation types based on the *Axxon PSIM* platform:

1. Operator workstation;
2. Administration workstation;

The *AutoPSIM.msi* executable module should be installed on the main computer in order to support the operation of *Auto PSIM* on workstations.

To enable remote operation of *Auto PSIM*, the *Guardant* hardware protection key should be installed on the main computer. The key is included in the *Auto PSIM* delivery set. The computer with the administration workstation software installed also supports the operator workstation functionality in case the user logs in using the operator password. If no hardware protection key is installed, the *Auto PSIM* software can be used in its demo version only.

2.2 Hardware

On the page:

- [The Guardant hardware protection electronic key](#)

- Communication
s environment

The following hardware and software components can be included in the video surveillance system based on the *Auto PSIM* package:

1. The operator and administration workstations using IBM-compatible personal computers. Administration workstation functionality includes the operator workstation functionality;
2. Videoservers using IBM-compatible personal computers with specialized hardware installed (audio and video capture cards, USB audio input devices). Videosever functionality includes the functionality of both workstation types;
3. Administration workstations enabled for videosever functionality using the network (IP) audio and video capture devices;
4. Network video concentrators (WaweHub, LinuxHub, etc);
5. Network videoservers (Matrix, etc);
6. Analog and IP video cameras;
7. Speed-traps;
8. TCP/IP communications environment.

2.2.1 The Guardant hardware protection electronic key

The *Auto PSIM* software package is protected. To install *Auto PSIM* on the main computer, the *Guardant* electronic key for hardware protection must be present.

2.2.2 Communications environment

The communications hardware of the *Auto PSIM* software package allows creation of automated monitoring systems for spacious and highly diverse sites. The components of the system communicate with each other automatically and form an integrated security system.

Local networks (LAN), the Internet (WAN), telephone lines (dial-up) and dedicated lines are used for data exchange and communications between system components using the TCP/IP protocol.

3 Requirements for the hardware and software platform

3.1 Software and hardware requirements

On this page:

- [General requirements for base computers and operating system](#)
- [Hardware and software requirements for neural analytics](#)

3.1.1 General requirements for base computers and operating system

The requirements for the base computers and operating system for *Auto PSIM* correspond to the same requirements for *Axxon PSIM* (see [Axxon PSIM Administrator's Guide](#)).

3.1.2 Hardware and software requirements for neural analytics

The software modules that use neural analytics (see [General information on Neural analytics](#)) have the following software and hardware platform requirements:

1. Due to the NVIDIA SDK specific features, the neural analytics can operate only on Windows Server 2019 OS and Windows 10 OS.
2. The neural network analytics supports the following devices: CPU, GPU NVIDIA, VPU ([Intel NCS](#), [Intel HDDL](#)).
3. If CPU or Intel GPU is used for the neural network analytics operation, then the following requirements should be taken into account:
 - a. support for Intel CPUs from 6th generation (Skylake) and Intel Pentium® processors N4200/5, N3350/5 or N3450/5 with Intel® HD Graphics
 - b. the OpenVino toolkit should support the Intel CPU being used (for more information, see <https://software.intel.com/content/www/us/en/develop/tools/opencvino-toolkit/system-requirements.html>).
4. NVIDIA GeForce 1050 Ti GPU or newer. GPU requirements:
 - a. at least 2 GB of memory;
 - b. Compute Capability 3.0 or higher.

Note

Please check the GPU Compute Capability version on the [manufacturer's website](#).

Attention!

When using NVIDIA graphics cards, it is recommended to install the latest driver from the [NVIDIA official website](#).

A single neural network consumes 500 MB of video memory. You can use multiple video cards in your system.

⚠ Attention!

To ensure the correct operation of each software module that uses neural analytics, the video image requirements should also be met (see [Configuring the program modules](#)).

3.2 General requirements for mounting and configuring of cameras

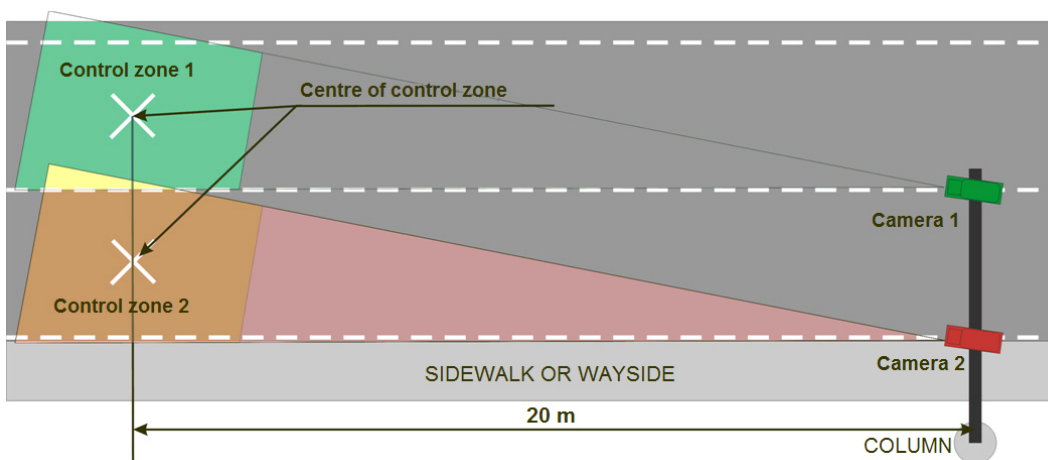
On the page:

- Camera location on the road
- Camera location at the security sites
- Setup of the lens focal length
- Camera setup
- General parameters of used video cameras

3.2.1 Camera location on the road

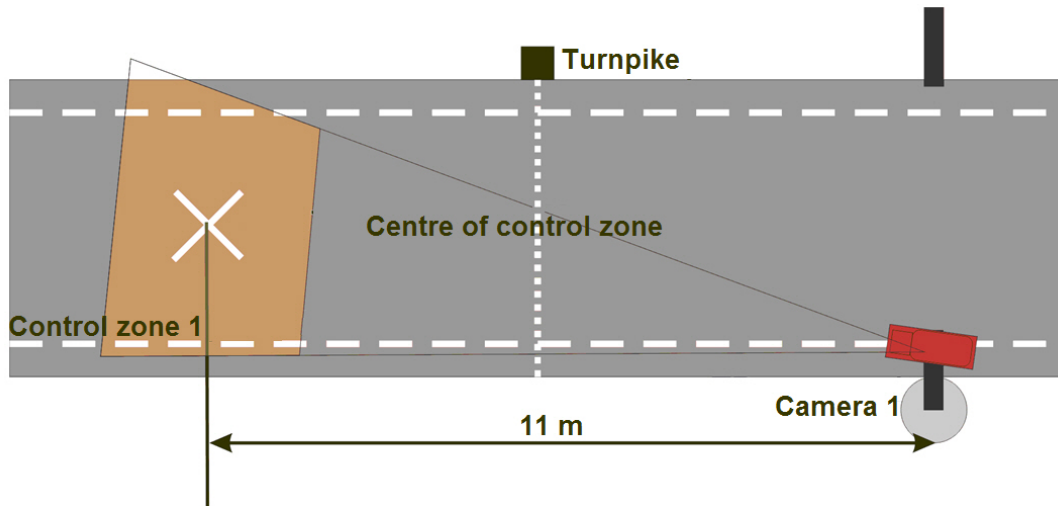
By default, the cameras are installed at a height of 6 m above the controlled lane edge. The control zone center is located 20 m from the camera. The camera is tilted at an angle of 18 degrees.

We recommend placing the cameras above the edge of the road, and not above the center. In this case, the horizontal inclination will amount to 4 degrees for the control zone width of 3 m.



3.2.2 Camera location at the security sites

By default, the cameras controlling the security site entrances and exits are located at a height of 3 m above the lane edge. The control zone center is then located 11 m from the camera.



3.2.3 Setup of the lens focal length

After the camera is mounted, the lens focal length should be adjusted to the required viewing distance.

To set up the lens without the Uragan software, do the following:

1. Direct the camera at the road area where the license plate numbers are to be read;
2. Place a license plate in the center of the control zone. The plate should be perpendicular to the camera axis;
3. Zoom the lens to make the license plate occupy approximately 1/5 of the image at the center of the image;
4. Lock the zoom position;
5. Adjust the image sharpness.

3.2.4 Camera setup

To set up the camera, do the following:

1. Set the required shutter speed.

Note.

1/1000 sec is enough in most cases.

2. Set maximum sharpness and dynamic range of the signal, if the camera includes the video signal Level adjustment.
Do the following:
 - 2.1 Aim the camera at a very bright object to catch as much light as possible (but not at the sun!). Decrease the Level value until the image disappears – the lens closes and the image becomes black.
 - 2.2 Gradually increase the Level value until the image appears.
 - 2.3 Close the lens for 5 sec using any opaque object (eg. the palm of your hand). Open the lens again.
 - 2.4 Make sure the image reappears. If the image does not appear, increase the Level value and check the image again.

- Set the image sharpness. The sharpness should be set up under poor lighting conditions (approx. 10 – 100 lux), when the noise level is just below the signal level. To achieve such conditions, the dark lens filter can be used.

3.2.5 General parameters of used video cameras

General parameters of used video cameras are presented in the following table.

№	Property	Range	Comment
1	Camera type	CCTV	Analog and IP-cameras can be in use.
2	Camera resolution	Not less than 520 TVL horizontally.	Only high resolution CCTV camera usage guarantees the recognition rate declared in the technical characteristics of the system.
3	Illuminance of the monitored area	Not less than 50 lux for cameras with 0.05 lux CCD sensitivity; Not less than 20 lux for cameras with 0.0002 lux CCD sensitivity; 0 lux for cameras with IR illumination.	At night time, standard auto road illumination devices are sufficient to provide 50 lux illuminance in full compliance with the building regulations.
4	Automatic amplification adjustment	LOW or MIDDLE depending on the camera	This function must be enabled. Unfortunately, the scene is usually not sufficiently illuminated, thus the image looks too dark in case this function is disabled. Enabling this function amplifies the whole video signal including the CCD noise. The amplification value is chosen for each camera separately.

№	Property	Range	Comment
5	Auto aperture and auto electronic shutter	<ul style="list-style-type: none"> • not more than 1/500 sec for vehicle speed below 40 km/h; • not more than 1/1000 sec for fast motions (vehicle speed above 40 km/h). 	<p>The image should be sharp. Sharpness can be achieved by locking the shutter speed (exposure). Locking the speed of the electronic shutter is a very important function.</p> <p>When the exposure is long, i.e. the shutter speed is low (1/100, 1/50 sec), the moving objects are blurred in the image. This most affects the small details, eg. the symbols in license plate numbers. The video sequence as a whole may look good enough, but the static frames that comprise it may be blurred, making LP number recognition partially or completely impossible. If the video camera is not forced to operate at high shutter speed, it will automatically switch to long exposure in case of poor lighting conditions, preventing plates recognition. With the same settings, the video camera can recognize the numbers in bright light only, automatically switching to short exposure.</p> <p>If the video camera is installed at an angle more than 10 degrees to perpendicular to the license plate, we recommend to halve the shutter speed.</p>
6	Color	Black and white image	It is recommended to use black and white cameras unless it is necessary to store color pictures of the vehicle. This is because color cameras while having same characteristics have less sensitivity and pictures appear less sharp.

№	Property	Range	Comment
7	Video stream speed (fps)	See the corresponding module functionality description.	For proper recognition, the plate is to be fully observed and read at least in one frame. For getting the car direction, the plate is to be fully observed and read at least in two frames. The maximum speed of vehicles moving in the control zone is defined for each object and depends on the way of camera installation, what objective is in use, etc. In some frames the plate can be light-struck/darkened/covered depending on the traffic situation, the time of day, etc. To avoid such problems, it is necessary to increase the number of frames in which the plate is observed. It is achieved by the video stream speed-up or decreasing of maximum allowed speed of a car.

The following video camera requirements should be met in order to ensure the recognition of license plate numbers using the *Auto PSIM* system.

- license plate number should be fully placed in the frame;
- symbols should be sharp, not smeared, undistorted, not overexposed, evenly lighted;
- symbols should be visually differentiated;
- technical requirements for the number plates should follow according government standards;
- without the effect of interlacing (on speed) for analog cameras.

4 Installing, restoring, removing of Auto PSIM software components

4.1 General description of the Auto PSIM distribution kit

Auto PSIM is supplied as a software installation package (distribution kit). The current version of the distribution kit can be downloaded from the official [AxxonSoft](#) website.

The distribution kit contains all the necessary software components for installing *Auto PSIM* on a base computer.

The distribution kit allows you to install, restore, and remove *Auto PSIM*.

Attention!

- Prior to installing, restoring or removing *Auto PSIM*, the *Axxon PSIM* operation should be shut down.
- Administrator rights are required for installing, restoring or removing *Auto PSIM*.

4.2 Installation of the Auto PSIM software package

Auto PSIM is installed as a part of *Axxon PSIM*. Information about compatibility of the *Axxon PSIM* software versions and *Auto PSIM* is presented in the General information about product releases and versions compatibility section.

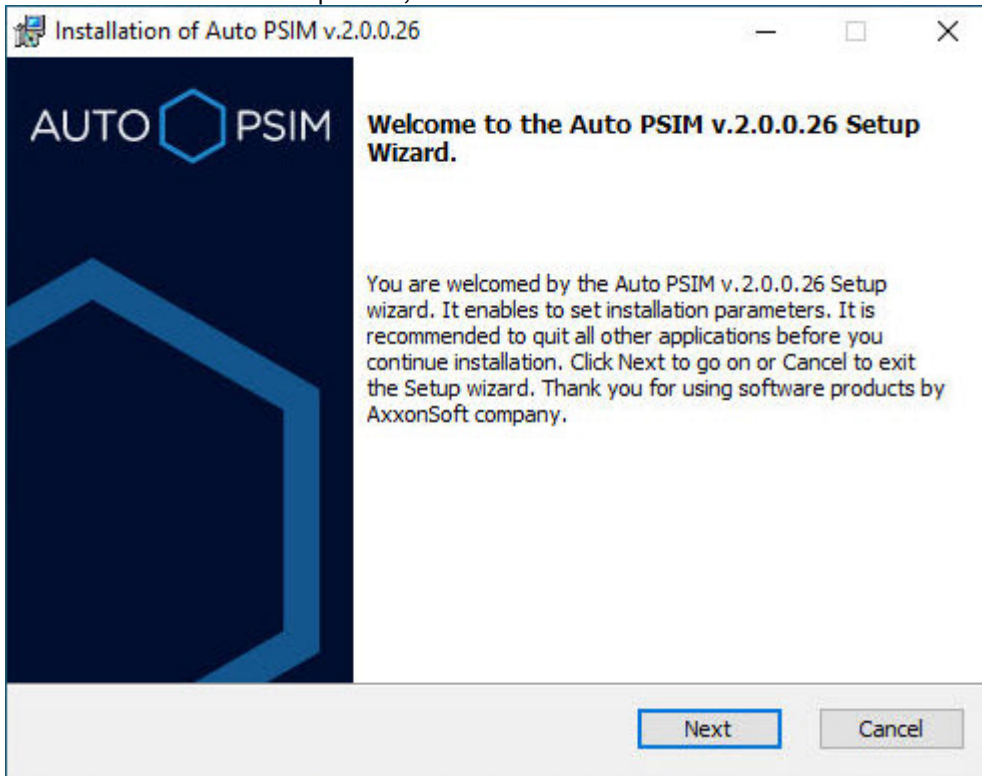
Attention!

Auto PSIM should be installed on both **Server/Remote Administrator's workstation** and **Client**. For details, see [Axxon PSIM. Administrator's Guide](#).

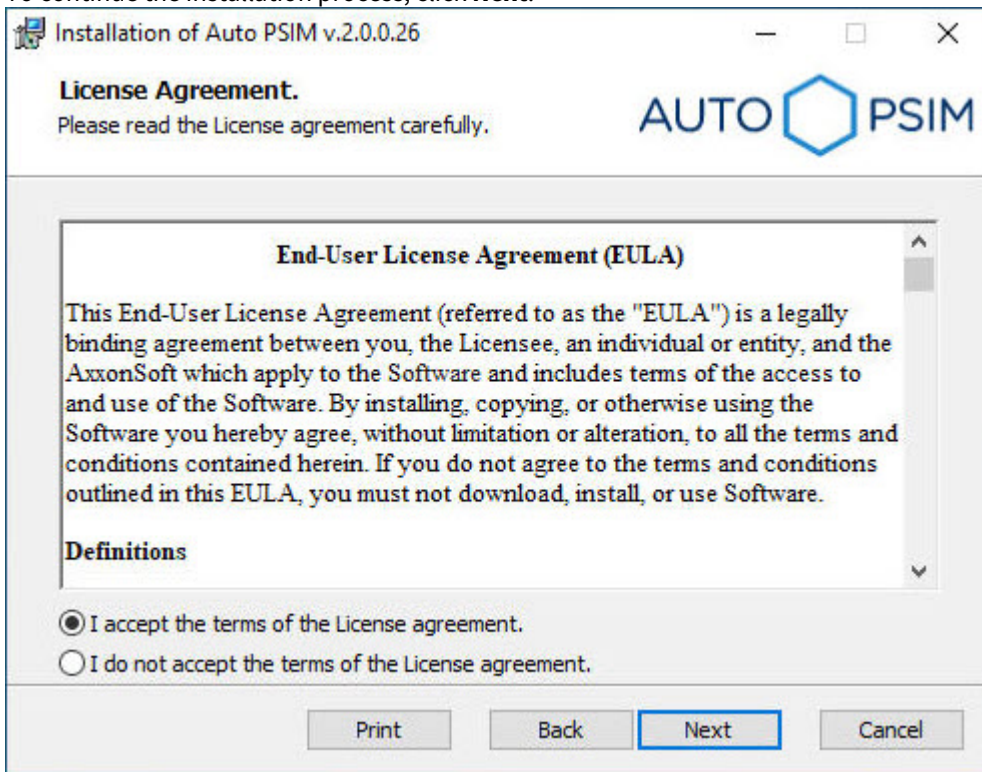
To install *Auto PSIM*, do the following:

1. In the root directory of the distribution kit, run the setup.exe file.

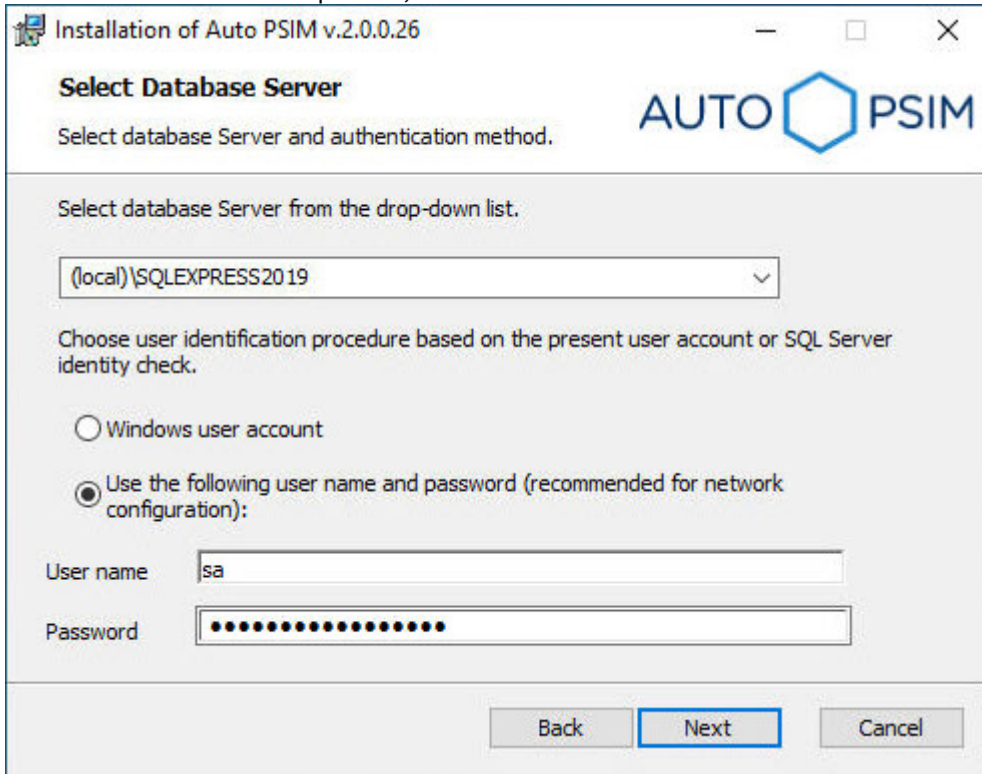
2. To continue the installation process, click **Next**.



3. Read the terms of the license agreement carefully.
4. Then set the radio button to **I accept the terms of the License agreement a**
5. To continue the installation process, click **Next**.

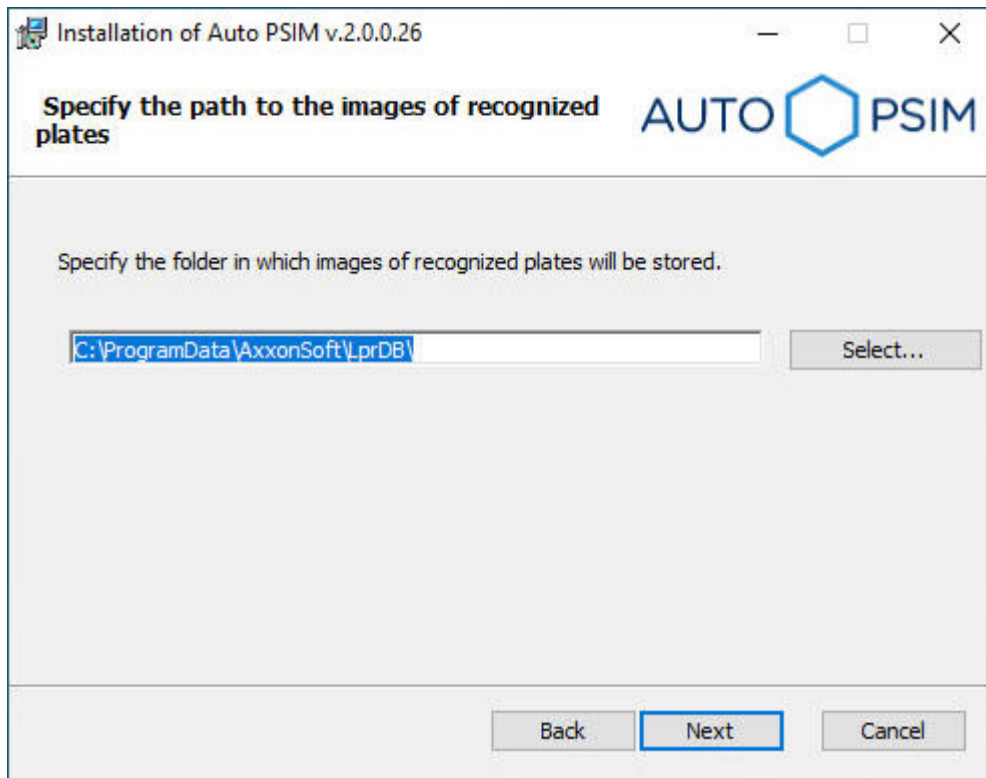


6. Select the database MS SQL Server and specify the authorization parameters for connection. For details, see [Installation of Axxon PSIM as a Server/Remote administrator's workstation](#).
7. To continue the installation process, click **Next**.

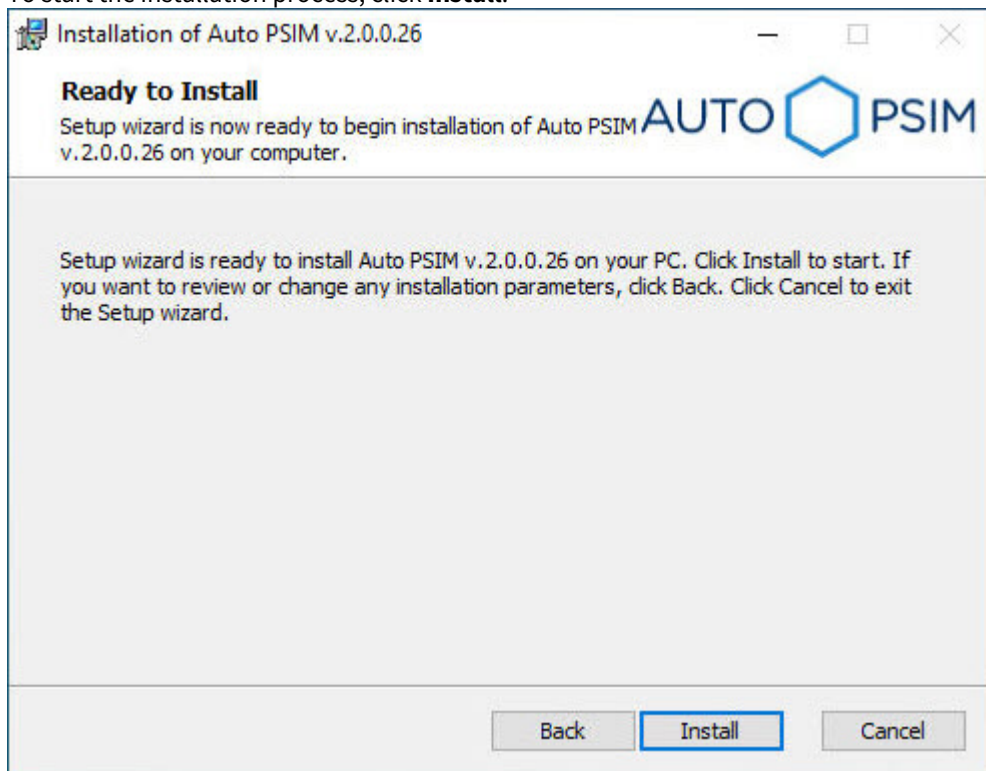


The screenshot shows a Windows-style dialog box titled "Installation of Auto PSIM v.2.0.0.26". The main heading is "Select Database Server". Below the heading, it says "Select database Server and authentication method." and "Select database Server from the drop-down list." A drop-down menu is set to "(local)\SQLEXPRESS2019". Below that, it asks to "Choose user identification procedure based on the present user account or SQL Server identity check." There are two radio buttons: "Windows user account" (unselected) and "Use the following user name and password (recommended for network configuration):" (selected). Under the selected option, there are two text boxes: "User name" containing "sa" and "Password" containing a series of dots. At the bottom, there are three buttons: "Back", "Next" (highlighted with a blue border), and "Cancel". The "AUTO PSIM" logo is visible in the top right corner of the dialog.

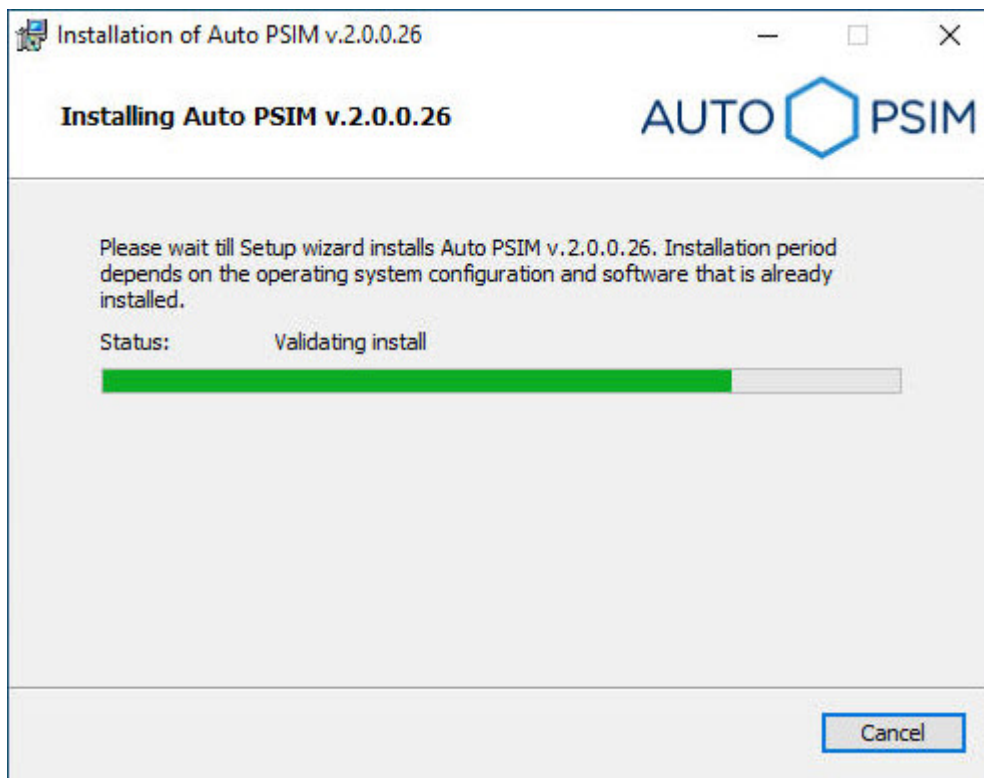
8. Specify the folder where the images of the recognized LP numbers will be stored. For more information about storing the images of the recognized LP numbers, see [Set up storage of images of recognized license plates and vehicles on disk](#).
9. To continue the installation process, click **Next**.



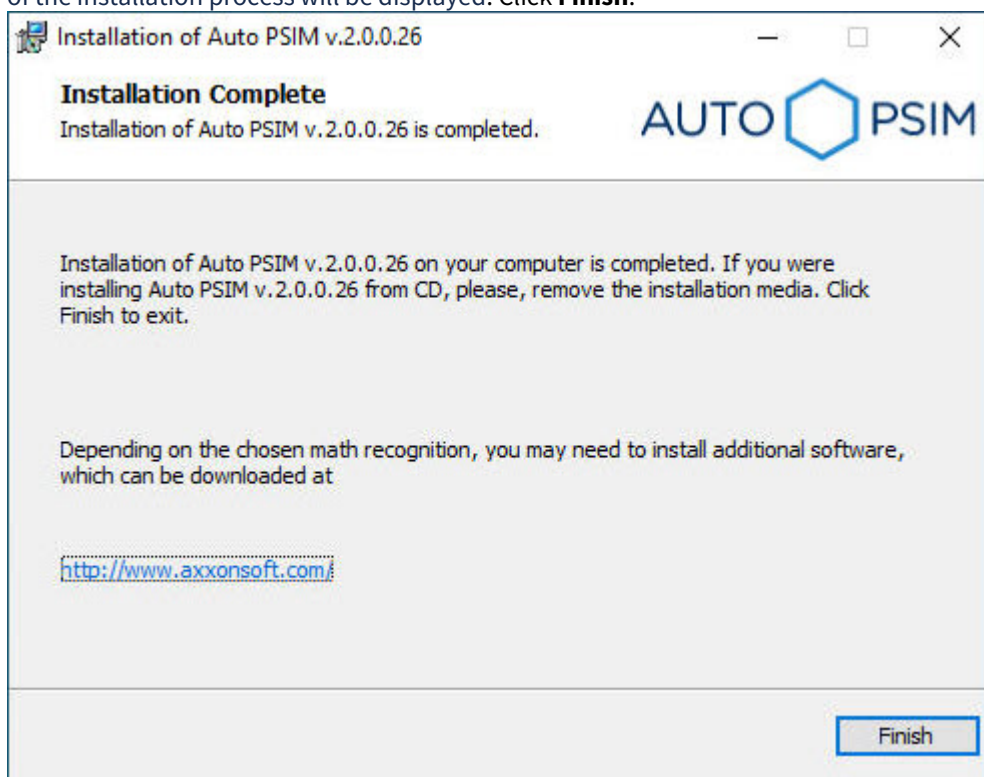
10. To start the installation process, click **Install**.



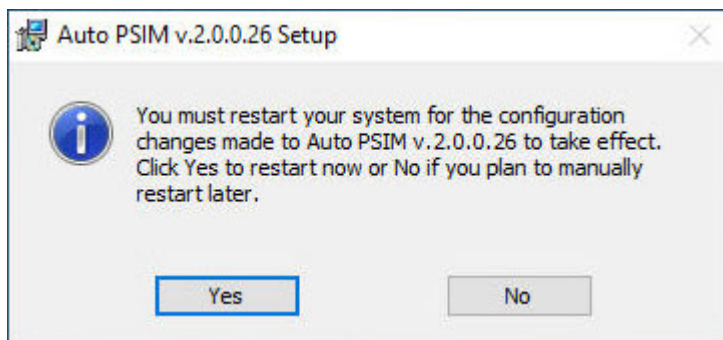
As a result, the necessary components of *Auto PSIM* will be copied to hard drive of your computer.



11. After all software components are successfully copied on your hard drive, the message about the completion of the installation process will be displayed. Click **Finish**.



12. It is necessary to restart the computer for the configuration changes to take effect. To restart your system automatically, click **Yes**. To restart your system manually, click **No**.



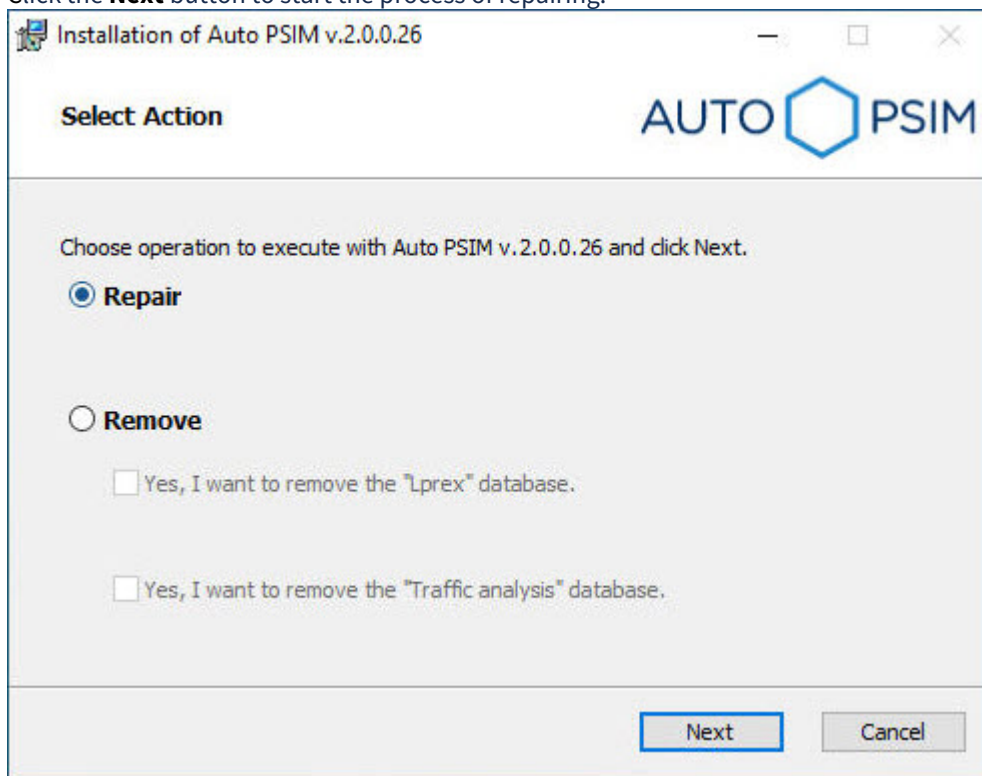
Auto PSIM installation is completed.

4.3 Repairing the Auto PSIM software package

The repair mode is used if *Auto PSIM* software components need to be re-installed.

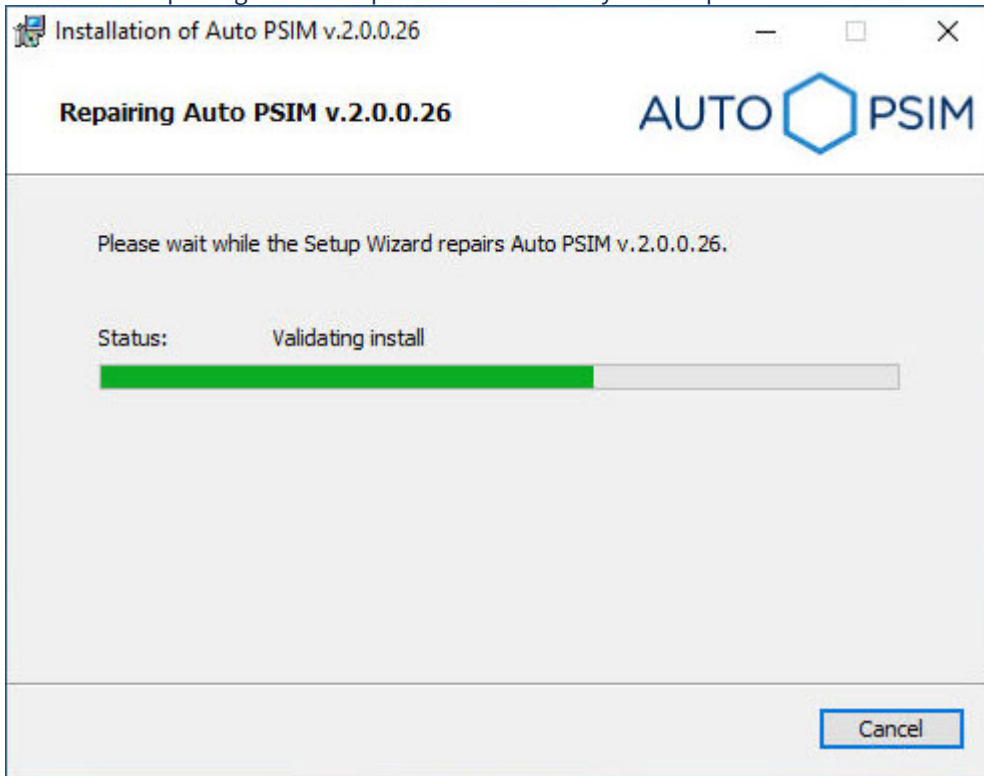
To repair the *Auto PSIM* software, do the following:

1. In the root directory of the distribution kit, run the setup.exe file.
2. Select the **Repair** operation type
3. Click the **Next** button to start the process of repairing.

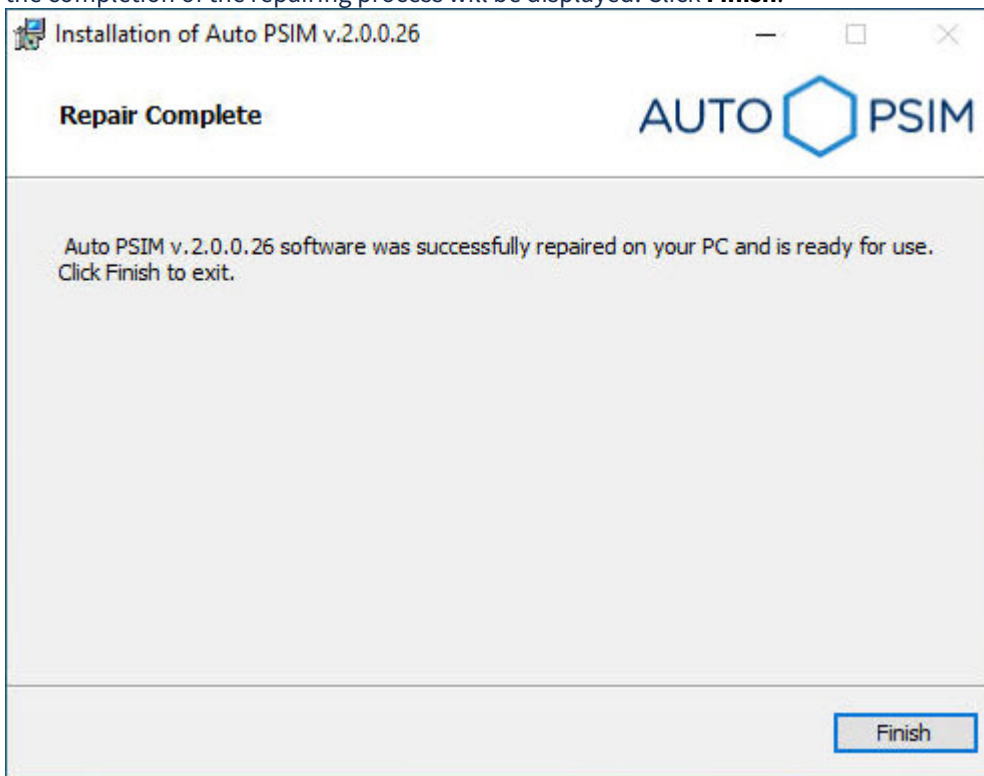


As a result, the installed components will be checked and the necessary components of the *Auto*

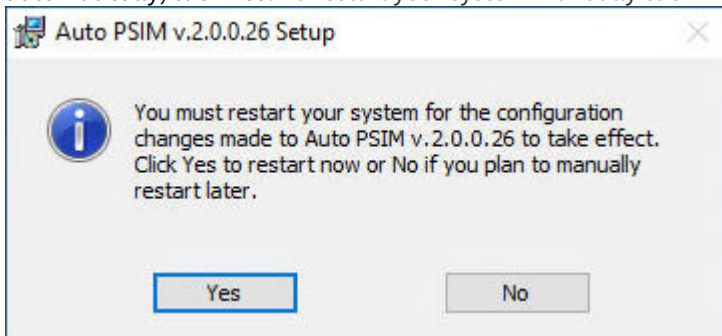
PSIM software package will be copied to hard drive of your computer.



4. After all software components are successfully copied on your hard drive, the message about the completion of the repairing process will be displayed. Click **Finish**.



5. It is necessary to restart the computer for the configuration changes to take effect. To restart your system automatically, click **Yes**. To restart your system manually click **No**.



Repairing the *Auto PSIM* software complex is completed.

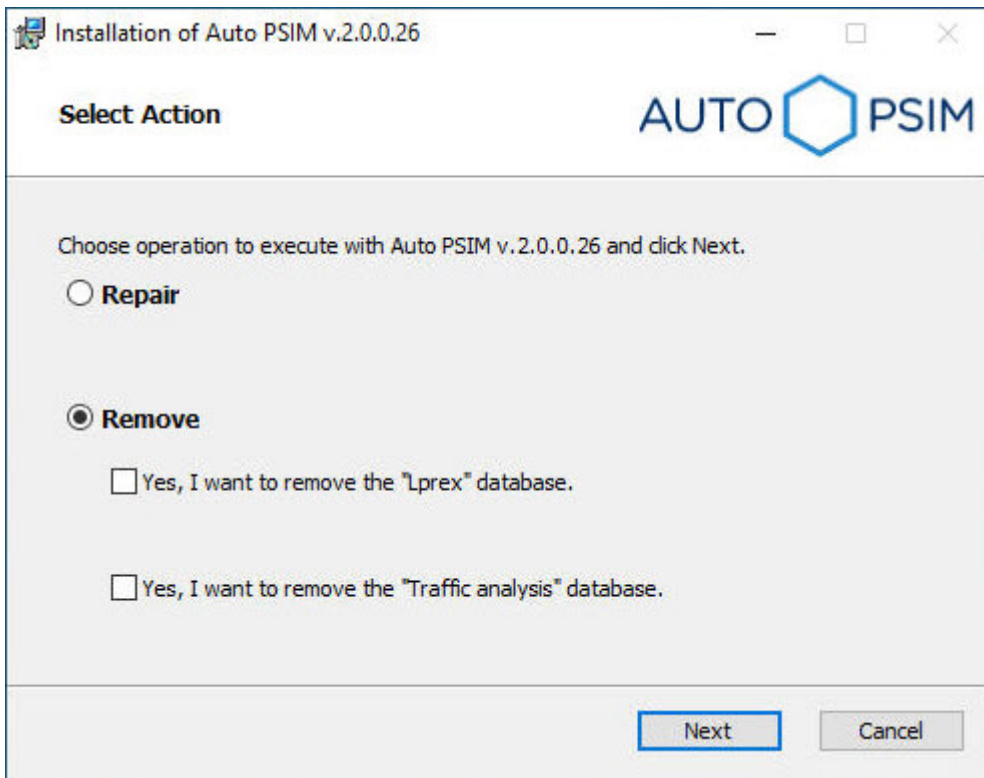
4.4 Removing the Auto PSIM software from the computer

To remove the *Auto PSIM* software, do the following:

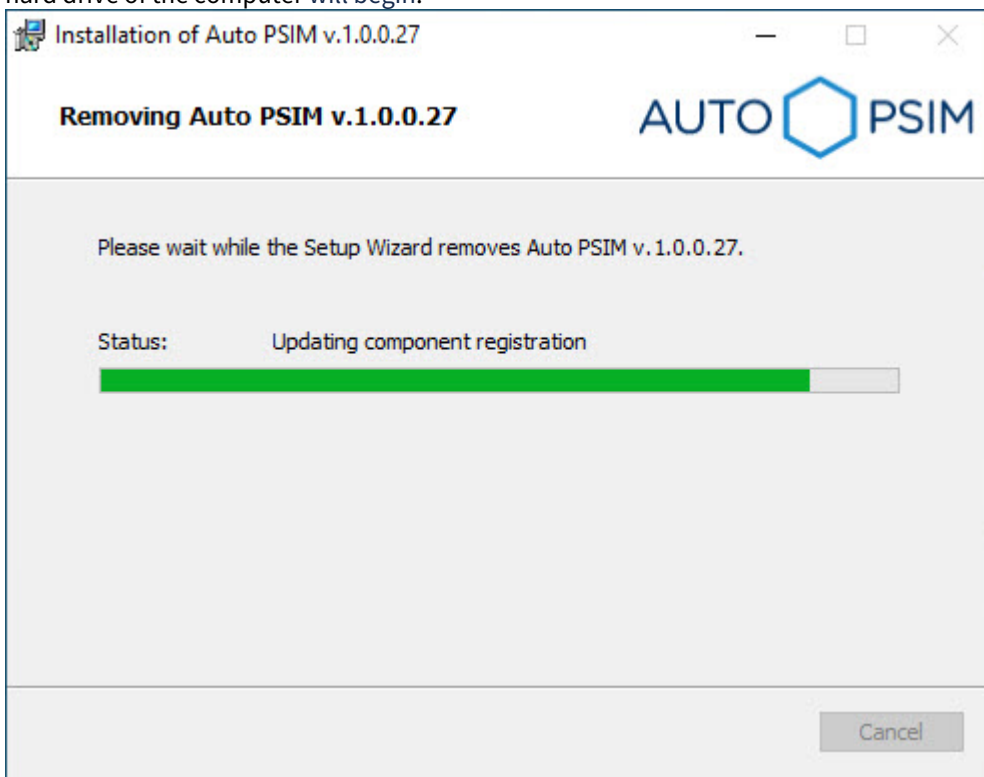
1. In the root directory of the distribution kit, run the setup.exe file.
2. Select the **Remove** operation type and click **Next**.

Notes

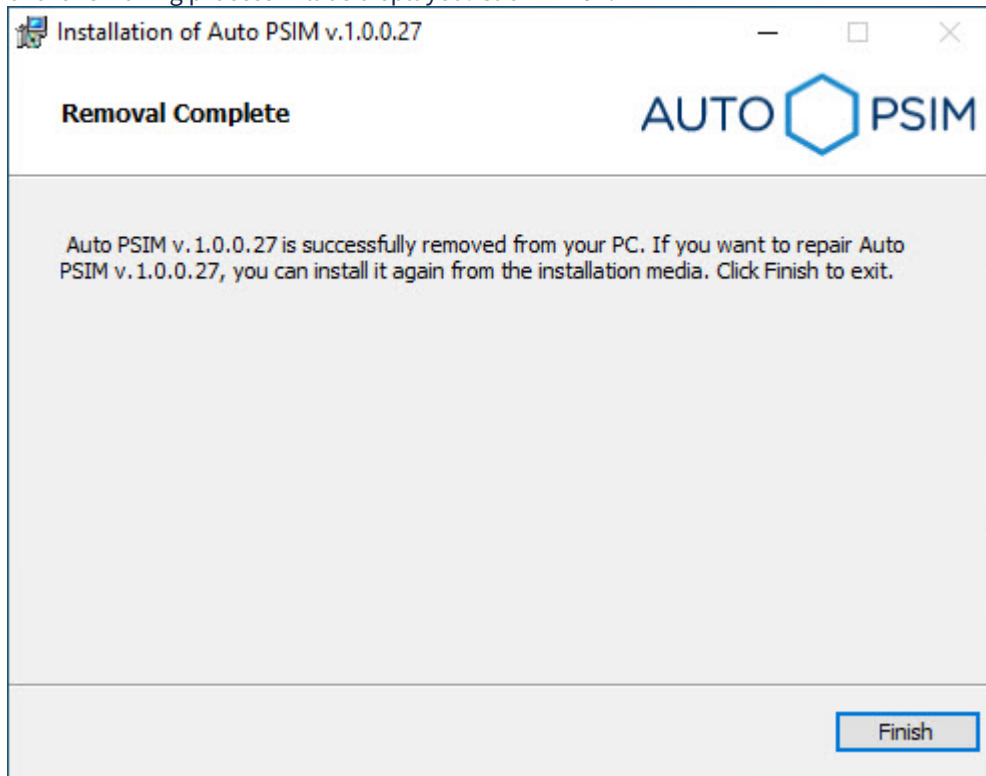
- To also remove the *Auto PSIM* recognizer database, set the **Yes, I want to remove a "Lprex" database** checkbox.
- To also remove the *Auto PSIM Traffic analysis* module database, set the **Yes, I want to remove the "Traffic analysis" database** checkbox.



As a result, the process of removing the installed components of the *Auto PSIM* software package from the hard drive of the computer will begin.



3. After all software components are successfully removed from hard drive, the message about the completion of the removing process will be displayed. Click **Finish**.



Removing the *Auto PSIM* software is completed.

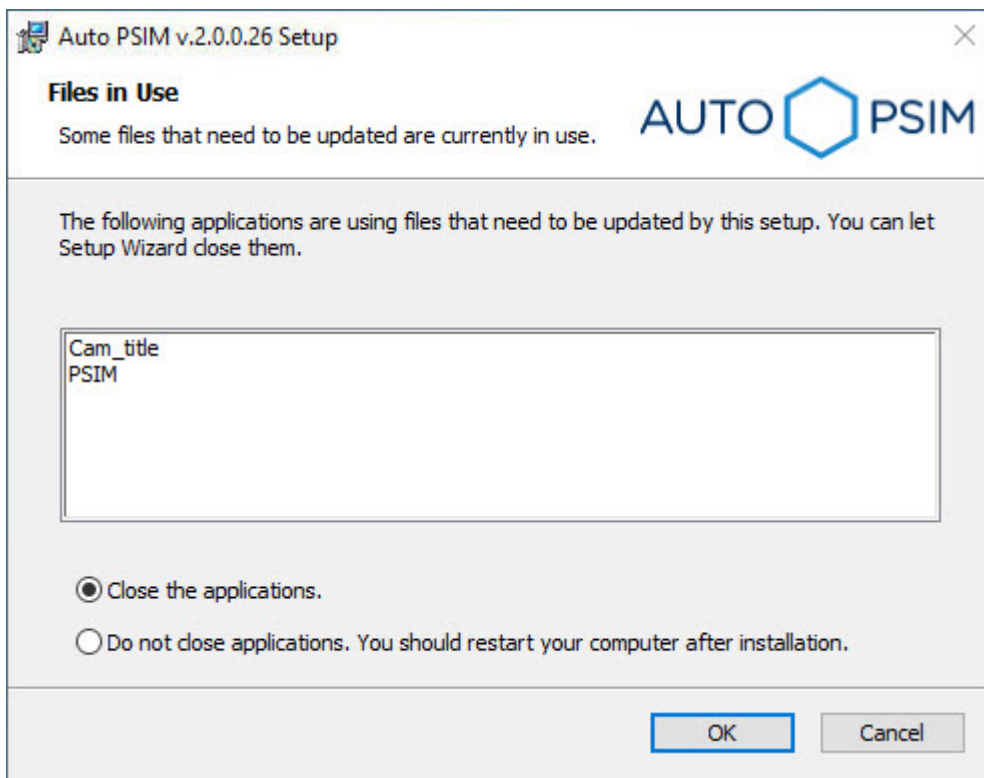
4.5 Possible problems during installation

On the page:

- Files that need to be updated by Auto PSIM installer are used by another application

4.5.1 Files that need to be updated by Auto PSIM installer are used by another application

In case when *Axxon PSIM* software package is installed as a service some problems can occur during installation, repairing, removing of *Auto PSIM* software package. If installation program can't close all applications and processes that use files that need to be updated then the corresponding dialog box is displayed.



Attention!

This dialog box can change according to OS in use.

To continue installation it's necessary to shut down the application that uses this file and click **OK**.

4.6 Remote installation, deinstallation and update of Auto PSIM

You can remotely install, deinstall and update *Auto PSIM* using the `wmic.exe` command line utility. This utility is a part of Windows OS. To run the utility, enter "wmic" without quotation marks in Windows command line.

Detailed information about this utility can be found on Microsoft technical documentation page <https://docs.microsoft.com/en-us/>. At the moment of creating this section, the description of the utility is available at <https://docs.microsoft.com/en-us/windows/win32/wmisdk/wmic>.

Note

The `wmic.exe` utility does not work correctly with VMware virtual machines. It is not guaranteed to work with other virtual machines.

To run `wmic` on a remote computer, you should disable UAC (for instructions on how to do this, see [OS settings for correct operation of remote administrator's workstation or server](#)).

The installation, deinstallation, and upgrade methods described in this section apply to domain and extra-domain computers.

It is necessary to copy *Auto PSIM* distribution kit to the computer local disks where the installation will be performed in advance.

To do this, you can use the following command line script:

```
xcopy %Path_to_folder_with_distribution_kit% %Network_folder_on_the_target_PC% /e
```

where:

- *%Path_to_folder_with_distribution_kit%* is the path to the folder with the distribution kit on the local computer.
- *%Network_folder_on_the_target_PC%* is the path to the folder on the computer where you want to install the software. You should have the write access to it.
- The */e* attribute copies all subdirectories and their contents, including empty directories.

Note

The UNC path is in the format \\<server IP address>\<Shared folder on this server>\... . The ellipses here represent the path from the shared folder to the folder with the distribution kit. If you are installing on the computers in the domain, specify the address of the server that contains the distribution kit folder available to all computers.

Detailed information about the xcopy utility can be found on Microsoft technical documentation page. At the moment of creating this section, the description of the utility is available at [https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-xp/bb491035\(v=technet.10\)](https://docs.microsoft.com/en-us/previous-versions/windows/it-pro/windows-xp/bb491035(v=technet.10)).

Note that the installation method described in this section allows you to install or upgrade only the core product without any add-ons.

4.6.1 Remote installation of Auto PSIM

In order to install *Auto PSIM* on a remote computer, run the following command with the wmic.exe utility:

```
/NODE:"Computer_name" /USER:"User_name" /PASSWORD:"Password" product call  
install true, "%installer parameters%", "%Path_to_folder_with_distribution_kit%  
\Product.msi"
```

Here:

- */NODE* - the name of the target computer on which *Auto PSIM* is being installed;

Note

The NODE list can be a text file that specifies the names of the target computers in column.

- */USER* and */PASSWORD* - login and password of the user who has the rights to install the software on the remote computer;
- *"%Path_to_folder_with_distribution_kit%\Product.msi"* - path to the Product.msi installer file you need to run. It is the local path to the folder to which you copied the distribution kit;
- *%installer parameters%* - installer options. The following parameters can be applied to Product.msi:
 - a. The parameters that can be applied to any msi file (for reference, run the msixec.exe /? command in the command line from <WINDOWS>\system32\ directory).
 - b. The parameters described in the setup.exe help article in the /CMD="[commands]" section (for reference, run the setup.exe /? command in the command line from the installer folder. These commands are also described in [Installing Axxon PSIM™ software in a quiet mode](#) section).
 - c. The parameters that are set in setup.exe during installation:
 - CMD_INSTALLTYPE – Client, Server, Admin;
 - REMOVEALL (0, 1) – removal with/without saving the configuration;
 - NOOSCHECK=1 – disable the OS compatibility check.

Note

The operation of these parameters is not guaranteed if there is a branch in the registry:

- for x86 system: HKEY_LOCAL_MACHINE\SOFTWARE\AxxonSoft\AxxonPSIM\InstallPropertyInfo;
- for x64 system:
HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\AxxonSoft\AxxonPSIM\InstallPropertyInfo.

The branch has the parameters of the previous installation.

Example

Example of an installer parameter string:

```
REBOOT=ReallySuppress LANGUAGE="en" TRANSFORMS="%Path_to_folder_with_distribution_kit%
\languages\Setup\en\en.mst" CMD_INSTALLTYPE="Server"
```

In the example above:

REBOOT=ReallySuppress cancels computer reset at the end of installation.

LANGUAGE="en" selects the product language. The product language is English.

TRANSFORMS="%Path_to_folder_with_distribution_kit%\languages\Setup\en\en.mst" specifies the path to the installer language mst-patch (specifies the installer language).

CMD_INSTALLTYPE="Server" specifies *Axxon PSIM* installation type - Server. It can also take the Admin value (if Remote Administrator's workplace installation type is required) and Client (if Remote Client installation type is required).

4.6.2 Remote deinstallation of Auto PSIM

In order to deinstall *Auto PSIM*, run the following command in the wmic.exe utility:

```
/NODE:"Computer_name" /USER:"User_name" /PASSWORD:"Password" product where
name="Product_name" call uninstall
```

Here Product_name is the name under which *Auto PSIM* is installed, it is usually "Auto PSIM v.Build_number". The name can be found in the registry in HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Uninstall section.

4.7 Installation, repair, update, and removal of Auto PSIM in quiet mode

You can install, repair, update, and remove *Auto PSIM* in quiet mode.

To start installation, select one of the following options:

1. In the **setup.ini** file located in the directory with the *Auto PSIM* distribution package (see [Installation of the Auto PSIM software package](#)), enter:

```
[Startup]
CmdLine=/quiet
```

```

1  [Info]
2  Name=POS
3  Version=1.00.000
4  DiskSpace=8000 ;DiskSpace requirement in KB
5
6  [Startup]
7  CmdLine= /quiet
8  Product=Auto PSIM
9  PackageName=Product.msi
10 LogOptions =
11 QuietCmdLine = /quiet

```

When you run the **Setup.exe** executable file, the installation of *Auto PSIM* starts in quiet mode.

2. When you are in the *Auto PSIM* distribution directory, use the Windows command line to specify the parameters of the setup.exe file. The parameters of the setup file are listed in the table.

Parameters of the setup.exe file in the command line	Description
/x	Removal of <i>Auto PSIM</i>
/uninstall	Removal of <i>Auto PSIM</i>
/r	Repair of <i>Auto PSIM</i>
/repair	Repair of <i>Auto PSIM</i>
/qn	Installation/update of <i>Auto PSIM</i>
/quiet	Installation/update of <i>Auto PSIM</i>
/norestart	Disable automatic system restart during installation
/debug	Logging
/LANG="en"	Select the English language for the installation program
/CMD="[commands]"	Property values for the base installation program, where commands is [Property]="[Value]" or [Property]='[Value]'. The available properties of the installation program are listed in the table below

Immediately after you run the command, the installation of *Auto PSIM* starts in quiet mode.

When the setup.exe process completes in Windows Task Manager, the installation finishes as well.

Note

During installation of *Auto PSIM* in quiet mode, the computer will restart. After the restart, the installation process continues automatically.

Example of running the *Auto PSIM* installation/update in quiet mode with the setup.exe file

setup.exe /quiet /norestart

This action launches the setup.exe file with the following parameters:

The program installs *Auto PSIM* in quiet mode (/quiet).

Automatic system restart during installation/update is disabled (/norestart).

Example of running the *Auto PSIM* repair in quiet mode with the setup.exe file

setup.exe /r /quiet /norestart

This action launches the setup.exe repair file with the following parameters:

The program repairs *Auto PSIM* (/r).

The program repairs *Auto PSIM* in quiet mode (/quiet).

Automatic system restart during repair is disabled (/norestart).

Example of running the *Auto PSIM* uninstaller in quiet mode with the setup.exe file

setup.exe /x /uninstall /quiet /norestart

This action launches the setup.exe uninstaller with the following parameters:

The program uninstalls *Auto PSIM* (/x /uninstall).

The program uninstalls *Auto PSIM* in quiet mode (/quiet).

Automatic system restart during uninstallation is disabled (/norestart).

- You can use the Windows system utility Msiexec.exe to determine the parameters of the Product.msi installation file in the Windows command line.

Example of running the *Auto PSIM* installation/update in quiet mode with the Msiexec.exe utility

msiexec /i Product.msi /qn /norestart

This action launches the MSI installation file with the following parameters:

The program installs/updates *Auto PSIM* (/i Product.msi).

The program installs/updates *Auto PSIM* in quiet mode (/quiet).

Automatic system restart during installation/update is disabled (/norestart).

Example of running the *Auto PSIM* uninstaller in quiet mode with the Msiexec.exe utility

msiexec /x Product.msi /qn /norestart

This action launches the MSI installation file with the following parameters:

The program uninstalls *Auto PSIM* (/x Product.msi).

The program installs/updates *Auto PSIM* in quiet mode (/qn).

Automatic system restart during uninstallation is disabled (/norestart).

Example of running the *Auto PSIM* repair in quiet mode with the Msiexec.exe utility

msiexec /fvomus Product.msi /qn /norestart

This action launches the MSI installation file with the following parameters:

Automatic system restart during installation/update is disabled (/norestart).

The program repairs *Auto PSIM* (/fvomus Product.msi):

- Reinstalls the product (/f).
- Starts execution from the original package and caching of the local MSI database (v).
- Installs if an older version is installed (o).
- Overwrites all necessary files (m).
- Overwrites all registry entries for the current user (u).
- Overwrites all registry entries for the local computer and runs all shortcuts (s).

Installation, repair, update, and removal of *Auto PSIM* in quiet mode are complete.

5 Configuring the Auto PSIM software package and setting up its components

5.1 The configuration and setup procedure of Auto PSIM

Auto PSIM configuration is performed on the basis of the *Axxon PSIM* software platform. The necessary system objects for video subsystem performing are considered having already been configured and set up (see [Configuring video subsystem](#)).

The second stage in configuring *Auto PSIM* is to create and set up system objects, necessary for processing the received video in order to identify plates, speed and type of the vehicle in the video surveillance area, and also to create databases for storing the received information.

Note

The database of identifiers/detections and the object from which the data is received to this database must be located on one computer for the correct operation of *Auto PSIM*.

The program module *Traffic Detection* is used to identify the type of the vehicle. The *Radar* module is used to identify the speed of the vehicle.

If the *ARENA* module is used and *Auto PSIM* is set up, create and set up the following objects:

1. **LPR channel** (should be only created, not set up);
2. *ARENA* module;
3. **Vehicle Tracer** interface object.

If the LP recognition modules are used and *Auto PSIM* is set up, it is necessary to create and set up the following objects:

1. **LPR channel**;

Note

The **LPR channel** object is used to create the multipurpose settings of the recognition modules.

2. The corresponding LP recognition module (see [Activating the software module used for identifying license plates](#)).

Attention!

With the growing number of *AR-Auto* identifiers on the *Auto PSIM* server the rate of video processing by every identifier goes down, that results in lesser percent of the identified characters. Results delay and missing of frames are also possible. The rate of video processing by *AR-Auto* can also depend on the model, resolution, color and other camera's parameters.

3. *Speed traps server* module (if LPR channel is used simultaneously with *Radar* module);
4. **External Plates DB** (if LPR channel is used simultaneously with external Plates database);
5. **Vehicle Tracer** interface object.

To set up *Auto PSIM*, when **Vehicle Tracer** is used, the following system objects should be created and set up:

1. **Traffic Detection**;
2. **Traffic Monitor** interface object.

To set up the subsystem, gathering information about vehicle streams, the following system objects should be created and set up:

1. **IV vehicle detection;**
2. **Vehicle Processor.**

5.2 Configuring the program modules

5.2.1 Activating the software module used for identifying license plates

Activate one of the following software modules for license plate recognition:

- *AR-Auto* module,
- *AR-Railway* module,
- *AR-Video* module,
- *ARENA* module,
- *AUTO-Uragan* module,
- *Camera of recognition upon request*,
- *CIDR IV* module,
- *IV* module,
- *Parking violation detection*,
- *Remote recognition*,
- *RIDR IV* module,
- *RR* module (fast),
- *RR* module (slow),
- *RR vendor and model recognizer*,
- *Traffic violations detection*,
- *Vehicle type recognition* module,
- *VT* module.

To activate the software module, create the same-name object on the basis of the **LPR channel** object.

Note

After creating the recognition module object, except the *Remote recognition*, it is necessary to configure it.

Attention!

- After creating or configuring the license plate recognition modules, it is necessary to go to the **LPR channel** settings panel and click the **Apply** button.
- Some settings can be unavailable for some modules. If a setting is only applied for several modules, it is indicated on the corresponding page.

5.2.2 General information on Neural analytics

Software and hardware requirements

Auto PSIM uses the AI analytics based on neural networks. The following AI features are available:

1. *Vehicle Type Recognition* (see [Vehicle Type Recognition module](#)).
The *Vehicle Type Recognition* module performs vehicle type recognition using a neural network.

Note

See also [Saving the frames processed by the Vehicle Type Recognition module](#).

The quality of work and resource consumption of software modules based on a neural network directly depend on the optimization of the neural network model they use.

Before you start setting up a software module based on a neural network, you should contact the [AxxonSoft](#) technical support and request the files of the trained neural networks models. Technical support specialists will request the required data and then provide files for each neural network model. These files should be distributed to all Servers on which you plan to use the corresponding software modules.

Attention!

The startup (initialization) time of each neural network on NVIDIA GPU can take several minutes, depending on the neural network model used. Until the initialization is complete, no events will be received from the software module.

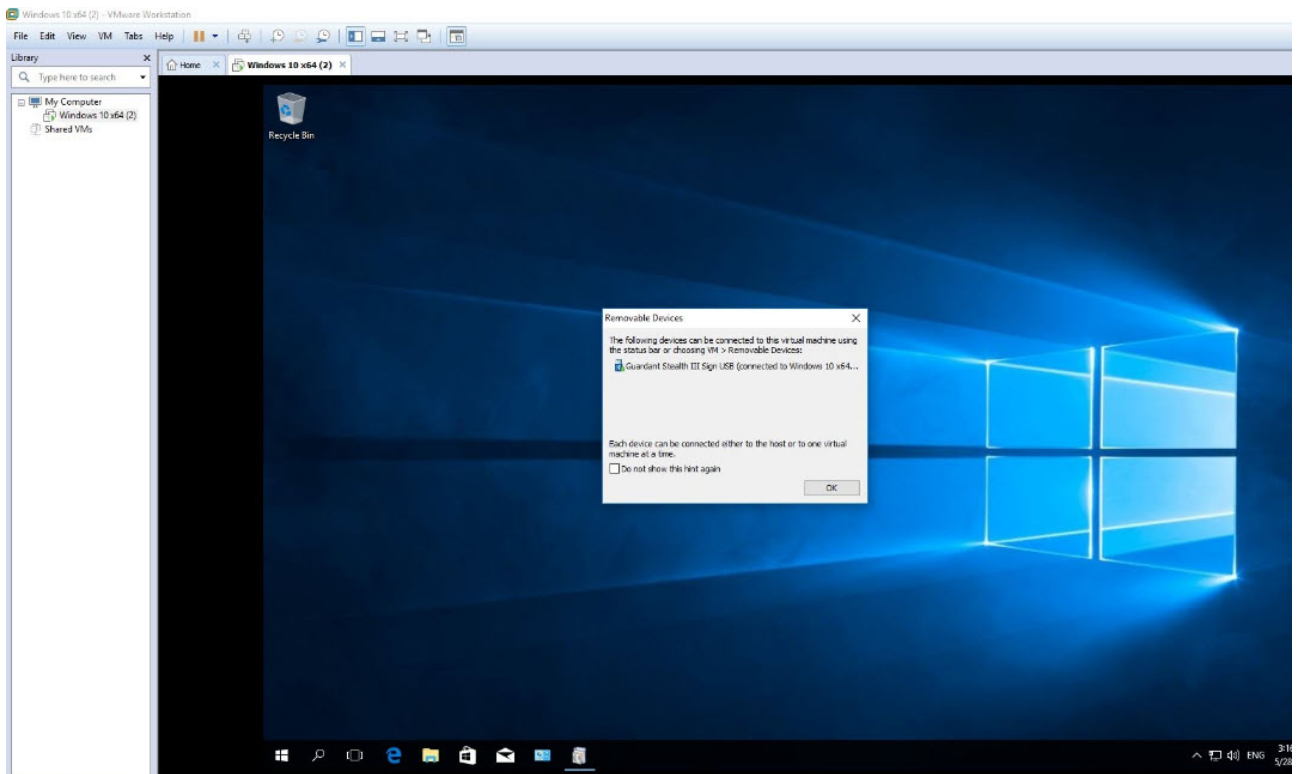
5.2.3 Features of Auto PSIM modules operating in VMware

Note

Find the list of *Auto PSIM* modules that support VMware operation in [Axxon PSIM operation on virtual machines](#).

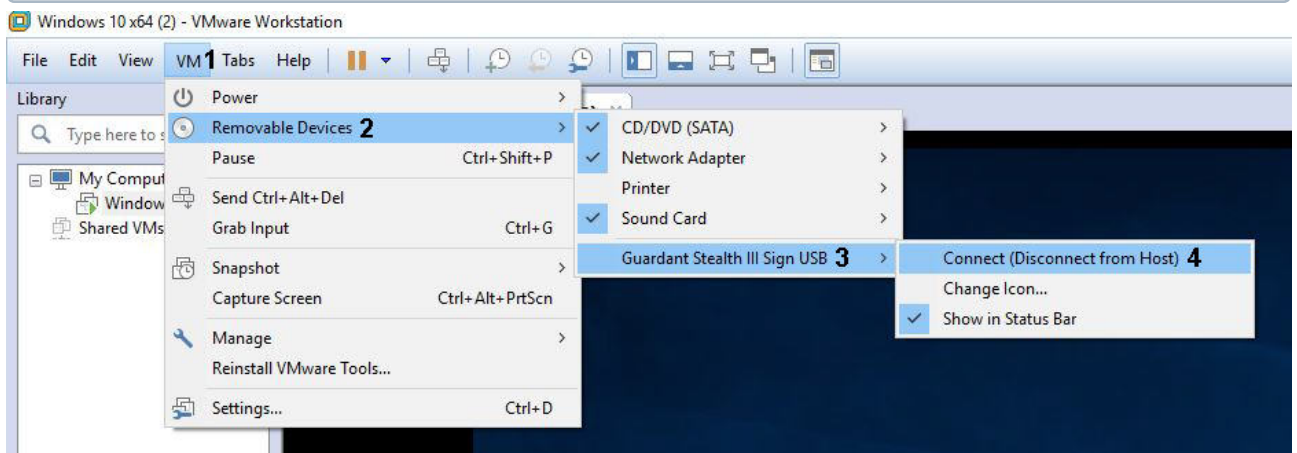
For the *LPR IV* module, copy the license key to the <Axxon PSIM installation folder>\Modules64 and apply the MAC address in order to activate it in VMware.

For the *VT*, *AUTO-Uragan* and *AR-Auto* modules, connect the USB key to the computer on which the VMware is installed in order to activate their license keys. The USB key will be discovered and connected automatically (the **Removable Devices** box appears, click the **OK** button).



Note

If the USB key is not discovered automatically, then connect it manually: **VM (1)** → **Removable Devices (2)** → **USB (3)** → **Connect (4)**.



5.2.4 ARENA

The ARENA module functionality

The ARENA software module supports the following functionality:

1. License plates identification.
2. Saving the identified number to the plates detector database.

3. Identification and logging the determined speed of the vehicle to the plates database.
4. Identification and logging the determined class of a moving vehicle to the plates database.

ARENA module licensing

The integration with the *ARENA* module is channel-based. Thus, each connection to the *ARENA* module is paid separately.

Setting up the ARENA module

Note

When the *ARENA* program module is used, the **LPR channel** parent object should not be set up.

The *ARENA* program module provides interaction of velocimeter and Arena photo fixation (Arena integrated circuit) and *Auto PSIM*.

Arena integrated circuit is a monobloc unit containing inside the following devices:

1. Radar.
2. Camera.
3. Computer with installed and set up ftp-server.
4. Data storage.
5. Devices, providing Arena integrated circuit workability.

Note

Detailed information about Arena integrated circuit is given in official reference manual.

The *Auto PSIM* server requires photos with a stated period of time from Arena integrated circuit. In case when the *Auto PSIM* server and Arena integrated circuit are disconnected and then the connection is restored, the photos made during the connection loss will be downloaded from the ftp-server.

Note

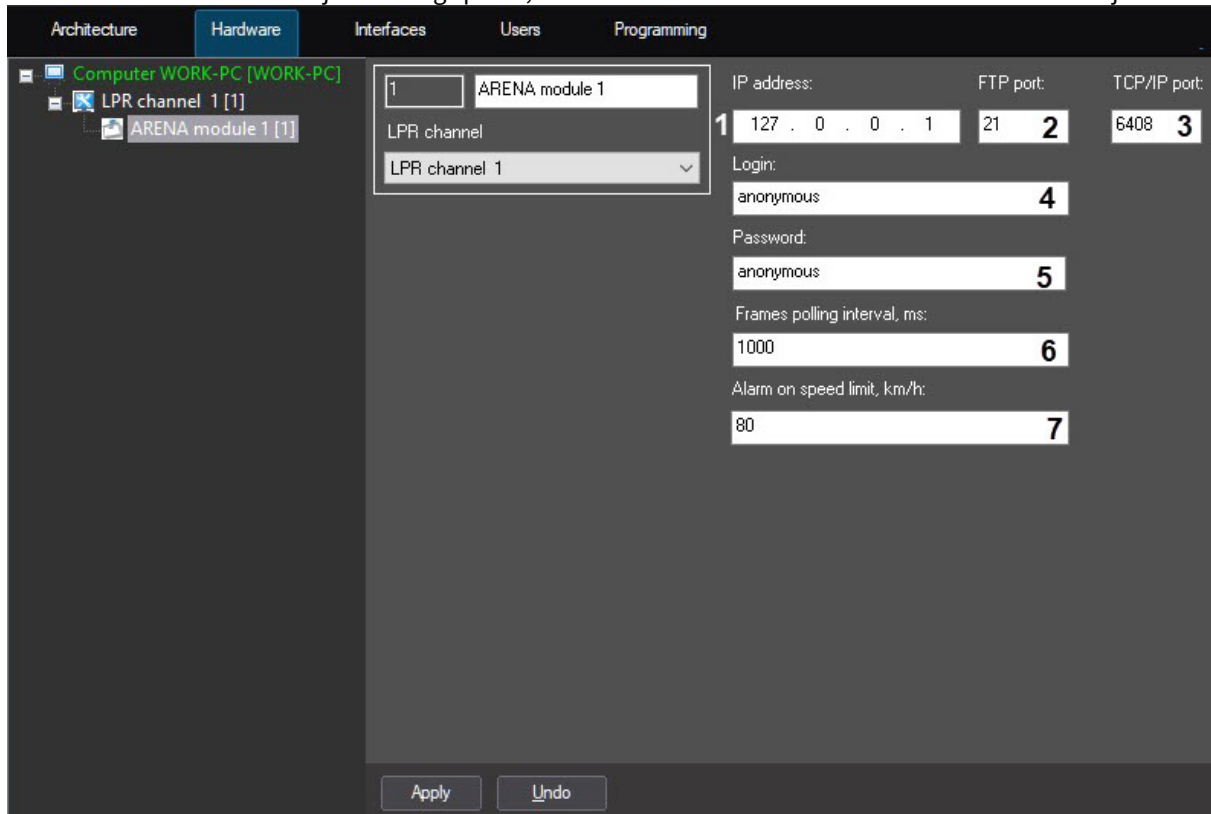
When the Arena web interface is closed incorrectly, *Auto PSIM* stops receiving events.

To set up the *ARENA* program module, the following data about the Arena integrated circuit are necessary:

1. IP address of the Arena computer with installed and set up ftp-server;
2. Port for connection to the ftp-server;
3. Username and password for connecting to the ftp-server.

Setting up *ARENA* program module is performed in the following way:

1. Go to the **ARENA module** object settings panel, which is created on the basis of the **LPR channel** object.



2. In the **IP address** field, enter the IP address of the Arena computer with installed ftp-server (**1**).
3. In the **FTP port** field, enter the port for connection to the ftp-server (**2**). Port 21 is used by default.
4. In the **TCP/IP port** field, enter the TCP/IP port for connection to the ftp-server (**3**). Port 6008 is used by default.
5. In the **Login** (**4**) and **Password** (**5**) fields, enter the username and password for connection to this ftp-server.
6. In the **Frames polling interval, ms** field, enter the time between two one by one requires of *Auto PSIM* for downloading the photos from the Arena integrated circuit (**6**).
7. In the **Alarm on speed limit, km/h** field, enter the maximum available vehicle speed in km/h (**7**). In case, when the vehicle moves at a speed above the maximum available vehicle speed, the system generates the report about the excessive speed.
8. Click the **Apply** button.

Setting up the *ARENA* module is completed.

5.2.5 AR-Railway

The AR-Railway module functionality

The *AR-Railway* software module supports the following functionality:

1. Recognition of transport containers' license plates.
2. Recognition of carriages' license plates.
3. Writing the recognized license plate to the license plates recognizer database.

The AR-Railway module licensing

The *AR-Railway* software module uses the Carmen FreeFlow license type and is licensed by the used processor cores. There is an additional hardware key in the form of a USB key in case of licenses for one and two cores, and in the form of a PCI card in case of one, two and four cores. The number of recognition channels is limited by the processor capacity. There are no restrictions on the number of recognitions per time unit.

For the Carmen FreeFlow license type, it is possible to use multiple hardware keys of any type on the same computer. It is also possible to use hardware keys of different types (a USB key and a PCI key).

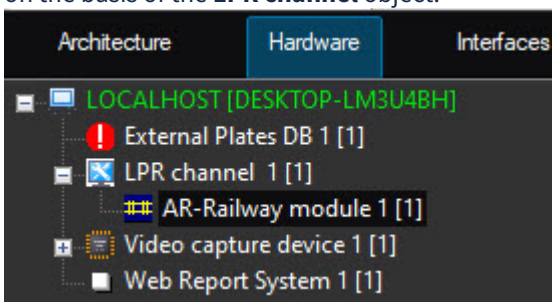
Configuring the AR-Railway module

⚠ Attention!

To ensure the correct operation of the *AR-Railway* module, do the following:

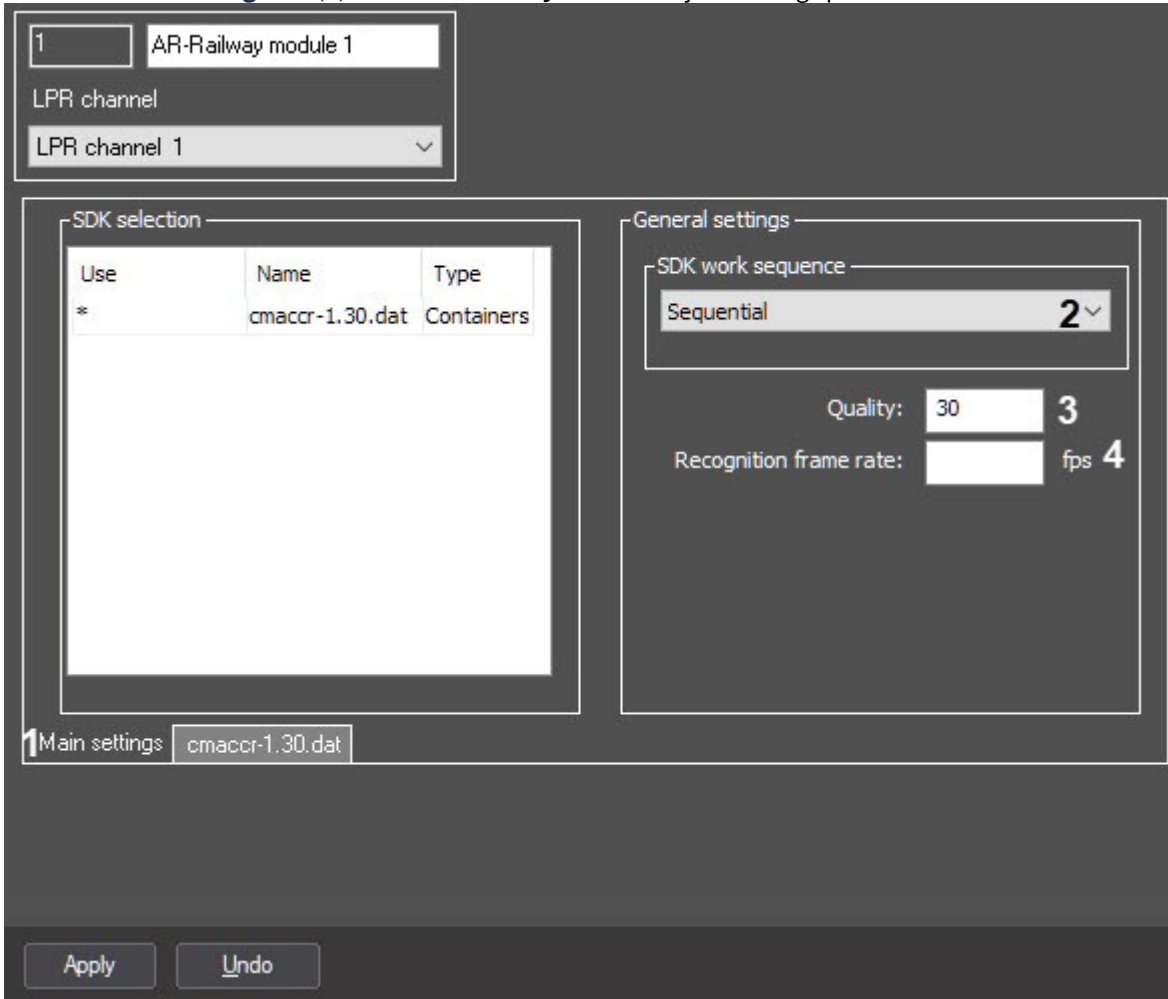
1. Make sure that the "KB3033929" security update and [Hotfix](#) are installed.
2. If *Carmen GX* drivers are installed, then they must be uninstalled from Windows.
3. Make sure that there is not a single folder with any drivers left at C:
 \Windows\System32\DRVSTORE\ (if there are folders, they must be deleted).
4. Restart the computer.
5. Download the *Carmen Freeflow 7.3.1* distribution package from the [manufacturer's website](#) and install it. If an older version was installed earlier, then it must be uninstalled before installing a newer version.
6. Download the *Carmen ACCR-7.3.2* distribution package from the [manufacturer's website](#). This distribution package contains a recognizer that must be installed via the *Engine Manager* utility. The procedure for installing the SDK using the *Engine Manager* utility is described in the `engine_install_windows.txt` file located in the folder with the corresponding recognizer.
7. Download the *AR Railroad Wagon Code Recognition Engine* distribution package from the [manufacturer's website](#) and install it via the *Engine Manager* utility. The procedure for installing the recognizer using the *Engine Manager* utility is described in the `engine_install_windows.txt` file located in the folder with the corresponding recognizer.
8. Install the software from the [manufacturer's website](#).

The *AR-Railway* software module can be configured on the settings panel of the **AR-Railway module** object created on the basis of the **LPR channel** object.



To configure the *AR-Railway* module, do the following:

1. Go to the **Main settings** tab (1) of the **AR-Railway module** object settings panel.



2. From the **SDK work sequence** drop-down list (2), select **Sequential** or **Parallel**.
3. In the **Quality** field (3), enter the image quality of the carriage or container numbers, starting from which the numbers will be recognized. The value is determined experimentally.
4. In the **Recognition frame rate, fps** field (4), enter the number of frames per second processed by the recognizer. If you enter **0** or leave the field blank, the recognizer will process the maximum possible number of frames.
5. Go to the tab of the selected SDK.



Note

Selected SDKs are marked with an asterisk in the **SDK selection** table on the **Main settings** tab.

The screenshot shows the configuration window for 'AR-Railway module 1'. The 'LPR channel' is set to 'LPR channel 1'. The 'Main settings' section is highlighted with a red box and contains the following fields:

- Symbol height:**
 - Minimum: 28 **1** [X]
 - Average: 32 **2** [X]
 - Maximum: 40 **3** [X]
- Symbol inclination:**
 - Average (%): -2 **4**
 - Minimum (%): -30 **5**
 - Maximum (%): 21 **6**

The 'Advanced settings' section contains:

- Slope (%): 1 **7**
- Min. contrast: 15 **8**
- X in Y (%): 100 **9**
- Delay: 1000 **10**

The 'Filters' section contains:

- ISO filter **11**
- Long code filter **12**
- Checksum test **13**

The 'Main settings' dropdown is set to 'cmaccr-1.30.dat'. At the bottom, there are 'Apply' and 'Undo' buttons.

6. In the **Symbol height** group, determine the symbol height of the carriage or container license plates in one of two ways:
 - a. In the **Minimum** field (**2**), enter the minimum height of the symbol in pixels. You can also select a symbol in the video image from the camera, specified in the recognition channel settings, by clicking the button to the right of the corresponding field.
 - b. In the **Average** field (**1**), enter the average height of the symbol in pixels. You can also select a symbol in the video image from the camera, specified in the recognition channel settings, by clicking the button to the right of the corresponding field.
 - c. In the **Maximum** field (**3**), enter the maximum height of the symbol in pixels. You can also select a symbol in the video image from the camera, specified in the recognition channel settings, by clicking the button to the right of the corresponding field.
7. In the **Symbol inclination** group, specify the inclination parameters of the carriage number symbols on the video image from the camera:
 - a. In the **Average (%)** field (**4**), enter the average inclination of the symbol in percent. The value is positive if the horizontal axis of the symbols is tilted down when viewed from left to right, and negative if this axis is tilted up.
 - b. In the **Minimum (%)** field (**5**), enter the minimum inclination of the symbol in percent. The value is positive if the horizontal axis of the symbols is tilted down when viewed from left to right, and negative if this axis is tilted up.

- c. In the **Maximum (%)** field (6), enter the maximum inclination of the symbol in percent. The value is positive if the horizontal axis of the symbols is tilted down when viewed from left to right, and negative if this axis is tilted up.
8. In the **Advanced settings** group, specify:
 - a. In the **Slope (%)** field (7), enter the slope of the carriage LP number in relation to the video image received from the camera in percent. The value is positive if the horizontal axis of the LP symbols is tilted down when viewed from left to right, and negative if this axis is tilted up.
 - b. In the **Min. contrast** field (8), enter the estimated difference between the shades of gray of the LP symbols and the background.
 - c. In the **X in Y (%)** field (9), enter the rate of the horizontal symbol resolution to the vertical one in percent. The horizontal resolution is the ratio of the symbol width on the video image to its actual width, and the vertical resolution is the ratio of the symbol height on the video image to its real height. If you enter zero or negative value, then the value will automatically change to 100.
 - d. In the **Delay** field (10), enter the time interval in milliseconds that must expire in order for the recognition module to display the next number recognition result. A zero value means no delay.

 **Note**

- Increasing the delay time can be useful if the same carriage number is displayed too often.
- If you use the LP recognition upon request (see [Setting up the Camera of recognition upon request module](#)), there must be no delay.

9. In the **Filters** group, specify:
 - a. Set the **ISO filter** checkbox (11) if it is necessary to enable the ISO carriage numbers filtering. When reading a number that consists of 11 symbols, the recognition module will attempt to read the ISO code (examples of ISO codes: GB4310, 22G1).
 - b. Set the **Long code filter** checkbox (12) if it is necessary to enable the long numbers filtering. If the video image does not contain the carriage number, but contains some other text, the recognition module can display a false carriage number. The long numbers filtering reduces the likelihood of the false numbers appearing, increases the runtime (by about 5%), and degrades the recognition of the carriage codes on the images with a carriage code (by about 0.5%).
 - c. Set the **Checksum test** checkbox (13) if it is necessary to test the checksum.
10. Click the **Apply** button to save the settings.

 **Attention!**

All changed settings remain in effect until you click the **Apply** button. After this, only the settings of the selected SDK are saved in the database, the rest are restored to original.

Configuring the *AR-Railway* software module is complete.

Requirements for mounting and configuring cameras for container recognition

The image received from video cameras must be sharp, contrast and readable for the correct recognition of carriages and containers license plates.

Requirements for the video camera characteristics:

1. Use video cameras with high resolution (720p is recommended).
2. The frame rate from the video camera (FPS) is selected individually and depends on the carriage speed: the faster the carriage goes, the higher the FPS should be, and vice versa. However, the higher the FPS, the greater the CPU load.
3. It should be possible to set a fixed exposure value (shutter) on a video camera of 1/2000 s or less.
4. High sensitivity of video cameras (0.01 lx and more).

Licensing requirements based on CPU processing power:

CPU	1-core license (FPS)	2-core license (FPS)	4-core license (FPS)
Intel Core i3	1-2	1-4	1-8
Intel Core i5	1-2	1-5	2-10
Intel Core i7	1-3	2-7	2-14

The optical axis of a video camera must be perpendicular to the plane of the license plate. To simplify the setting, it is recommended to use the varifocal lenses. The focal length variation range should be selected in each case of the system installation.

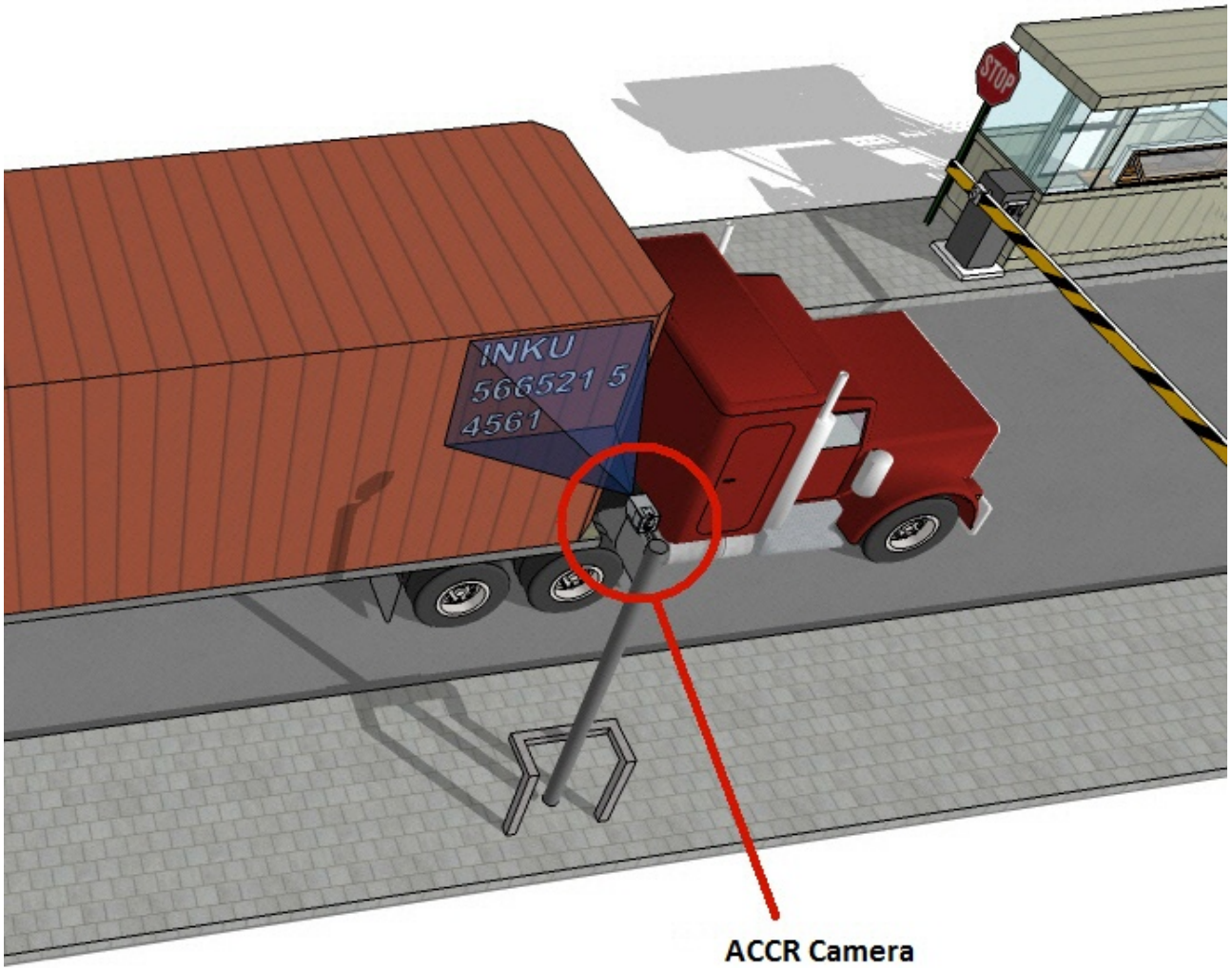
Image requirements:

1. The position of a carriage or a container in the frame should be strictly horizontal.
2. Size of the license plate characters in the image must be from 20 to 80 pixels, i.e. from 4% of the image height.
3. The geometric distortion by optics ("barrels" and "pincushions") should be reduced.

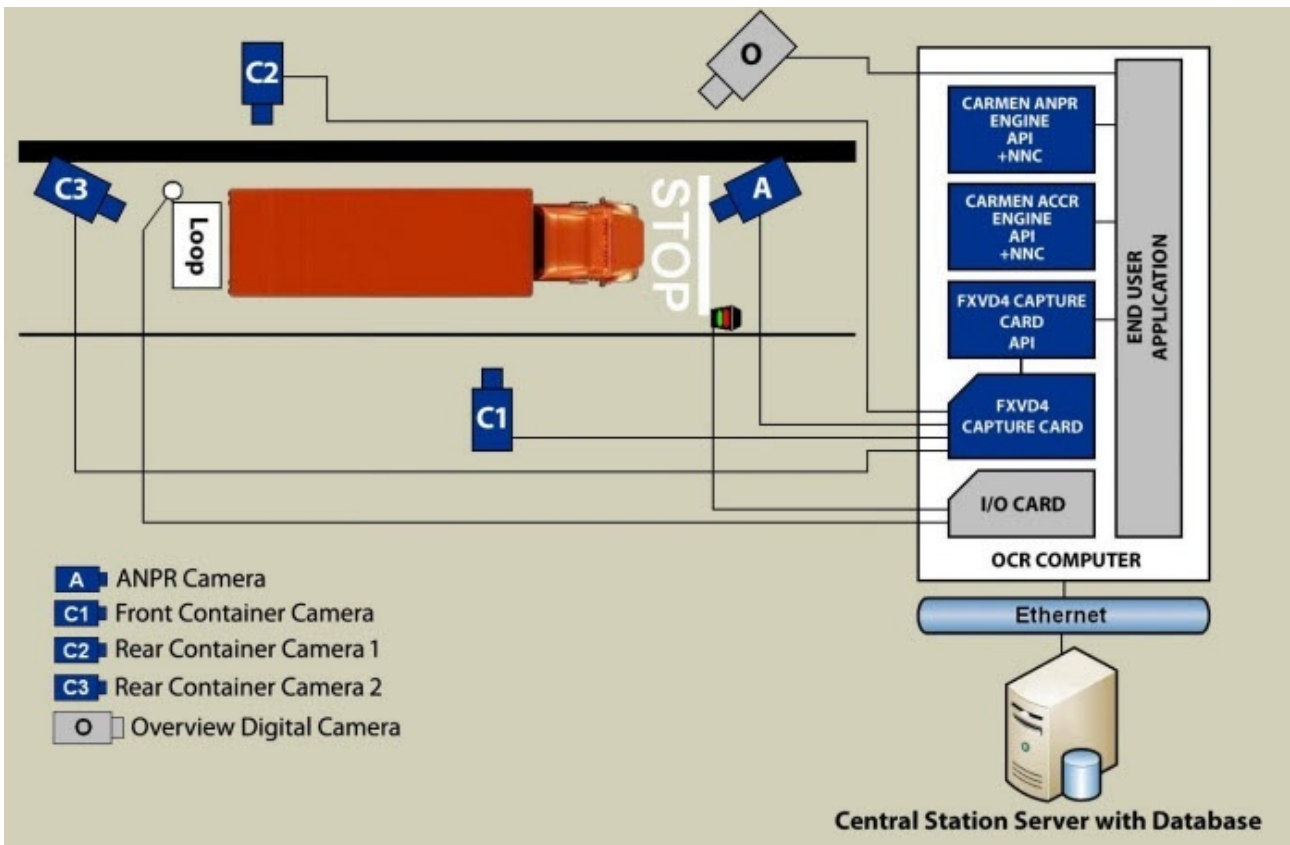
When configuring video cameras, it is also required:

1. Focus camera exactly on the container or carriage license plate and disable the auto focus.
2. It is recommended to disable all video camera smart features. For example, the contrast enhancement mode.

The diagrams of mounting video camera for providing the exact recognition of container license plates are shown in the following figures.

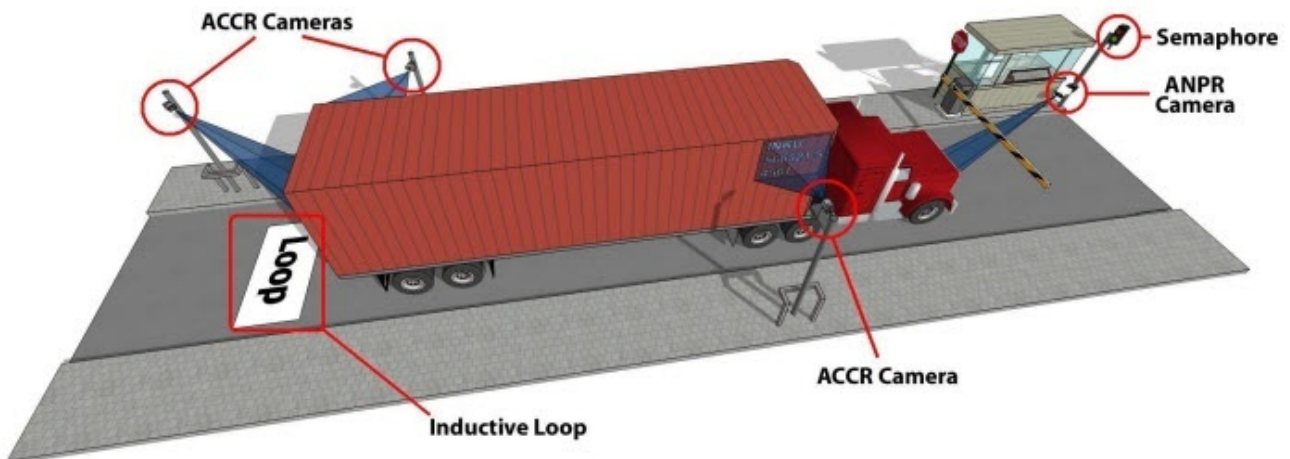


ACCR Camera



⚠ Attention!

The FXVD4 capture card and API are required only when you use analog CCTV cameras.



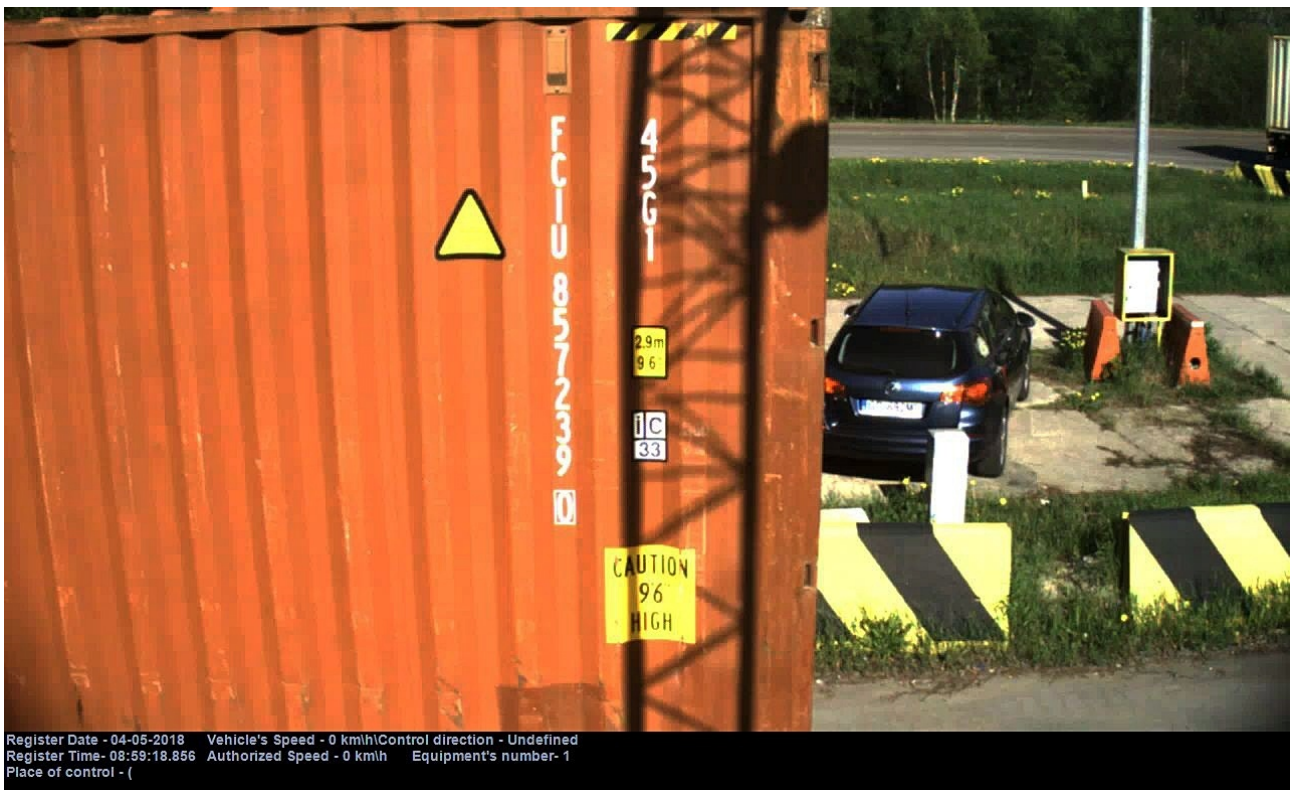
In the above image, you can see a sample application for the ACCR purposes. In many cases the container codes are damaged, therefore we suggest capturing multiple images from different sides of the container and process them together as an image sequence. To get the most precise reading results, it is recommended to use three container cameras. To provide the optimal conditions for taking an image, use two external white LED illuminator devices. With the help of an additional ANPR camera, a truck, carrying a container, can be identified.

To reduce consumption of the computer resources, use external triggering to capture images only if the container code and the license plate are in a good position.

The inductive loop (other triggering possibilities: laser sensor, microwave sensor, magnetic sensor or infrared barrier) serves as a sensor, which indicates the arrival of the vehicle.

As the vehicle stops at the “STOP” sign, all cameras identify the container code and the license plate of the truck.

The reference image received from the correctly mounted and configured video camera is shown in the following figure.



Requirements for mounting and configuring cameras for carriage recognition

The image received from video cameras must be sharp, contrast and readable for the correct recognition of containers license plates.

Requirements for the video camera characteristics:

1. It is recommended to use the resolution of no more than 800x600, because using a resolution of more than 800x600 does not lead to the recognition quality improvement.
2. High resolution black and white cameras are recommended because they provide better quality of image at low light conditions.
3. The frame rate from the video camera (FPS) is selected individually and depends on the carriage speed: the faster the carriage goes, the higher the FPS should be, and vice versa. However, the higher the FPS, the greater the CPU load.
4. It should be possible to set a fixed exposure value (shutter) on a video camera of 1/2000 s or less.
5. The video cameras should have high sensitivity (0.01 lx or more).

Licensing requirements based on CPU processing power:

CPU	1-core license (FPS)	2-core license (FPS)	4-core license (FPS)
Intel Core i3	1-2	1-4	1-8
Intel Core i5	1-2	1-5	2-10
Intel Core i7	1-3	2-7	2-14

Requirements for video camera position:

1. The distance between the video camera and the carriage should be at least 1.5 meters (depends on the focal length of the camera lens), the optimal distance is 5-7 meters.

Note

To simplify the setting, it is recommended to use the varifocal lenses. The focal length variation range should be selected in each case of the system installation.
If you use the camera with an integrated lens with a focal length of 2.8 mm or less, then there may be strong geometric distortions on the image. As a result, the recognition quality may go down. To avoid this, it is necessary to use special removable lenses with an aspherical lens, which eliminate these distortions.

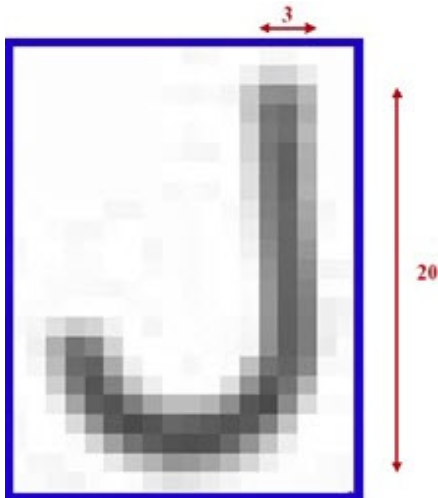
2. The camera height for reading the side number is 3–3.5 meters. The camera height for reading the chassis number is 1.5 meters.
3. The width of the carriage plate number in the image should be about 30-35% of the total image width, in most cases this means the width of the camera control zone is 3-5 meters.
4. The optical axis of video camera should be perpendicular to the plane of carriage plate number.
5. The position of the carriage in the frame should be strictly horizontal.
6. The infrared sensor and the video camera should be located in the same vertical plane.

Note

If the analog video camera is used, then to prevent the video signal fading on the transmission line, it is necessary that the distance from the video camera to the digitizing device does not exceed 30 meters.

Image requirements:

1. The minimum character height in the frame should be 20 pixels, 40–80 pixels are recommended. The width of the character line should be at least 2-3 pixels.



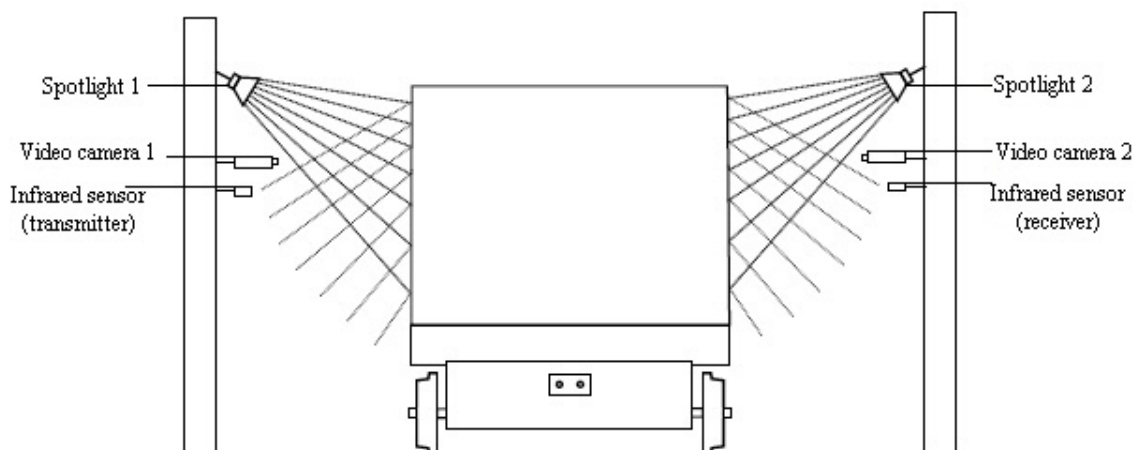
2. The geometric distortion by optics ("barrels" and "pincushions") should be reduced.
3. The image of the carriage plate numbers should be clear, contrast and readable.

When configuring video cameras, it is also required:

1. Focus camera exactly to the carriage plate number.
2. Disable the AGC mode in video camera.
3. Disable the modes of adding contrast in video camera.

To provide the system operation at night, use the searchlight lighting of carriages/cisterns. Use usual halogen spotlight with a capacity of 1–1.5 kW when mounting spotlight in the distance of 5-7 meters from railway. Locate spotlight as shown in the figure below. Such location allows avoiding the following:

1. Blinding of camera by spotlight directed to it from another side of railway.
2. Image flashing by light reflection from carriage.



Reference image received from the correctly mounted and configured video camera is shown in the following figure.



Combining the carriages and containers SDK

Trains with carriages and containers go on the railway track, their license plates include different types of codes. For their recognition, there are three versions of SDK (software development kit) that are a toolkit for the software development in one installable package:

1. iso.

Example of a license plate that can be recognized with the iso SDK:



2. accr.
Example of a license plate that can be recognized with the accr SDK:



3. aar.
Example of a license plate that can be recognized with the aar SDK:



Example of a carriage license plate recognition with the aar SDK

ONLINE MONITOR Server status



Parameter	Value
Recognizer	LPR channel 2
Recognition time	2021-10-27 10:43:38
Validity	82 %
Direction	Undefined
Regional code	443
Camera	Camera 2
SDK data file	cmocr-2.87-aar.dat

- TBOX638443
LPR channel 2
2021-10-27 10:43:38
- TBOX66613
LPR channel 2
2021-10-27 10:43:27
- TBOX889296
LPR channel 2
2021-10-27 10:43:22
- DEAX20376
LPR channel 2
2021-10-27 10:43:10
- FXE930414
LPR channel 2
2021-10-27 10:43:10

5.2.6 AUTO-Uragan

The AUTO-Uragan module functionality

⚠ Attention!

Please note the changes in the technical support for this module. Due to the fact that the vendor (producer) ended the life cycle of the current version of the SDK, security updates and bug fixes for this component are no longer available. Accordingly, our support service cannot affect the functionality of the outdated analytical engine. Therefore, any incidents classified as problems within the engine will not be considered by the technical support of the AxonSoft company.

The *AUTO-Uragan* software module supports the following functionality:

1. License plates identification.
2. Saving the identified plates to the detector database.
3. Identification and logging the determined speed of the vehicle to the plates database (by video or using the *Speed traps server* module).
4. Identification and logging the determined class of a moving vehicle to the plates database (when the *Traffic detection* module is connected).
5. Check of identified license plates via connected search database.
6. Possibility to work with a multilane driveway.

7. Identification of extended list of license plate types: all types of Russian license plates, all CIS countries and Baltic States, countries of Europe, Latin America, and the USA. Worked out the main types of single- and double-line plates of different countries for both civil and specialized (diplomatic, transit, military, and others). The full list of countries is given below.
8. Plate filtration according to their character sizes.
9. Possibility to change level of plate identification quality.
10. Saving the frames of the identified plates to BMP, JPEG, and AVI formats.
11. Calculation of the capture lanes in the area of identification restriction.
12. Setting the alarm when the vehicle enters an oncoming lane.

The *AUTO-Uragan* software module uses the IPP 6.1 library.

The *AUTO-Uragan* software module can work in one of the following modes: Slow or Fast (for more detail, see [AUTO-Uragan module licensing](#)).

AUTO-Uragan module allows recognition of vehicles' license plates of the following countries:

 **Note**

The list of countries below is actual at the moment of documentation creation. Contact an AxxonSoft manager to find out the most relevant list of countries supported.

1. CIS + Baltic + Georgia

- a. Abkhazia
- b. Belarus
- c. Georgia
- d. Kazakhstan
- e. Kyrgyzstan
- f. Latvia
- g. Lithuania
- h. Moldavia
- i. Russia
- j. Tajikistan
- k. Turkmenistan
- l. Uzbekistan
- m. Ukraine
- n. Estonia
- o. South Ossetia

2. Europe

- a. Austria
- b. Belgium
- c. Bulgaria
- d. Bosnia and Herzegovina
- e. United Kingdom
- f. Hungary
- g. Germany
- h. Greece
- i. Denmark
- j. Spain
- k. Italy
- l. Luxembourg
- m. Netherlands
- n. Norway
- o. Poland
- p. Portugal

- q. Romania
 - r. San Marino
 - s. Slovakia
 - t. Slovenia
 - u. Turkey
 - v. Finland
 - w. France
 - x. Croatia
 - y. Czech Republic
 - z. Switzerland
 - aa. Sweden
3. **North and South America**
- a. Argentina
 - b. Brazil
 - c. Paraguay
 - d. USA
 - e. Uruguay
4. **Africa**
- a. Morocco
 - b. Tanzania
 - c. South Africa
5. **Southeast Asia**
- a. India
 - b. Malaysia
 - c. Singapore
 - d. Thailand
6. **Australia and Oceania**
- a. Australia
 - b. New Zealand

 **Note**

Missing countries except for the listed above can be added into the recognition module if necessary. For that, contact your AxxonSoft manager and provide a video recording with license plates of the required country. The final decision on adding a country to the module is made by the module manufacturer.

 **Attention!**

Ask the manager of the AxxonSoft company about the possibility of recognizing special license plates (for example, two-lane, motorcycle license plates, and special vehicle license plates) for each country.

AUTO-Uragan module licensing

There are two types of license for *AUTO-Uragan* program module:

1. Slow – the module processes the video stream with the speed not exceeding 3 fps and recognizes license plates of vehicles moving with speed not more than 10 km/h.
2. Fast – the module processes the video stream with the speed not exceeding 25 fps and recognizes license plates of vehicles moving with speed not more than 150 km/h.

 **Attention!**

Licensing of the *AUTO-Uragan* module depends on the number of motion lanes in the video camera control area. Calculation of the numbers of motion lanes is performed by internal module logic and depends on automatically defined typical minimal and maximum sizes of license plates (see the [Setting up the Auto-Uragan module](#) section). For example, the Uragan Fast 2 allows using of two cameras, each of which controls one lane, or one camera controlling two lanes.

Maximal width of motion lane is 3.5 m. So if the width of video camera control area more than 3.5 meters, the license for 2 channels of the *AUTO-Uragan* module is required. If the width of control area more than 7 meters, the license for 3 channels is required.

Selected area of recognition is considered while licensing if it is specified in settings of the *AUTO-Uragan* program module. The whole frame is considered if area of recognition is not specified. Detailed information about specifying areas of recognition is presented in the [Set the borders of the license plate search area](#) section.

There is an electronic hardware security key for the *AUTO-Uragan* program module (*Guardant*), which depends on the SDK version used (see [Setting up the AUTO-Uragan module](#)). The key can be remotely updated when it is required (to expand the permanent key or convert demo key to the permanent key).

Important!

The *AUTO-Uragan* hardware security keys are not summed up.

Video camera mounting and setup requirements for the AUTO-Uragan software module

The following camera functions should be disabled:

1. Video information accumulation mode / night mode;
2. Permanent automatic image sharpness adjustment;
3. Motion detectors;
4. Any information from the camera (name, date, time, etc) inserted in the video image.

The declared recognition quality is guaranteed if the cameras are installed at angles of not more than 20 degrees to the perpendicular to the plate. In case of larger angles (up to 45 degrees) the numbers will be recognized, although the recognition accuracy will decrease.

The following table shows the main parameters required for camera installation.

Parameter	Maximum value	Recommended (optimal) value
Camera height	20 m	6 m
Vertical inclination	30°	18°
Horizontal inclination	20°	5-10°
Maximum inclination of the license plate	10°	10°

Control zone width of a CCTV camera:

- 3 m – frontal camera location;
- 3.2–3.7 m - side location with an angle of no more than 10-20°.

Zone width of a 1 Mpix digital camera:

- 6.5 m – frontal location.

Zone width of a 3 Mpix digital camera:

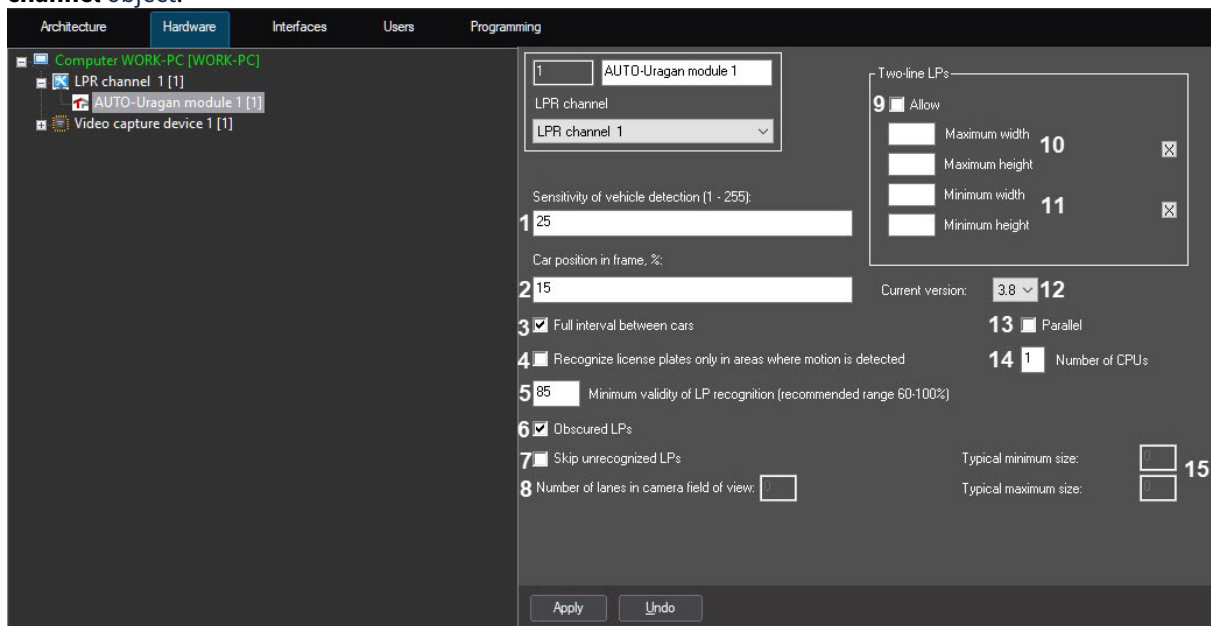
- 11 m – frontal location.

Basic characteristics of used video cameras are presented in the [General requirements for mounting and configuring of cameras](#) section.

Setting up the AUTO-Uragan module

Setting up the *AUTO-Uragan* program module is done in the following way:

1. Go to the *AUTO-Uragan* module object settings panel, which is created on the basis of the **LPR channel** object.



2. In the **Sensitivity of vehicle detection (1-255)** field (1), enter the sensitivity value which characterizes the motion detector sensitivity to the contrast of video image. When recognizing, the *AUTO-Uragan* module also determines the vehicle dimensions. The lower the value, the higher the detector sensitivity. The **Sensitivity of vehicle detection** parameter value is selected by testing the detector for false positives.
3. In the **Car position in frame, %** field (2), enter the value in percent, showing the position of a car in a displayed frame. This setting is relevant only for those cars which plates have not been recognized. If the plate has not been recognized, the module gives as a result the frame located at the specified distance from the frame with first car appearance.


Note

The moment when the car appears in the frame is considered as 0%. The moment when the car leaves the frame is considered as 100%.

4. Set the **Full interval between cars** checkbox (3) if you want the recognizer is to be in a waiting state with motion absence in the whole frame. This adjustment can improve the quality of recognizing long vehicles (e.g. trucks) in the frame.
5. Set the **Recognize license plates only in areas where motion is detected** checkbox (4) to increase the recognizing speed on mega-pixels video cameras.
6. Enter the value of minimal validity of recognition in percent in the **Minimum validity of LP recognition (recommended range 60-100%)** field (5). Validity is defined by the degree of similarity between results of recognition and the LP template and it allows distinguishing the LP from other marks on the vehicle.

Note

The validity is displayed in the List of parameters of the **Active monitor** dialog box.

7. Set the **Obscured LPs** checkbox (6) to increase the quality of recognizing the vehicles with obscured plates.
8. Set the **Skip unrecognized LPs** checkbox (7) if it is necessary to ignore unrecognized numbers.
9. The non-editable **Number of lanes in camera field of view** field (8) displays the number of lanes captured by the *AUTO-Uragan* module.
10. Set the **Allow** checkbox (9) to enable the possibility of recognizing the two-line LPs.
11. Set the maximum width and height of area where the search of LPs is performed (set in percent of the full frame) (10). Click the  button to set these parameters. In the **Two-line LPs** opened dialog box, click the **Stop video** button when the appropriate frame appears and select the area of the required size.



Click the **OK** button and the specified area parameters will be automatically entered in the **Maximum width** and **Maximum height** fields.

12. Set the minimum area width and height where the search of LP is performed in the **Minimum width** and **Minimum height** fields (11) (set in percent of the full frame) by analogy with the **Maximum width** and **Maximum height** parameters—see step 11.
13. In the **Current version** field (12), select the SDK version of the *AUTO-Uragan* module. SDK version **3.8** (default) is recommended.

Note

You can also change the SDK version using the batch files (see [Changing the SDK version using batch files](#)).

 **Attention!**

After changing the SDK version, it is necessary to restart *Auto PSIM* to apply the changes.

14. Set the **Parallel** checkbox (**13**) if it is necessary to recognize a LP number simultaneously on several processors using parallel computing, which improves the performance of the *AUTO-Uragan* module.
15. In the **Number of CPUs** field (**14**), specify the number of processors which will be used for the parallel computing, if the **Parallel** checkbox is set.

 **Note**

Processors are physical and logical cores available on the Server. For example, if there are 8 cores available on the Server, and the **Number of CPUs** field value is set to 4, then only the cores from 1 to 4 will be involved in the LP numbers recognition.

16. The typical minimum size and the typical maximum size of plates recognized by *Auto-Uragan* program module will be correspondingly displayed in the **Typical minimum size** and **Typical maximum size** non-edited fields (**15**).

 **Note**

- If no LPs were recognized, the **Typical minimum size** and **Typical maximum size** fields won't be displayed.
- The **Typical minimum size** and **Typical maximum size** fields are displayed only if the Debug 1-Debug 4 mode is enabled. The debug mode is described in [Axxon PSIM software package. Administrator's Guide](#).

17. Click the **Apply** button to save the changes.

 **Note**

The **Current version**, **Parallel**, and **Number of CPUs** parameters will be applied to all activated *AUTO-Uragan* software modules in *Auto PSIM*.

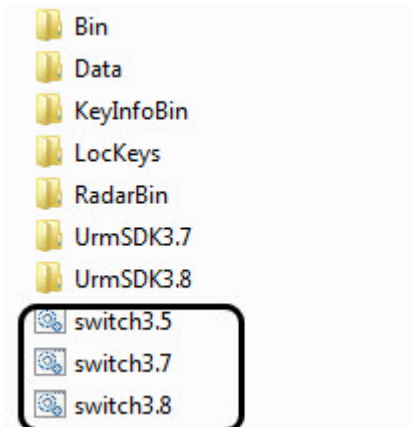
Setting up the *AUTO-Uragan* program module is completed.

Changing the SDK version using batch files

To enable the possibility of changing the versions of SDK, at the first start of *Axxon PSIM*, open the command line as an administrator, using it, go to the Modules64/UrmLpr/Auto_uragan/required SDK version/Bin folder and run the Regsvr32 UrmCom.dll command. After that, you can change the version of SDK both using the batch files and via the *Axxon PSIM* settings.

To change the SDK version of the *AUTO-Uragan* software module using the batch files, do the following:

1. Go to the <Auto PSIM installation directory>\Modules\UrmLpr\Auto_uragan folder.



2. Execute the **switch3.5.cmd** batch file to change the SDK version to **3.5** or the **switch3.7.cmd** file to change the SDK version to **3.7** or the **switch3.8.cmd** file to change the SDK version to **3.8**. As a result, a Windows command prompt window will open, where the information about the SDK version change status will be displayed.

```

C:\Windows\system32\cmd.exe
Register Urm.dll
Save to registry AutoUragan.SDKVersion = 3.5
The operation completed successfully.
The operation completed successfully.
Press any key to continue . . . _

```

Note

Press any key on the keyboard to close the Windows command window.

3. Restart *Auto PSIM* to apply the changes.

Note

The SDK version will be changed for all *AUTO-Uragan* software modules in *Auto PSIM*.

Changing the SDK version of the *AUTO-Uragan* software module using the batch files is complete.

5.2.7 AR-Auto

The AR-Auto module functionality

The *AR-Auto* software module supports the following functionality:

1. License plates identification.
2. Saving the identified number to the plates detector database.
3. Identification and logging the determined speed of the vehicle to the plates database (by video or using the *RR* module).

 **Note**

The *AR-Auto* software module also supports the parking mode, which is enabled using the **ParkingMode** registry key (for details, see [Registry keys reference guide](#), for more information about working with the registry, see [Working with Windows OS registry](#)).

By default, the recognition of all Latin license plate characters is used (for example, corresponding to countries such as Argentina, India, Africa and Singapore), although the country recognition function is not used.

To add additional recognition engines, you need to install the appropriate engines (for more information see [Setting up the AR-Auto module](#)).

The full list of supported countries for *AR-Auto* module and the personal settings for license plates recognition are available on request to technical support of the module manufacturer [Adaptive recognition Hungary \(ARH\)](#).

The missing countries can be added into the recognition module if necessary. For that, contact your AxxonSoft manager and provide him or her a video recording with license plates of the required country. The final decision on adding a country to the module is made by the module manufacturer.

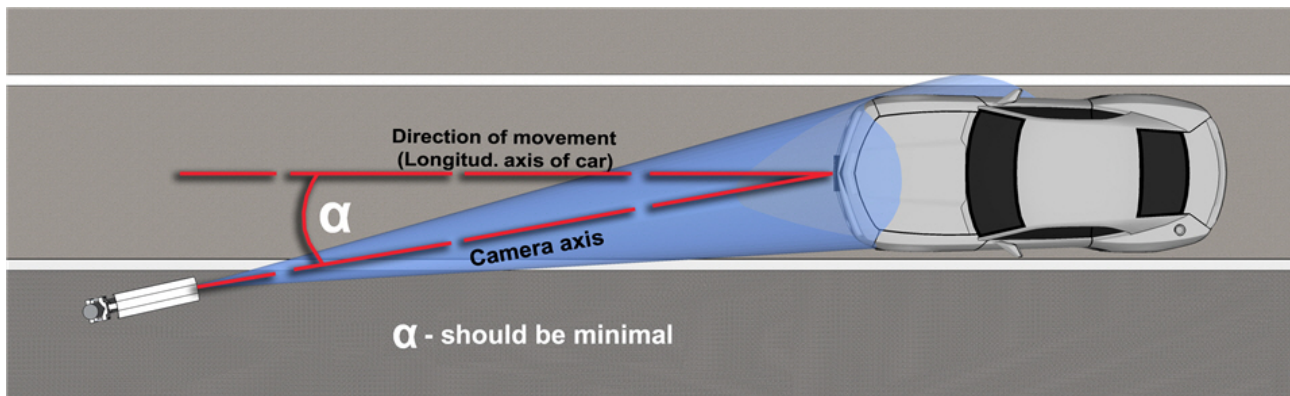
AR-Auto module licensing

The *AR-Auto* software module uses the Carmen FreeFlow license type and is licensed by the used processor cores. There is additional electronic key in the form of USB key in case of license for one and two cores and in the form of PCI card in case of one, two and four cores. Number of recognition channels is limited by processor capacity. There are no restrictions on the number of recognitions per unit.

For the Carmen FreeFlow license type, it is possible to use multiple hardware keys of any type on the same PC. Even if two hardware keys of different types are used (the first is USB and the second is PCI).

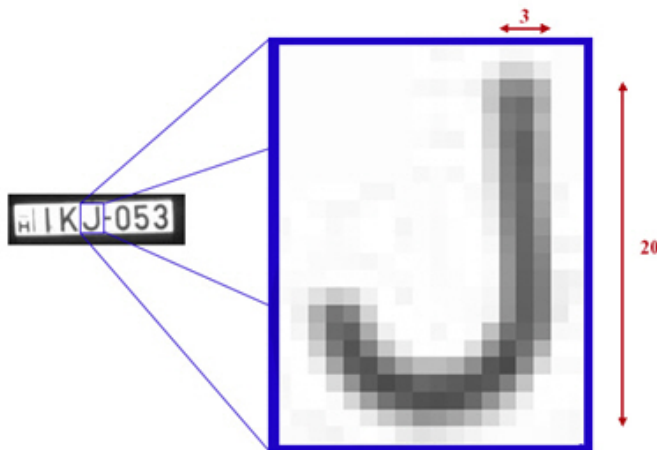
Video camera mounting and setup requirements for the AR-Auto software module

To ensure the proper recognition of license plate numbers using the *AR-Auto* software module, the angle between the camera axis and the direction of the vehicle movement is to be minimal.



The camera is to be installed on the optimal distance from the plate. If the camera is too far from the plate, the characters may not be large enough for recognizing them. In this case zoom-in until you reach the proper size. If the distance is too short it may happen that a part of the plate is over the camera's field of view.

For recognition it is necessary to make sure that frames with number plates fulfill the following characteristics:



- height of latin symbols is not less than 16 px, line-width is not less than 2px;
- height of non-latin symbols is not less than 20 px, line-width is not less than 2px;
- optimal character height is around 16-30 px;
- character size is not greater than 50 px in height;
- symbols should be sharp, not smeared, undistorted, not overexposed, evenly lighted;
- symbols should be visually differentiated;

- license plate number should be fully placed in the frame.

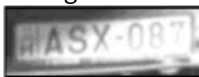


The following conditions may cause invalid results of LP recognition:

- low contrast;



- bad light conditions (shadow and strong light);



- high distortion;



- low spatial resolution;



- blurred image;



- interlaced.



Setting up the AR-Auto module

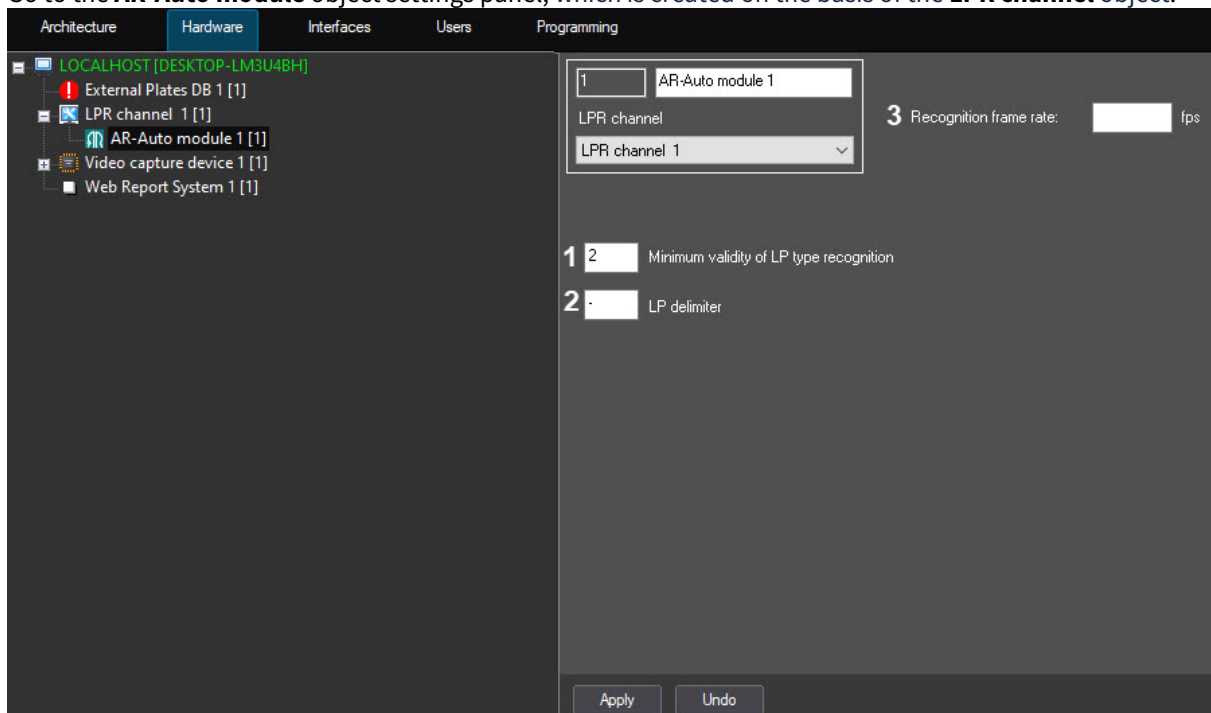
Attention!

To ensure the correct *AR-Auto* module operation, do the following:

1. Make sure that "KB3033929" security update and [Hotfix](#) are installed.
2. If *Carmen GX* drivers are installed, then they must be uninstalled from Windows.
3. Make sure that there is not a single folder with any drivers left at C:\Windows\System32\DRVSTORE\ (if there are folders, they must be removed).
4. Restart the computer.
5. Download the *Carmen Freeflow 7.3.1* distribution kit from the [manufacturer's website](#) and install it. If an older version was installed earlier, then it must be uninstalled before installing a newer version.
6. Download the distribution kit with the license plate recognition algorithm from the [manufacturer's website](#) and install it via the *Engine Manager* utility. The procedure for installing the recognizer using the *Engine Manager* utility is described in the *engine_install_windows.txt* file located in the folder with the corresponding recognizer.

Setting up the *AR-Auto* program module is performed in the following way:

1. Go to the **AR-Auto module** object settings panel, which is created on the basis of the **LPR channel** object.



2. Enter the value of minimum validity of recognition in percent in the **Minimum validity of LP type recognition** field (1). Validity is determined by the degree of similarity between results of recognition and the LP template and it allows distinguishing the LP from other unrelated inscription on the vehicle.

Note

The validity is displayed in the List of parameters of the **Active monitor** dialog box.

3. In the **LP delimiter** field (2), enter symbols which will separate LP symbols from region symbols. Maximum number of delimiter symbols—2. If a recognized license plate must be written without any delimiters, leave the **LP delimiter** field blank.
4. In the **Recognition frame rate, fps** field (3), enter the number of frames per second processed by the recognizer. If you enter **0** or leave the field blank, the recognizer will process the maximum possible number of frames.
5. Click the **Apply** button to save the changes.

Setting up the *AR-Auto* program module is completed.

For the best quality of recognition, consider the following characteristic when configuring the *AR-Auto* module:

1. The lower the resolution, the higher the quality of recognition. It is recommended to use the following resolution: 320x240–800x600px. It is highly recommended not to use resolution more than 1.2 Mpx.
2. It is recommended to specify the search area. It results in decreasing of factual resolution, which is fed to the input of the recognizer. The smaller the area, the lower the resolution, and consequently, the higher the quality of recognition.
3. It is recommended to use recognition by trigger command (motion detection, the Parking mode) instead of permanent recognition. If many recognizers must be configured on one server, use the Parking mode. For the detailed information about Parking mode, see [Scripts used in the Auto PSIM software package](#).
4. The fewer recognizers are created on one computer, the higher the quality of recognition, because the speed of video processing is shared between all created recognizers. Low speed of processing results in plate recognition delay and bad quality of recognition.

Here's the approximate speed of video processing:

For the Common characters template:

Resolution	FPS
320x240	19
480x360	18
640x480	13
1024x768	8
1280x960	8

For other templates:

Resolution	FPS
320x240	12
480x360	9
640x480	7
1024x768	5

Resolution	FPS
1280x960	4

**Note**

The data can move down in frequency of processed frames at different lighting conditions, on different processors, etc.

5.2.8 AR-Video

The AR-Video module functionality

The *AR-Video* software module supports the following functionality:

1. License plates identification.
2. Saving the identified number to the plates detector database.
3. Identification and logging the determined speed of the vehicle to the plates database (by video or using the *RR* module).
4. Receive a video stream, pre-select images with license plates based on video analytics, and provide these images to the Carmen FreeFlow engine for processing.

By default, the recognition of all Latin license plate characters is used (for example, corresponding to countries such as Argentina, India, Africa and Singapore), although the country recognition function is not used.

To add additional recognition engines, you need to install the appropriate engines (for more information see [Setting up the AR-Auto module](#)).

Full list of supported countries for *AR-Video* module:

- Arab countries
- Australia
- Bangladesh
- Caribbean countries
- Central America
- Central Asia
- East Asia
- Europe
- India
- Indonesia-Timor-Papua
- Inner Asia
- Iran
- Iraq
- Israel
- Japan
- Latin America
- Nepal
- New Zealand
- North Africa
- North America
- Pacific region
- Pakistan

- Philippines
- South Africa
- South America
- South Asia
- Taiwan
- Turkey
- Vietnam

The personal settings for license plates recognition are available on request to technical support of the module manufacturer [Adaptive recognition Hungary \(ARH\)](#).

The missing countries can be added into the recognition module if necessary. For that, contact your AxxonSoft manager and provide him or her a video recording with license plates of the required country. The final decision on adding a country to the module is made by the module manufacturer.

AR-Video module licensing

The *AR-Video* software module is an additional feature available free of charge for any Carmen FreeFlow license, which is licensed based on the number of CPU cores used.

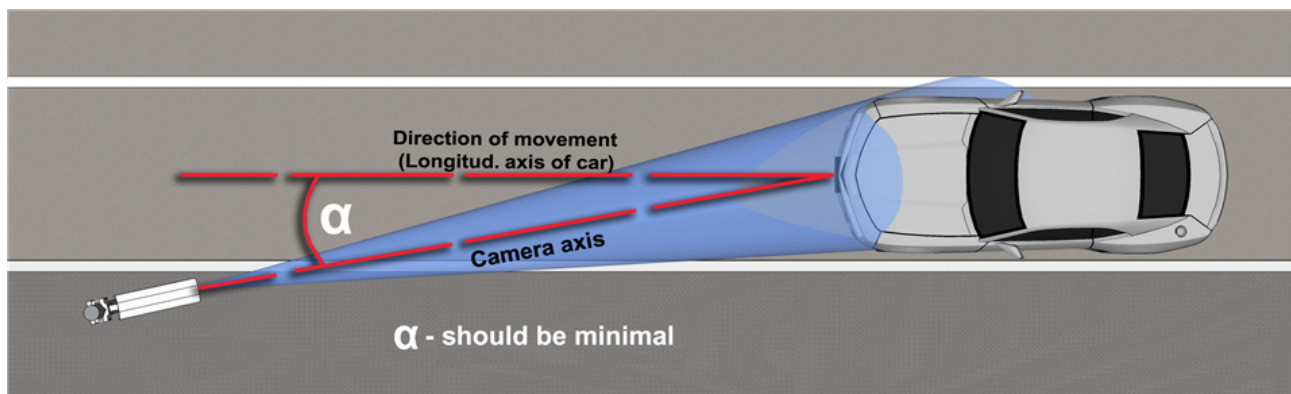
- For single-core and dual-core licenses, an additional electronic key is provided in the form of a USB key.
- For single-core, dual-core, and quad-core licenses, the key is provided in the form of a PCI card.

The number of recognition channels is limited only by the capabilities of the processor in use. There are no restrictions on the number of recognitions per time unit.

A Carmen FreeFlow license allows the use of multiple hardware keys of any type on the same machine, including a combination of different types (e.g., one USB key and one PCI card).

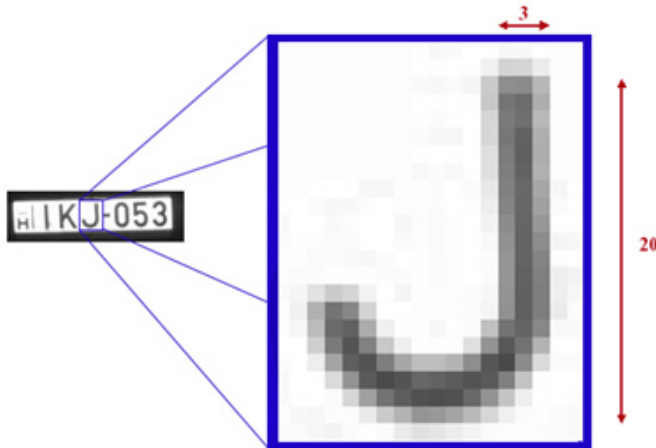
Video camera mounting and setup requirements for the AR-Video software module

To ensure the proper recognition of license plate numbers using the *AR-Video* software module, the angle between the camera axis and the direction of the vehicle movement is to be minimal.



The camera is to be installed on the optimal distance from the plate. If the camera is too far from the plate, the characters may not be large enough for recognizing them. In this case zoom-in until you reach the proper size. If the distance is too short it may happen that a part of the plate is over the camera's field of view.

For recognition it is necessary to make sure that frames with number plates fulfill the following characteristics:



- height of Latin symbols is not less than 16 px, line-width is not less than 2px;
- height of non-Latin symbols is not less than 20 px, line-width is not less than 2px;
- optimal character height is around 16-30 px;
- character size is not greater than 50 px in height;
- symbols should be sharp, not smeared, undistorted, not overexposed, evenly lighted;
- symbols should be visually differentiated;
- license plate number should be fully placed in the frame.



The following conditions may cause invalid results of LP recognition:

- low contrast;



- bad light conditions (shadow and strong light);



- high distortion;



- low spatial resolution;



- blurred image;



- interlaced.



Setting up the AR-Video module

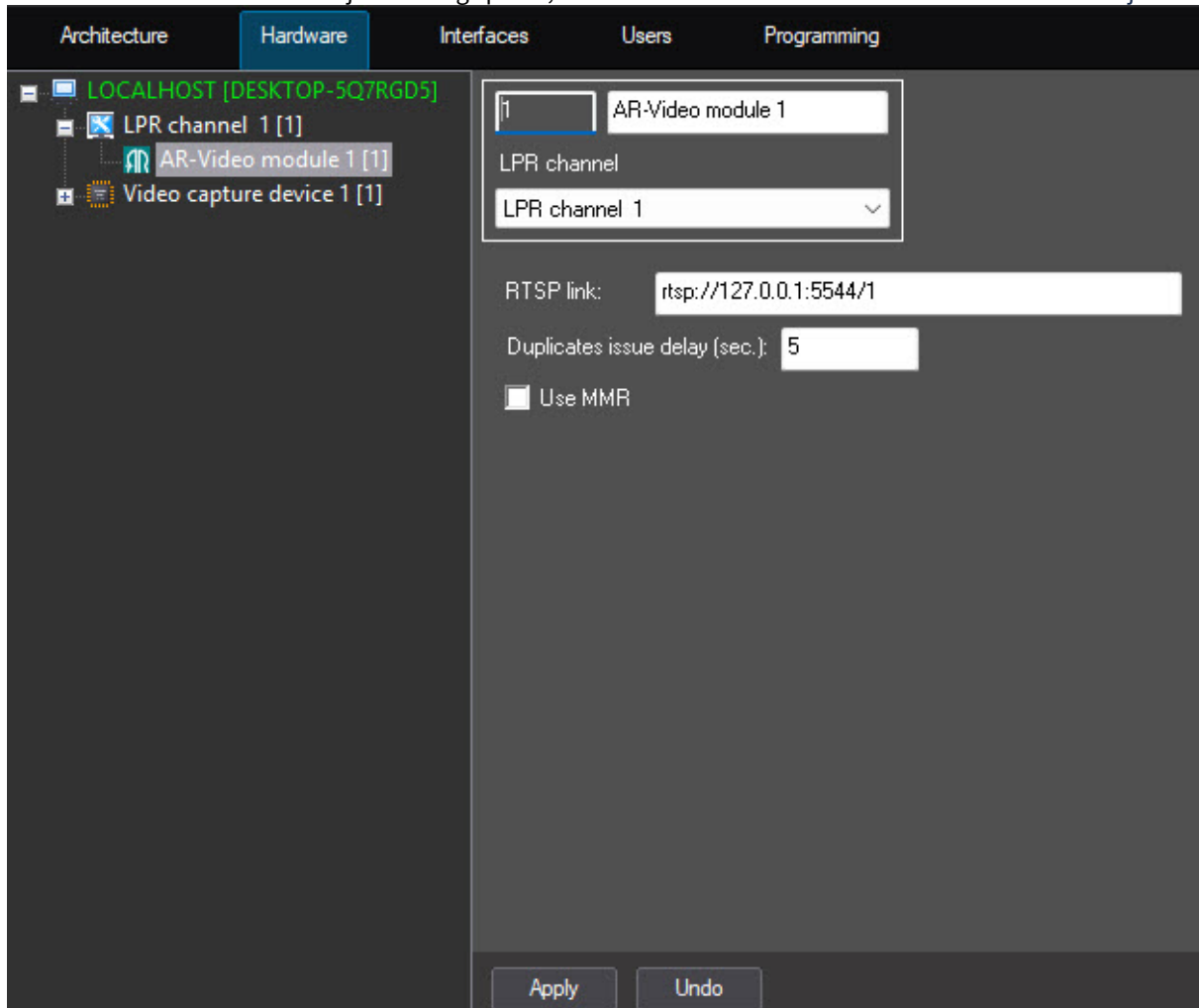
⚠ Attention!

To ensure the correct *AR-Video* module operation, do the following:

1. Make sure that "KB3033929" security update and [Hotfix](#) are installed.
2. If *Carmen GX* drivers are installed, then they must be uninstalled from Windows.
3. Make sure that there is not a single folder with any drivers left at C:\Windows\System32\DRVSTORE\ (if there are folders, they must be removed).
4. Restart the computer.
5. Download the *Carmen Freeflow 7.3.1* distribution kit from the [manufacturer's website](#) and install it. If an older version was installed earlier, then it must be uninstalled before installing a newer version.
6. Download the distribution kit with the license plate recognition algorithm from the [manufacturer's website](#) and install it via the *Engine Manager* utility. The procedure for installing the recognizer using the *Engine Manager* utility is described in the `engine_install_windows.txt` file located in the folder with the corresponding recognizer.

Setting up the *AR-Video* program module is performed in the following way:

1. Go to the **AR-Video module** object settings panel, which is created on the basis of the **LPR channel** object.



2. In the **RTSP link** field, specify the RTSP stream address in the format `rtsp://ip:port/camera_number`.

Note

An RTSP Server must be created and configured in advance (see [Configuration of the RTSP Server module](#)).

3. In the **Duplicates issue delay (sec.)** field, specify the delay time in seconds, after which an already recognized license plate number will be displayed. The default value is **5**.
4. Set the **Use MMR** checkbox to use the MMR engine to recognize car vendors and models.

Note

If you use the MMR engine, make sure that the Carmen MMR engine is installed, otherwise license plates will not be recognized. You can download it from the [manufacturer's official website](#).

5. Click **Apply** to save the changes.

Setting up the *AR-Video* program module is completed.

5.2.9 CIDR IV

The functionality of the CIDR IV module

The *CIDR IV* module supports the following functionality:

1. Recognition of railway container license plates;
2. Recording the recognized license plate into the database;
3. Checking the recognized railway container license plates against the connected search databases;
4. Recording the frames of recognized license plates for debugging in BMP, JPEG and AVI formats.

Licensing of the CIDR IV module

The *CIDR IV* module is licensed in *Auto PSIM* using a USB dongle.

Video camera mounting and setup requirements for the CIDR IV module

To ensure the correct recognition of the railway container license plates, follow the requirements listed below.

Requirements for video camera characteristics:

1. High definition cameras (720p recommended);
2. Recommended frame rate per second is 24;
3. The container motion speed must meet the camera operation speed. For a better recognition, it is necessary and it is enough to have 1-2 frames of a container number.
4. it should be possible to set a fixed exposure value (shutter) on video camera of 1/2000 s or less;
5. the video cameras should have high sensitivity (0,01 lx or more).

Requirements for video camera position:

1. The distance between the video camera and the carriage should be at least 1,5 meters (depends on the focal length of the camera lens), the optimal distance is 5-7 meters;

Note

To simplify the setting, it is recommended to use the varifocal lenses. The focal length variation range should be selected in each case of the system installation.
If you use the camera with an integrated lens with a focal length of 2.8 mm or less, then there may be strong geometric distortions on the image. As a result, the recognition quality may go down. To avoid this, it is necessary to use special removable lenses with an aspherical lens, which eliminate these distortions.

2. the cameras height for reading the side number is 3–3,5 meters, the cameras height for reading the chassis number is 1,5 meters;
3. the width of the carriage plate number in the image should be about 30-35% of the total image width, in most cases this means the width of the camera control zone is 3-5 meters;
4. the optical axis of video camera should be perpendicularly to plane of carriage plate;
5. the position of the carriage in the frame should be strictly horizontal;
6. the infrared sensor and the video camera should be located in the same vertical plane.

Note

If the analog video camera is used, then to prevent the video signal fading on the transmission line, it is necessary that the distance from the video camera to the digitizing device does not exceed 30 meters.

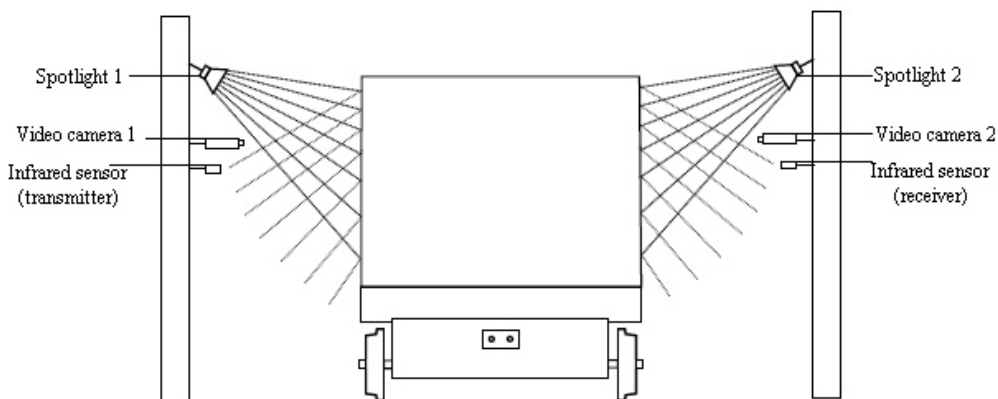
Image requirements:

1. the position of the container or wagon in the frame should be strictly horizontal;
2. the size of the number symbols on the image should be between 20 and 40 pixels, i.e. not less than 4% of the image height;
3. geometric distortions ("barrels", "pillows") introduced by the optics should be moderate.

Also it's required while video camera setup:

1. Focus camera exactly to the container or wagon plate;
2. It is recommended to turn off all the camera's smart features. For example, contrast adding mode.

Below is a diagram of the camera installation to ensure the most accurate recognition of license plates of freight containers.



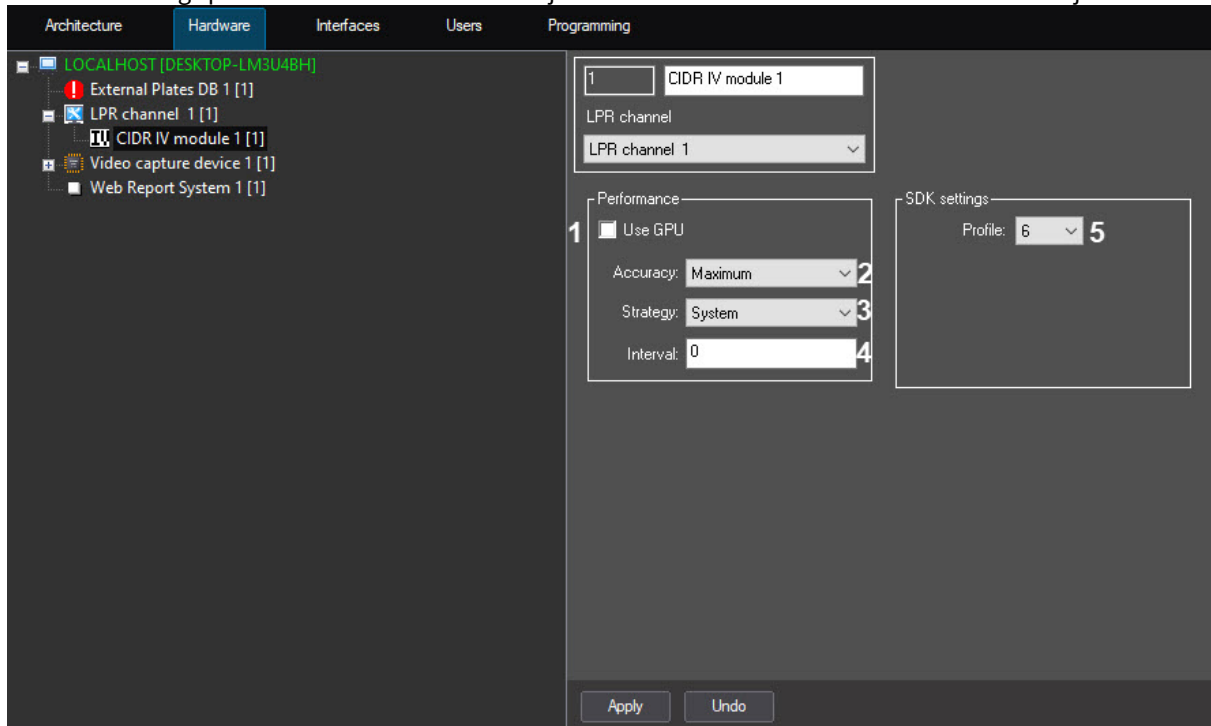
Reference image received from correctly mounted and setup video camera is shown in the following figure.



Configuring the CIDR IV module

Configure the *CIDR IV* module as follows:

1. Go to the settings panel of the *CIDR IV* module object created on the basis of the **LPR channel** object.



2. Set the **Use GPU** checkbox (**1**) if it is necessary to use the NVIDIA GPU resources to increase the license plate recognition performance. By default, only the CPU resources are used.

Attention!

The startup (initialization) of the license plate recognition algorithm on NVIDIA GPU can take about one minute. No LP recognition events will be received until the initialization is complete.

3. Select the numbers recognition accuracy in the **Accuracy** drop-down list (**2**). The following options are available:
 - a. Maximum—enables maximum recognition accuracy, but it causes great CPU and/or GPU load.
 - b. High—enables high recognition accuracy, it requires less computing resources than maximum accuracy.
 - c. Fast—enables high recognition speed, while reducing the recognition accuracy.
4. Select the computing resources use mode in the **Strategy** drop-down list (**3**). The following options are available:
 - a. Process—mild mode: no more than one core for one license plate.
 - b. System—default mode: all available computing cores are used;
 - c. Core—strict mode: one core per one stream.
5. In the **Interval** field (**4**), specify the minimum time interval in milliseconds that lasts between frames processing (i.e. all frames within this interval will not be processed). The range of values is 0-999, the default value is 0.
6. The **Profile** drop-down list (**5**) displays the license plate recognition quality profile. At the moment, only profile **6** is used, which provides high performance (high processing speed and low CPU usage).
7. Click the **Apply** button.

Configuration of the *CIDR IV* module is completed.

5.2.10 IV

The IV module functionality

The IV software module supports the following functionality:

1. Recognition of vehicle license plates.
2. Saving the recognized license plates to the license plates database of the detection tool.
3. Checking the recognized license plates of vehicles in the connected search databases.
4. Recognition of an extended list of vehicle license plate types, including the main types of single-line plates of different countries, both civil and specialized (diplomatic, transit, military, and so on):

Country	Comment	Profile (see Setting up the IV module)
Africa	The Republic of South Africa	6 (recommended), 9
Australia	-	6 (recommended), 9
Austria	-	6 (recommended), 9
Bangladesh	-	6 (recommended), 9
Belarus	-	6 (recommended), 9
Brazil	-	6 (recommended), 9
Canada	-	6 (recommended), 9
China	-	6 (recommended), 9
Costa Rica	Costa Rica	6 (recommended), 9
Czech Republic	-	6 (recommended), 9
Dubai	Dubai (emirate of UAE)	6 (recommended), 9
Egypt	-	6 (recommended), 9
Europe	The template that includes the countries: Germany, Austria	6
Finland	-	6 (recommended), 9

Country	Comment	Profile (see Setting up the IV module)
France	-	6 (recommended), 9
Germany	-	6 (recommended), 9
Great Britain	-	6 (recommended), 9
India	-	6 (recommended), 9
Indonesia	-	6 (recommended), 9
Iraq	-	6 (recommended), 9
Israel	-	6 (recommended), 9
Italy	-	6 (recommended), 9
Japan	-	6 (recommended), 9
KZ, UA, BY, RU	The template that includes the countries: Kazakhstan, Ukraine, Belarus, Russia	6 (recommended), 9
Kazakhstan	-	6 (recommended), 9
Malaysia-Singapore	-	6 (recommended), 9
Mexico	-	6 (recommended), 9
Middle East	-	6 (recommended), 9
Monaco	-	6 (recommended), 9
Mongolia	-	6 (recommended), 9
Netherlands	-	6 (recommended), 9

Country	Comment	Profile (see Setting up the IV module)
North America	-	6 (recommended), 9
Pakistan	-	6 (recommended), 9
Poland	-	6 (recommended), 9
Qatar	-	6 (recommended), 9
Russia	-	6 (recommended), 9
Saudi Arabia	The Kingdom of Saudi Arabia	6 (recommended), 9
Slovenia	-	6 (recommended), 9
South Korea	-	6 (recommended), 9
Spain	-	6 (recommended), 9
Sri Lanka	-	6
Sweden	-	6 (recommended), 9
Switzerland	-	6 (recommended), 9
Taiwan	-	6 (recommended)
Thailand	-	6 (recommended), 9
Turkey	-	6 (recommended), 9
UAE	United Arab Emirates	6 (recommended), 9
USA	The United States of America	6 (recommended), 9
Ukraine	-	6 (recommended), 9

Country	Comment	Profile (see Setting up the IV module)
Uzbekistan	-	6 (recommended), 9
Vietnam	-	6 (recommended), 9

5. Recording the frames with recognized license plates in BMP, JPEG and AVI formats for debugging.

IV module licensing

The *IV* module licensing in the *Auto PSIM* software is performed by processed video channels.

Contact *AxxonSoft* managers to get the *IV* license.

The received IntelliVisionLPRLicense.txt license file is a software key, and it is assigned to the computer hardware. Add it to the folder at: <*Axxon PSIM* installation folder>\Modules64.

Video camera mounting and setup requirements for the IV software module

To ensure the vehicle license plates recognition with the *IV* software module, install and configure cameras so that the following requirements are met:

Camera specifications	<ul style="list-style-type: none"> the minimum video resolution of 640x480, the recommended resolution of 720p or 1080p; the minimum frame rate of 15 fps, the recommended frame rate of 25-30 fps; autofocus and zoom features are advisable to enable small changes after recognizer's configuration; automatic white-balance / automatic gain control; high-contrast IR for night mode; HDR / WDR.
Video image	<ul style="list-style-type: none"> the video image must be clear and contrast, without aberration; the size of the license plate must be 10-70% of the total frame size; there should be single or two-row of symbols on a license plate.
Camera positioning	<ul style="list-style-type: none"> the camera is to be 0,6-2,4 meters above the ground; the angle between the license plate bottom border and the horizon line should be of 0 to 20 degrees.
Vehicle speed	<ul style="list-style-type: none"> slow to moderate (8-40 kmph).

 **Note**

Current license plate recognition algorithm works only with alphanumeric symbols (A-Z, 0-9). In some countries specific letters on a license plate can be displayed as * after recognition.

Note

For the examples of correct and incorrect video images, see [Appendix 8. Examples of correct and incorrect video images for the IV software module.](#)

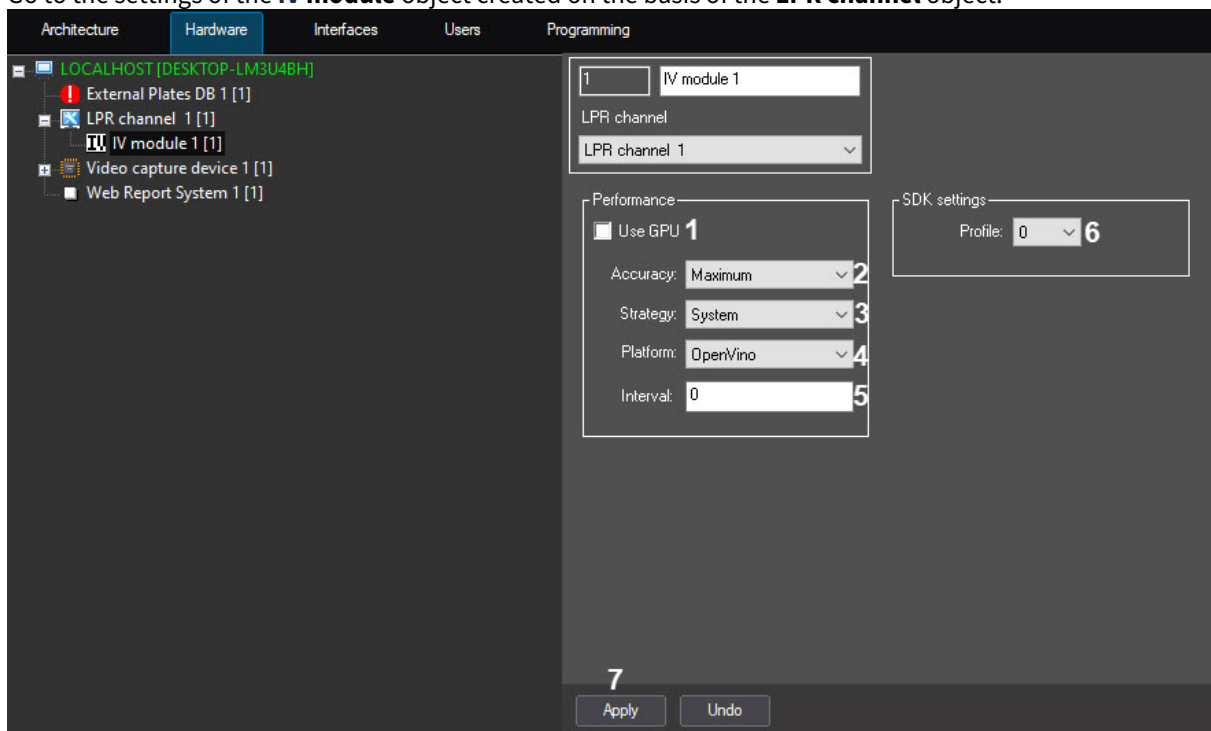
Important!

It is also recommended to study the [manufacturer's specification](#).

Setting up the IV module

Configure IV module as follows:

1. Go to the settings of the **IV module** object created on the basis of the **LPR channel** object.



2. Set the **Use GPU** checkbox (1) if it is necessary to use the NVIDIA GPU resources to increase the license plate recognition performance. By default, only the CPU resources are used.

Attention!

The startup (initialization) of the license plate recognition algorithm on NVIDIA GPU can take about one minute. No LP recognition events will be received until the initialization is complete.

3. Select the LPR accuracy in the **Accuracy** drop-down list (2). The following options are available:
 - a. Maximum—enables maximum recognition accuracy, but it causes great CPU and/or GPU load.
 - b. High—enables high recognition accuracy, it requires less computing resources than for maximum accuracy.
 - c. Fast—enables high recognition speed, but the accuracy becomes worse.

4. Select the computing resources use mode in the **Strategy** drop-down list (3). The following options are available:
 - a. Process—mild mode: no more than 1 core for 1 license plate.
 - b. System—default mode: all available computing cores are in use;
 - c. Core—strict mode: 1 core per stream.
5. From the **Platform** drop-down list (4), select the device on which the module will operate:
 - a. Default—CPU resources are used for computing.
 - b. TensorRT—NVIDIA GPU resources are used for computing.
 - c. CV22, NCNN, HISI, Qualcomm, TFLite, OpenVino—other device resources are used for computing, if available. These options apply to platforms other than x86/x64.
6. In the **Interval** field (5), specify the minimum time interval in milliseconds that lasts between frames processing (i.e. all frames within this interval will not be processed). The range of values is 0-999, the default value is 0.
7. Select the profile of country license plates that are to be recognized in the **Profile** drop-down list (6).

 **Attention!**

The profile of country license plates should match the selected country for plate recognition (see [Select the country and license plate recognition SDK](#)).

The following options are available:

- 0—Common. This profile should be selected if **By default** country is selected.
- 3, 6 and 9—for more information see [The IV module functionality](#).

 **Note**

- The **9** profile enables recognizing correctly USA license plates with vertical letters on the plates. It can also be recommended to be in use when maximum recognition accuracy is needed if there is no high load on hardware.
- Greater profile number enables more accurate LPR comparing to the solution with smaller number, but it is more demanding to computing resources.

8. Click the **Apply** button (7).

Configuration of the *IV* module is completed.

5.2.11 RIDR IV

The functionality of the RIDR IV module

The *RIDR IV* module supports the following functionality:

1. Recognition of railway car license plates;
2. Recording the recognized license plate into the database;
3. Checking the recognized railway car license plates against the connected search databases;
4. Recording the frames of recognized license plates for debugging in BMP, JPEG and AVI formats.

Licensing of the RIDR IV module

The *RIDR IV* module is licensed in *Auto PSIM* using a USB dongle.

Video camera mounting and setup requirements for the RIDR IV module

To ensure the correct recognition of the railway carriage license plates, follow the requirements listed below.

Requirements for video camera characteristics:

1. It is recommended to use the resolution of no more than 800x600, because using a resolution of more than 800x600 does not lead to the recognition quality improvement.
2. High resolution black and white cameras are recommended because they provide better quality of image at low light conditions.
3. Recommended frame rate per second is 24.
4. The carriage motion speed must meet the camera operation speed. For a better recognition, it is necessary and it is enough to have 1-2 frames of a carriage number.
5. It should be possible to set a fixed exposure value (shutter) on video camera of 1/2000 s or less.
6. The video cameras should have high sensitivity (0,01 lx or more).

Requirements for video camera position:

1. The distance between the video camera and the carriage should be at least 1,5 meters (depends on the focal length of the camera lens), the optimal distance is 5-7 meters.

 **Note**

To simplify the setting, it is recommended to use the varifocal lenses. The focal length variation range should be selected in each case of the system installation.
If you use the camera with an integrated lens with a focal length of 2.8 mm or less, then there may be strong geometric distortions on the image. As a result, the recognition quality may go down. To avoid this, it is necessary to use special removable lenses with an aspherical lens, which eliminate these distortions.

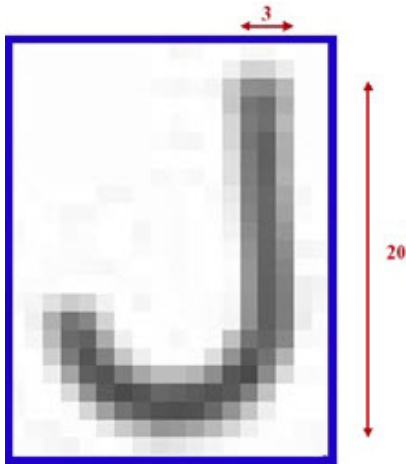
2. The cameras height for reading the side number is 3–3,5 meters, the cameras height for reading the chassis number is 1,5 meters.
3. The width of the carriage plate number in the image should be about 30-35% of the total image width, in most cases this means the width of the camera control zone is 3-5 meters.
4. The optical axis of video camera should be perpendicularly to plane of carriage plate.
5. The position of the carriage in the frame should be strictly horizontal.
6. The infrared sensor and the video camera should be located in the same vertical plane.

 **Note**

If the analog video camera is used, then to prevent the video signal fading on the transmission line, it is necessary that the distance from the video camera to the digitizing device does not exceed 30 meters.

Image requirements:

1. The minimum character height in the frame should be 16 pixels, 20–50 pixels are recommended; the line width of the character should be at least 2-3 pixels.



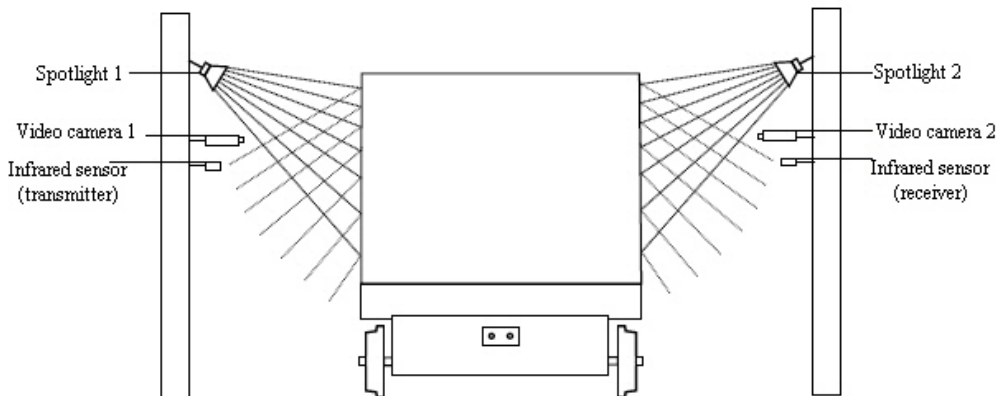
2. The geometric distortion by optics ("barrels" and "pillows") should be reduced.
3. The image of the carriage plate numbers should be clear, contrast and readable.

Also it's required while video camera setup:

1. Focus camera exactly to the carriage plate.
2. Disable AGC mode in video camera.
3. Disable modes of adding contrast of video camera.

To provide working of system at night use searchlight flashing of carriages/cisterns. Use usual halogen spotlight with a capacity of 1–1,5 kW while mounting spotlight in distance 5-7 meters from railway. Locate spotlight as shown in the figure below. Such location allows to avoid the following:

1. Blindness of camera by spotlight directed to it from another site of railway.
2. Image flashing by light reflection from carriage.



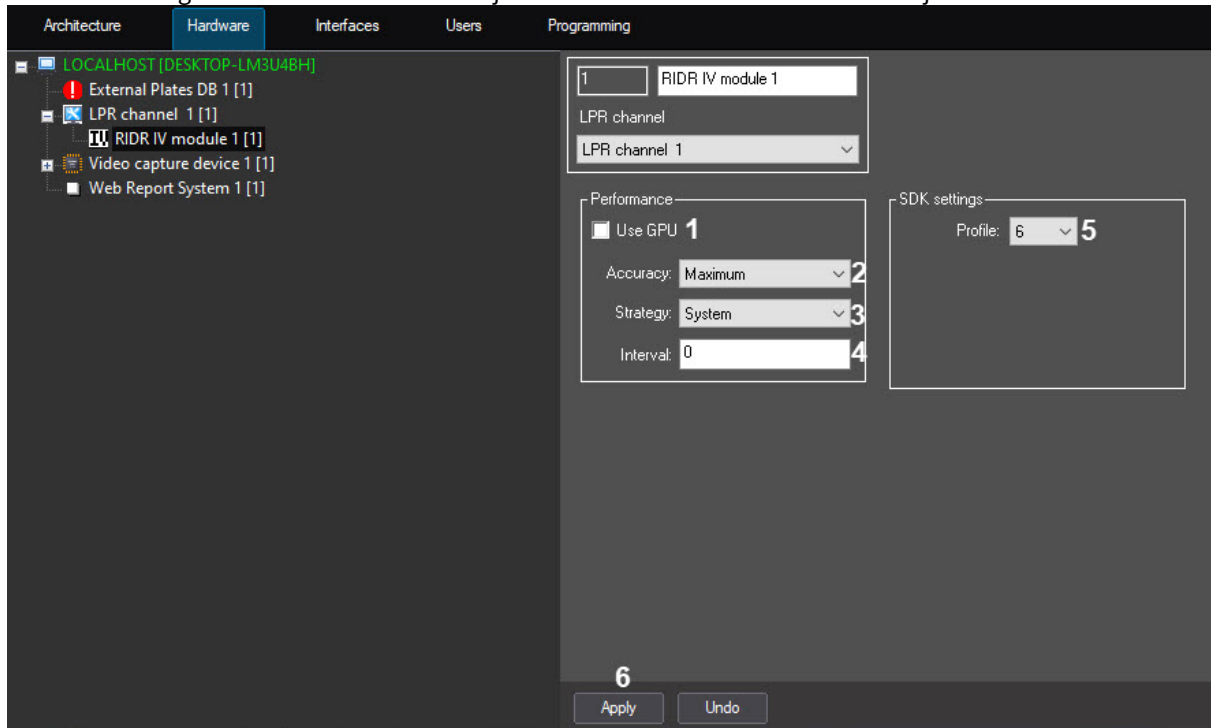
Reference image received from correctly mounted and setup video camera is shown in the following figure.



Configuring the RIDR IV module

Configure the *RIDR IV* module as follows:

1. Go to the settings of the **RIDR IV module** object created under the **LPR channel** object.



2. Set the **Use GPU** checkbox (1) if it is necessary to use the NVIDIA GPU resources to increase the license plate recognition performance. By default, only the CPU resources are used.

Attention!

The startup (initialization) of the license plate recognition algorithm on NVIDIA GPU can take about one minute. No LP recognition events will be received until the initialization is complete.

3. Select the numbers recognition accuracy in the **Accuracy** drop-down list (2). The following options are available:
 - a. Maximum — enables maximum recognition accuracy, but it causes great CPU and/or GPU load.
 - b. High — enables high recognition accuracy, it requires less computing resources than for maximum accuracy.
 - c. Fast — enables high recognition speed, but the accuracy becomes worse.
4. Select the computing resources use mode in the **Strategy** drop-down list (3). The following options are available:
 - a. Process — mild mode: no more than 1 core for 1 license plate.
 - b. System — default mode: all available computing cores are in use;
 - c. Core — strict mode: 1 core per stream.
5. In the **Interval** field (4), specify the minimum time interval in milliseconds that lasts between frames processing (i.e. all frames within this interval will not be processed). The range of values is 0-999, the default value is 0.
6. From the **Profile** drop-down list (5) select a license plate recognition quality profile:
 - 6 — provides higher performance (higher processing speed and less CPU usage) relative to profile 9, but has a lower recognition accuracy.
 - 9 — provides higher recognition accuracy (works well on noisy and complex scenes) relative to profile 6, but has lower performance (lower processing speed and more CPU consumption).
7. Click **Apply** (6).

Configuration of the *RIDR IV* module is completed.

5.2.12 RR

The RR module functionality

The *RR* software module supports the following functionality:

1. License plates recognition.
2. Saving the recognized number to the plates detector database.
3. Identification and logging the determined speed of the vehicle to the license plates database (by video or using the *Speed traps server* module).
4. Check of recognized license plates via connected search database.
5. Possibility to work with multi-lane driveway (recognition of up to 10 vehicle license plates in one frame).
6. Saving the frames of the recognized license plates for debugging in BMP, JPEG and AVI formats.
7. Recognition of an extended list of vehicle license plate types:
 - Argentina,
 - Armenia,
 - Austria,
 - Azerbaijan,
 - Belarus,
 - Belgium,
 - Beliz,
 - Brazil,
 - Brunei,
 - Bulgaria,
 - China,
 - Chile,
 - Colombia,
 - Cote d'Ivoire,
 - Croatia,
 - Cyprus,
 - Czechia,
 - Denmark,
 - Egypt,
 - Estonia,
 - Finland,
 - France,
 - Georgia,
 - Germany,
 - Greece,
 - Hungary,
 - Indonesia,
 - Ireland,
 - Italy,
 - Kazakhstan,
 - Kyrgyzstan,
 - Latvia,
 - Lithuania,
 - Luxembourg,
 - Malaysia,
 - Malta,
 - Mexico,
 - Moldova,
 - Myanmar,

- Netherlands,
- Panama,
- Paraguay,
- Peru,
- Poland,
- Portugal,
- Romania,
- Russia,
- Serbia,
- Slovakia,
- Slovenia,
- Spain,
- Sri Lanka,
- Sweden,
- Tajikistan,
- Tunisia,
- Turkey,
- Turkmenistan,
- Ukraine,
- Uruguay,
- USA,
- Uzbekistan,
- Venezuela,
- Vietnam,
- Other.

 **Note**

Due to the peculiarities of the *RR* SDK, Cyrillic characters on the license plate are recognized by Latin characters.

The *RR* software module can work in one of the following modes depending on the type of license:

1. Slow — the module processes 6 frames per second, evenly thinning the processed video stream in case of a higher camera frame rate. Recognizes the license plates of the vehicles moving at a speed of no more than 20 km/h.
2. Fast — the module processes 25 frames per second, evenly thinning the processed video stream in case of a higher camera frame rate. Recognizes the license plates of the vehicles moving at a speed of no more than 150 km/h.

RR module licensing

RR software module is licensed **by the number of channels** using the `psim.sec` key file, i.e. the key file is purchased for a certain number of cameras used for the module with payment for each camera. Additional key files are not required.

There are two license types for *RR* software module:

1. Slow.
2. Fast.

 **Note**

See [The *RR* module functionality](#) for more details.

The *RR* module is licensed by processed video channels, taking into account the type of license, i.e. the `psim.sec` key file is purchased for a certain number of cameras used by this module in Slow or Fast mode, with payment for each camera.

Additional key files are not required.

Hardware requirements for the RR software module

✔ Requirements for the hardware and software platform

When you work with the *RR* software module, the devices must meet the following requirements:

Device	Requirements for the supported model
CPU	<ul style="list-style-type: none"> Intel Core 6th generation and later, Intel Xeon v4 and later Support for the AVX2 instruction set, listed here Movidius/Neural Compute Stick devices are formally supported but aren't regularly tested
Nvidia GPU	<ul style="list-style-type: none"> NVIDIA GTX 1050 Ti and later At least 2 GB of video memory Compute Capability: 3.5–8.9. You can check the Compute Capability version of your GPU on the manufacturer's website Support for CUDA 11.8. CUDA is compatible with the following architectures: Kepler (partial), Maxwell, Pascal, Volta, Turing, Ampere (partial), and Ada Lovelace (see CUDA). NVIDIA drivers version 450.36.06 or higher are required. We recommend installing the latest driver from the official website
Intel GPU	<ul style="list-style-type: none"> Intel Arc Family, Intel Data Center GPU Flex Series (including 140/170 models) Intel HD Graphics, Intel UHD Graphics, Intel Iris Xe Graphics and later Other platforms listed in the OpenVINO official documentation are likely to be supported, but their compatibility with the detector hasn't been tested

For the correct operation of the *RR* software module on the Windows Server r12 platform:

1. Install the Windows Server Essentials Media Pack from the [Microsoft official website](#).
2. Add the Windows Server Essentials Experience role (for example, via Server Manager).
3. Configure Windows Server Essentials.
4. Install the Windows Server Essentials Media Pack again.

Video camera mounting and setup requirements for the RR software module

To ensure the recognition of the state license plates using the *RR* software module, it is necessary to install and configure the video cameras in such a way that the following requirements are met:

Camera specifications	<ul style="list-style-type: none"> The recommended resolution of 720p or 1080p. The minimum frame rate of 5 fps, the recommended frame rate of 20 fps. Video stream: MJPEG, H.264 or no compression.
------------------------------	---

Video image	<ul style="list-style-type: none"> • The video image should be clear, contrasting, without distortion, not blurry. • Expected image contrast: the difference between the license plate characters and the background is not less than 20 units with the image brightness scale from 0 to 255. • Minimum character height on the license plate is 10 px, recommended is 20 px or more.
Camera mounting	<ul style="list-style-type: none"> • Installation height should be at least 3 above from the road. • The maximum tilt of the video camera should not exceed 30° horizontally, and 45° vertically. • Camera inclination should be minimum. • Camera should be static.

Configuring the RR software module

Attention!

To increase the performance of license plate recognition, you can use computing resources of the graphics card. To do this, when configuring the **LPR channel** object (see [Select a device for license plate recognition](#)), from the **Use GPU** drop-down list, select the required device. By default, only CPU computing resources are used.

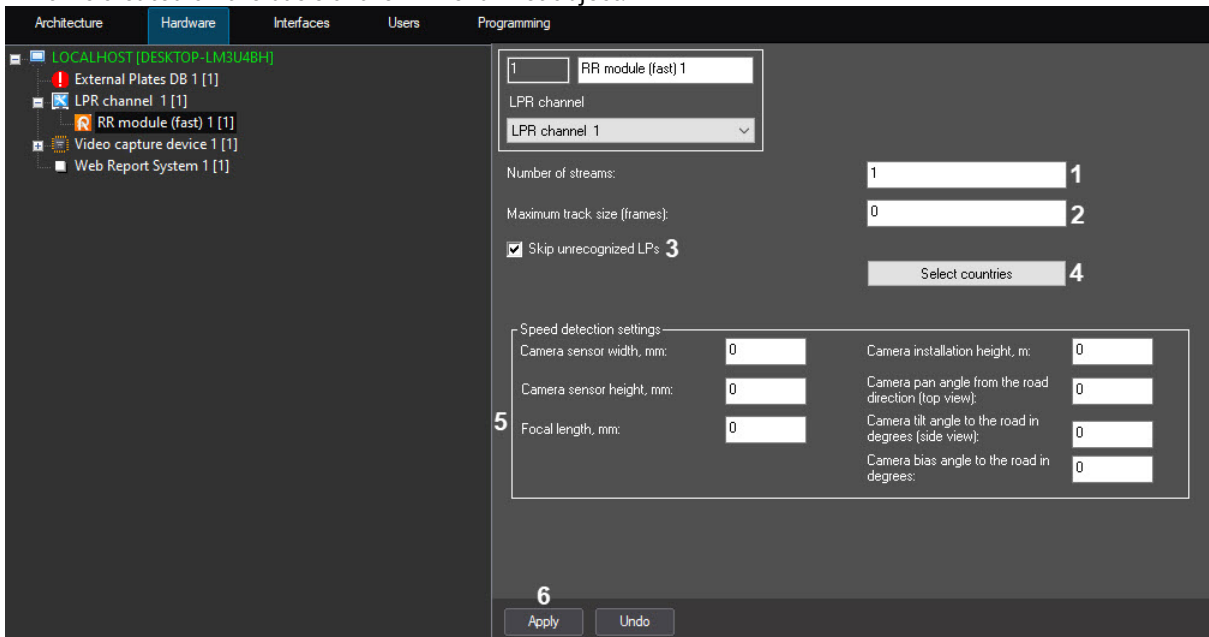
The start (initialization) time of the license plate recognition algorithm using a graphics card can take several minutes. No license plate recognition events are received until the initialization is complete. GPU files are included in the distribution package starting with *Auto PSIM* version 1.0.1.293. No additional installation is required.

For *Auto PSIM* earlier than version 1.0.1.293, you must activate computing resources of a graphics card:

1. Download the distribution package to activate the GPU for the *RR* module from the AxxonSoft [website](#).
2. Unzip the downloaded archive.
3. Put all files of the downloaded archive into the folder on the computer with installed *Auto PSIM* at C:\Program Files (x86)\Axxon PSIM\Modules64\UrmLpr\RR_gpu.

To configure the *RR* software module, do the following:

- Depending on the license type, go to the settings panel of the **RR module (fast)** or **RR module (slow)** object, which is created on the basis of the **LPR channel** object.



- In the **Number of streams** field (1), enter the number of streams that the SDK of the *RR* recognizer uses during parallel computing. The **0** value (default) disables parallelization during license plate recognition.

⚠ Attention!

Increasing the number of streams during parallel computing also increases the load on the CPU. All changes are applied only after you restart *Axxon PSIM*.

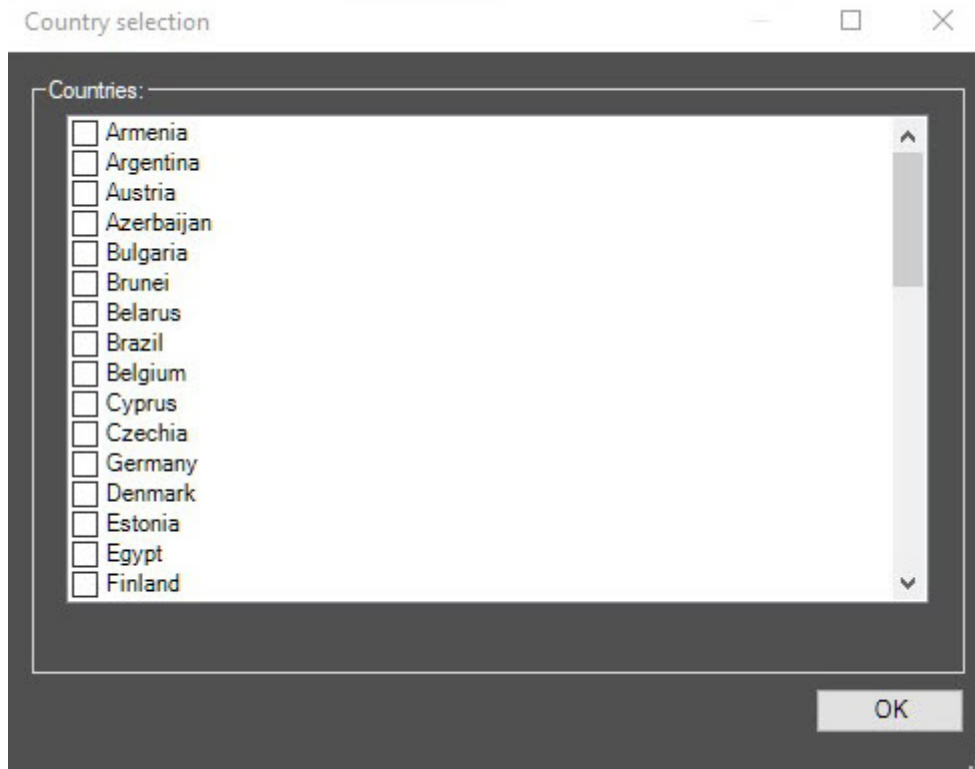
- In the **Maximum track size (frames)** field (2), enter the maximum number of frames for one track that will be processed by the *RR* SDK (the smaller the value, the faster the recognition result are given, but it is also be less accurate). The default value is **0**. The number of frames is not limited.

⚠ Attention!

If the LP recognition upon request is used (see [Setting up the Camera of recognition upon request module](#)), the **Maximum track size (frames)** must be equal to **1**.

- Set the **Skip unrecognized LPs** checkbox (3) to ignore the vehicles with unrecognized license plates.
- By default, only license plates of the main country are recognized, which is specified in the settings panel of the **LPR channel** object (see [Select the country and license plate recognition SDK](#)). If it is also necessary to recognize license plates of additional countries, click the **Select countries** button (4) and in the **Country**

selection window that opens, select the required countries.



6. If it is necessary to determine the speed by video, specify the appropriate camera settings (5). The specified parameters must correspond to the actually used camera and its mounting parameters.
7. To save the settings, click the **Apply** button (6).

Note

If you create several *RR* recognition channels, the load on the CPU cores can be uneven, because the even distribution mode isn't enabled by default. To enable it, set the **1** value for the string parameter of the **IsProcessObject** registry key (see [Registry keys reference guide](#)).

Configuration of the *RR* software module is complete.

5.2.13 VT

The VT module functionality

The *VT* software module supports the following functionality:

1. Recognizing the license plates.
2. Saving the recognized number to the plates detector database.
3. Determining and logging the speed of the recognized vehicle to the plates database (by video or using the *Speed traps server* module).
4. Checking the recognized plates of vehicles via connected search databases.
5. Possibility of working with multilane driveway (recognizing up to 10 license plates in one frame).
6. Recognizing an extended list of license plate types: all types of Russian license plates, all CIS countries and Baltic States, Europe, Latin America, the USA, Tanzania, including Zanzibar. Worked out the main types of single-line plates of different countries, both civil and specialized (diplomatic, transit, military, and so on). The full list of countries is given on the manufacturer's [website](#).

Note

Missing countries can be added into the recognition module if necessary. For that, contact the [AxxonSoft technical support](#) and provide a video recording with license plates of the required country. The final decision on adding a country to the module is made by the module manufacturer.

7. Possibility of changing the quality level of vehicle plates recognizing.

Note

The license plate recognition accuracy depends on the number of characters on the license plate—the more characters, the higher the accuracy.

8. Saving the frames of the recognized plates to BMP, JPEG and AVI formats.

The *VT* software module can work in one of the following modes depending on the type of license:

1. Slow—the module processes 6 frames per second. *VT* SDK evenly decimates the processed video stream in case of a higher camera frame rate. It recognizes the license plates of the vehicles moving at a speed of no more than 20 km/h.
2. Fast—the module processes 25 frames per second. *VT* SDK evenly decimates the processed video stream in case of a higher camera frame rate. It recognizes the license plates of the vehicles moving at a speed of no more than 150 km/h.

VT module licensing

On the page:

- [General information on the VT module licensing](#)
- [How to activate a Hasp hardware security key for the VT module](#)
- [How to activate a software demo key for the VT module](#)
- [How to activate a software license key for the VT module](#)

General information on the VT module licensing

The *VT* module licensing in the *Auto PSIM* software is performed by processed video channels and countries/regions (a region is a set of countries).

To prevent the loss of processed frames, it is recommended that each megapixel of the video camera be processed in a separate stream. In this case, 1 stream uses 1 license channel.

Note

For example, if you use one video camera with a resolution of 1920×1080 (2 megapixels), it is recommended to purchase a license for 2 channels and process the frames using 2 streams (see [Configuring the VT module](#)). For two video cameras with a resolution of 4 megapixels, it is recommended to purchase a license for 8 channels and process the frames of each camera using 4 streams.

There are two license types for *VT* program module:

1. Slow;
2. Fast.

Note

See [The VT module functionality](#) for more details.

Slow or Fast license types can be represented as follows:

1. Hasp hardware security key (purchased separately). The key can be remotely updated when it is required (to expand the permanent key or convert demo key to the permanent key).
2. Software license key. This key is binded to computer hardware.
3. Software demo key.

Note

One demo key may include several licenses.

There can be several keys with Slow and/or Fast license types on one Server. In this case, the number of channels of all keys is summed within the license type (Slow channels are summed separately from the Fast channels).

If there is a single key with several licenses on the Server, then in this case, the license with the biggest product of the channels number and the recognition frame rate is used. For example: the key includes 2 licenses, the first is a Slow license for 10 channels (10 channels * 6 fps), the second is a Fast license for 2 channels (2 channels * 25 fps). In this case the Slow license for 10 channels will be used, because 60 is more than 50.

Note

It is possible to use a network license.

How to activate a Hasp hardware security key for the *VT* module

To ensure the operation of the *Hasp* hardware security key, it is necessary to download and install the [HASPUserSetup.exe](#) driver distribution kit.

How to activate a software demo key for the *VT* module

It's possible to use the *VT* program module in demo mode. License plates recognition of all available countries is permitted in demo mode on 4 Fast channels or 4 Slow channels. Demo mode is active for 60 days since the software key activation.

Attention!

VT module demo mode usage on virtual machines is not allowed.

Activation of demo-mode is performed as follows:

1. Download installation package: [Fast](#); [Slow](#).
2. In the folder with the installation package, run the command line as the system administrator.
3. Execute **SDK_4hi_60d_WORLD.exe -i -fi -fss** command (for the Fast demo license) or **SDK_4lo_60d_WORLD.exe -i -fi -fss** (for the Slow demo license).
4. To enable the archive search in the integration mode with *Axxon One*, download and install the [archive_search.exe](#) distribution kit.

Note

In the case of errors refer to the [VT documentation](#).

Demo licensing is activated.

How to activate a software license key for the VT module

In order to receive the software license key for the VT module, proceed as follows:

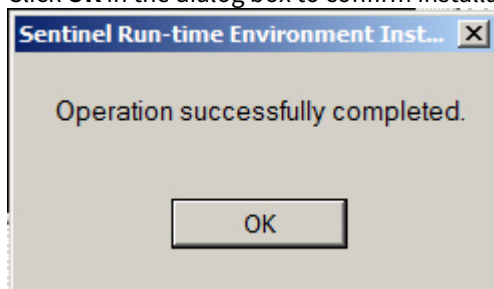
1. Download the utilities by the links below:
 1. [haspdinst-8.31.exe](#)
 2. [RUS_EOAWT.exe](#)
- In the folder with the installation package, run the command line as the system administrator and execute the following two commands one after another to install the protection key driver:

```
haspdinst-8.31.exe -fr -purge
haspdinst-8.31.exe -i -fi -fss
```

- Wait for the installation completion.



- Click **OK** in the dialog box to confirm installation is completed.



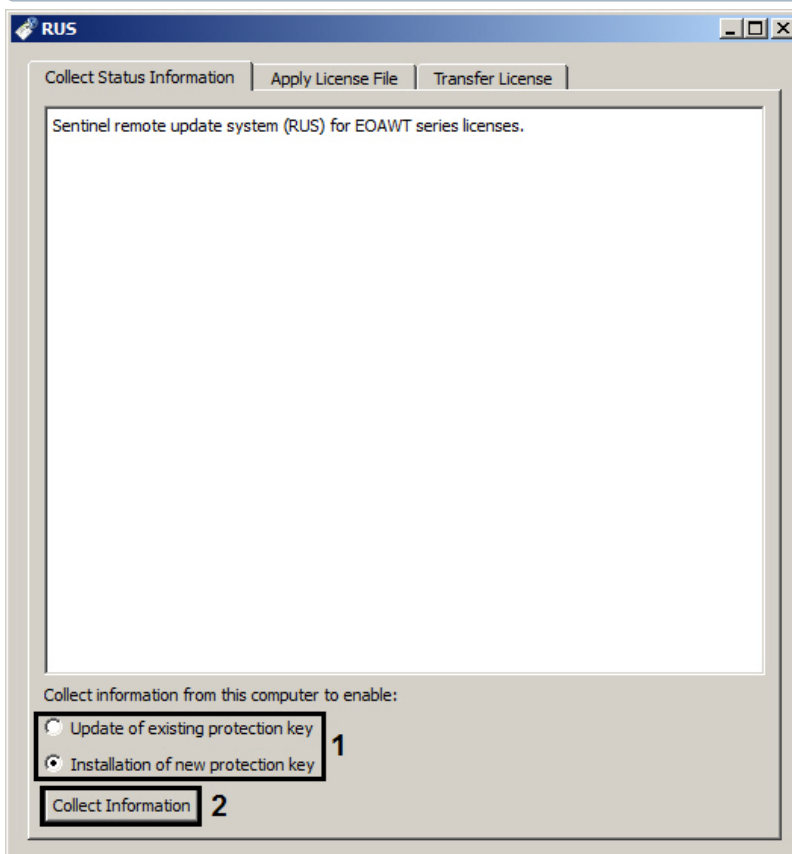
- Check installation correctness by opening the http://127.0.0.1:1947/_int_/ACC_help_index.html page in the web browser.



- Run the RUS_EOAWT.exe file to start the Remote Update System. The **RUS** dialog box opens.

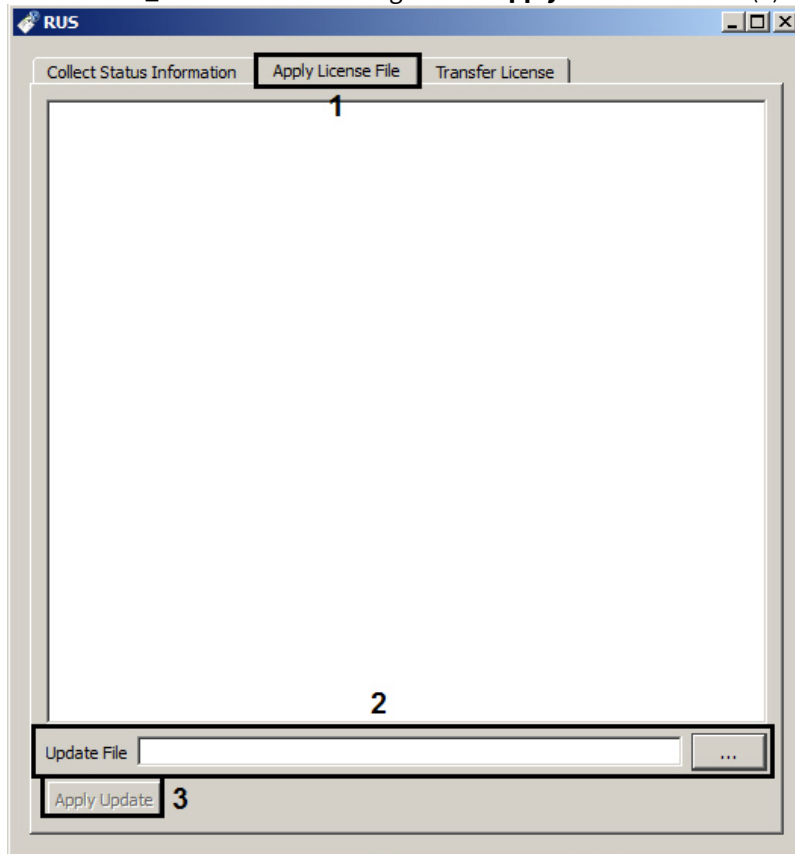
Note.

The RUS abbreviation stands for Remote Update System.



- Set the **Collect information from this computer to enable:** switch into the **Installation of new protection key** position in case if license for a "clean computer" is needed, i.e. if there is no demo license on it, or to the **Update of existing protection key** position, if demo license is already in use (1).
- Click **Collect Information** (2).
- Save the file with .c2v extension to any folder.

- Close the RUS_EOAWT.exe tool.
- Hand the .c2v file to your AxxonSoft manager.
- Receive the license file with .v2c extension from your AxxonSoft manager.
- Run the RUS_EOAWT.exe tool and go to the **Apply License File** tab (1).



- Specify location of the license file in the **Update File** field using the ... button (2).
- Click **Apply Update** (3).

Receiving the software license key for the VT module is now completed.

Video camera mounting and setup requirements for the VT software module

To ensure the recognition of the state license plates using the VT software module, it is necessary to install and configure the video cameras in such a way that the following requirements are met:

Camera specifications	<ul style="list-style-type: none"> • Basic characteristics of used video cameras are presented in the General requirements for mounting and configuring of cameras section.
------------------------------	--

Video image	<ul style="list-style-type: none"> • The symbols height for IP cameras should be not less than 20-30 px, for analog cameras – not less than 14-20 px, the stroke width should be not less than 2 px; • Minimum allowed contrast with evenly dirty number plate should not be less than 10% (contrast differentiation of symbols to the background is 25 on 256 point scale); • Maximum allowed uneven dirtiness is not more than 12% (ratio of the dirty area of the number plate to its whole area); • Geometrical proportions of the number plate picture should not differ from such proportions of the number plate itself with more than 10%.
Camera positioning	<ul style="list-style-type: none"> • The camera should be installed permanently (for detailed installation information, see the vendor documentation).
Vehicle speed	<ul style="list-style-type: none"> • In Slow mode – vehicle speed is no more than 20 km/h; • In Fast mode – vehicle speed is not more than 150 km/h.

Examples of LP images that will be recognized correctly and completely:

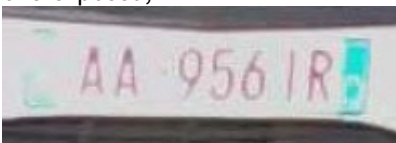


To ensure the correct recognition of the LP number, its image should not be:

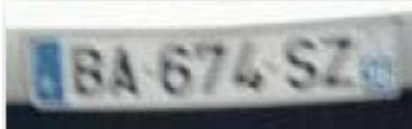
- unequally lit;



- overexposed;



- blurred (due to incorrect shutter speed settings for the speed of the vehicle);



- distorted (due to incorrect placement of the camera);



- interlaced;



- dirty.



⚠ Attention!

Any deviation from the above requirements reduces the likelihood of correct number recognition.

Configuring the VT software module

On this page:

- [Configuring the VT software module](#)
- [Tracking the disappearance of a recognized license plate](#)
- [License plate recognition when there are problems with templates or templates are absent](#)
- [Using a GPU for VT license plate recognition](#)

⚠ Attention!

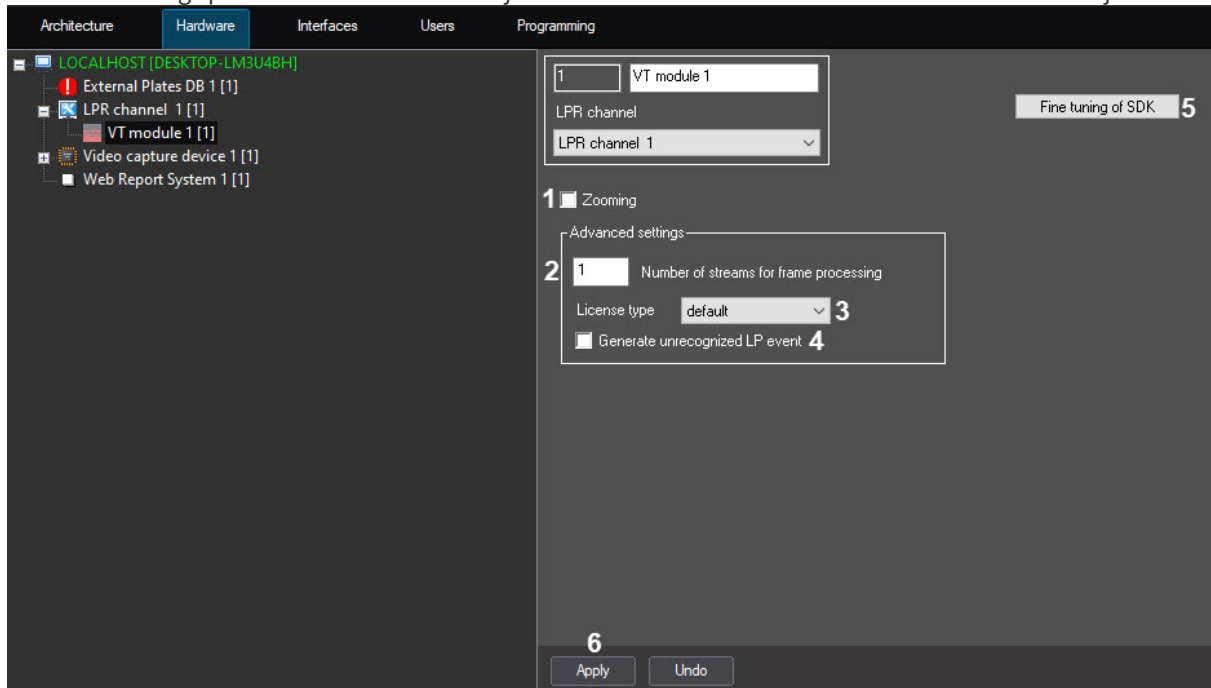
To ensure the correct operation of the *VT* module, the current Windows user must have read and write access to the following directories and files:

- `<Auto PSIM installation directory>\Modules\UrmLpr\`
- `<Auto PSIM installation directory>\Modules64\UrmLpr\`
- `C:\ProgramData\VT\LprPresetDemo\presets.xml`

Configuring the VT software module

Configure the *VT* program module as follows:

1. Go to the settings panel of the **VT module** object that is created on the basis of the **LPR channel** object.



2. Set the **Zooming** checkbox to increase the license plate recognizing speed on megapixel cameras without loss of recognizing quality (1). This checkbox is relevant when the value of the **Zone width** parameter is more than 150 pixels (see [Configuration of the LPR channel detector](#)). The zone is an image from the corresponding camera. The recognition speed increases:
 - a. Two times if the value of the **Zone width** parameter is more than 150 pixels.
 - b. Four times if the value of the **Zone width** parameter is more than 400 pixels.
 - c. Eight times if the value of the **Zone width** parameter is more than 800 pixels.
3. To prevent the loss of processed frames, it is recommended that each megapixel of the camera be processed in a separate stream. If there is a loss of frames, then it is necessary to increase the number of streams in the **Number of streams for frame processing** field (2):
 - a. If the value of the **Number of streams for frame processing** field is 0, recognition is performed in the same stream it is started. It is the default value.
 - b. If the value of the **Number of streams for frame processing** field is 1, recognition is performed in the parallel stream to the process that starts it. This is the default value. We don't recommend changing it.
 - c. If the value of the **Number of streams for frame processing** field is 2 or more, recognition is performed in two or more streams simultaneously to the process that starts it. However, in this case, one license channel is used for each stream.

⚠ Attention!

The specified number of streams must not exceed the number of CPU cores on the server. We don't recommend setting more than two streams.

4. From the **License type** drop-down list (3), select the type of license used:
 - default—the license type is determined automatically
 - fast—25 FPS
 - slow—6 FPS.

⚠ Attention!

If you select the license type that is not in the key, then license plate recognition will not work.

- Set the **Generate unrecognized LP event** checkbox (4) if it is necessary to generate a **NOT DETECTED** event for vehicles whose license plates could not be recognized.
- Perform fine-tuning of the SDK if required (5) (see [VT module object settings panel](#)).

⚠ Attention!

You must perform fine-tuning of the SDK only with the help of AxxonSoft technical specialists! When fine-tuning the SDK parameters `VodiCTL_VPW_DYNAMIC_WITH_DUPLICATE`, `VodiCTL_VPW_DYNAMIC_OUTPUT_TIMEOUT`, and `VodiCTL_VPW_DYNAMIC_OUTPUT_FRAMECOUNT`, the values of the corresponding fields of the LPR channel also change (for details, see [Set up the display of license plate recognition results](#)).

You can find out the current SDK version by the name of the `VIT_<SDK version>` folder, for example:

- for x32: `<Auto PSIM installation directory>\Modules\UrmLpr\VIT_2.16.0`.
- for x64: `<Auto PSIM installation directory>\Modules64\UrmLpr\VIT_2.16.0`.

You can also find out the current SDK version using the `vpwfetch.exe -v` command in the Windows command line while in the corresponding folder.

- Click **Apply** button (6) to save the changes.

The VT software module is now configured.

Tracking the disappearance of a recognized license plate

It is possible to track the disappearance of the recognized license plate. If the recognized license plate disappeared from the camera field of view and was not recognized again within the specified time, the lost license plate event will be generated. To enable this feature, in the **VIT.TimeoutLostNumber** parameter, set the time in milliseconds after which the lost number event will be generated (for details, see [Vertical solutions](#), for more information about working with the registry, see [Working with Windows OS registry](#)).

To ensure the operation of this feature, it is necessary to set the **true** value for the **VodiCTL_VPW_DYNAMIC_ENABLE** parameter (see [The settings panel of the VT module object](#)).

License plate recognition when there are problems with templates or templates are absent

It is possible to interpret recognized characters as text if, for example, there are problems with template recognition or if the recognized license plates don't match known templates.

To ensure the operation of this feature, it is necessary to set the **true** value for the **VodiCTL_VPW_TREAT_SYMBOLS_AS_TEXT** parameter (see [The settings panel of the VT module object](#)).

Using a GPU for VT license plate recognition

By default, only the CPU resources are used. To enable the usage of the GPU computing resources, do the following:

- Download the `TensorRTCudaCudnn_SDK_Installer.zip` distribution kit from [Hotfixes of Axxon PSIM and vertical solutions](#).
- Unpack the downloaded archive.
- Install this software on the computer that has *Auto PSIM* installed.
- On the settings panel of the **LPR channel** object, select a GPU for license plate recognition (see [Select a device for license plate recognition](#)).

The start time (initialization) of the license plate recognition algorithm using a GPU can take several minutes. No license plate recognition events are received until initialization is complete.

If recognition doesn't start, delete the cache files from the VT_Cache folder located at C:Windows and restart *Axxon PSIM*. After that, wait for the caching process to complete. As a result, cache files appear in the VT_Cache folder, and GPU is used for recognition.

5.2.14 External Plates DB

The External Plates DB module functionality

The *External Plates DB* software module supports the following functionality:

1. Automatic search (comparison) of recognized vehicle license plates in the plug-in license plate database (external Plates DBs).
2. Generation of an alarm event about the presence of a number in the corresponding external Plates DB.
3. External Plates DB replication in a distributed configuration with several Servers.

Attention!

Correct operation of the LP number database is possible only when the number of recognitions is not more than 480,000 per 24 hours.

Note

An example of an external database of license plates numbers is a wanted database.

Search results of recognized numbers in the external database are displayed in the **Vehicle Tracer** interface window (see [The Vehicle Tracer interface module](#)).

Auto PSIM supports the external databases in the following formats:

1. SQL Server 2014.
2. Access.
3. FoxPro.
4. Oracle.

Note

If an external LP number database in SQL Server 2008 format was previously in use, then it is necessary to migrate it to SQL Server 2014. To do this, create a backup of the lprex DB in SQL Server 2008, and then deploy it to SQL Server 2014.

Connecting and setting up of the external LP number database

External database connection and setup procedure

To setup the **External Plates DB** object do the following steps:

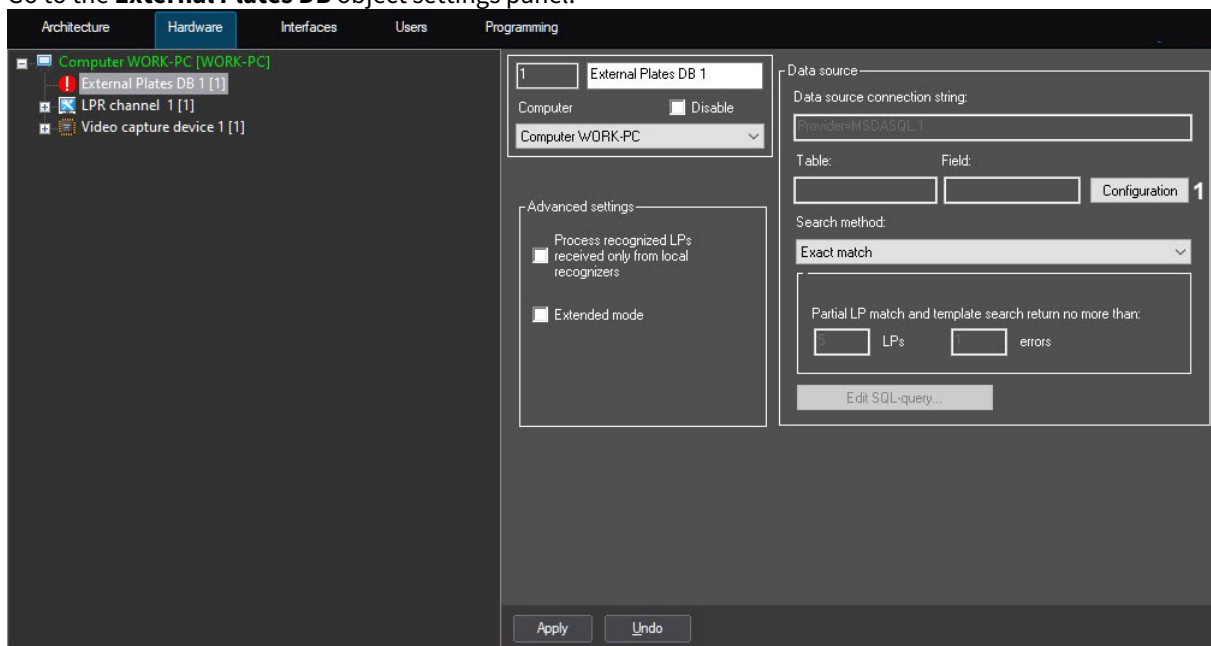
1. Connect the external plates database.
2. Set the names to the table's columns, that contain vehicle numbers, for displaying in the interface **Vehicle Tracer**.
3. Select search numbers method in the external database.

4. Set the number of displayed numbers, found in the external database in case when the search was made for a number component or license-plate number.
5. Set the SQL- query in case, when the plate search is performed by SQL-query.

Connecting the external database

To connect the external database, do the following:

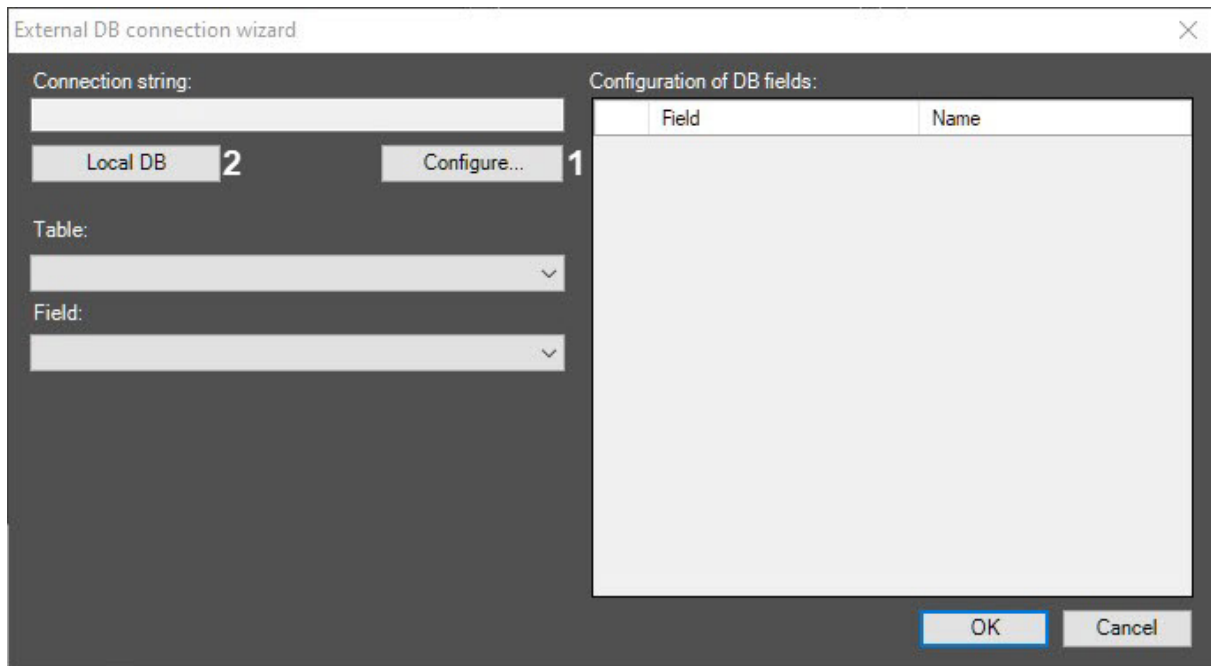
1. Go to the **External Plates DB** object settings panel.



2. Click the **Configuration** button (1).
3. In the **External DB connection wizard** window that opens, click the **Configure...** button (1). If the *Auto PSIM* database should be used as the external database, click **Local DB** (2) and go on to step 4.

Note

To connect to the Active tracking database, select the Local DB.



Note

If the external database is the *Auto PSIM* database then you can add the LP numbers using the **Event search in the Recognizers DBs** dialogue window (see [Create the active tracking database](#)).

- a. As a result, the standard dialog window of database selection **Data Link Properties** will be displayed. Database selection process in the window **Data Link Properties** depends on the format of the connected database:
- SQL Server and Access. Detailed description of database selection in the stated formats is given in the [Database connection](#) section;

Note

The **Active tracking** database is maintained in SQL Server format. When you connect to it, select the Lprex database in the **Data Link Properties** window.

- FoxPro. Microsoft OLE DB for Visual FoxPro or other OLE DB provider should be used to connect to external database of the stated format;
- Oracle. Connection to the external database of the stated format is done in the following way:

Attention!

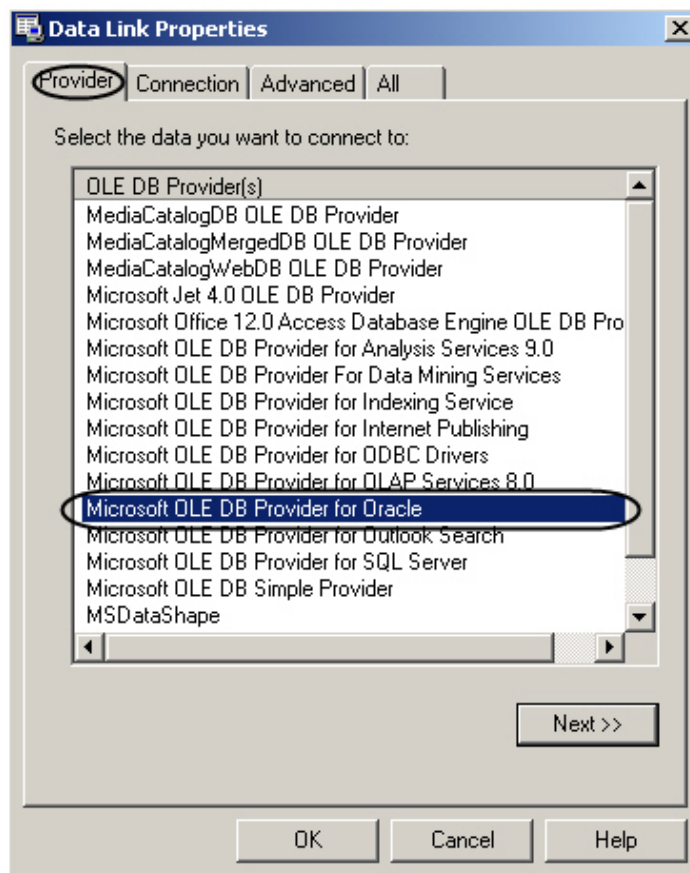
To connect an Oracle database, the following conditions must be met:

- the Oracle client is installed on the computer with the *Auto PSIM* Server;
- the Oracle client is connected to the Oracle database server (the Listener component is configured).

Note

Detailed information about Oracle databases is given in the official reference manuals concerning this software.

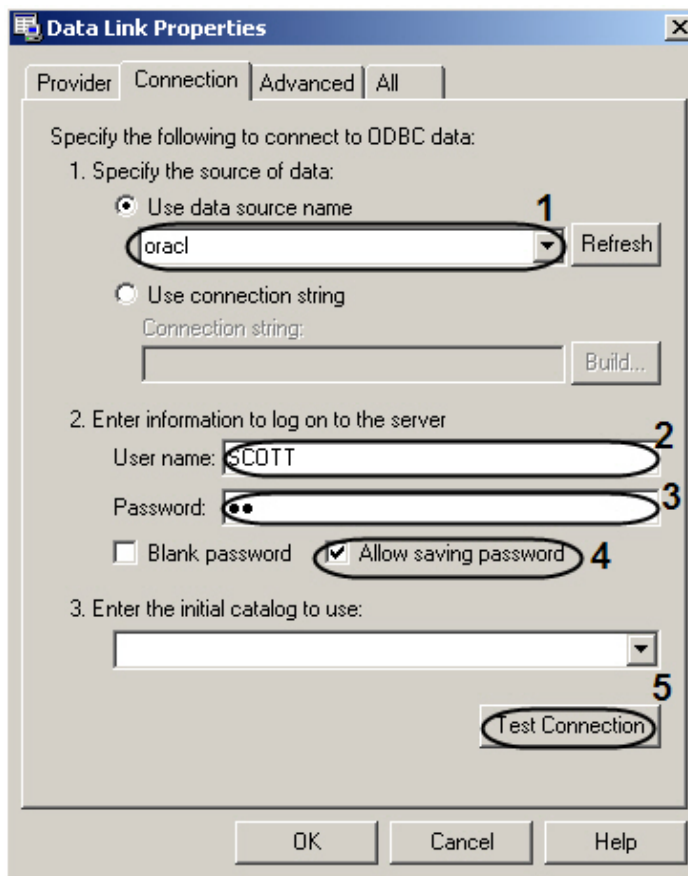
- b. On the **Provider** tab of **Data Link Properties** dialog window select the **Microsoft OLE DB Provider for Oracle** value or **Oracle Provider for OLE DB**.



- Go to the **Connection** tab or click the **Next>>** button.
- In the **Use data source name** field (1), enter the server name of Oracle database to which the local client Oracle is connected.

Note

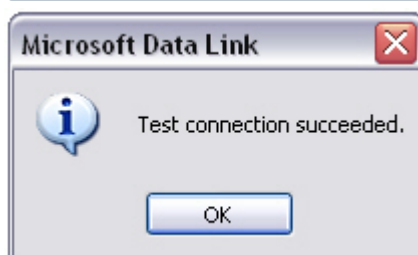
Oracle database name is specified upon its installation.



- In the **User name (2)** and **Password (3)** fields, enter the user name and password to connect to the Oracle database server.
- Set the **Allow saving password (4)** checkbox.

Note

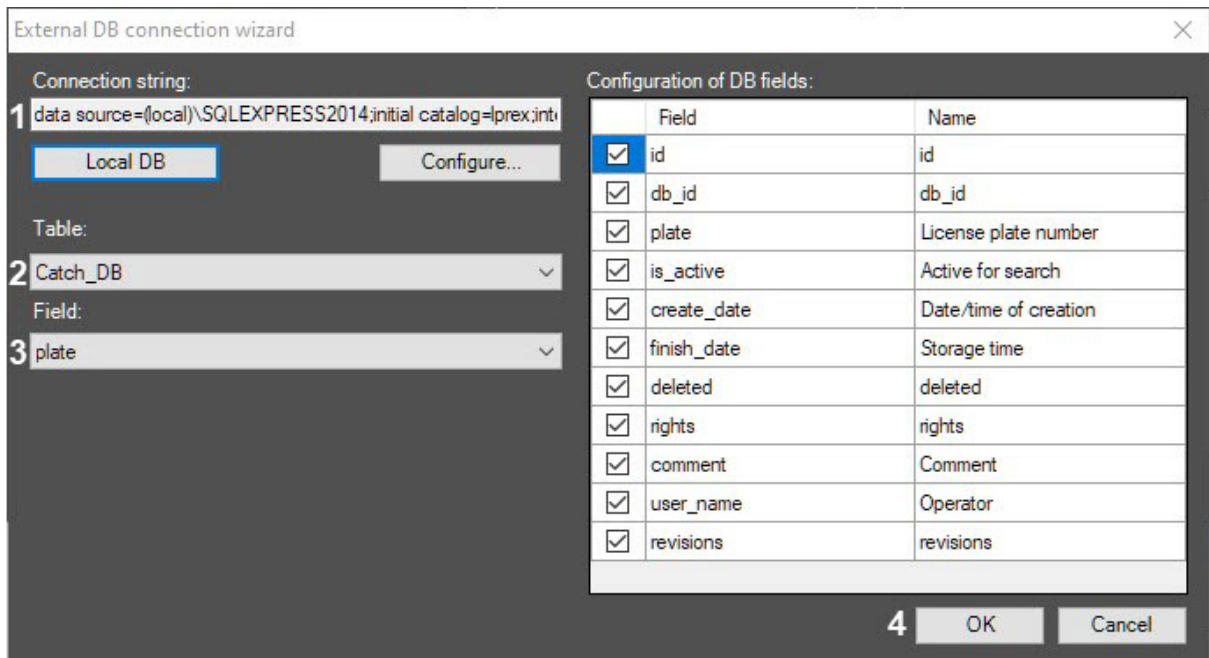
To check the connection to the Oracle database server, click the **Test Connection** button (5). If test connection succeeded, the message window would be displayed. To close the message window, click **OK**.



- To complete the connection to external Oracle database, click **OK**.
4. After the database is selected, the connection string with the selected database will be displayed in the **External DB connection wizard** window (1).

Note

The `idb.exe` utility is used to configure *Auto PSIM* databases. Its operation is described in the [The `idb.exe` utility for converting databases, selecting database templates and making backup copies of databases](#) section. When you switch between databases, we recommend you to refer to the [Using the `idb.exe` utility](#) section.



- The **Table** drop-down list (2) contains the table names in the selected database. Select the table, containing the vehicle plates from this list.

Note

When connecting to the Active tracking database, select the **Catch_DB** value.

- The **Field** drop-down list (3) contains the column names of the selected table. Select the column with vehicle plates from this list.

Note

When connecting to the Active tracking database, select the **Plate** value.

- Click **OK** (4) to save the changes and close the **External DB connection wizard** dialog window.

Note.

To quit the **External DB connection wizard** without saving the changes, click **Cancel**.

8. As a result, the **Data source connecting string**, **Table** and **Field** fields (1) on the **External plates DB** object settings panel will be filled up.

The screenshot shows the 'External Plates DB 1' settings panel. The 'Data source' section is highlighted with a red box and a '1' label. It contains the following fields:

- Data source connection string:** Data Source=(local)\SQLEXPRESS;Initial Catalog=lpex;Integra
- Table:** Catch_DB
- Field:** plate
- Search method:** Exact match
- Partial LP match and template search return no more than:** 5 LPs, 1 errors
- Edit SQL-query...** button

The 'Advanced settings' section is also visible, with the following options checked:

- Process recognized LPs received only from local recognizers
- Extended mode

At the bottom of the panel, the 'Apply' button is highlighted with a red box and a '2' label.

9. Click **Apply (2)**.

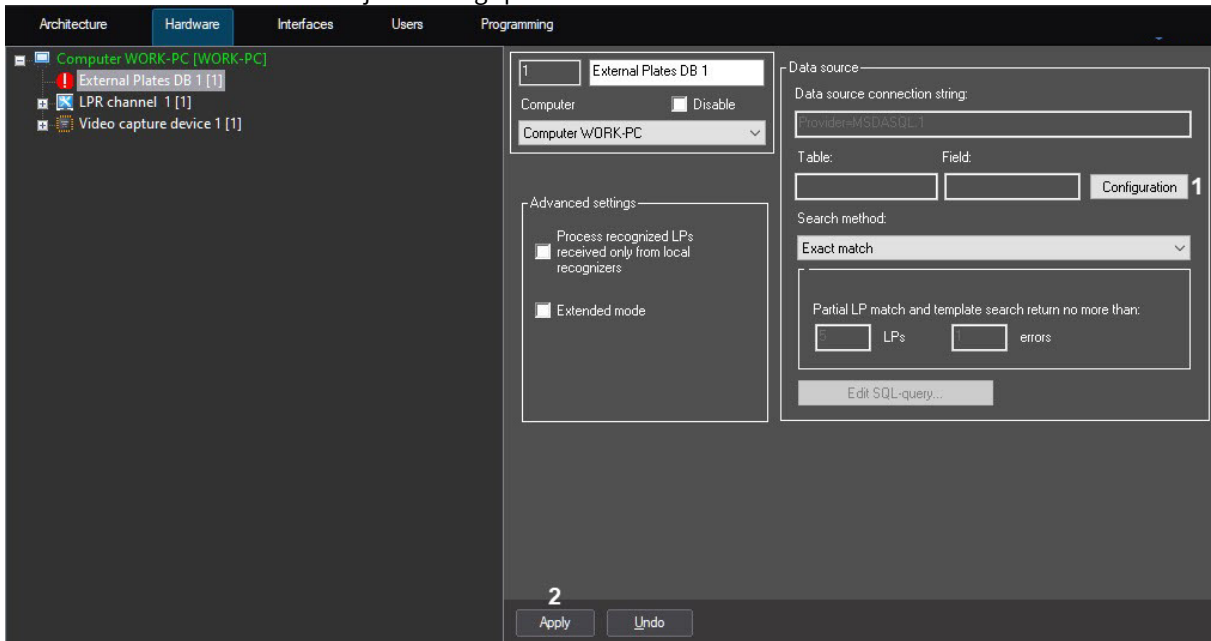
The External Plates database connection is completed.

Assigning names to table columns containing LP numbers

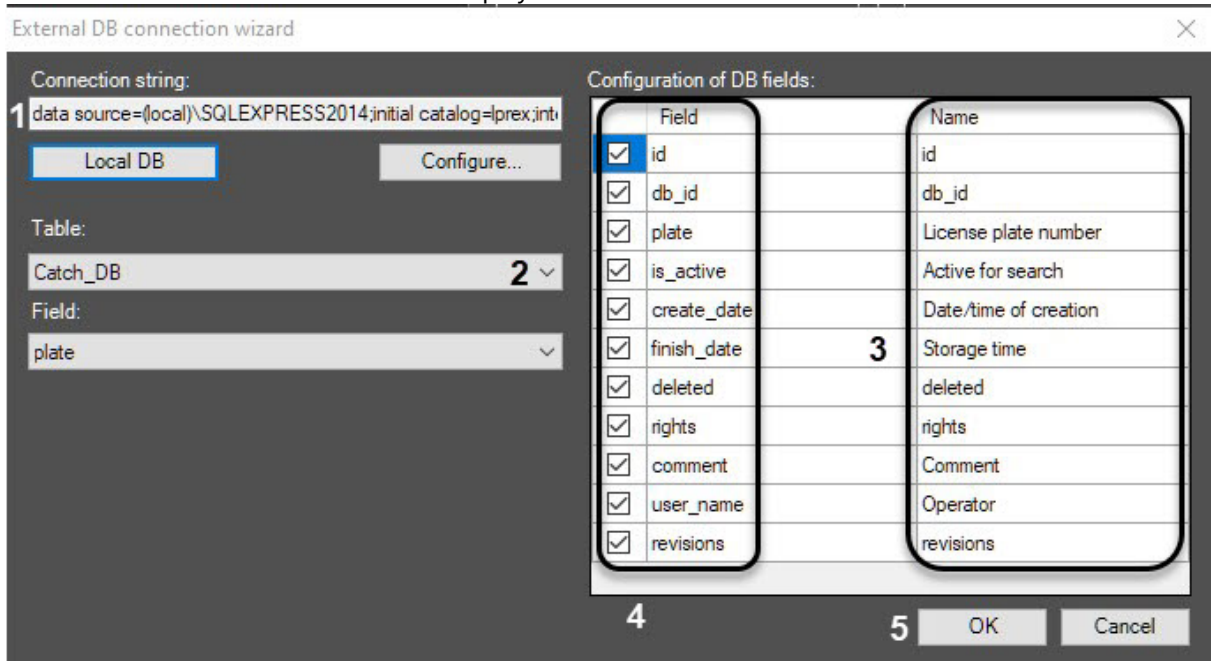
You can assign names to the table columns containing the vehicle LP numbers to be displayed in the **Vehicle Tracer** module interface window. The table columns will be displayed in this window if the search for a recognized license plate in the External Plates Database is successful.

To assign names to table columns, containing vehicle plates, do the following:

1. Go to the **External Plates DB** object settings panel.



2. Click the **Configuration** button (1).
3. **External DB connection wizard** will be displayed in result.



4. Set the connection string to the External DB (1) (see [External DB connection](#)).
5. From the **Table** drop-down list (2), select the table, containing vehicle plates. As a result, a list of columns in the selected table will be displayed in the **Configuration of DB fields** table (3).
6. In the **Name** column (3), enter the names corresponding to columns that will be displayed in the **Vehicle Tracer** interface window.
7. Set the check boxes for the strings (4) which fields should be displayed in the **Vehicle Tracer** interface window.
8. Click **OK** (5) to save the applied changes and close the dialog window **External DB connection wizard**.

Note.

Click **Cancel** to close the window **External DB connection wizard** without saving the changes.

9. Click **Apply (2)**.

Assigning names to table columns, containing vehicle plates, is completed.

Plates search method selection in the external plates database

Plates auto search in the External DB is performed by one of the following methods.

Search method	Method description	Search results displaying
Exact match	The same sequence of characters in the column with vehicle plates must correspond to a sequence of characters, corresponding to the identified vehicle plate.	The Vehicle Tracer window displays all table columns containing the vehicle numbers
Partial search	At least one sequence of characters, that is partially or in full present in the plate in the external BD must correspond to identified vehicle plate.	
Wildcard search	At least one of the plates, stored at external DB, must correspond to identified vehicle plate. Wildcards are recorded to the external BD preliminary together with vehicle plates. Wildcards in the DB are recorded according to Transact-SQL rules. Wildcards may contain usual characters and wildcards in the required combination.	
SQL-query	SQL-query is designed for extracting the required data from the table, containing plate's numbers and also from bound tables. SQL-query is used for more flexible setting up the Auto PSIM PC (see Setting up SQL-query for plates search in the external database).	The Vehicle Tracer window displays the columns of the external database tables specified in the SQL query
With acceptable number of errors	The recognized number must correspond to at least one sequence of characters that is partially or completely contained in the number in the external plate database. You can select the maximum number of errors (mismatches of characters) in the number. <i>Note. The more errors are accepted, the more the search system is loaded.</i>	The Vehicle Tracer window displays all table columns containing the vehicle numbers

Wildcards Transact_SQL are presented in the following table.

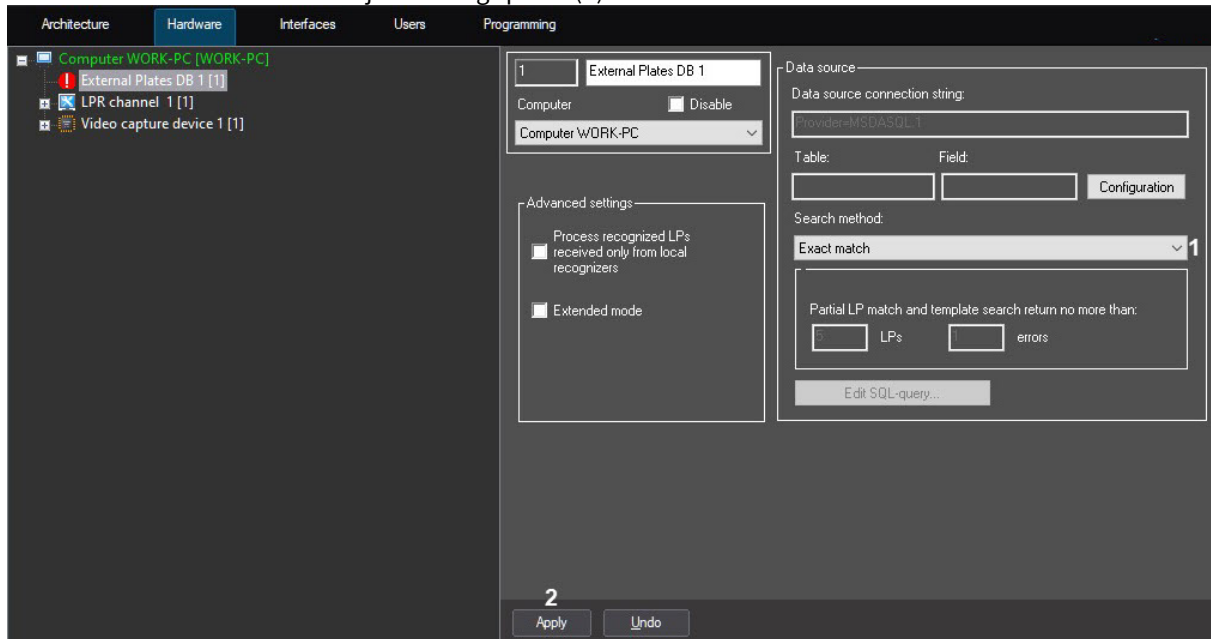
Wildcard	Wildcard description	Example of search results
%	Any string with a length of zero or more characters	Plates, containing elements 'A', '385' and '78', divided by any number of characters, for example 'AO38578', 'A385MK78' correspond to the wildcard 'A%385%78'
_ (underlining)	Any single character	Plates, containing a sequence of 4 characters , the first of which is '2' and the last is '5' correspond to the wildcard '2__5', for example 'A256577', '2115OK43'
[]	Any single character contained in a range ([A-E]) or set ([ABCDE])	Plates, containing a sequence of 4 characters correspond to the wildcard '[E-M][2-5]53' . The sequence ends in '53', the first character belongs to the range E-M, the second one belongs to the range 2-5, for example 'K453MH02', 'm253BT63'
[^]	Any single character not contained in a range ([^A-E]) or set ([^ABCDE])	Plates, containing a sequence of 4 characters correspond to the wildcard '[^E-M]499'. The sequence ends in '499', the first character does not belong to the range E-M, for example 'B499BK57', 'H499578'

 **Note.**

You can add numbers' templates through **Active tracking** database (see [Create the active tracking database](#)), or through DB editor (see official reference manual on required editor).

To select the search method of the identified plates in the external DB, do the following:

1. Go to the **External Plates DB** object settings panel (2).



2. Select the required search method of the identified plates in the external DB from the list **Search method** (1).
3. Click **Apply** (2).

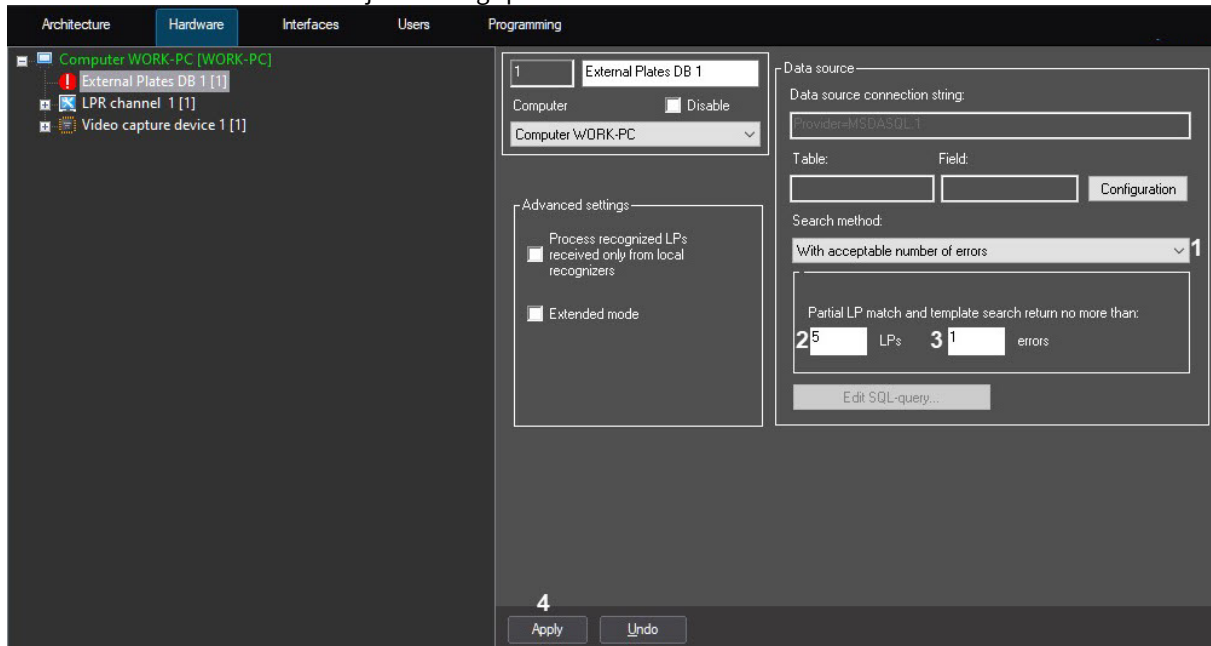
Selecting the search method of the identified plates in the external DB is completed.

Setting up the number of search results to be displayed

The *External Plates DB* module should be set to return a certain amount of LP numbers found in the database. This amount of numbers will be returned in case of partial search or wildcard search methods. This parameter is required for a more flexible setup of *Auto PSIM* using the internal programming tools.

For setting the plates number to be returned while searching via a wildcard or a number's part, do the following:

1. Go to the **External Plates DB** object settings panel.



2. Select the value **Partial match, Wildcards match** or **With acceptable number of errors** from the **Search method** drop-down list (1).
3. In the **Partial LP match and template search return no more than** field:
 - **LPs (2)** — enter the maximum number of license plates returned when searching by part of the number or number template in the external plates database.

Note.

This parameter also affects the number of returned records in the **Event viewer** window when searching by template or by part of a number.

- **errors (3)** — enter the maximum number of errors (character mismatches) in the search request and numbers in the external plate database.

Note

The more errors are accepted, the more the search system is loaded.

4. Click **Apply (4)**.

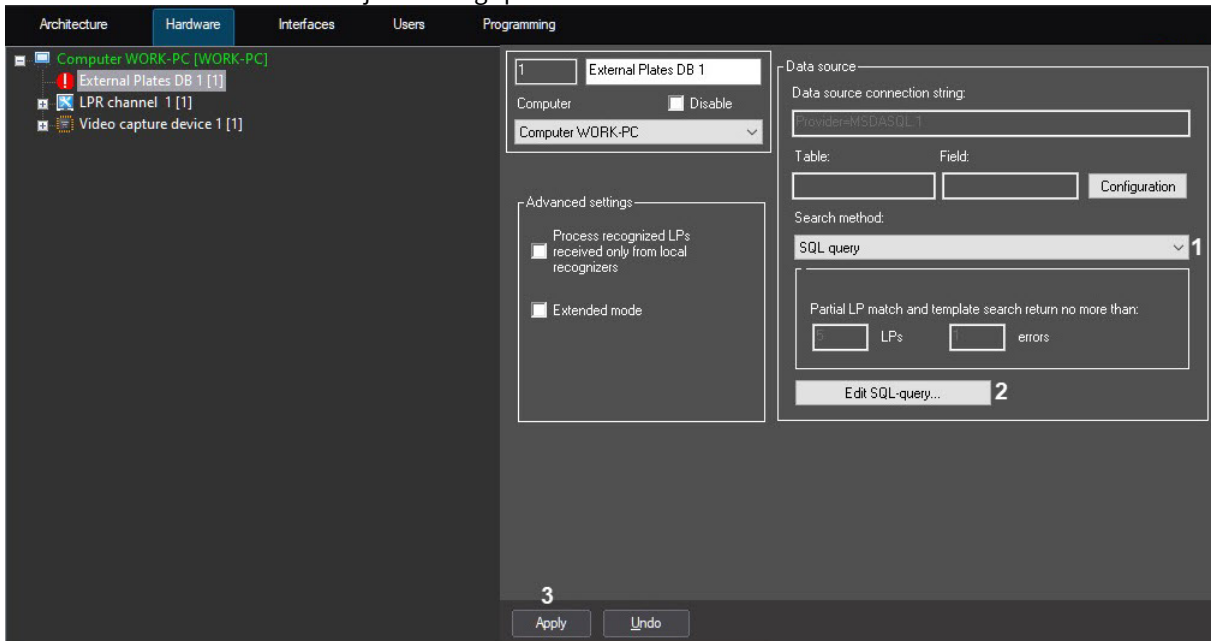
Setting the plates number to be returned while searching via a wildcard or a number's part is completed.

Setting up SQL-query for plates search in the external database

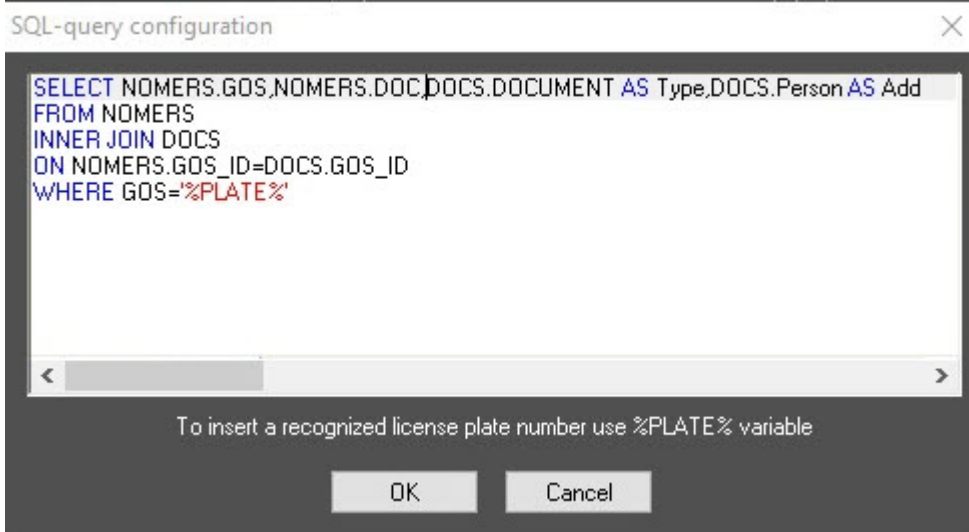
There is a possibility to set SQL-query for extracting the required data from the table, containing plates and bound tables. The set SQL-query will be used while searching the plates in the external DB if the **SQL-query** search method is selected (see section [Plates search method selection in the external plates database](#)).

To set the SQL-query do the following:

1. Go to the **External Plates DB** object settings panel.



2. Select the **SQL query** value from the **Search method** list (1).
3. Click the **Edit SQL-query** button (2).
4. The **SQL-query configuration** dialog window will be displayed in result.



5. Enter SQL-query to extract (SELECT) the required data from the table, containing plates and bound tables. To replace the identified plate use the variable %PLATE%.

Note.
Detailed information concerning setting the SQL-queries is given in the corresponding reference manual.

Note.

SQL-query, given for example, returns the required columns from the external DB if the plate in this DB coincide with the identified number.

Example of extracting the data from external DB

Table	Table's column	Column's contain	Is returned in result of SQL-query
NOMERS	GOS_ID	Primary keys of NOMERS' table recordings	No
	GOS	Plates	Yes
	DOC	Documents' keys, on the basis of which the plates have been recorded to the DB	Yes
	DATE	Dates, of entering the plates to DB	No
DOCS	DOC_ID	Primary keys of DOCS' table recordings	No
	DOCUMENT	Document types, on the basis of which the plates have been recorded to the DB	Yes
	PERSON	Persons, who entered the plates to the DB	Yes
	GOS_ID	External keys of DOCS' table recordings, used for connection to the NOMERS table	No

The screenshot shows the 'ONLINE MONITOR' interface. On the left, a video feed shows a black car with license plate WXH2663. Below the video, a red box highlights the license plate 'WXH2663' and a table of parameters:

Parameter	Value
Recognizer	LPR channel 1
Country	Malaysia
Recognition time	2022-10-18 10:49:24
Validity	98 %
Direction	To camera
Cause of alarm	Found in: External Plates DB 1
Regional code	663
Camera	Camera 1

In the center, there are two smaller panels, each showing a car image and the license plate 'WXH2663' with the following details:

- LPR channel 1
- 2022-10-18 10:49:24
- Found in: External Plates DB 1

On the right, there is a 'Database:' section with a table for 'Record No.1':

Parameter	Value
Active for search	True
Date/time of creation	18.10.2022 10:46:00
id	d5287407-b94e-ed11-a...
License plate number	WXH2663
Storage time	
Comment	
Operator	

At the bottom of the interface, there are icons for Print, Search, Video archive, Filter, and Comment.

6. To save the changes and close the **SQL-query settings** dialog window click **OK**.

Note.

Click **Cancel** to close the dialog window **SQL-query settings** without saving the changes.

7. Click **Apply (3)**.

Setting up the SQL-query is completed.

Additional settings of the external plates database

To set the additional settings of the external plates database, do the following:

1. Go to the settings panel of the **External Plates DB** object.

2. Set the **Process recognized LPs received only from local recognizers** checkbox (1) if you want to consider license plates only from the local recognizers when comparing with license plates that are stored in the database.
3. Set the **Extended mode** checkbox (2) to use the special algorithm for recognizing violators in accordance with restrictions imposed on license plates depending on the day of the week. In this case, all recognized plates that are found in the license plates database are always passed without alarm regardless of the content in the `lprdb_rules.xml` file. If the recognized plate isn't found in the license plates database, then the execution of rules from the `lprdb_rules.xml` file (or `lprdb_rules_X.xml`, where X is the ID of the **External Plates DB** object if you want to set the extended mode for this DB separately) is checked. This file must be located in the `<Auto PSIM installation directory>\Modules64\` folder. In this file, you can specify the day of the week and the time interval within which vehicles whose license plate ends with the specified digit are forbidden to pass.

Example

Example of the `lprdb_rules.xml` file content. With this file, you can forbid the passage on Mondays for the following vehicles:

1. Vehicles with the last digit of the license plate equal to 1, in the time interval from 12:00:00 PM to 4:00:00 PM and from 8:00:00 PM to 10:00:00 PM.
2. Vehicles with the last digit of the license plate equal to 8, in the time interval from 10:00:00 PM to 13:00:00 AM.

```

<LPRDB_Rules>
  <DayOfWeek value = 'Monday'>      <!-- The day of week>
    <Alarm match='1'>                <!-- The last digit of the license
plate>
      <Time from='12:00:00' to='16:00:00' />  <!-- Time interval>
      <Time from='20:00:00' to='22:00:00' />  <!-- Time interval >
    </Alarm>
    <Alarm match='8'>
      <Time from='22:00:00' to='23:00:00' />
    </Alarm>
  </DayOfWeek>
  <DayOfWeek value = 'Tuesday'></DayOfWeek>
  <DayOfWeek value = 'Wednesday'></DayOfWeek>
  <DayOfWeek value = 'Thursday'></DayOfWeek>
  <DayOfWeek value = 'Friday'></DayOfWeek>
  <DayOfWeek value = 'Saturday'></DayOfWeek>
  <DayOfWeek value = 'Sunday'></DayOfWeek>
</LPRDB_Rules>

```

4. Click the **Apply** button (3).

Setting the additional settings of the external database is complete.

LP database replication

The LP database replication is used in a distributed configuration with several Servers, so that when new LPs are added from the LP database of the selected Server (the replication source), the same LPs are automatically added to the external LP database of another Server in the distributed configuration. Also, when the LP database replication is enabled, the changes/deletions of LPs in the selected external LP databases (the replication source) are also synchronized with other Servers.

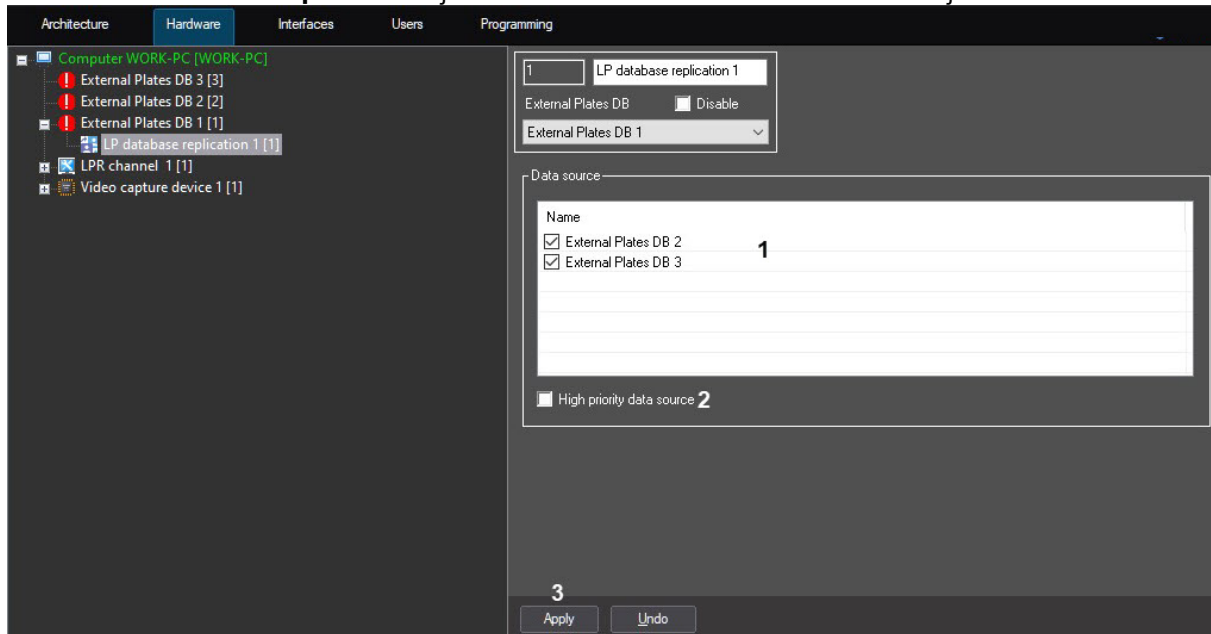
Note

The LP database is synchronized in the background every 10 seconds.

LP database replication is configured as follows:

1. Configure the *External Plates DB* module (see [Connecting and setting up of the external LP number database](#)).

2. Create the **LP database replication** object on the basis of the **External Plates DB** object.



3. In the **Data source** list (1), set the checkboxes for the external Plates DBs, the LP from which will be replicated to the external Plates DB on the current Server.
4. Set the **High priority data source** checkbox (2) so that in case of changing/deleting the LPs in the external plates DB of the current Server, the LPs are replaced with data from the external plates DB from which replication is carried out. If the checkbox is unset, then when changing/deleting LPs in the external plates DB of the current Server, these LPs will be saved even after replication.
5. Click **Apply** (3) to save the settings.

5.2.15 Remote recognition

The Remote recognition module functionality

The *Remote recognition* module is designed to implement the following functions:

- working with cameras with the LP recognition function;
- working with cameras with the vehicle speed detection function;
- recording the LP recognition and vehicle speed detection events to the database.

The LP recognition is supported by Tattile, ARH, GIT, and other manufacturers. The vehicle speed detection is supported by the GIT-CNW25060/BUR(L) camera by GIT.

See the [Drivers Pack documentation](#) for a complete list of supported cameras.

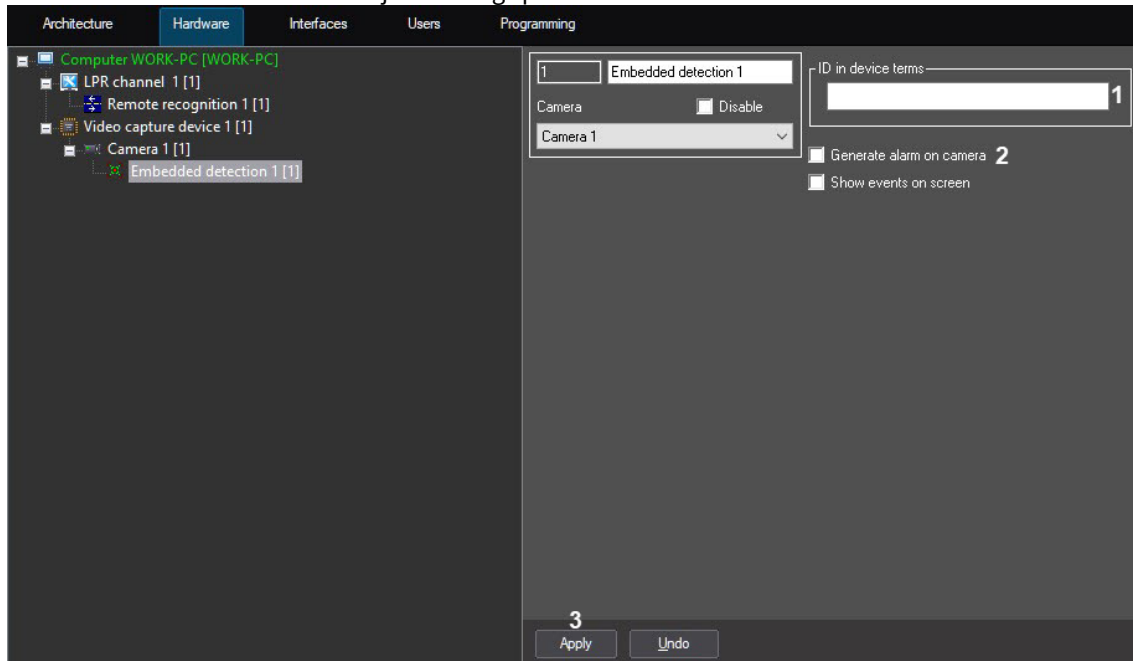
The list of supported countries for Tattile cameras can be found on the manufacturer's [website](#).

Configuring the cameras with LP recognition and vehicle speed detection

A general way to configure a camera with the license plate number recognition and vehicle speed detection functions is as follows:

1. Add a camera via the [Camera discovery tool](#) or manually (see [Configuring video acquisition from IP devices](#)).
2. If a camera was created manually, then you need to create an **Embedded detector** object on the basis of the **Camera** object and configure it as follows:

a. Go to the **Embedded detector** object settings panel.



b. In the **ID in device terms** field (1), specify the required value:

- **lpr_detection** - the id for working with a camera with a LP number recognition function;
- **radar_detection** - the id for working with a camera with a vehicle speed detection function.

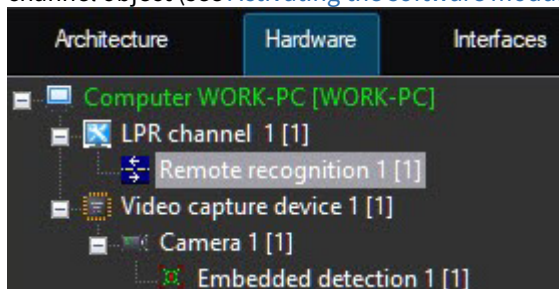
Attention!

- The id may differ from the specified one depending on the camera model.
- If the camera supports both the LP number recognition and the vehicle speed detection, then for their simultaneous operation, it is necessary to create an **Embedded detector** object for each function and specify the id of the corresponding one.

c. Set the **Generate alarm on camera** checkbox (2) if the alarm should be generated on the camera by detector's response.

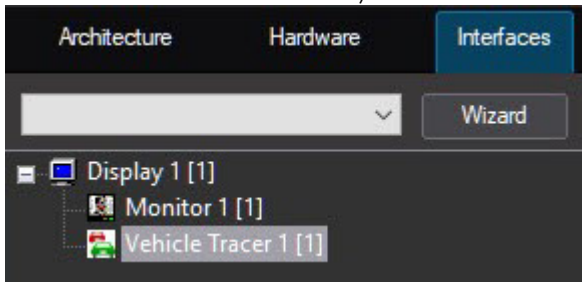
d. Click the **Apply** button to save the changes (3).

3. Create the **Remote recognition** object on the basis of the **LPR channel** object and configure the LPR channel object (see [Activating the software module used for identifying license plates](#)).



4. In order for the LP recognition and vehicle speed detection events to be displayed in the user interface, it is necessary to create and configure the **Monitor** and **Vehicle Tracer** objects on the **Interfaces** tab (see [The](#)

Vehicle Tracer interface module).



Note

If there are no data on the recognized LPs displayed in the Active Monitor of the *Auto PSIM* — although they are found in the Debug window and Event protocol — it is necessary to change the **RemoteLpr.x.NearestTime** registry key value. **X** is the identifier of the **LPR channel** object in the *Axxon PSIM* software on which the remote recognition module is used (for more details, see [Registry keys reference guide](#), for more information about working with the registry, see [Working with Windows OS registry](#)).

The **RemoteLpr.x.NeatestTime** registry key value can also be changed by the Debug window (see [Editing the Nearest Time for the specified remote recognition module](#)).

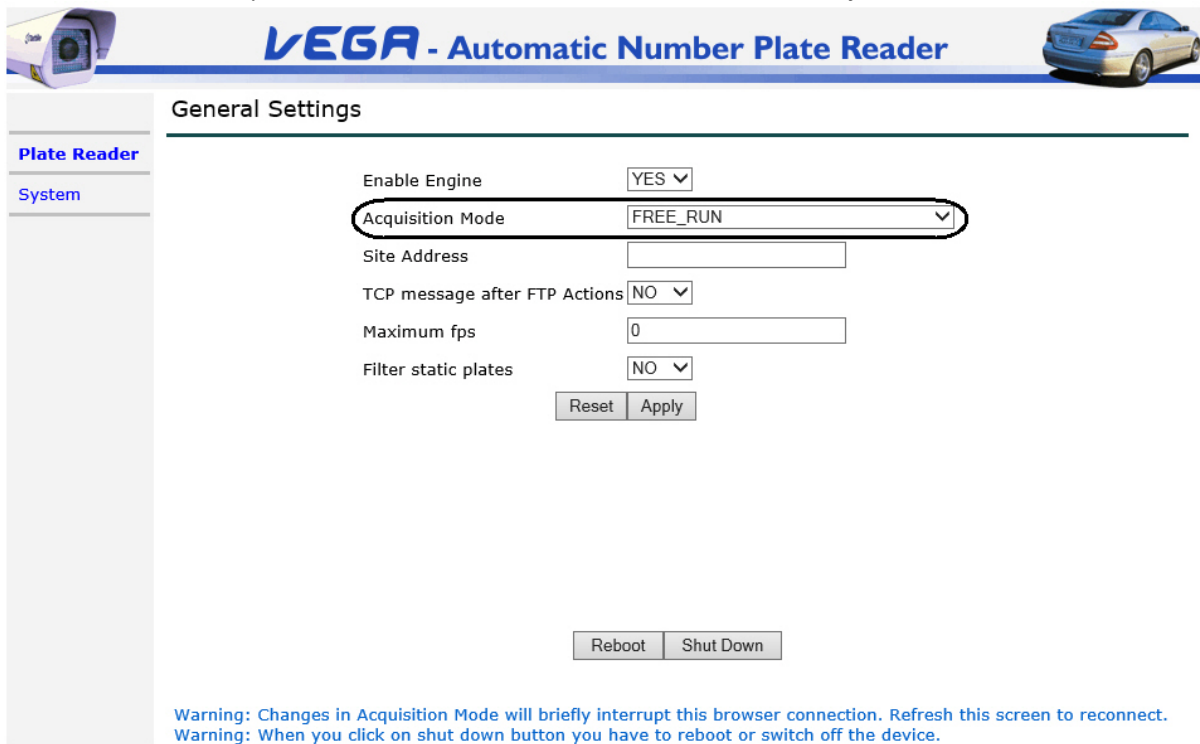
5. Go to the camera web-interface and configure the camera in a way necessary to achieve the stable license plate number recognition and vehicle speed detection, which meets the requirements.

Configuring the cameras with LP recognition and vehicle speed detection in a general way is complete.

Configuring VEGA Access and VEGA III cameras by Tattile

Configuring the VEGA Access and VEGA III cameras by the Tattile manufacturer is performed the following way:

1. Go to the **Plate reader** tab in the camera settings program and select the **General** item of menu. From the **Acquisition Mode** drop-down list select the **FREE_RUN** value to send data by camera.



VEGA - Automatic Number Plate Reader

General Settings

Plate Reader

System

Enable Engine

Acquisition Mode

Site Address

TCP message after FTP Actions

Maximum fps

Filter static plates

Warning: Changes in Acquisition Mode will briefly interrupt this browser connection. Refresh this screen to reconnect.
Warning: When you click on shut down button you have to reboot or switch off the device.

www.tattile.com

- In the **Plate reader** tab select the **Events/Actions settings**.

VEGA - Automatic Number Plate Reader

Events/Actions Settings

Actions / Events	Send Image FTP	Save DB FTP	GM Alarm	Pulse Out	Com232 Message	Com485 Message	TCP Message	Send Image FTP 2	Save DB FTP 2	TCP Message 2	SD Saving
Ocr Read											
Ocr Not Read											
Ocr No Plate											
Match On List A											
No Match On List A											
Match On List B											
No Match On List B											
Start Trigger											
Stop Trigger											
System Alarm											

www.tattile.com

- In the displayed list click the **TCP Message (Ocr Read)** parameter and configure it the following way in the opened box.

VEGA - Automatic Number Plate Reader

TCP Message on Ocr Read

Enable: YES

Message format: STANDARD

Message: %DATE%TIME%PLATE%PLATE_COUNTRY%OCRSCORE%

Jpeg Quality: 75

Crop Image(*): PLATE

Server IP: 77.246.233.102

Server Port: 32000

Reuse Connection: YES

Buffering on SD: NO

HELP
JPEG
HEADER

Reset Apply

[Previous Page](#)

www.tattile.com

- a. Enter the whole list of metadata in the **Message** field considering the follows:
 - i. specify **IMAGE_BW** to send frames by camera;
 - ii. only plates will be observed at minimum resolution;
 - iii. specify a date and time in the list to send time intervals to the database.
At the moment of writing the document the following types are supported:
%DATE%TIME%PLATE_STRING%PLATE_COUNTRY%OCRSCORE%SPEED%CLASS%DIRECTION%IMAGE_BW%PLATE_MIN_X%PLATE_MIN_Y%PLATE_MAX_X%PLATE_MAX_Y.
- b. Enter the IP address of the computer with installed *Auto PSIM* software in the **Server IP** field;
- c. Enter the number of port at which data will be sent in the **Server Port** field. The fixed port for the Axxon PSIM software package is 32000. Ensure that this port is not used by other processes.

After the required settings are performed, create and configure the corresponding objects in the *Auto PSIM* software package:

1. Go to the **Hardware** tab of the **Settings** dialog box of the *Auto PSIM* software. Create the **Video Capture Device** on the base of **Computer** object. In the right part of **Hardware** tab the settings panel will display.

The screenshot shows the 'Settings' dialog box for 'Video capture device 1'. The left sidebar contains a 'Computer' section with a 'Disable' checkbox and a dropdown menu showing 'Computer WORK-PC'. The main area is divided into two panels. The right panel contains the following settings:

- Type: Tattile (dropdown, marked with 1)
- Model: (dropdown)
- Firmware: (dropdown)
- PCI channel: 00 (dropdown), Signal: PAL (dropdown)
- Resolution: Standard (dropdown)
- Rate: (slider, marked with 1, 2, 3, 4)
- IP address: 62.98.61.37 (text field, marked with 2)
- Port: 31000 (text field, marked with 3), RTSP: (text field)
- Name: superuser (text field)
- Password: (masked text field)
- Activate watchdog: (checkbox)
- Use device settings: (checkbox)

At the bottom of the dialog, there is a 'Basic settings' tab and two buttons: 'Apply' and 'Undo' (marked with 4).

2. Select the type of configured camera in the **Type** drop-down list (1).
3. Enter the IP address of connected device in the **IP address** field (2).
4. Enter the number of port in the **Port** field (3). Default number of port is 31000.
5. To save changes click the **Apply** button (4).

To enable the remote identifier operation, do the following:

1. Create the **Embedded detection** object on the base of **Camera** object. Enter the **anpr-detector** value in the **ID in device terms** field.

2. To save changes click the **Apply** button.

i Notes

- For license plates identification in the *Auto PSIM*, create the **Remote recognition** object on the base of the **LPR channel** object and configure the **LPR channel** object (see [Activating the software module used for identifying license plates](#)).
- In order for the uploaded frames and events to be displayed in the user interface, it is necessary to create and configure the **Monitor** and **Vehicle Tracer** objects on the **Interfaces** tab (see [The Vehicle Tracer interface module](#)).

Configuring of VEGA Access and VEGA III cameras by Tattile manufacturer for working with the *Auto PSIM* software package is completed.

i Note.

The camera will send frames and metadata while the detector operation. If the **Color** mode is selected in the camera settings program, then the camera will send 2 photos:

- black and white – to display the license plate;
- color – to display a frame of the vehicle's video image.

5.2.16 Traffic violations detection

Video camera mounting and setup requirements for the Traffic violations detection

The following camera functions should be disabled:

1. Video information accumulation mode/night mode.
2. Permanent automatic image sharpness adjustment.
3. Motion detectors.
4. Any information from the camera (name, date, time, etc.) inserted in the video image.

Basic characteristics of used video cameras are presented in the [General requirements for mounting and configuring of cameras](#) section.

i Note.

Digital video cameras also can be in use for working with the *Traffic violations detection* module. Testing with IP-cameras is not be performed.

Note.

There are no any limitations for fps for the *Traffic violations detection* module.

The Traffic violations detection functionality

The *Traffic violations detection* module is designed for identifying vehicles that have passed on the red light. Identifying is performed in real time.

The *Traffic violations detection* module supports the following functionality:

1. Setting the alarm when the red light passing is detected.
2. Setting the alarm when the vehicle going through the stop line on the red light.
3. Setting the alarm when the vehicle stops over the crosswalk line on the stoplight.
4. Registering the events in the database.

Attention!

The *Traffic violations detection* is in full operation with the *AUTO-Uragan, VT, IV* and *RR* recognition modules. Only the *Red light violation* will be recognized while join operation of the *Traffic violations detection* module and the *AR-Auto* recognition module. Other violations will be inaccessible.

Setting up the Traffic violations detection module

For the *Traffic violations detection* module operation program module for identifying the plates and that is being set up is required (see [Activating the program module, used for identifying the plates](#) section).

Attention!

For correct operation of the *Traffic violations detection* module configure the synchronous video camera from which frames and video fragments will be saved (detailed information about configuring the synchronous video camera is presented in the [Select cameras to work with the LPR channel](#) page).

To set the *Traffic violations detection* module, do the following:

1. Go to **Traffic violations detection** object settings panel, which is created on the basis of **LPR channel** object.

The screenshot shows the configuration interface for 'Traffic violations detection'. It features several input fields and dropdown menus, a checkbox, and a table. The interface is annotated with numbers 1 through 12 corresponding to the steps in the instructions.

LPR channel	Sensor	State	Alarm type

2. In **Traffic lights signal** dropdown list select the object (**Sensor** or **Traffic Light Detection**) by signal of which the light of traffic light is detected (1).

Note.

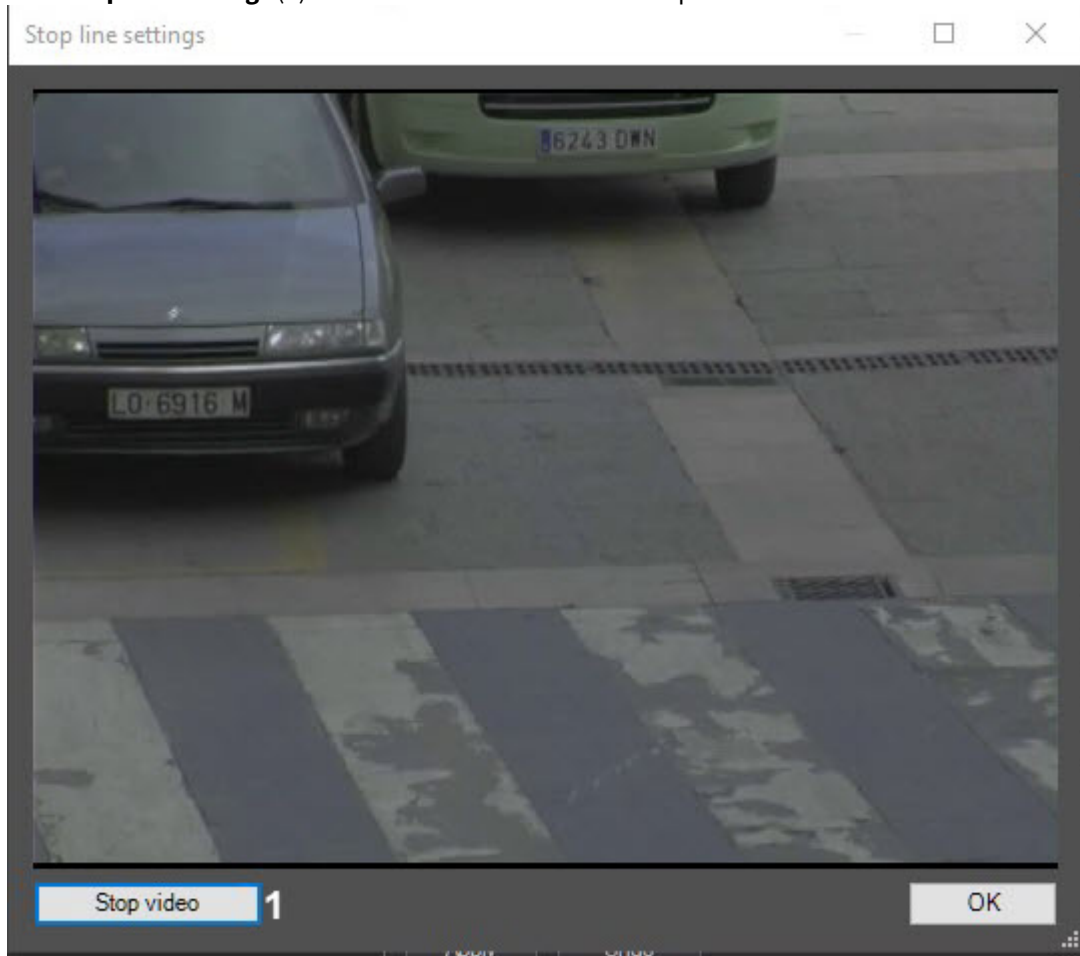
Information about **Sensor** object is presented in the [Creating and configuring the Sensor system object](#) section. Information about *Traffic Light Detection* module is presented in *DetectorPack PSIM. User Guide* document (see [DetectorPack PSIM](#)).

Attention!

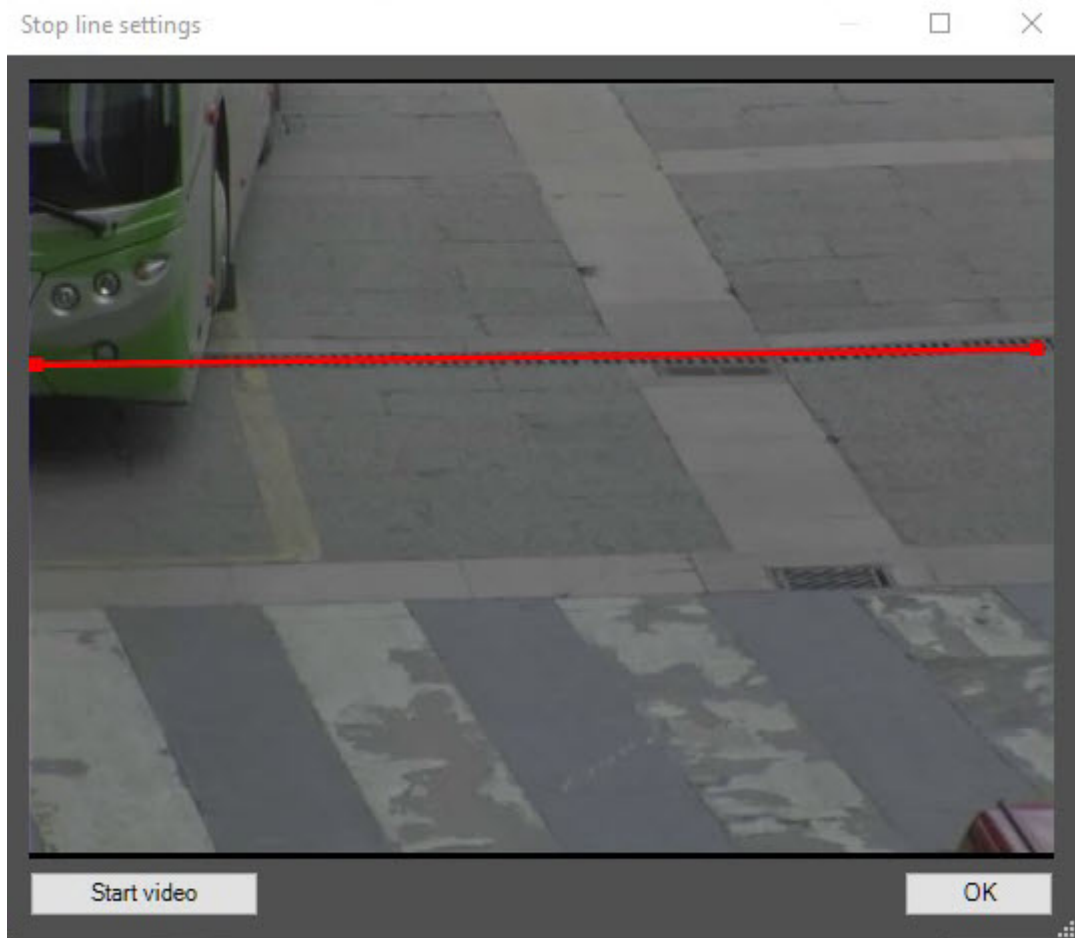
For correct operation of the *Traffic violations detection* module disarm the corresponding **Sensor** object.

3. From the **Alarm direction** dropdown list select the signal of traffic light detection on which the traffic violations detection is to be responded (2).
 - a. Basic – to fix violation use the base signal of the traffic light.
 - b. Left – to fix violation use the left arrow of the traffic light.
 - c. Right – to fix violation use the right arrow of the traffic light.
4. Set the **Draw stop line** checkbox if it's necessary to overlay a stop line before the traffic light (3).
5. Set up the stop line displaying:

- a. Click **Stop line settings (4)**. The window of the same name opens.

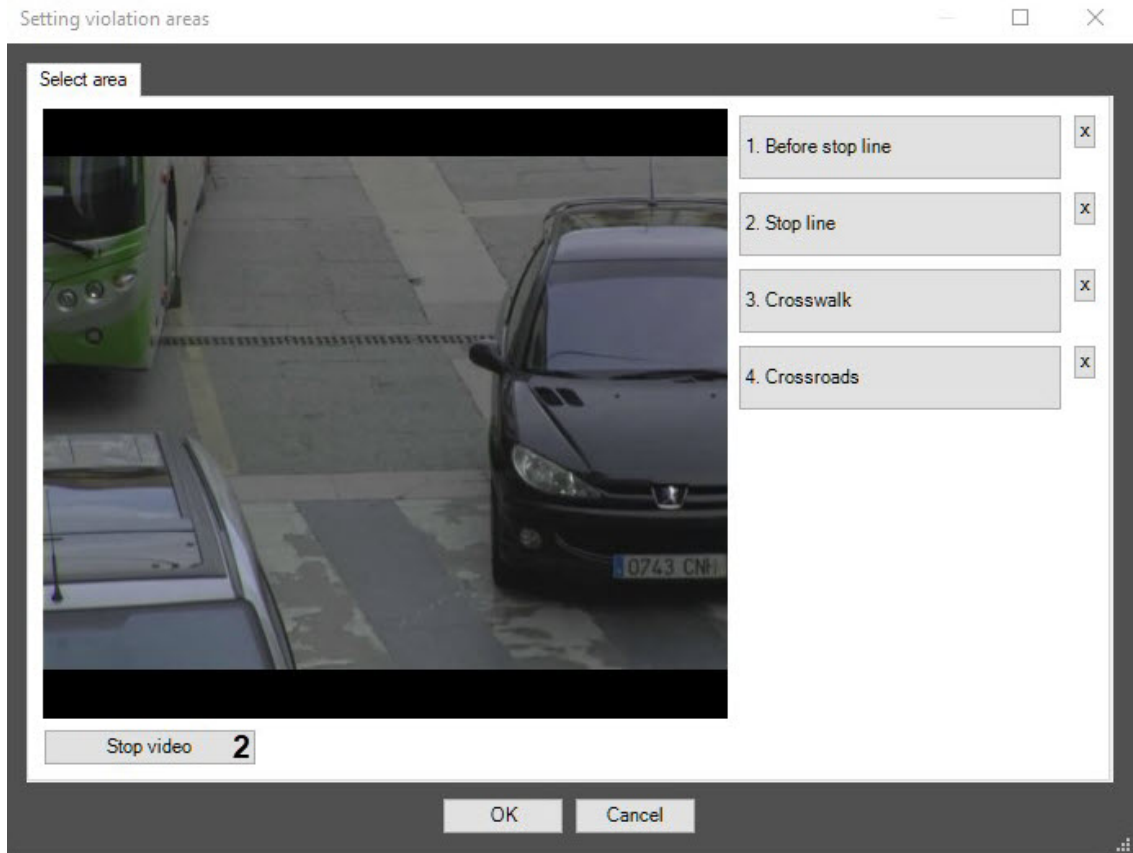


- b. Click **Stop video (1)** to set the stop line. As the result the frame on which it's necessary to set the stop line, is displayed.

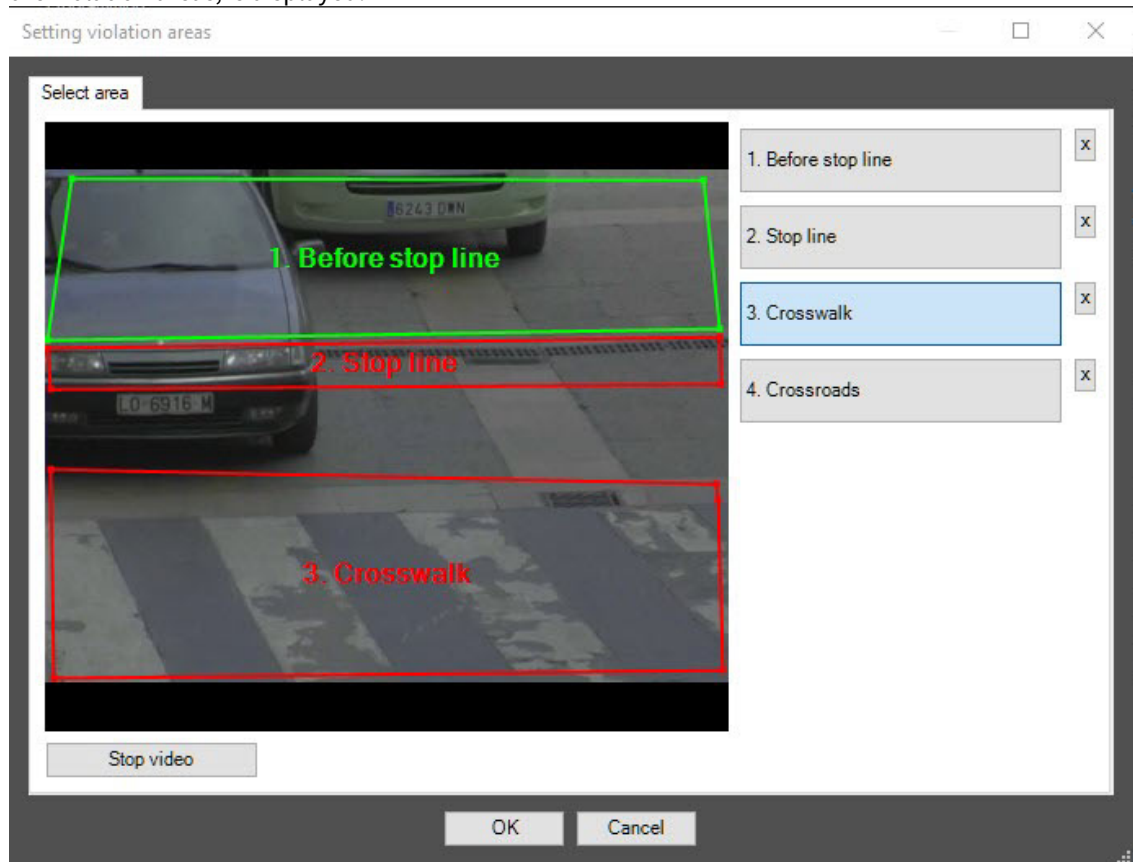


- c. Set the stop line. To set the stop line, click the road edge in the image, press the left mouse button, drag the cursor to another edge of the road in the video frame.
 - d. Click **OK**.
6. Set up the displaying of violation areas:

- a. Click **Setting violation areas (5)**. The window of the same name opens.



- b. Click **Stop video (2)** to set the violation areas. As the result the frame on which it's necessary to set the violation areas, is displayed.



- c. Set the areas corresponding to following zones: before stop line. stop line, crosswalk, crossroads. To set the violation areas, click the points corresponding to the boarder of selected area in the video frame.
- d. Click **OK**.

Note.

To remove the area click the  button close to the corresponding button.

7. In the **Delay in violation registering** field enter time (in milliseconds) that determines the time interval after which after switching on a red light the violations will fix (**6**).
8. In the **Time of stop for recording** field enter time (in milliseconds) that determines the time interval during which the vehicle should stay still while registering the **Stop over crosswalk line** violation (**7**).

Note

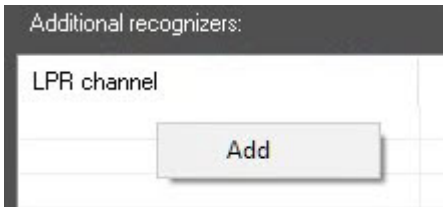
If the **Stop over crosswalk line** violation is registered incorrectly, you can change the values of the registry key parameters that affect its accuracy. Changing the registry key parameters values enables the alarm activation even if only one plate is recognized at the crosswalk, regardless of the vehicle movement. To do this, change the **Alarms.CrossWalkOne** and **Alarms.LimitedByBestResult** values to **1** (for details, see [Registry keys reference guide](#) and [Working with Windows OS registry](#)).

9. In the **Number of pictures to trace alarm** field specify number of photos which will be stored from the moment of LP recognizing on the base recognizer to the moment of LP recognizing on the additional recognizer (**10**).
10. In the **Add.photos** field enter the number of photos made before the licence plate fixing and after its going out the control zone (**8**).
11. In the **Interval** field enter time (in milliseconds) that determines the time interval between saving additional photos (**9**).

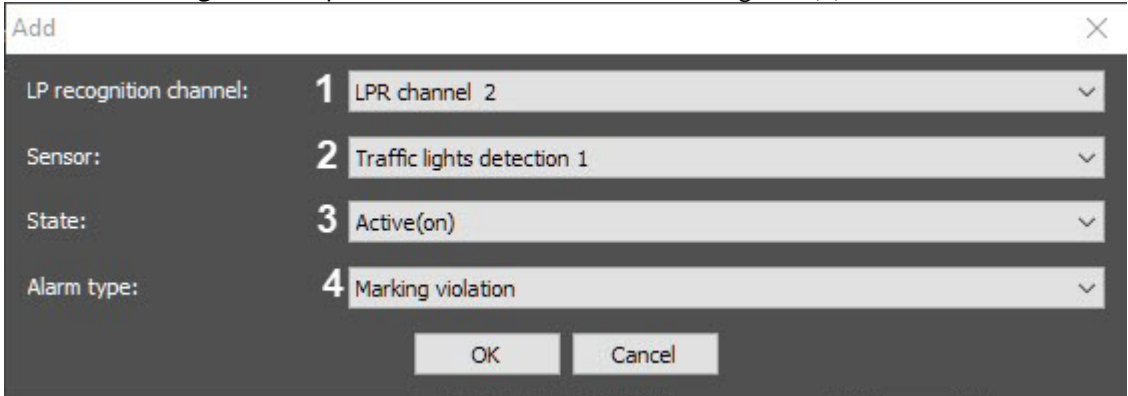
⚠ Attention!

For correct operation of synchronized frames recording set the checkbox in **Automatic recording on LPR channel** object setting panel and set value of time that is bigger than the product of **Number of frames for saving** and **Interval of frame saving** parameter points.

12. In the **Additional recognizers** table specify additional LPR channels if it's required to use them along with the base recognizer (**11**).
 - a. To add additional recognizer right-click in the **Additional recognizers** list, then click **Add** in the drop-down menu.



- b. From the **LP recognition** drop-down list select the additional recognizer (**1**).



- c. From the **Sensor:** drop-down list select the sensor which will send events about traffic light operation (2).
 - d. From the **State** drop-down list select event from the sensor on which violation will be fixed (3).
 - e. From the **Alarm** drop-down list select the corresponding type of violation (4).
 - f. Click **OK**. The specified parameters will be added to the **Additional recognizer** table.

Additional recognizers:			
LPR channel	Sensor	State	Alarm type
LPR channel 2	Traffic lights detection 1	Active(on)	Marking violation

i Note.

To modify recognizers in the table, right-click the required recognizer to open the functional menu. Click **Delete all** button if the **Additional recognizers** table is to be cleared.

13. To save the changes click **Apply**.

Note

The recognition results can be saved to the hard drive for the *Traffic violations detection* module debugging. To do this, change the **SaveRecognitionResult** registry key parameter value to **1** (for details, see [Registry keys reference guide](#) and [Working with Windows OS registry](#)).

The *Traffic violations detection* module setup is complete.

Logic of working the *Traffic violation detection* is explained in the following example.

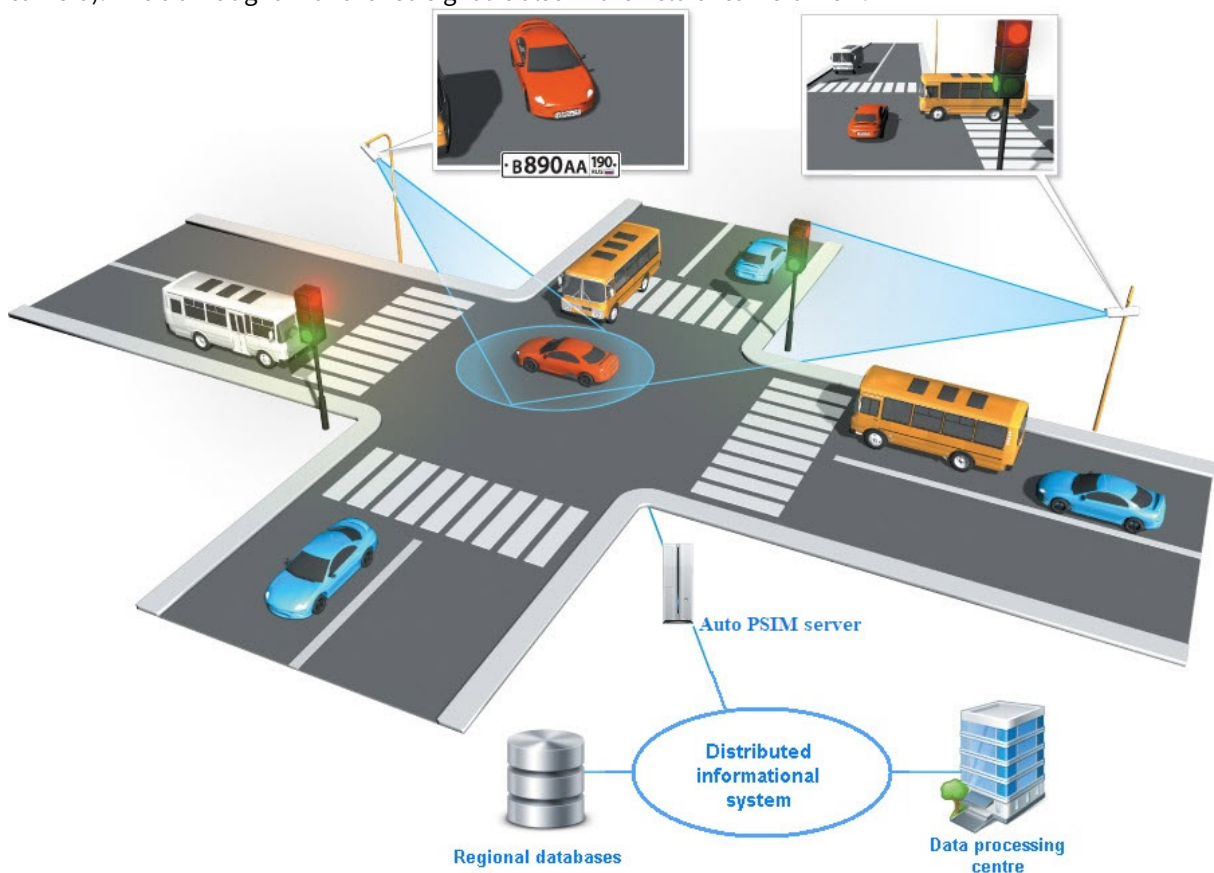
Example. The vehicle is going from zone 1 to zone 2. **Crossing over stop line** violation will be registered in case of the vehicle is not crossing the border of zone 3 during the delay in violation registering. Checking for **Stop over crosswalk line** violation is performed in case of vehicle is crossing the border of zone 3. In such case vehicle stay still during the time of stop for recording and **Stop over crosswalk line** violation is registered or the vehicle is crossing the border of zone 4 and **Crossing over crossroads on red light** violation is registered.

The installation diagram of video cameras for violations detections by all directions of signaled crossing depending on the number of lanes is follows.

Several cameras are used for this purpose:

- main camera – by one on each lane focused on the crossing and they detect and recognize license plates of vehicles entered to the crossing. Vehicles are moving to cameras;

- additional, overview camera directed behind vehicles entered to the crossing (vehicles are moving from the camera). The traffic light with the red signal is also in the field of camera view.



The *Auto PSIM* software package receives signal from traffic light controller that the red signal enabled. After this signal record by all cameras started. For each vehicle entered to the crossing the following are detected:

- image of vehicle and its license plate;
- recognized vehicle LP (in the text mode);
- image confirming that the red signal is enabled and vehicle is located on the forbidden place is detected by additional, overview camera.

The *Auto PSIM* software package allows combining of unlimited number of crossings in the one photo-video detection system of moving on the red signal of traffic light. Data about all detected violations on all crossings are automatically passing to the integrated database.

5.2.17 Parking violation detection

The Parking violation detection functionality

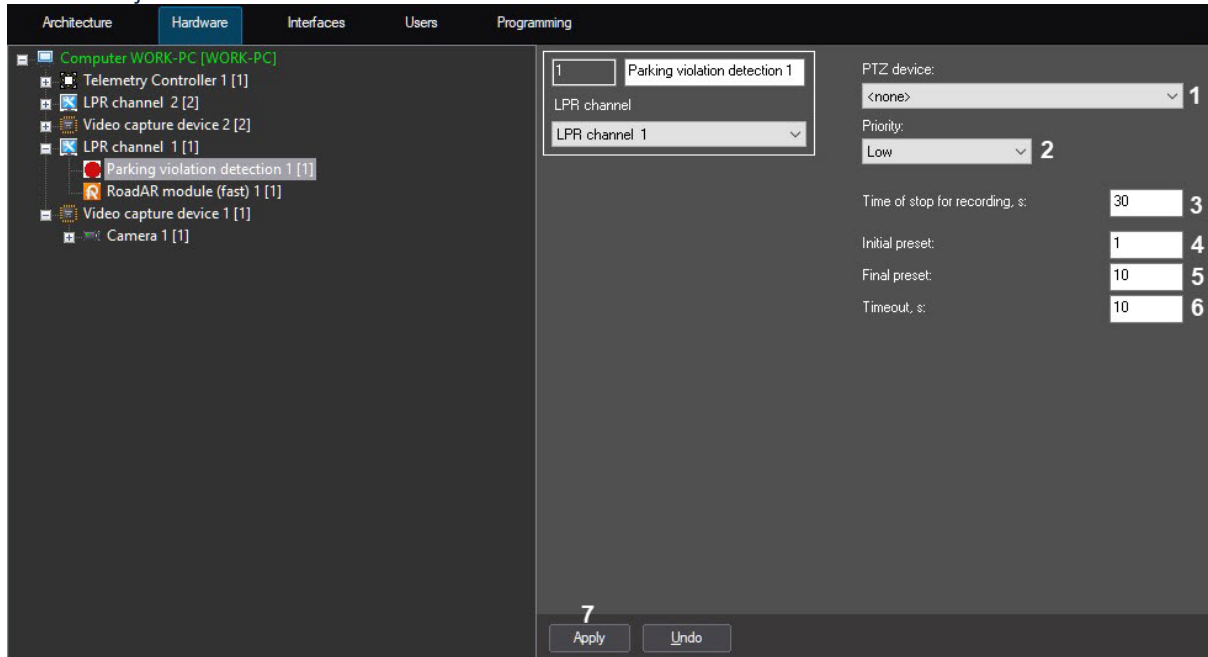
The *Parking violation detection* module is designed for identifying vehicles violated forbidding of stop during time interval exceeding the allowable interval. Allowable time of vehicle stop is specified in the settings panel of the **Parking violation detection** object.

Setting up the Parking violation detection module

The *Parking violation detection* module requires any customized software module for the license plate recognition (see [Activating the software module used for identifying license plates](#) section).

To set the *Parking violation detection* module, do the following:

1. Go to the settings panel of the **Parking violation detection** object, which is created on the basis of **LPR channel** object.



2. From the **PTZ device** drop-down list select the ptz device which will perform the passage between presets (1). For details, see [Configuring PTZ device in Axxon PSIM](#).
3. From the **Priority** drop-down list select the prz priority (2). If the selected priority is higher than the priority of the telemetry console, then the operator will lose control and the camera will turn to the parked vehicle.
4. In the **Time of stop for recording, s** field enter the time interval in seconds during which the vehicle can be in the frame (3). When the vehicle get into the frame, it's license plate is recognizing. If the recognized license plate is in the frame of the same preset more than specified time, the **Parking violation** alarm is generated.
5. In the **Initial preset** field enter the number of preset from which monitoring will start (4).
6. In the **Final preset** field enter the number of preset on which monitoring will finish (5).
7. In the **Timeout, s** field enter the time interval in seconds after which passage to the next preset will be performed (6).
8. Click **Apply** to save the changes (7).

Configuring of the *Parking violation detection* is completed.

5.2.18 Camera of recognition upon request

Setting up the Camera of recognition upon request module

The LPR channel enables license plate recognition upon request using the **Camera of recognition upon request** object. This object allows you to configure the camera so that it captures and sends a video image to the recognition module after a specific trigger activates. It can be, for example, a macro, a script, or some event.

Note

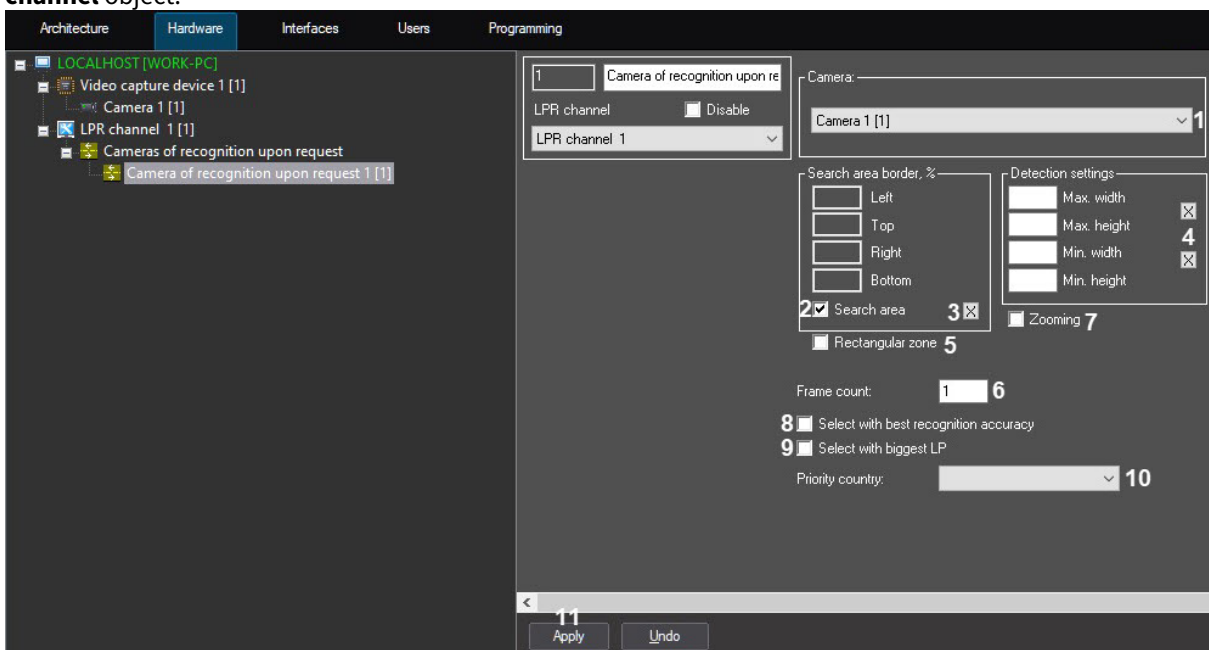
For now this functionality is implemented for *AR-Auto*, *VT*, *RR*, *AR-Railway* recognition modules only.

Note

When using the **Camera of recognition upon request** object along with the *VT* recognition module, we recommend disabling **VodiCTL_VPW_DYNAMIC_ENABLE** in the SDK tweaking, that is, setting the **False** value of this parameter, to prevent repeated recognition (see [The settings panel of the VT module object](#)).

Configure the recognition upon request as follows:

1. Go to the **Camera of recognition upon request** settings panel created on the basis of the **LPR channel object**.



2. From the **Camera** drop-down list (1), select the camera that will work upon request.


Note

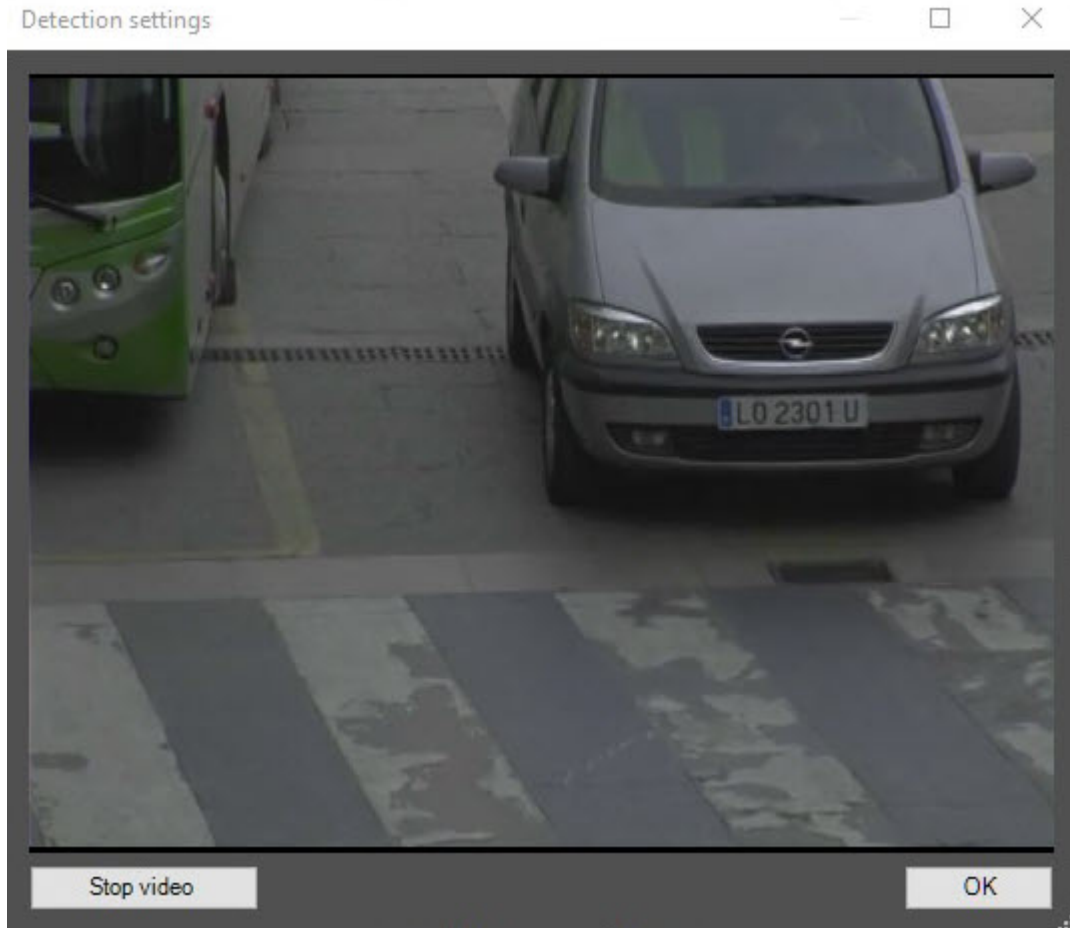
- You can select the same camera in the several **Camera of recognition upon request** objects.
- When you select a camera in the settings of the **Camera of recognition upon request** object, it becomes impossible to select any camera on the settings panel of the **LPR channel** object (see [Select cameras to work with the LPR channel](#)).

3. Set the **Search area** (2) checkbox to enable setting the search area border of the license plate in the frame.
 - a. In the **Left**, **Top**, **Right**, and **Bottom** fields, set manually or using the button (3), by clicking which, the interactive interface for setting search area borders of the vehicle license plate appears—a video image from the corresponding camera. You can set an arbitrary search area using the segments. To select a rectangular search area, set the **Rectangular zone** checkbox (5).

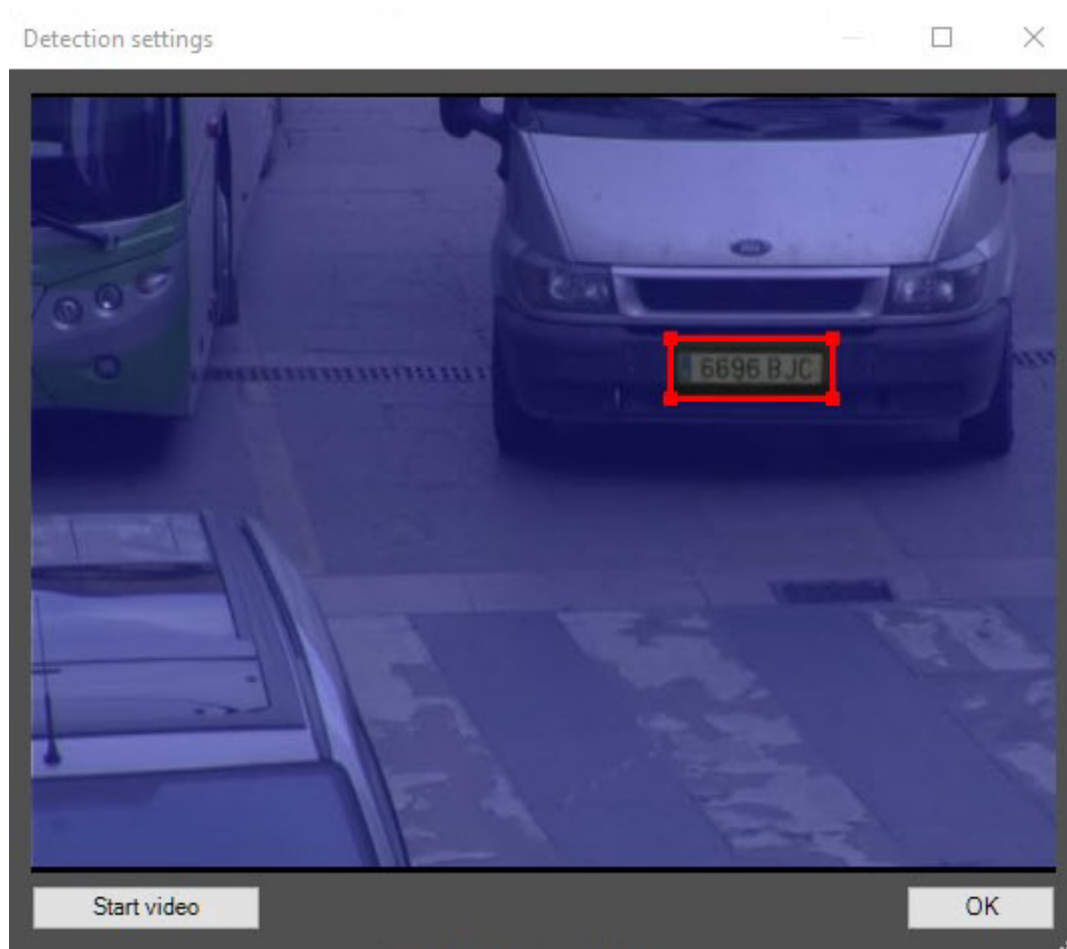
Note

The values in the **Left**, **Top**, **Right**, and **Bottom** fields are specified as percentages of the surveillance window.

4. Set the maximum and minimum size of license plates:
 - a. Set the **Max.width** and **Max.height** parameters manually or using the  button (4), by clicking which, the interactive interface for setting the zone parameters appears—a video image from the corresponding camera.



- b. When required, click the **Stop video** button, select the required area using the left mouse button, and then click the **OK** button.



Results of setting zone parameters will automatically appear in the **Max.width** and **Max.height** fields.

Set the **Min.width** and **Min.height** parameters in the same way.

- For the **Frame count (6)** parameter, set the number of frames that are analyzed when recognizing the license plate.

Note

We recommend setting the number of frames to no more than **1**.

- Set the **Zooming (7)** checkbox to speed up the license plate recognition for megapixel cameras without any quality loss.

Note

This checkbox is relevant only when the width of the **Search area** is more than 150 pixels. The recognition speed increases:

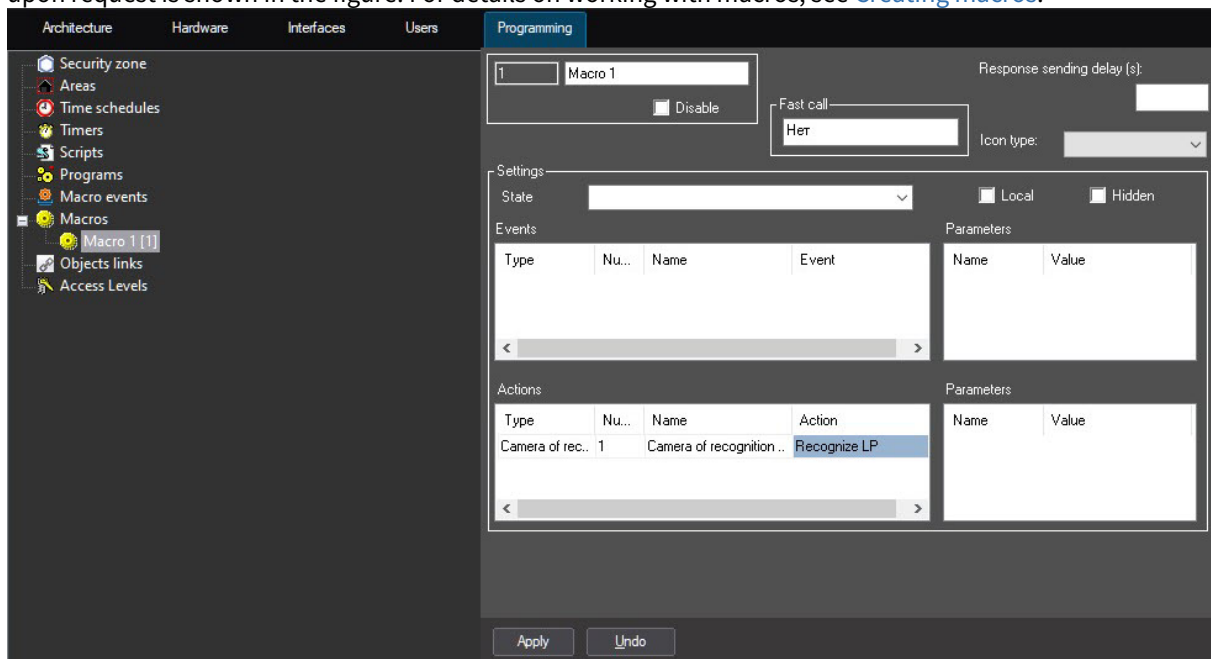
- 2 times if the value of the **Width** parameter is more than 150 pixels;
- 4 times if the value of the **Width** parameter is more than 400 pixels;
- 8 times if the value of the **Width** parameter is more than 800 pixels.

- Set the **Select with best recognition accuracy** checkbox (**8**) to show the recognition results with the highest accuracy rate, since the bigger LP size doesn't always result in better recognition accuracy. Operates only when using the *VT* recognition module.

8. Set the **Select with biggest LP** checkbox (9) to show the result with the biggest LP size. Operates only when using the *VT* recognition module.
9. From the **Priority country** drop-down list (10), select the country whose LPs must be shown first. Operates only when using the *VT* recognition module.
10. Click the **Apply** button (11).

You can configure the request, which will trigger the camera, in two ways:

1. **Using a macro.** To do this, go to the **Programming** tab in *Axxon PSIM* and select the **Macros** item in the programming tools tree. A window for creating a macro will open, enabling you to create an event of any complexity that will trigger the recognition upon request. An example of the simplest macro for recognition upon request is shown in the figure. For details on working with macros, see [Creating macros](#).



2. **Using a script or the IIDK interface.** To do this, go to the **Programming** tab in *Axxon PSIM* and select the **Scripts** item in the programming tools tree. A window for creating a script will open, enabling you to create an event of any complexity that will trigger the recognition upon request. For details on working with scripts, see [Creating a script](#). An example of a simple script for working with a camera for recognition upon request is shown below.

```
QUERY_CAMERA | ID | RECOGNIZE
```

where ID is the ID of the camera in the *Axxon PSIM* objects tree.

For details on the IIDK interface, see [Axxon PSIM Integration Developer Kit \(IIDK\)](#).

Setting the license plate recognition upon request is complete.

5.2.19 Vehicle Type Recognition module

The Vehicle Type Recognition Module functionality

The *Vehicle type recognition module* software module is designed to do the following:

1. Determine one of the following 6 vehicle types:
 - Undefined,

- Bus,
- Car,
- Motorcycle,
- Small bus,
- Truck.

2. Record the events about determining the vehicle type in the database.

 **Note**

It is possible to interact with the *Vehicle type recognition module* software module via HTTP requests (see [UrlServer](#)).

 **Attention!**

To ensure the *Vehicle type recognition module* operation, it is necessary to install the *DetectorPack PSIM* subsystem (see [DetectorPack PSIM. User Guide](#)). It is also necessary to configure any software module for license plate recognition (see [Activating the software module used for identifying license plates](#)) except the Remote recognition module, as it does not operate in conjunction with the *Vehicle type recognition module* (see [Remote recognition](#)).

Video camera mounting and setup requirements for the Vehicle Type Recognition Module

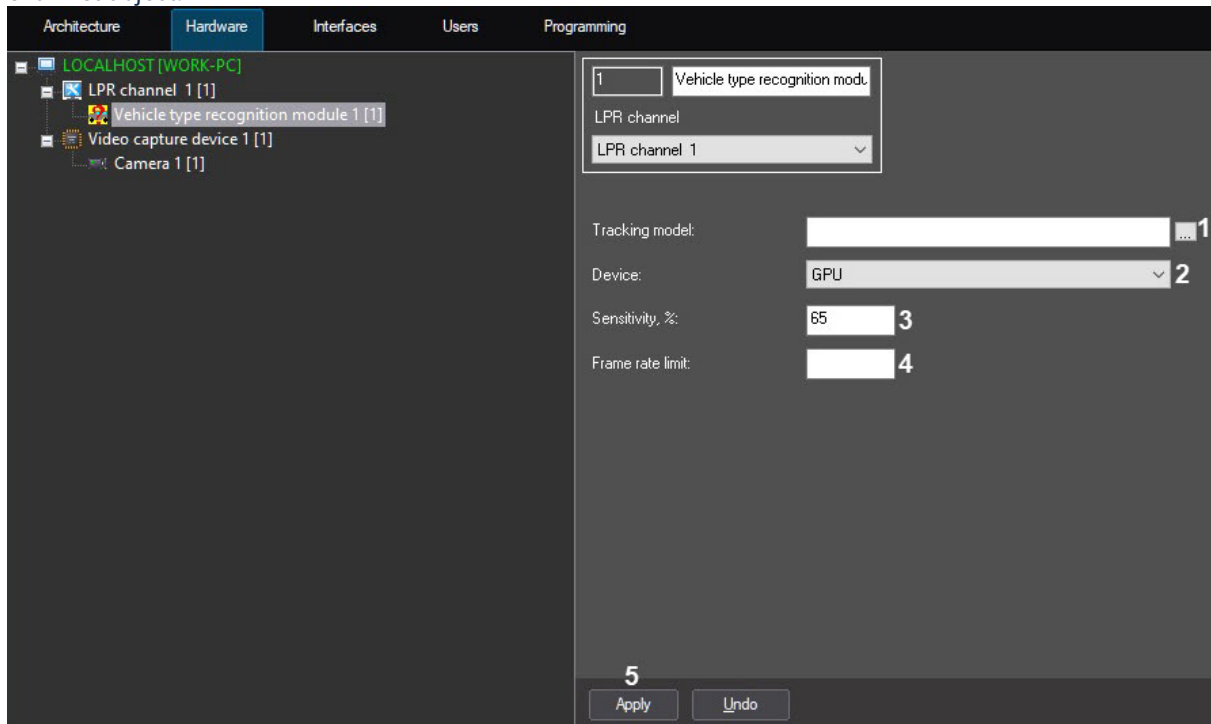
The video camera requirements for the *Vehicle type recognition module* operation are shown in the following table.

Camera specifications:	<ul style="list-style-type: none"> • It is recommended to use color cameras. When using black and white cameras, the detection quality can be noticeably worse. • Video resolution should be at least 640x480.
Images of objects:	<ul style="list-style-type: none"> • Vehicle area should be at least 10% of the frame area.

Setting up the Vehicle type recognition module

To configure the *Vehicle type recognition module*, do the following:

1. Go to the **Vehicle type recognition module** object settings panel, which is created on the basis of the **LPR channel** object.



2. Click the **...** button (1) and open the trained neural network file in the standard Windows box that opens.
3. From the **Device** drop-down list (2), select the device on which this software module will operate:
 - **CPU** – Central Processing Unit from Intel (not recommended).
 - **GPU** – NVIDIA GPU.
4. In the **Sensitivity, %** field (3) specify the module sensitivity - an integer value in the range from **0** to **100**.

Note

The sensitivity is determined experimentally. The lower the sensitivity, the greater the likelihood of a false vehicle type recognition. The higher the sensitivity, the less likely the false vehicle type recognition, but some useful tracks may be skipped.

5. In the **Frame rate limit** field (4), enter the number of frames that will be sent for analysis. Frame decimation is performed at an interval, which is defined as: **Initial number of frames/Frame rate limitation**. If the field is empty, then all frames will be sent for analysis; if the value **0** is specified, then no frames will be sent.
6. Click **Apply** (5).

Note

It is possible to change the number of frames that are stored in the buffer for the Vehicle Type Recognition Module (UrlServer). To do this, change the value of the **UrlServerFrameBuffer** parameter (for details, see [Registry keys reference guide](#), for more information about working with the registry, see [Working with Windows OS registry](#)).

Configuring the *Vehicle type recognition module* software module is completed.

Saving the frames processed by the Vehicle Type Recognition module

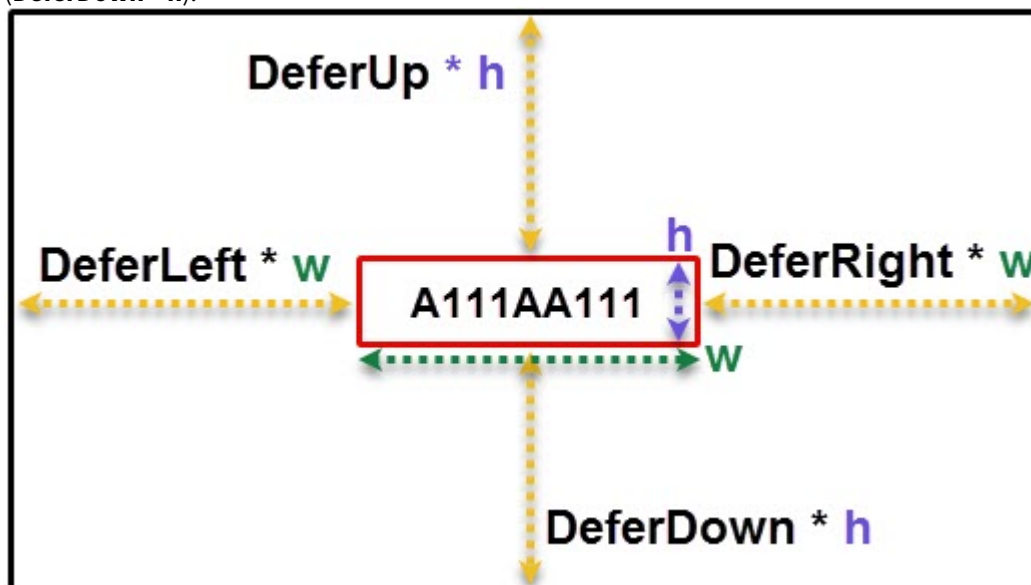
- ✓ [Registry keys reference guide](#), for details about working with the registry, see [Working with Windows OS registry](#).

Saving the frames processed by the *Vehicle type recognition* module may be necessary for training the neural network or for debugging the module (see [UrlServer debug window](#)).

To enable saving the frames processed by the *Vehicle Type Recognition* module (UrlServer), namely a cropped frame that shows only a vehicle, it is necessary to specify the path to the folder in which these frames will be saved in the **SavePictures** registry key.

If the frame is not cropped correctly (the vehicle is cropped or there are foreign objects present in the frame), it is necessary to empirically determine the right cropping parameters as follows:

1. For the **DeferLeft** registry key, specify the coefficient by which the number plate width will be multiplied. The photo will be cropped from the left relative to the number plate at a distance equal to the product (**DeferLeft * w**).
2. For the **DeferRight** registry key, specify the coefficient by which the number plate width will be multiplied. The photo will be cropped from the right of the number plate at a distance equal to the product (**DeferRight * w**).
3. For the **DeferUp** registry key, specify the coefficient by which the number plate height will be multiplied. The photo will be cropped from the top relative to the number plate at a distance equal to the product (**DeferUp * h**).
4. For the **DeferDown** registry key, specify the coefficient by which the number plate height will be multiplied. The photo will be cropped from the bottom relative to the number plate at a distance equal to the product (**DeferDown * h**).



5.2.20 RR vendor and model recognizer

The functionality of RR vendor and model recognizer module

The *RR vendor and model recognizer* module supports the following functionality:

- recognition of the vehicle manufacturer;

- recognition of the vehicle model;
- recognition of the type of vehicle (car, bus, truck, light commercial vehicle, motorcycle, trolleybus);
- recognition of the vehicle color;
- recording the recognized characteristics into the database and displaying the corresponding information in the **Online monitor** window.


 **Note**

One of the software modules for license plate recognition should also be used for the *RR vendor and model recognizer* module operation (see [Activating the software module used for identifying license plates](#)).

Licensing of the RR vendor and model recognizer module

The *RR vendor and model recognizer* software module is licensed for each object of this module.

Hardware requirements for the RR vendor and model recognizer module

 [Requirements for the hardware and software platform](#)

When you work with the *RR vendor and model recognizer* module, the devices must meet the following requirements:

Device	Requirements for the supported model
CPU	<ul style="list-style-type: none"> • Intel Core 6th generation and later, Intel Xeon v4 and later • Support for the AVX2 instruction set, listed here • Movidius/Neural Compute Stick devices are formally supported but aren't regularly tested
Nvidia GPU	<ul style="list-style-type: none"> • NVIDIA GTX 1050 Ti and later • At least 2 GB of video memory • Compute Capability: 3.5–8.9. You can check the Compute Capability version of your GPU on the manufacturer's website • Support for CUDA 11.8. CUDA is compatible with the following architectures: Kepler (partial), Maxwell, Pascal, Volta, Turing, Ampere (partial), and Ada Lovelace (see CUDA). NVIDIA drivers version 450.36.06 or higher are required. We recommend installing the latest driver from the official website
Intel GPU	<ul style="list-style-type: none"> • Intel Arc Family, Intel Data Center GPU Flex Series (including 140/170 models) • Intel HD Graphics, Intel UHD Graphics, Intel Iris Xe Graphics and later • Other platforms listed in the OpenVINO official documentation are likely to be supported, but their compatibility with the detector hasn't been tested

For the correct operation of the *RR vendor and model recognizer* module on the Windows Server r12 platform:

1. Install the Windows Server Essentials Media Pack from the [Microsoft official website](#).
2. Add the Windows Server Essentials Experience role (for example, via Server Manager).
3. Configure Windows Server Essentials.
4. Install the Windows Server Essentials Media Pack again.

Video camera mounting and setup requirements for the RR vendor and model recognizer module

To ensure the recognition of the vehicle characteristics using the *RR vendor and model recognizer* software module, it is necessary to install and configure the video cameras in such a way that the following requirements are met:

Camera specifications	<ul style="list-style-type: none"> • Recognition of the vehicle manufacturer and model: color or black and white image • Recognition of the vehicle color: color image
Video image	<ul style="list-style-type: none"> • The vehicle must be completely in the frame • The width of the vehicle in the frame is at least 100px
Lighting	<ul style="list-style-type: none"> • Recognition of the vehicle color: good lighting conditions

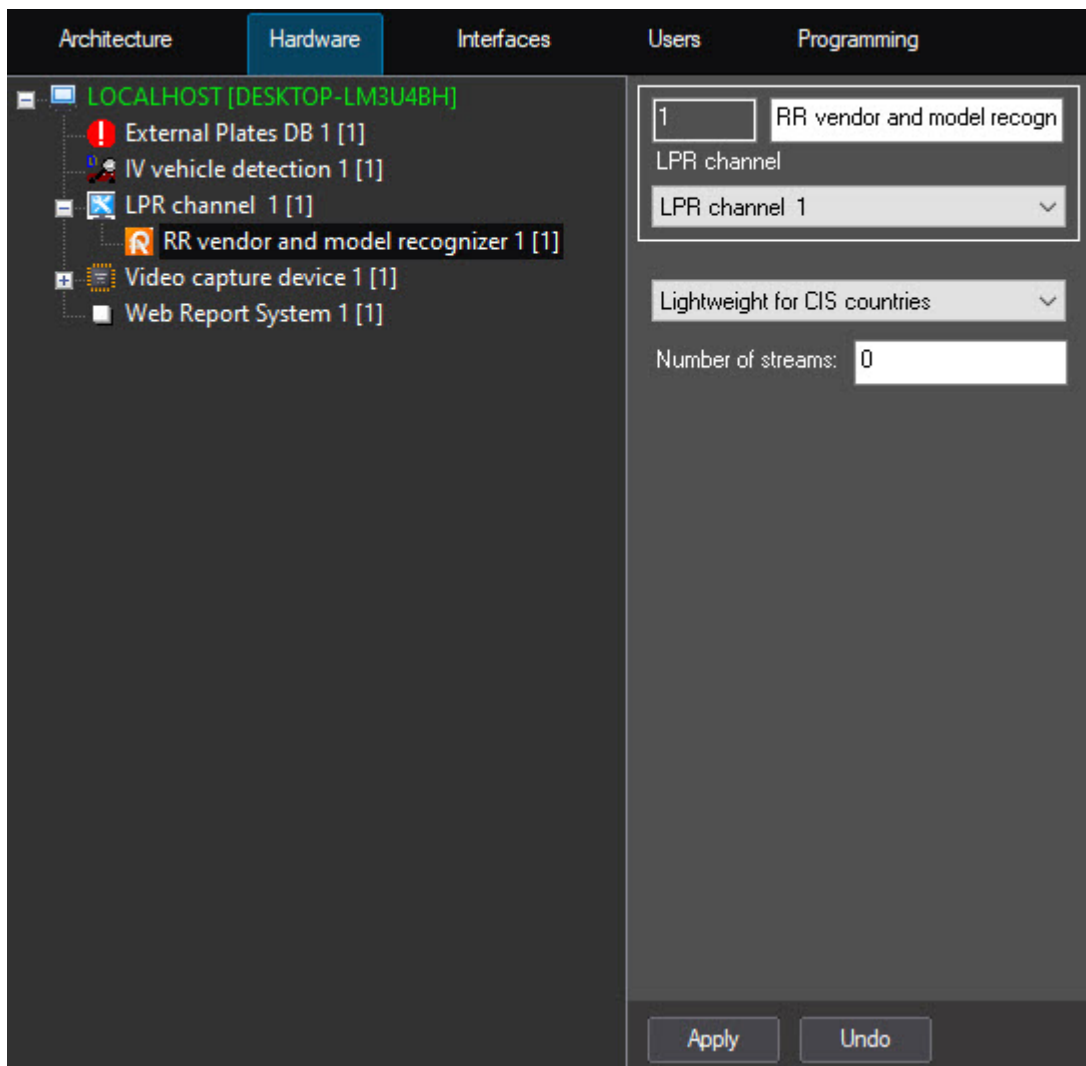
Configuring the RR vendor and model recognizer module

Note

If you create several *RR* recognition channels, the load on the CPU cores can be uneven, because the even distribution mode isn't enabled by default. To enable it, set the **1** value for the string parameter of the **IsProcessObject** registry key (see [Registry keys reference guide](#)). In this case, each recognition channel is started in a separate process.

To configure the *RR vendor and model recognizer* module, do the following:

1. Go to the settings panel of the **RR vendor and model recognizer** object that is created on the basis of the **LPR channel** object.



2. From the drop-down list, select the type of neural network for recognizing vendors and models of *RR* vehicles:
 - a. **Lightweight for CIS countries** (default);
 - b. **Medium-weight for CIS countries;**
 - c. **Lightweight for other countries;**
 - d. **Medium-weight for other countries.**
3. In the **Number of streams** field, specify the number of streams that the SDK of the *RR* recognizer uses during parallel computing. The **0** value (default) disables parallelization during license plate recognition.

⚠ Attention!

Increasing the number of streams during parallel computing also increases the load on the CPU. All changes are applied only after you restart *Axxon PSIM*.

4. Click the **Apply** button to save the settings.

⚠ Attention!

To increase the performance of license plate recognition, you can use computing resources of the graphics card. To do this, when configuring the **LPR channel** object (see [Select a device for license plate recognition](#)), from the **Use GPU** drop-down list, select the required device. By default, only CPU computing resources are used.

The start (initialization) time of the license plate recognition algorithm using a graphics card can take several minutes. No license plate recognition events are received until the initialization is complete.

GPU files are included in the distribution package starting with *Auto PSIM* version 1.0.1.293. No additional installation is required.

For *Auto PSIM* earlier than version 1.0.1.293, you must activate computing resources of a graphics card:

- a. Download the distribution package to activate the GPU for the *RR* module from the AxxonSoft [website](#).
- b. Unzip the downloaded archive.
- c. Put all files of the downloaded archive into the folder on the computer with installed *Auto PSIM* at C:\Program Files (x86)\Axxon PSIM\Modules64\UrmLpr\RR_gpu.

Configuration of the *RR vendor and model recognizer* module is complete.

5.2.21 Information-gathering subsystem

The Information-gathering subsystem functionality

On the page:

- [The IV vehicle detection functionality](#)
- [The Vehicle Processor functionality](#)

The information-gathering subsystem module is designed for:

1. Determining the overall parameters of vehicles that passed in camera's view.
2. Gathering information about traffic in general on the basis of vehicles' parameters statistic analysis.
3. Saving the information about traffic to database.

To realize the information-gathering subsystem features the following program modules should interoperate:

1. *IV vehicle detection*.
2. *Vehicle Processor*.

Use the *Web Report System PSIM* module to create reports based on the results the operation of data acquisition subsystem (see [WEB Report System PSIM. User Guide](#)).

The IV vehicle detection functionality

The *IV vehicle detection* module is the information-gathering subsystem about traffic in the *Auto PSIM* software complex.

The module is designed for:

1. Registering vehicle's entrance and exit from the detection zone.
2. Determining the speed of the vehicle.
3. Determining the class of the vehicle.
4. Transmitting the data about the vehicle to the *Vehicle Processor* module for handling and saving to the database.

The Vehicle Processor functionality

The *Vehicle Processor* module is a part of the information-gathering subsystem about traffic in the *Auto PSIM* software complex.

The module is designed for:

1. Statistic data analysis of vehicles, received from the *IV vehicle detection* module to gather overall information about vehicles.
2. Saving the data about traffic to the database.

Video camera mounting and setup requirements for the IV vehicle detection module

The angle of video camera objective should be around 60° for correct working of the *IV vehicle detection* module. This condition is defined by the following factors:

1. There are no geometric distortions of image corresponding to objectives with angle more than 60° .
2. Objective with angle 60° can cover several road lanes by contrast of long-focus objectives.

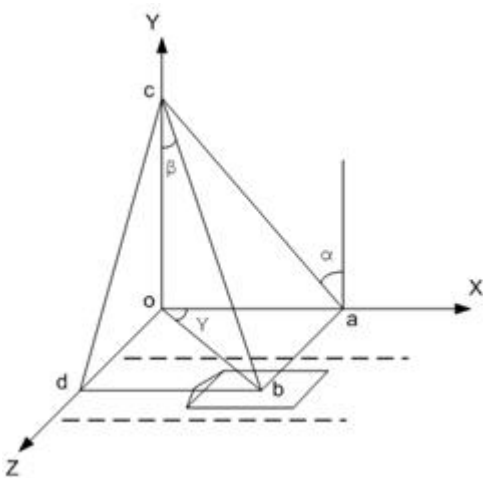
Requirements for video camera characteristics:

- recommended resolution: 360x240, 720x480 or 720x576;
- recommended frame rate: 25.

Location of video cameras is defined by the following interrelating factors while using the *IV vehicle detection* module:

- geometric parameters of detection zones;
- covering effect of vehicles moving by neighboring lanes.

Geometry of detection zone while using the *IV vehicle detection* module is presented in the figure. Video camera is located in the point C. Axis Y is align with video camera pier. Axis X is directed along a road against the current of traffic. Axis Z is perpendicular to a road. Lane of vehicles moving is presented by dashed line. Center of detection zone is presented by point b.



Size of detection zone is selected the following way:

1. Length of zone is 6 meters.
2. Width of zone is about 2 meters.

 **Note**

Width of detection zone can be varied to reduce covering effect of vehicles moving by neighboring lanes.

Covering effect of vehicles moving by neighboring lanes is missing if video camera is located strictly above the center of detection zone ("top view to lane").

 **Note**

In such case point b will coincide with origin of coordinates (see figure).

In other cases covering effect is observed especially for large vehicles.

The lower a video camera pier and the longer its location from center of zone by axis Z, the more significant a covering effect.

It is recommended to mount videocamera the following way:

1. Minimal height of video camera suspension is about 8 meters.
2. Pier should be located as close to the zone center by axis Z as possible.

It is recommended to mount objective axis perpendicularly to road to minimize value of accuracy error.

Traffic data gathering subsystem setup

Traffic data gathering subsystem setup procedure

Correct operation of Traffic data gathering subsystem is provided by two modules' interaction:

1. *IV vehicle detection*.
2. *Vehicle Processor*.

Setting up the IV vehicle detection parameters

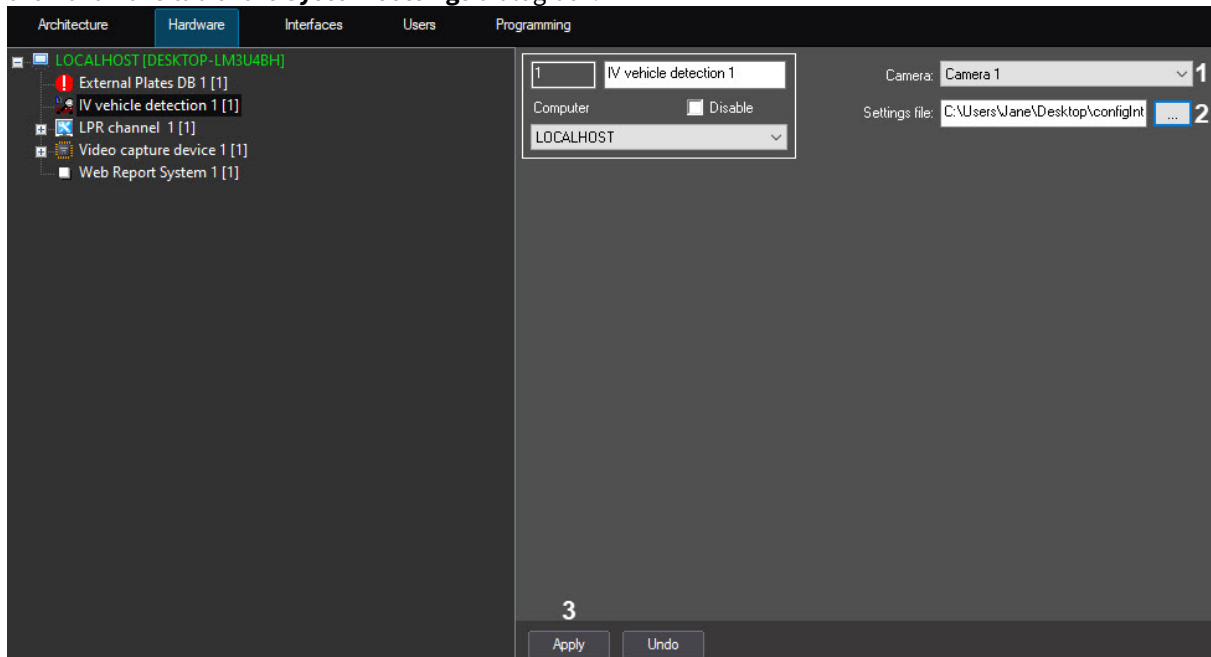
 **Attention!**


Allowable error at determining the number of vehicles is 10% and allowable error at vehicle types recognizing is 15%. Errors determination is performed while moving not less than 1000 vehicles in the camera field of view.

Setting up the *IV vehicle detection* parameters is done in the following way:

1. Execute the *IV vehicle detection* setup with the TestAppTMD.exe utility (see [TestAppTMD.exe utility for setting up the IV vehicle detection](#)).

- Go to the **IV vehicle detection** object setup panel which is created on the base of the **Computer** object on the **Hardware** tab of the **System settings** dialog box.



- From the **Camera** dropdown list select the **Camera** object, corresponding to the camera of the *IV vehicle detection* (1).
- Click the button  (2) and select the setup file in the JSON format created with the TestAppTMD.exe utility.
- To save the applied changes click **Apply** (3).

Setting up the *IV vehicle detection* parameters is completed.

Setting up the Vehicle Processor module

Vehicle Processor setup procedure

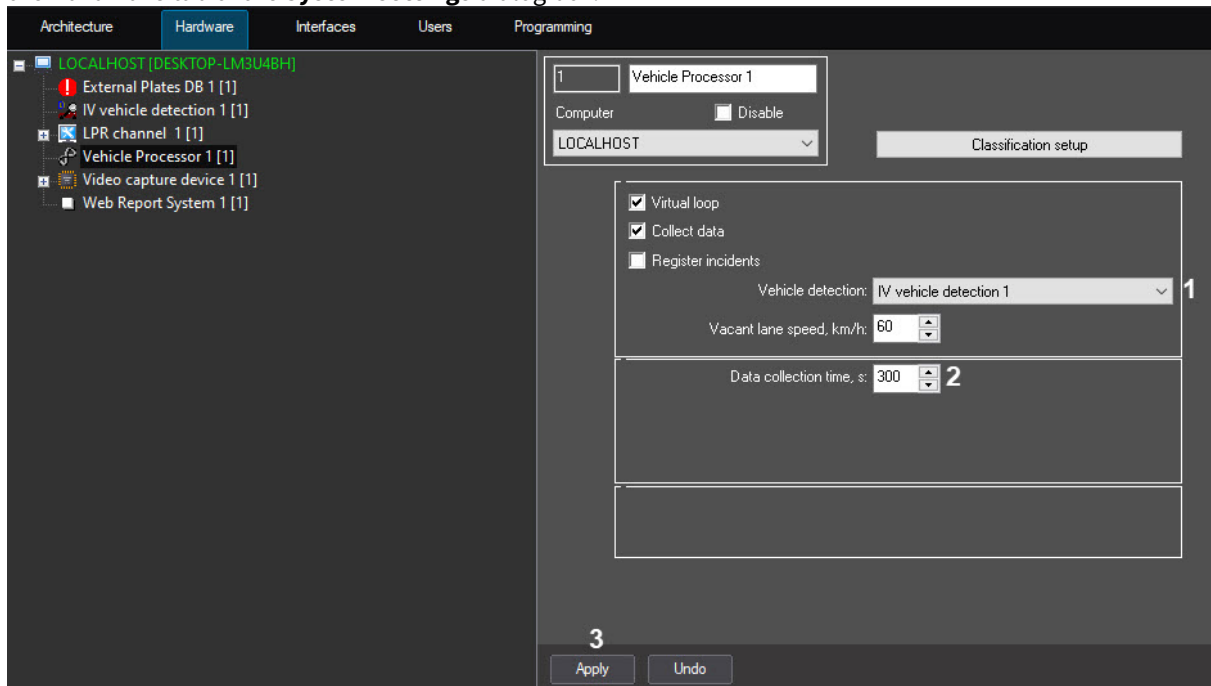
The *Vehicle Processor* module setup procedure:

- Set up *Vehicle Processor* and *IV vehicle detection* modules interaction.
- Select *Vehicle Processor* module's operation.
- Set the speed of the free stream.
- If it is necessary to set up the vehicle classification by length.

Setting up the Vehicle Processor and IV vehicle detection modules interaction

To set up the *Vehicle Processor* and *IV vehicle detection* modules interaction, do the following:

1. Go to the **Vehicle Processor** object settings panel, which is created on the base of the **Computer** object on the **Hardware** tab of the **System settings** dialog box.



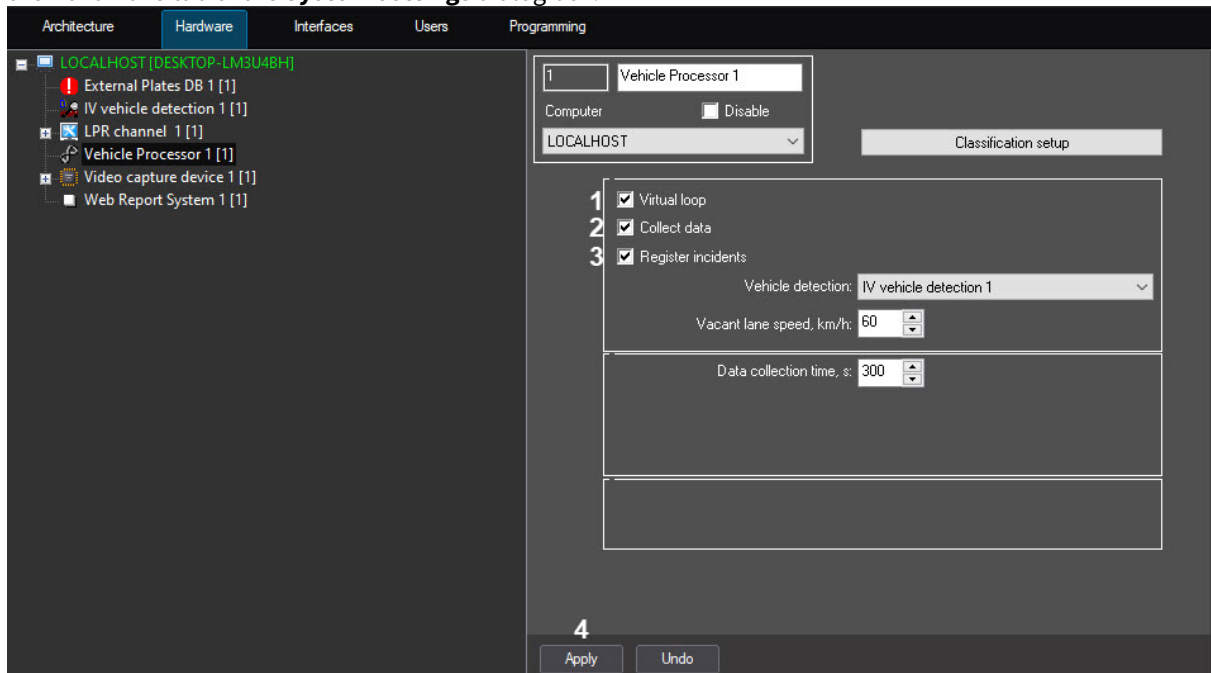
2. From the **Vehicle detection (1)** drop-down list, select the **IV vehicle detection** module.
3. In the **Data collection time, s (2)** field, enter the time period, during which the *Vehicle Processor* module receives messages from the *IV vehicle detection module* and makes the averaging of the traffic characteristics. Upon the expiry of this period the data is stored to the *Vehicle Processor* module database.
4. Click the **Apply (3)** button to save the changes.

Setting up the *Vehicle Processor* and *IV vehicle detection* modules interaction is completed.

Selecting the *Vehicle Processor* operation mode

To select the *Vehicle Processor* operation mode, do the following:

1. Go to the **Vehicle Processor** object settings panel, which is created on the base of the **Computer** object on the **Hardware** tab of the **System settings** dialog box.



2. To enable the mode of imitating the virtual loop, set the **Virtual loop (1)** checkbox. The result of this mode operation is retranslating the events of vehicles passing in and out from the detection zone, registered by the *IV vehicle detection* module. By default, the events are retranslated without storing to the *Vehicle processor* database. To enable storing the events to the database, perform the step 3.

Note

Vehicle speed will be displayed in the **Add. info** column of the **Event viewer** interface object if the **Virtual loop** checkbox is set.

Event viewer 1 [~203]

Source	Event	Region	Add. info	Card	Date and time
Vehicle Proce...	Virtual loop		115		25.08.2022 15:06:34
Vehicle Proce...	Virtual loop		128		25.08.2022 15:06:35
Vehicle Proce...	Virtual loop		96		25.08.2022 15:06:38
Camera 1	Harddisk rec				25.08.2022 15:06:42
Camera 1	Alarm				25.08.2022 15:06:42
Vehicle Proce...	Virtual loop		122		25.08.2022 15:06:43
Vehicle Proce...	Virtual loop		104		25.08.2022 15:06:46
Vehicle Proce...	Virtual loop		101		25.08.2022 15:06:53
Vehicle Proce...	Virtual loop		125		25.08.2022 15:06:57
Vehicle Proce...	Traffic status				25.08.2022 15:06:58
Vehicle Proce...	Virtual loop		117		25.08.2022 15:07:05

3. To enable the mode of collecting and storing vehicles information to the *Vehicle Processor* database, set the **Collect data (2)** checkbox .
4. To enable the registration mode and storing the incidents in the traffic to the *Vehicle Processor* database, set the **Register incidents (3)** checkbox .

Note.

At the moment of writing the documentation, only the **Meeting of traffic incidents** are registered.

- Click the **Apply (4)** button to save the changes.

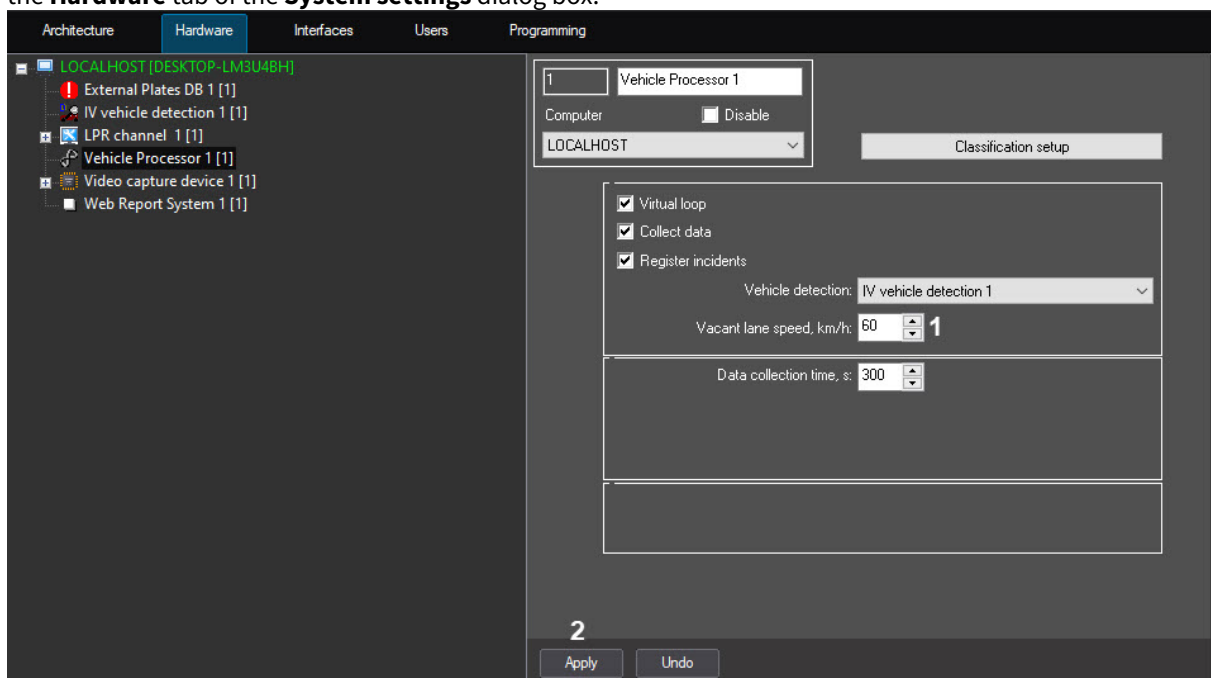
Selecting the *Vehicle Processor* operation mode is completed.

Setting up the vacant lane speed

The **Vacant lane speed** constant characterizes the detected road area and is stored to the database if, for the time of the data collection, no vehicle has been registered.

To set up the vacant lane speed, do the following:

- Go to the **Vehicle Processor** object settings panel, which is created on the base of the **Computer** object on the **Hardware** tab of the **System settings** dialog box.



- In the **Vacant lane speed, km/h (1)** field, enter the speed in km/h of a vacant lane speed in the detection zone.
- Click the **Apply (2)** button to save the changes.

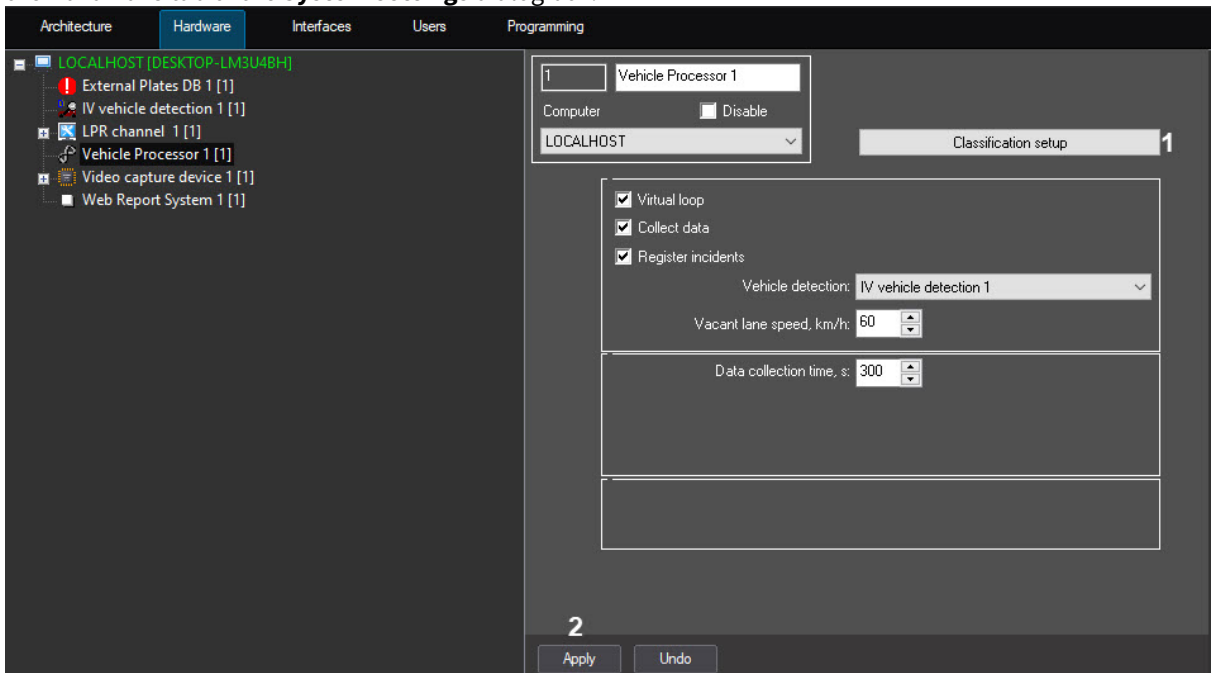
Setting up the vacant lane speed is completed.

Setting up the vehicles classification according to the length

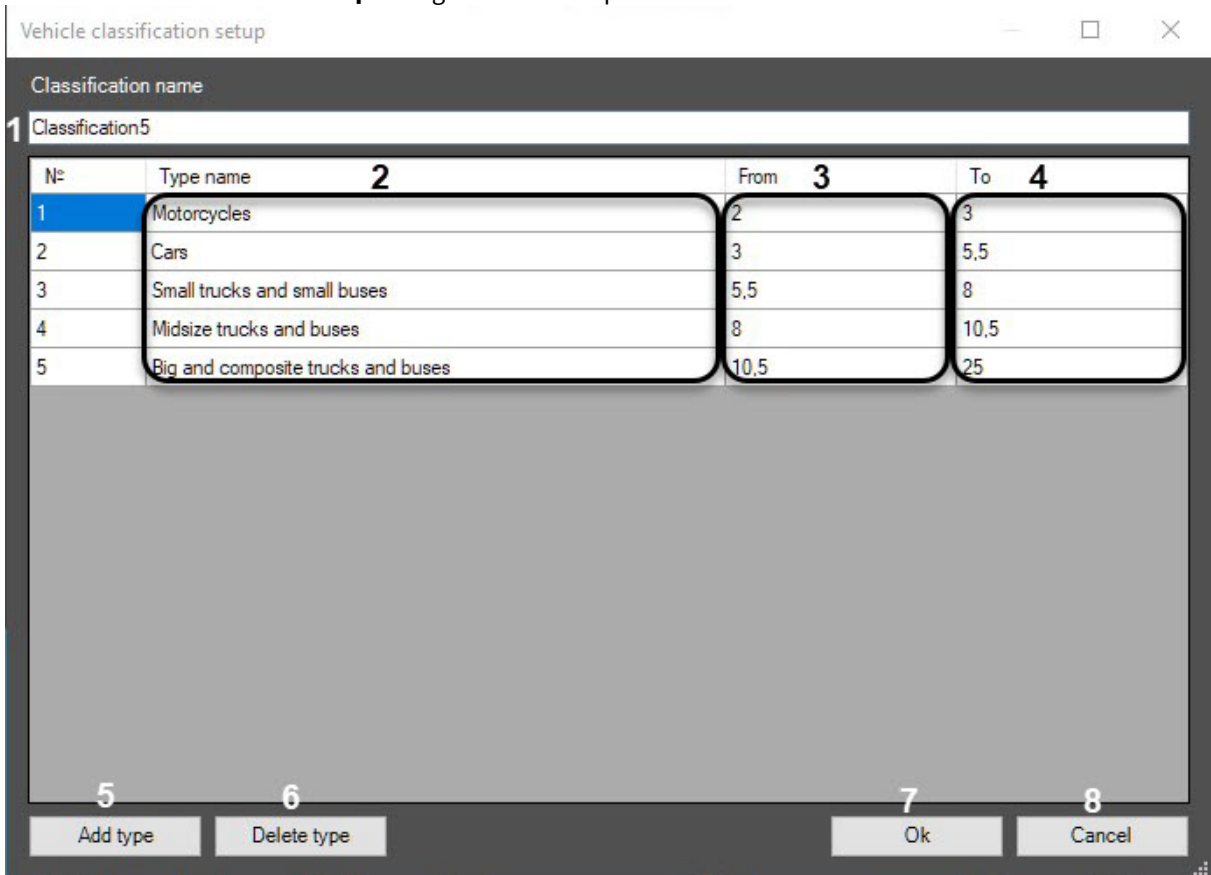
You can to set up the classification of the detected vehicles according to their length.

To set up the classification of vehicles according to their length, do the following:

1. Go to the **Vehicle Processor** object settings panel, which is created on the base of the **Computer** object on the **Hardware** tab of the **System settings** dialog box.



2. Click the **Classification setup (1)** button.
3. The **Vehicle classification setup** dialog window will open.



4. In the **Classification name (1)** field, enter the name of the vehicle classification that you want to set up.
5. To edit the types of vehicles, do the following:
 - a. In the **Type name (2)** column, enter the required names of the vehicles types.
 - b. In the **From (3)** and **To (4)** columns, set the length ranges of vehicles, belonging to the corresponding types. The values of the range boundaries are entered in meters. The type of the detected vehicle will be determined on the basis of this vehicle's length fitting one of the ranges.

 **Attention!**

For every pair of vehicles types the length ranges should not intersect.

6. To add a new type of the vehicle to the classification, click the **Add type (5)** button and in the appeared line, perform the steps 5a-5b.
7. To delete a vehicle type from the classification, select a line, corresponding to the required type, and then click the **Delete type (6)** button.
8. Click the **Ok (7)** button to save the changes and close the **Vehicle classification setup** dialog window.

 **Note**

To close the **Vehicle classification setup** dialog window without saving the changes, click the **Cancel (8)** button.

Setting up the vehicles classification according to their length is completed.

5.2.22 Speed traps server

The Speed traps server module functionality

The *Speed traps server* software module supports the following functionality:

1. Registering the speed-trap hardware devices designed to determine the vehicle speed.
2. Recording the events with the vehicle speed in the database.

The following speed-trap models are compatible with *Auto PSIM*:

1. Iskra DA/210.
2. Rapira.

 **Note**

The *Auto-Uragan*, *AR-Auto*, or *VT* modules also enable determining the vehicle speed by video without using a speed-trap device.

Speed-trap mounting and setup requirements for the Speed traps server module

The speed-traps should be mounted and set up according to their documentation.

 **Note.**

If the *Speed traps server* software module is used together with the *Traffic Detection* module, the speed-trap capture zone should be right next to the capture area of the loop detector of the *Traffic Detection* module in the direction of traffic movement.

The Speed traps server software module setup

The *Speed traps server* software module is designed for the installation and setup of speed-trap devices in the system.

During the *Speed traps server* module configuration, it is necessary to specify the connection and operation settings of the speed-trap device, as well as the vehicle speed detection parameters.

The Speed traps server module setup procedure

To set up a speed-trap device in *Auto PSIM*, the system object corresponding to the *Speed traps server* software module should be created and set up.

The **Speed traps server** object setup includes the following steps:

1. Set up the connection between the Speed-trap device and the *Auto PSIM* software package.
2. Select a camera for the joint operation of the *Speed traps server* and *Auto-Uragan*, *AR-Auto* or *VT* modules.
3. Specify the speed limit.
4. Setting the permitted vehicle speed for displaying in the report concerning the recognized number.
5. Select the model and installation type of a Speed-trap device.
6. Select the vehicle movement direction relative to the Speed-trap, needed to determine the vehicle speed.
7. Specify the distance between the speed-trap and the vehicle position at the moment of speed detection.
8. Set up additional parameters related to joint operation of the speed-trap device and the *Speed traps server* module.
9. Specify the minimum vehicle speed to be detected by the speed-trap.

Setting up the speed-trap device connection to the server

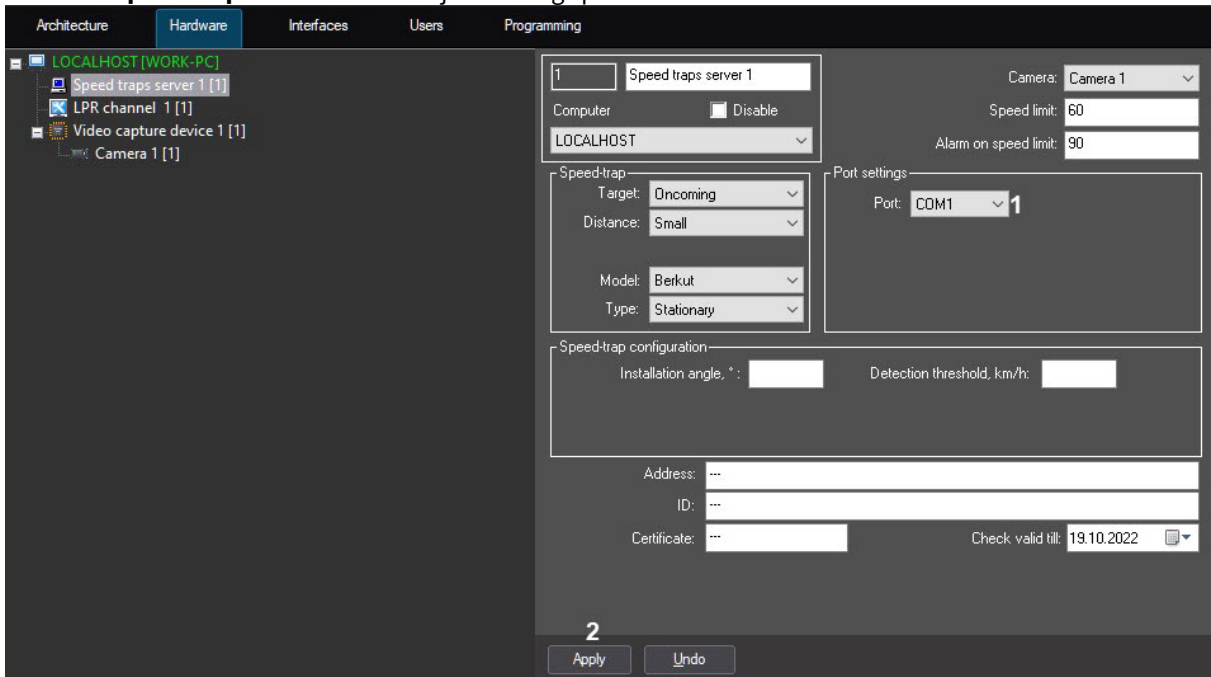
Speed-traps are connected to the server via the COM port. Any number of speed-trap devices can be connected to *Auto PSIM*, depending on customer needs.

Specialized protocol is used for data exchange with the speed-traps via the COM port. Each Speed-trap uses its individual protocol for data exchange.

Several COM ports should be set up one by one. Each speed-trap device is represented by a separate **Speed traps server** object created and set up in the **Hardware** tab of the **System Settings** window.

To set up a COM port for speed-trap connection, do the following:

1. Go to the **Speed traps server** server object settings panel.



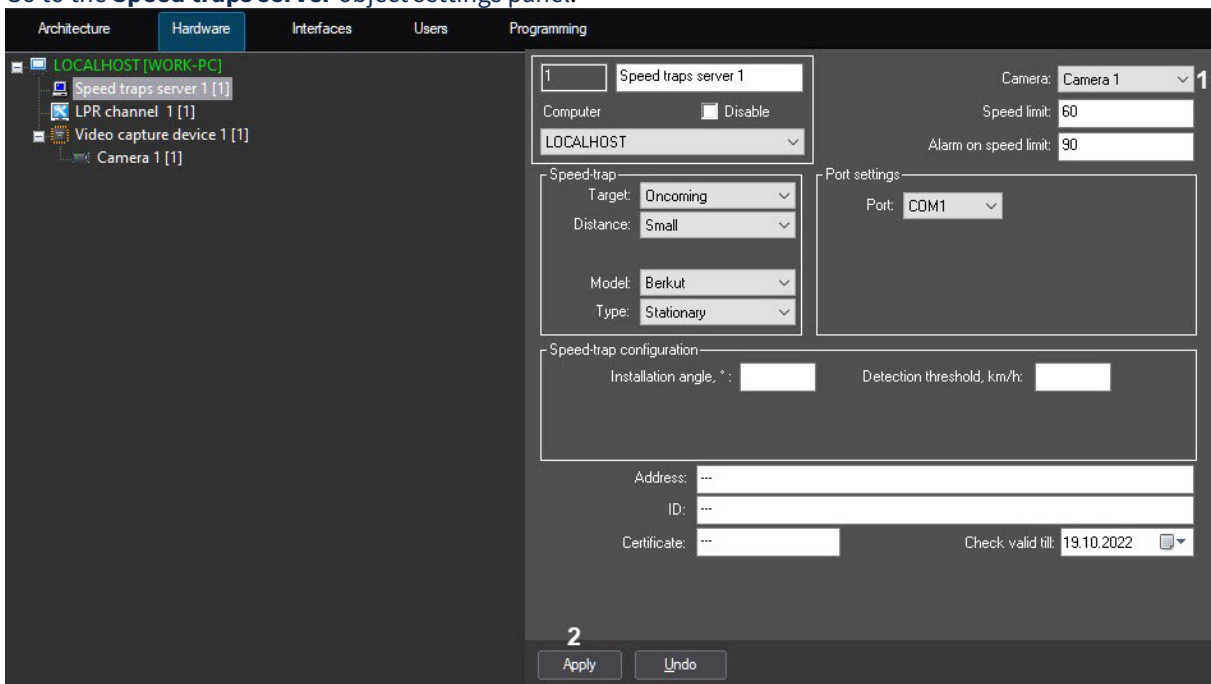
2. In the **Port** drop-down list, select the COM port to connect the speed-trap (1).
3. Click **Apply** (2) to save all changes.

The speed-trap is now connected to the server.

Selecting the video camera for Speed traps server and LPR channel joint operation

For the joint operation of the *Speed traps server* software module and the *LPR channel*, it is necessary to specify a video camera that is configured to work with the *LPR channel*. To do this, follow these steps:

1. Go to the **Speed traps server** object settings panel.



- From the **Camera** drop-down list, select the Camera object that is used to work with the *LPR channel* (1).
- Click **Apply** to save all changes (2).

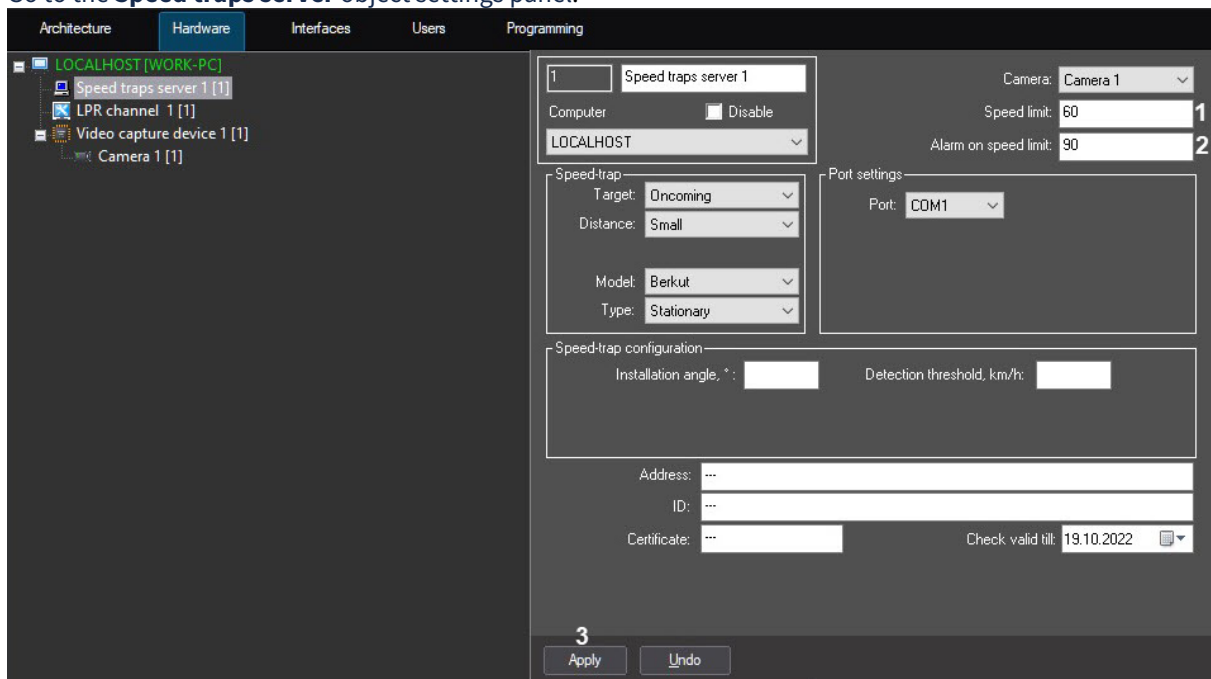
The camera selecting for *Speed-trap server* and *LPR channel* joint operation is completed.

Setting up the vehicle speed

The allowed driving speed can be set up for the *Speed traps server* software module, as well as the maximum driving speed. If a vehicle exceeds the specified speed limit, the system generates a speeding event.

To set the speed, do the following:

- Go to the **Speed traps server** object settings panel.



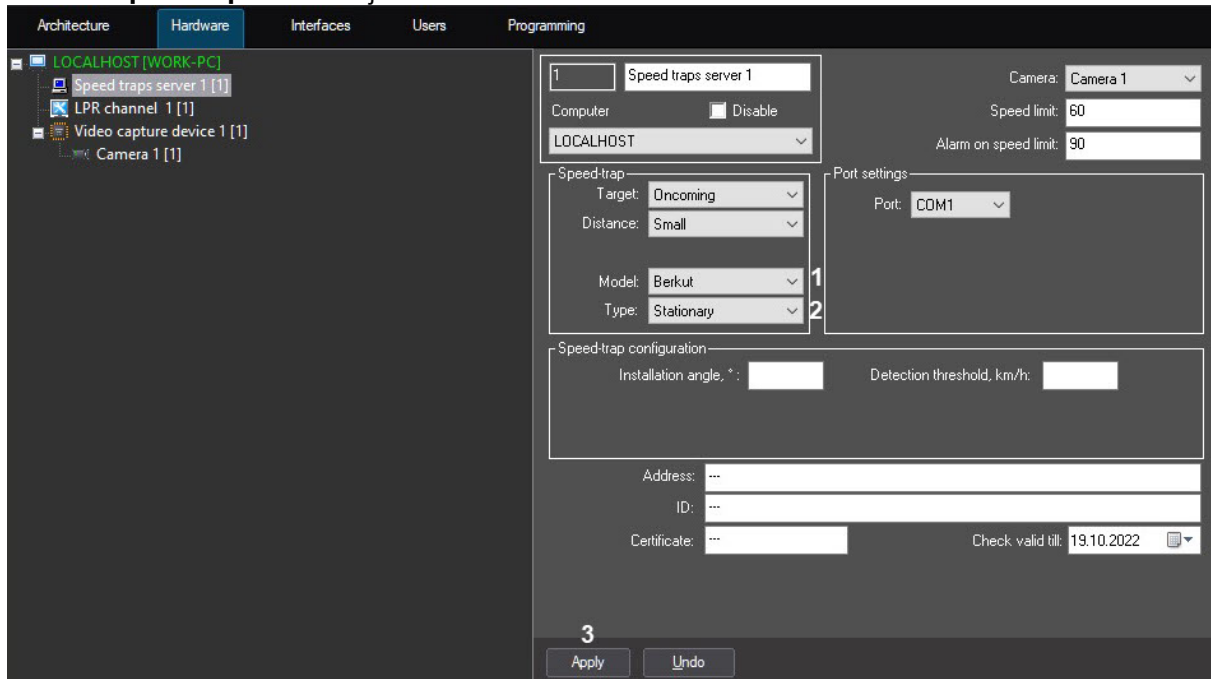
- In the **Speed limit** field enter the allowed driving speed in km/h (1).
- In the **Alarm on speed limit** field enter the maximum allowed driving speed in km/h (2).
- Click **Apply** (3).

The speed is now set up.

Selecting the model and installation type of a Speed-trap device

To select the model and installation type of a Speed-trap device, do the following:

1. Go to the **Speed traps server** object.



2. From the **Model** drop-down list (1) select the model of the supported installed Speed-trap device.

Attention!

Correct operation of the *Iskra-1*, *Iskra-1B*, *Iskra-1D*, *Iskra-1KRIS* models is not guaranteed.

3. From the **Type** drop-down list select the installation mode of Speed-trap device (2):
 - **Stationary** – if the Speed-trap device is installed stationary.
 - **Moving** – if the Speed-trap device is installed on moving vehicles.

Note

The availability of the **Type** drop-down list depends on the selected Speed-trap device model.

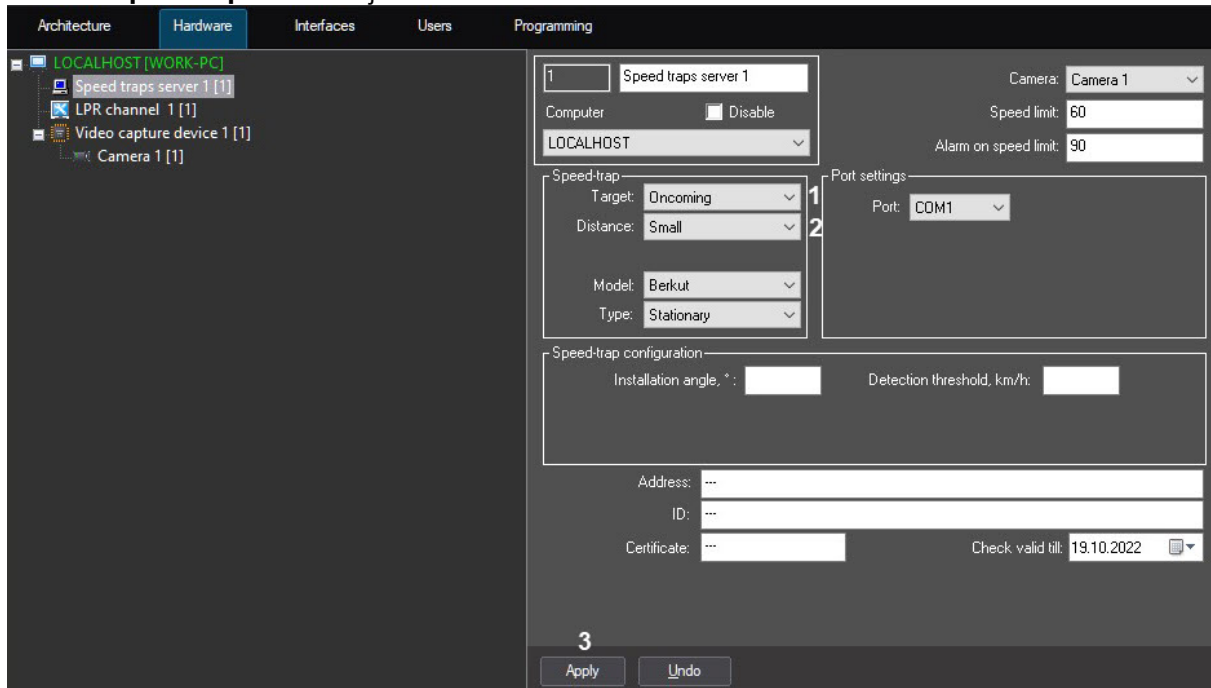
4. Click **Apply** (3).

The process of selecting the module and installation mode of Speed-trap device is completed.

Selecting the vehicle movement direction and distance

To select the vehicle movement direction and distance, do the following:

1. Go to the **Speed traps server** object.



2. From the **Target** drop-down list (1), select the vehicle direction relative to the Speed-trap device to determine its speed of movement:
 - **Automatically** – to automatically determine the vehicles speed moving relative to the Speed-trap device;
 - **Oncoming** – to determine the vehicles speed moving oncoming to the installed Speed-trap device;
 - **Passing** – to determine the vehicles speed moving from the installed Speed-trap device.
3. When configuring the *Auto-URAGAN* or *AR-Auto* software modules, from the **Distance** drop-down list (2), select the distance from the Speed-trap device to the place where the vehicle speed is determined.

Note

- The physical distance from the Speed-trap device to the place where the speed is determined is indicated in the documentation for the Speed-trap device.
- The value of the **Distance** parameter is determined experimentally.

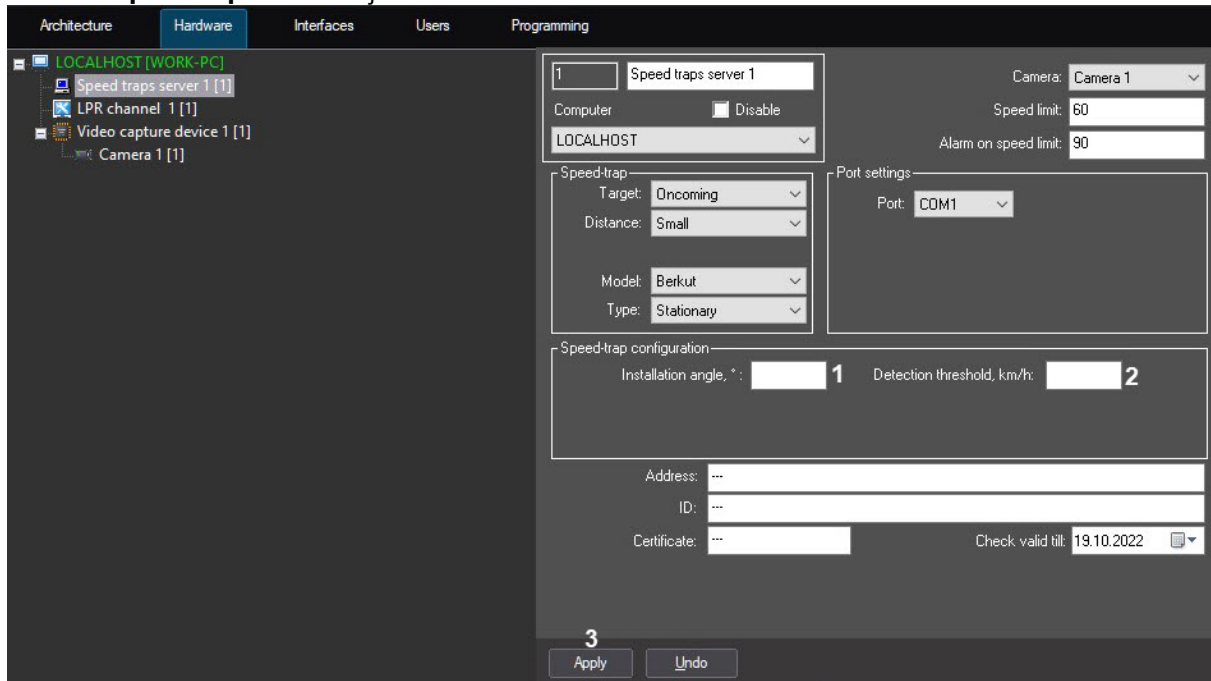
4. Click **Apply** (3).

The vehicle movement direction and distance is now selected.

Setting up the Speed-trap device

To configure the Speed-trap device, do the following:

1. Go to the **Speed traps server** object.



2. In the **Installation angle, *** field (1), enter the inclination angle at which the Speed-trap device is installed above the traffic lane (see the official documentation for the Speed-trap device).

Note.

Depending on the Speed-trap device model, the system may ignore this option if it is not applicable to that particular speed-trap model (see the official documentation for the Speed-trap device).

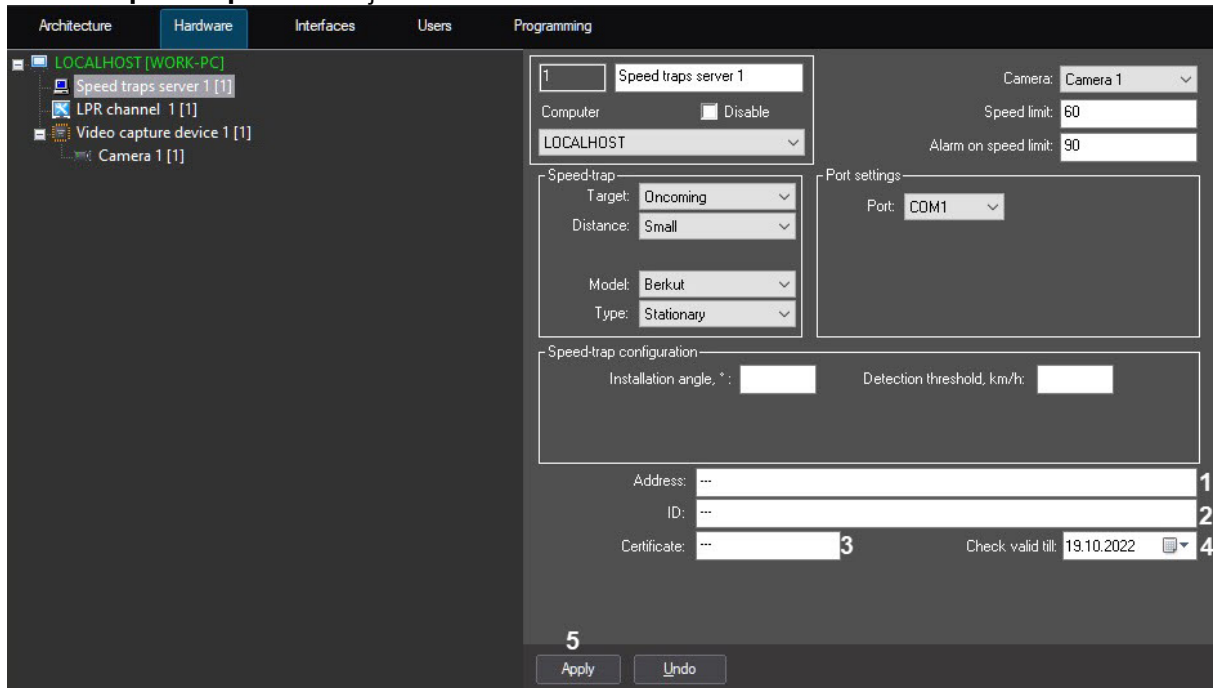
3. In the **Detection threshold km/h** field, enter the minimum vehicle speed determined by the Speed-trap device (2). For vehicles moving slower than a given threshold, the speed will not be determined by the Speed-trap device.
4. Click **Apply** (3).

The Speed-trap device is now set up.

Specifying the Speed-trap device information to be displayed in the recognized number report

To specify the Speed-trap device information to be displayed in the recognized number report, do the following:

1. Go to the **Speed traps server** object.



2. In the **Address** field (1), enter the location of Speed-trap device.
3. In the **ID** field (2), enter the factory ID of Speed-trap device.
4. In the **Certificate** field (3), enter the certificate number, that corresponds to Speed-trap device.
5. From the **Check valid till** drop-down list (4), select date, until that verification of Speed-trap device is valid.
6. Click **Apply** (5).

Specifying the Speed-trap device information to be displayed in the recognized number report is completed.

Joint operation of the LPR channel and Speed traps server module

The LPR channel can operate together with the *Speed traps server* module. In this case, each vehicle recognized by the LPR channel is compared to the speed value specified in the speed-trap device.

Note

This settings is specified only when the *Auto-Uragan*, *AR-Auto* or *VT* program modules are used.

To set up the joint operation of the LPR channel and *Speed traps server* module, do the following:

1. Go to the settings panel of the **LPR channel** object, corresponding to the activated *Auto-Uragan*, *AR-Auto* or *VT* program module (see [Activating the software module used for identifying license plates](#)).

2. Go to the **Speed camera settings** tab (1).
3. In the **Speed camera settings** drop-down list (2), select the **Speed traps server** object representing the speed-trap device directed at the same lane as the LPR channel camera.
4. In the **Synchronization time...ms** field (3), enter the time period in milliseconds that it takes the vehicle to drive from the spot of speed detection by the speed-trap device to the FOV of the LPR channel recognition video camera.

Note

The **Synchronization time** parameter is used to synchronize the operation of the *Speed traps server* module and the LPR channel.

5. Set the **Filter events from speed camera** checkbox (4) if it is necessary to record only the first speed value detected by the speed-trap device, while other values are ignored until the delay expires or until the LP number is recognized.
6. Click the **Apply** button (5).

The joint operation of the *LPR channel* and *Speed traps server* module is complete.

5.2.23 Traffic analysis module

Functionality of the Traffic analysis program module

The *Traffic analysis* program module is used to determine the general characteristics of the traffic flow as a whole and each vehicle in particular.

The *Traffic analysis* program module performs the following functions:

1. Detects a vehicle in the detector's operation area.
2. Detects the traffic flow density and sharp decrease of the road bandwidth on each traffic lane.
3. Detects the intentional vehicle stopping on the roadway, on highways, as well as in other places where stopping and parking are prohibited.
4. Automatically detects the drop of the traffic flow average speed.
5. Detects the movement in the prohibited direction relative to the specified borders.
6. Determines the class of the vehicle:
 - a. Light:
 - i. Cars.
 - ii. Cars with a trailer.
 - b. Average:
 - i. Minibuses.
 - ii. Trucks up to five tons.
 - c. Truck:
 - i. Small biaxial buses.
 - ii. Two-axle trucks.
 - iii. Three-axle trucks.
 - iv. Special vehicle.
 - d. Large vehicle:
 - i. Large buses.
 - ii. Tram.
 - iii. Trolleybuses.
 - iv. Truck or bus with a trailer.
 - v. Large special vehicle.
 - e. Mega-large vehicle:
 - i. Mega-large buses.
 - ii. Mega-large road trains.
 - f. Moto:
 - i. Motorcycles/mopeds/quads/tricycles.
 - ii. Bicycles.
 - iii. Scooter.
 - g. Special transport:
 - i. Cars.
 - ii. Minibuses.
 - iii. Trucks.
 - iv. Other.
 - h. Dump truck:
 - i. Two-axle dump trucks.
 - ii. Three-axle dump trucks.
 - iii. Four-axle dump trucks.
7. Registers the exceeding of the maximum allowable speed limit.
8. Detects the traffic accidents.
9. Detects the lost cargo.

You can use the following tools to create reports on results of the detector operation:

1. The *WEB Report System PSIM* module. This module isn't included in the *Auto PSIM* distribution package and must be installed separately (see [WEB Report System PSIM](#)).
2. The **Traffic analysis monitor** object. For the information on how to configure this object, see the [The Traffic analysis monitor interface window](#) section; to work with the dialog window, see [Operator's Guide](#).

Licensing of the Traffic analysis program module

The *Traffic analysis* module uses the algorithms produced by *RR*.

The licensing of the *RR* license plate recognition program module is performed by the processed video channels, taking into account the license type, that is, the *psim.sec* key file is purchased for a certain number of cameras with payment for each camera.

No additional key files are required.

Requirements for installation and configuration of cameras for the Traffic analysis program module

For the correct operation of the *Traffic analysis* program module, the following camera requirements must be met.

Camera (angle) requirements:

1. Resolution is at least 720p.
2. Frame rate is at least 10 FPS.
3. Illumination in the surveillance area is 75-100 lux/m² and higher.
4. Camera is directed to the road/pavement surface.
5. Installation height is from 2 to 12 meters.
6. Camera roll is no more than 20 degrees.
7. Consistent transmission (without frames skipping).

Server capacity requirements (for 1 analytics)

1 core, 2.6 GHz, 2 Gbytes.

Configuring the Traffic analysis program module

Procedure for configuring the Traffic analysis program module

You can configure the *Traffic analysis* program module in the following way:

1. Download and install the current version of the RoadarAnalytics SDK.



Note

The current version of the RoadarAnalytics SDK is 1.13.18. To get it, consult with the [AxxonSoft technical support](#).

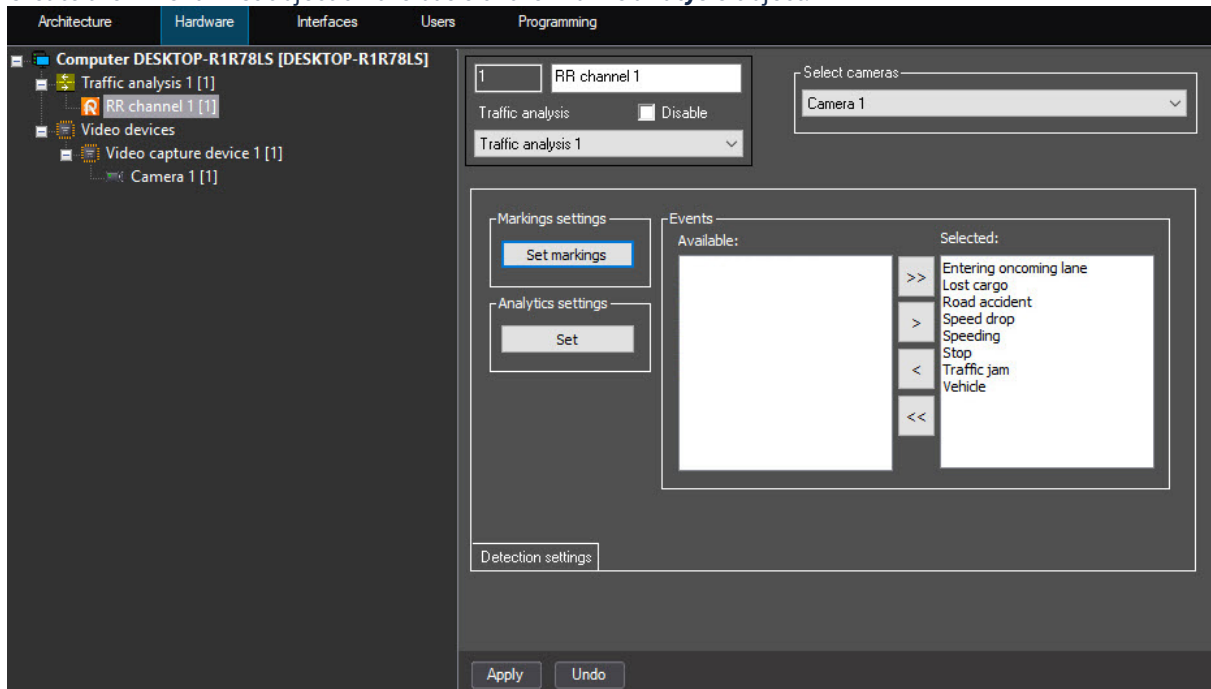
2. Create the **Traffic analysis** system object.
3. Create and configure the *RR* channel object on the basis of the Traffic analysis object.
4. Select a camera for the *RR* channel of the Traffic analysis module.
5. Specify the parameters of road marking in the editing utility: set lanes, areas of static objects, direction of movement.
6. Save the file of the road marking in the JSON format.
7. Select analytics that are included in the SDK.
8. Configure these analytics in the **Analytics settings** window.
9. Create and configure the **Traffic analysis monitor** interface object.

RR channel object

Creating the RR channel object

To work with the *Traffic analysis* program module, use the **RR channel** system object. To create it, do the following:

1. Create the **Traffic analysis** object on the **Hardware** tab.
2. Create the **RR channel** object on the basis of the **Traffic analysis** object.



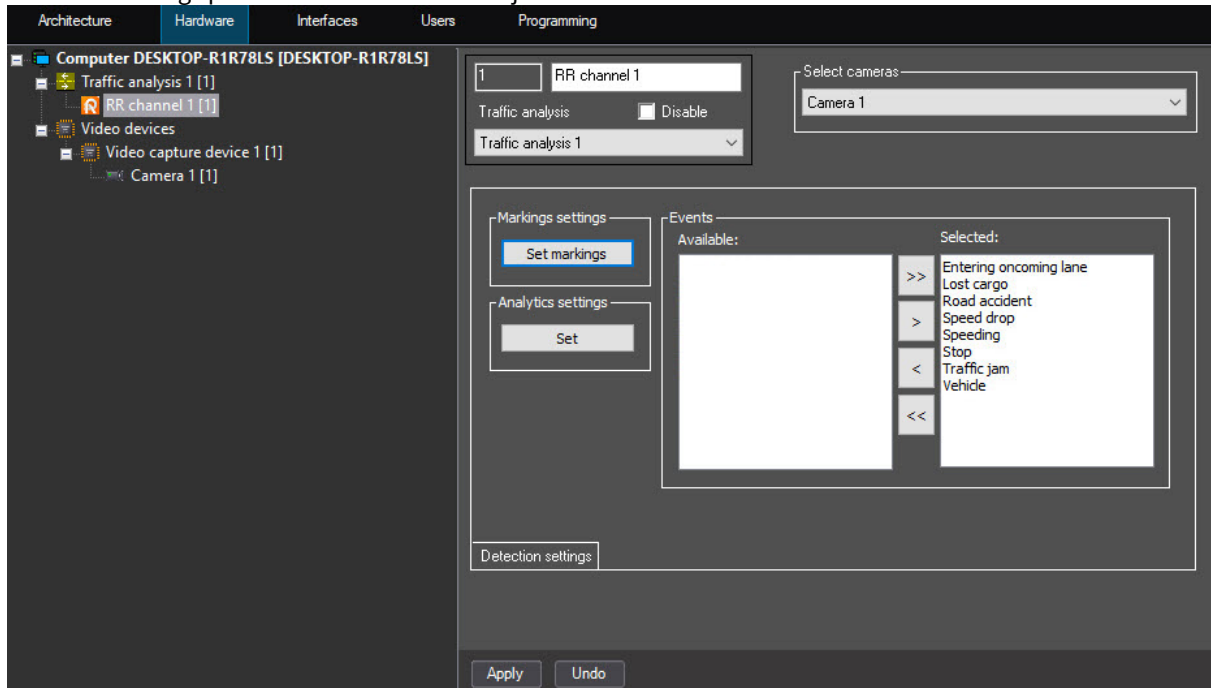
3. Click the **Apply** button.

Creating the **RR channel** object for the operation with the Traffic analysis module is complete.

Selecting a camera for working with the RR channel

To select a camera for the operation with the RR channel, do the following:

1. Go to the settings panel of the **RR channel** object.



2. From the **Select cameras** drop-down list, select a camera directed to the traffic lane, the video signal from which is processed by the RR channel.

Note

First, you must create and configure this camera in *Axxon PSIM*.

3. To save the settings, click the **Apply** button.

Selecting cameras for the operation with the RR channel is complete.

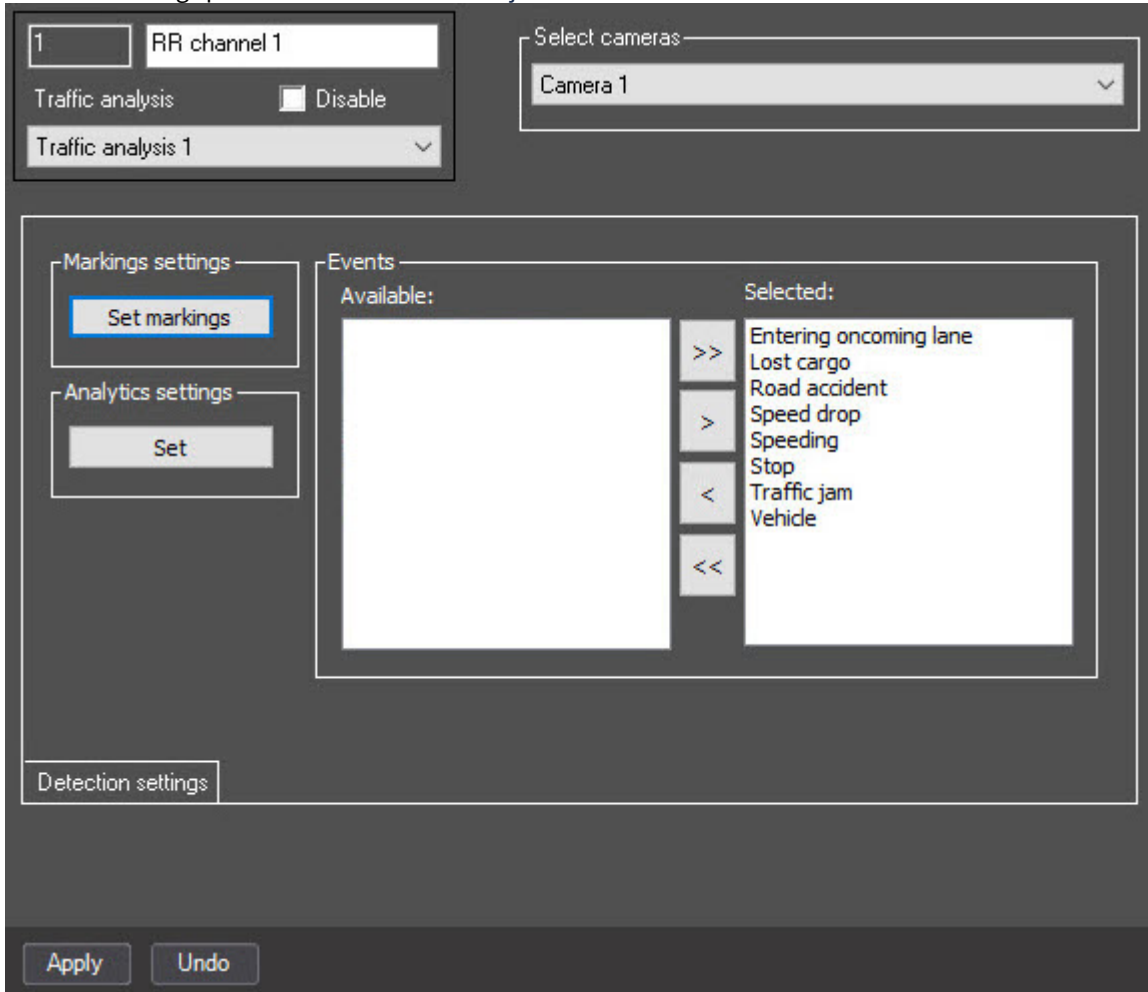
Specifying the road marking settings

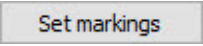
Attention!

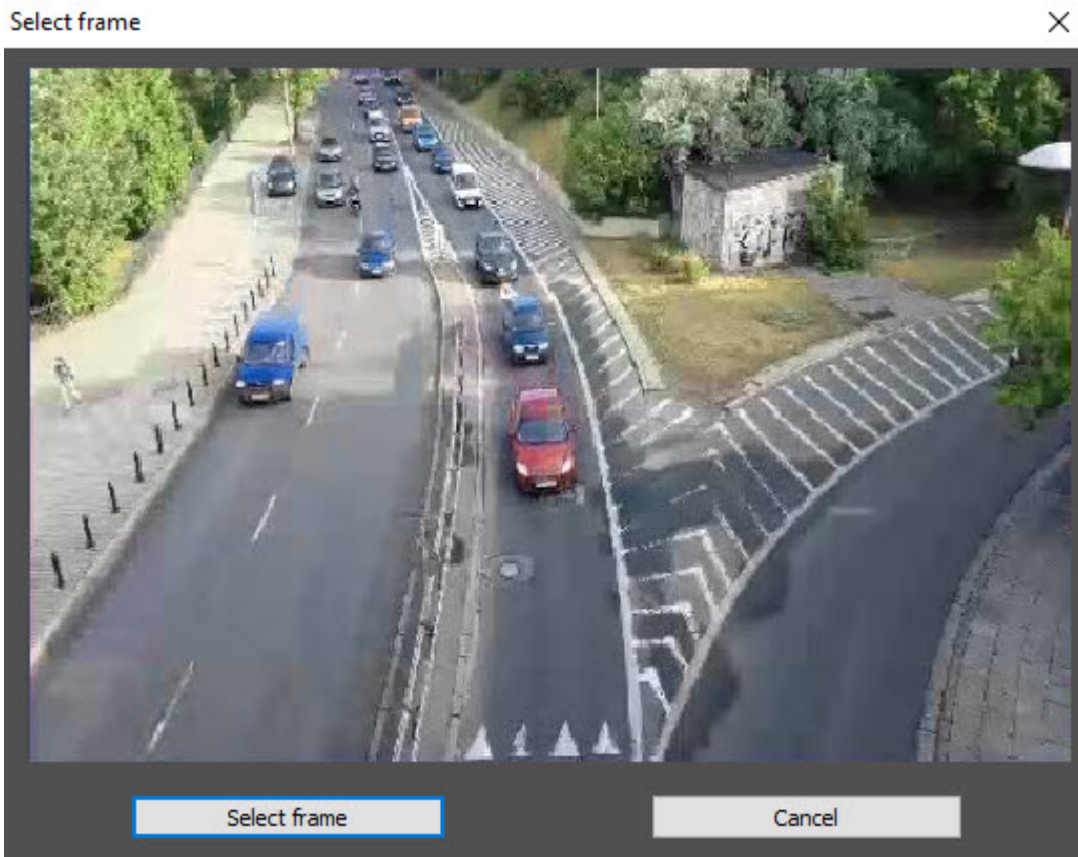
You can specify the road lane borders by using the marking editing utility only. You cannot do that manually.

To work with the RR channel of the *Traffic analysis* module, you must specify the road marking settings. To do this, do the following:

1. Go to the settings panel of the **RR channel** object.

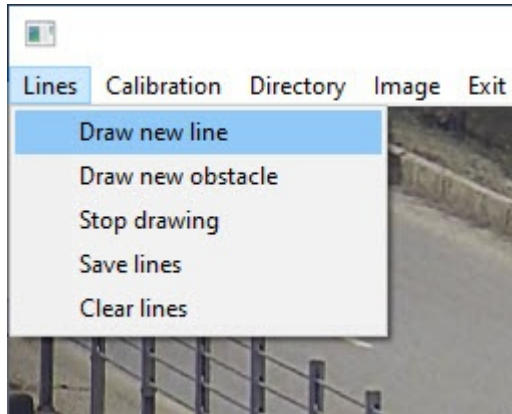


2. Click the **Set markings**  button on the settings panel to open the editing utility.
3. In the **Select frame** window that opens, click the **Select frame** button to stop the video and specify the road marking in this frame.



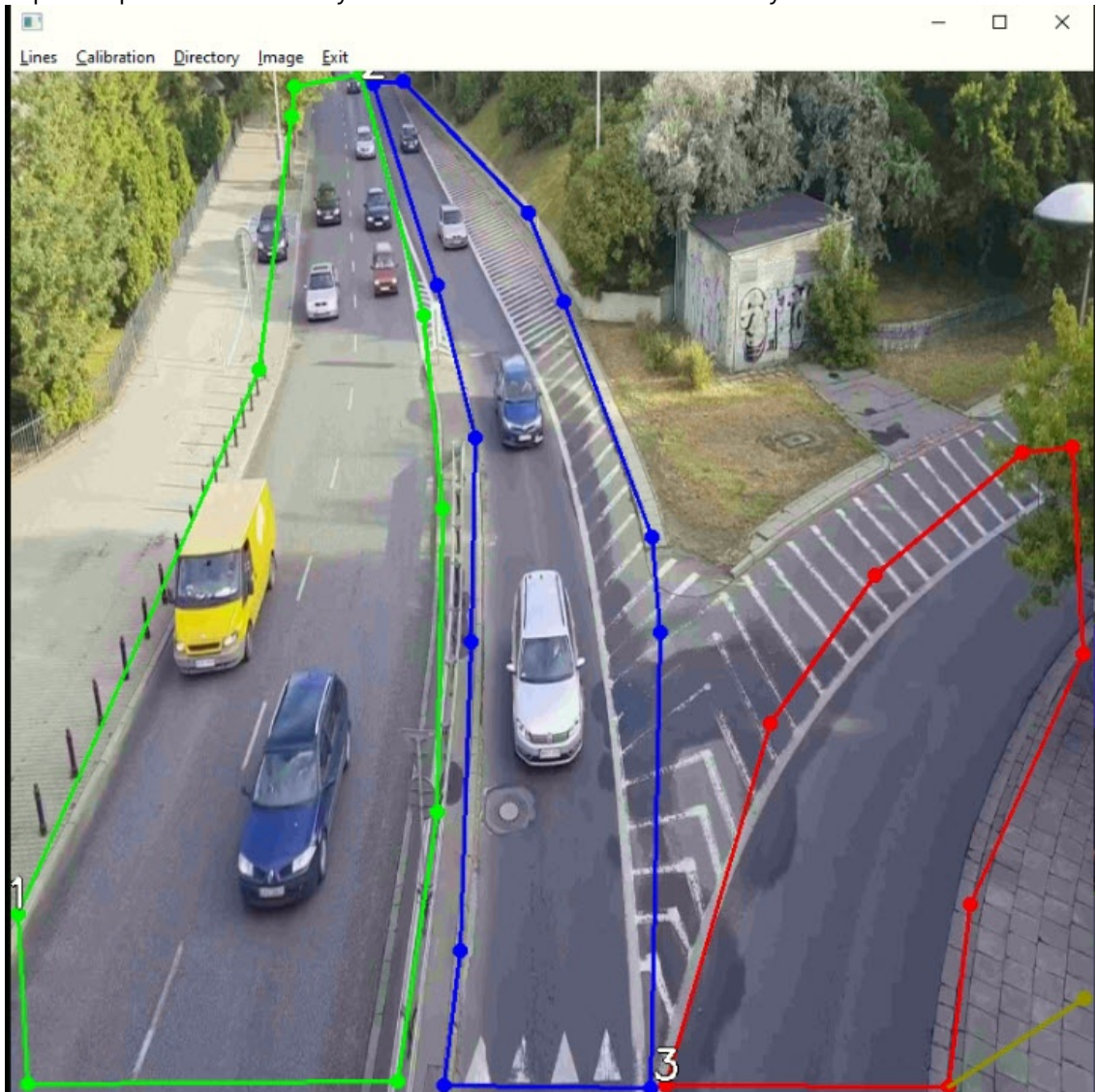
As a result, the marking editing utility opens.

4. In the editing utility that opens, mark traffic lanes on the selected frame of the video:
 - a. Select the **Lines** → **Draw new line** item in the menu line. Select **Clear lines** to delete a line.



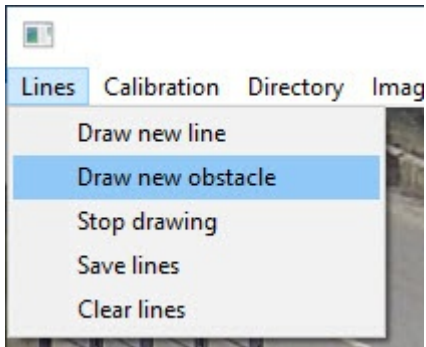
- b. Mark the lane borders.

- c. Repeat steps 4a and 4b as many times as there are lanes on the roadway.



5. Mark the borders of static objects:

- a. Select the **Lines** → **Draw new obstacle** item in the menu line.

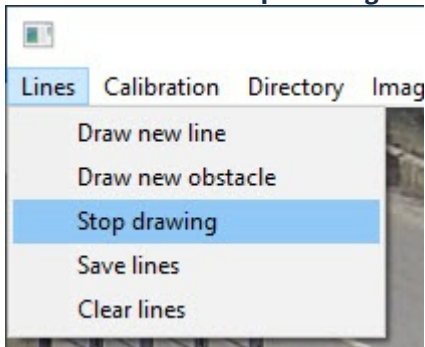


- b. Mark the borders of static objects.

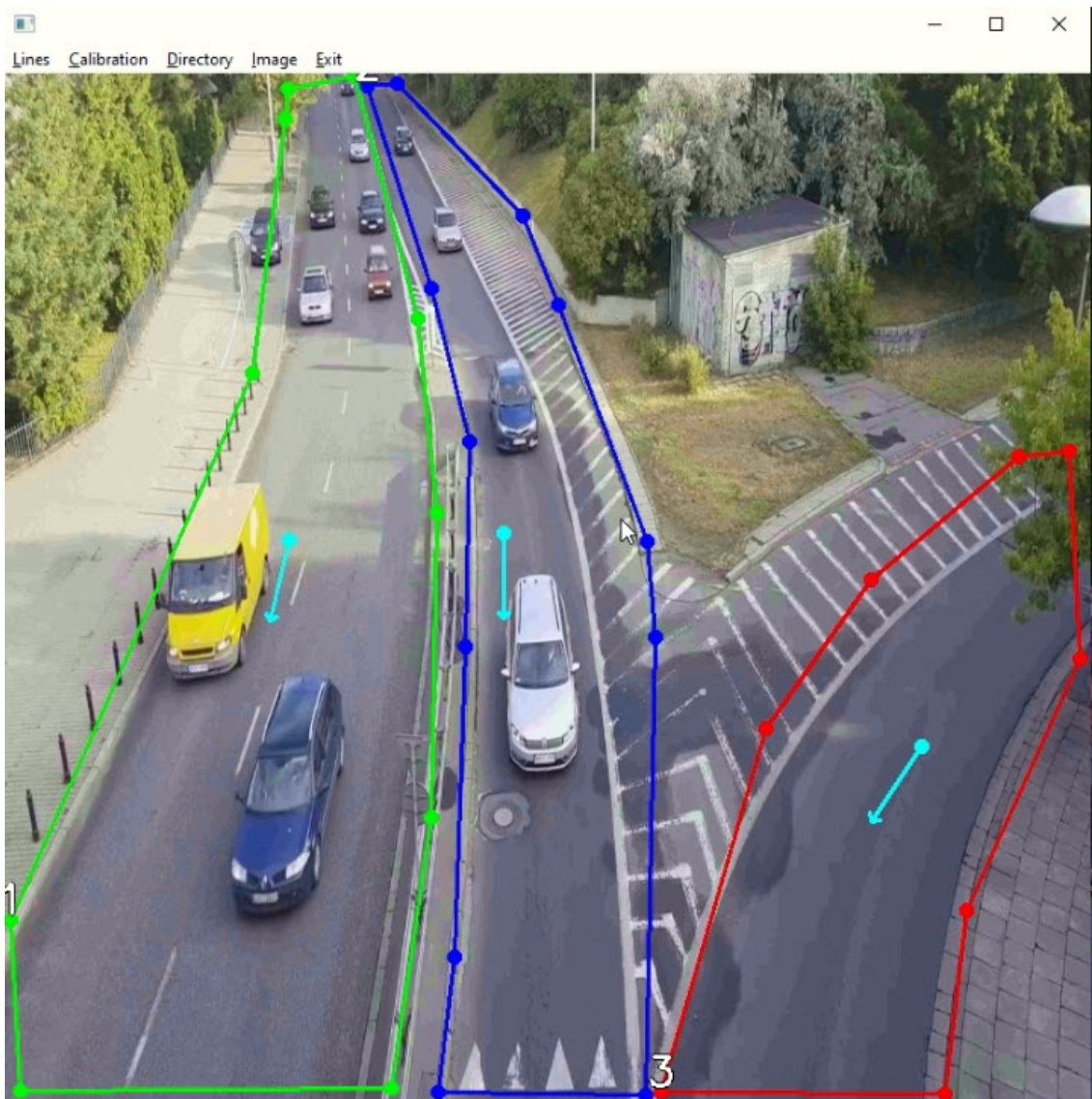
- c. Repeat steps 5a and 5b as many times as there are static objects in the frame.



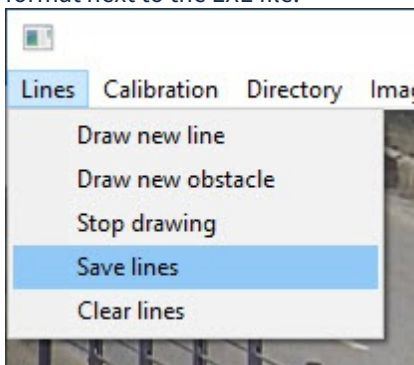
6. Specify the direction of movement on the lanes:
 a. Select the **Lines** → **Stop drawing** item in the menu line.



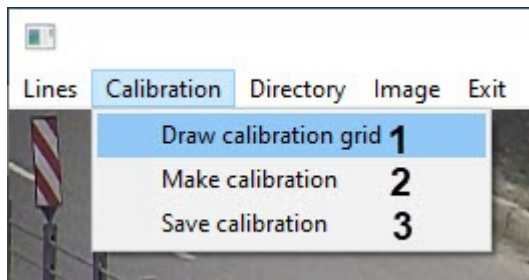
- b. Point the arrows that appear on the lanes in the direction of traffic. This is required to generate an event of entering an oncoming lane.



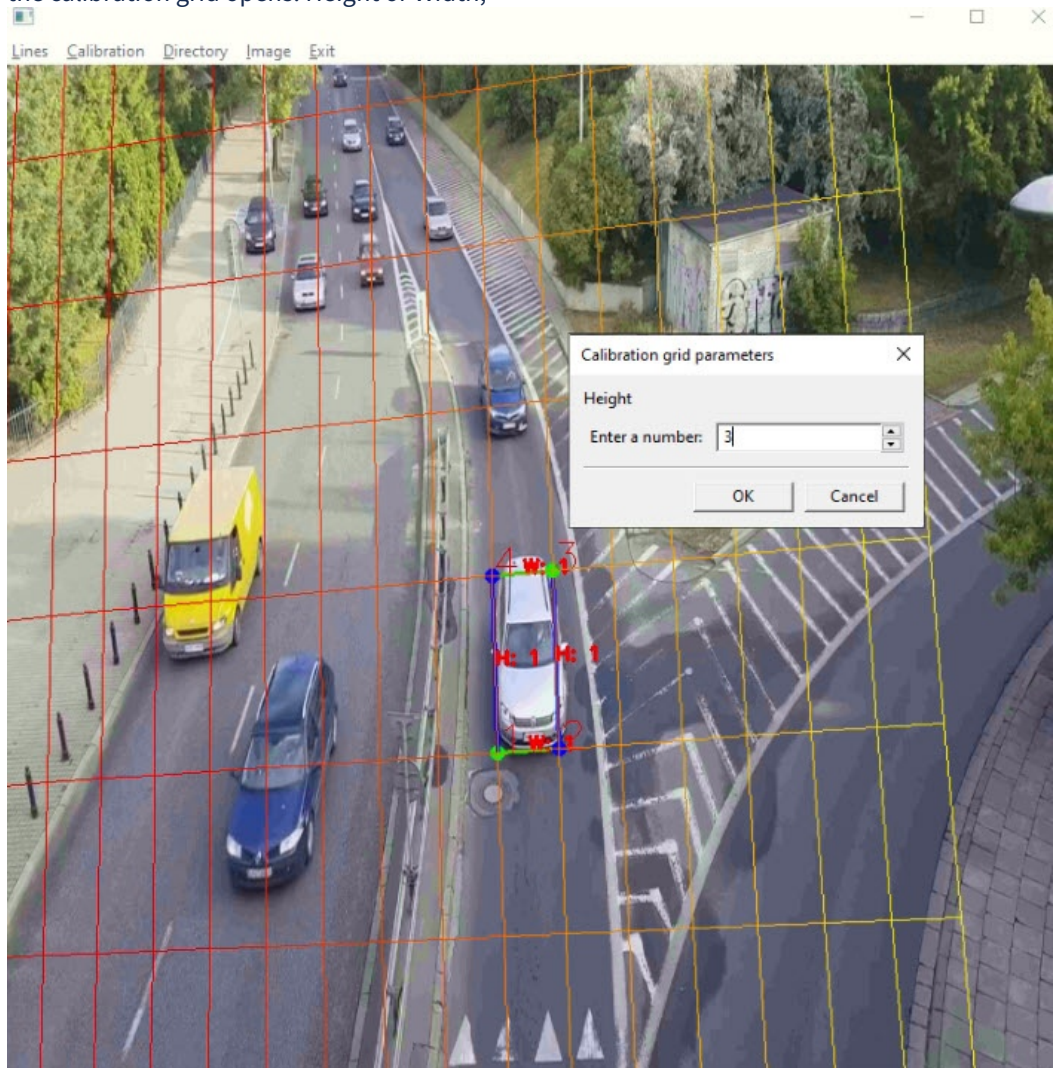
7. Select the **Lines** → **Save lines** item in the menu line to save the specified marking in the file of the JSON format next to the EXE file.



8. Calibrate dimensions:
 - a. Set the correspondence of pixels to meters:
 - i. Select the **Calibration** → **Draw calibration grid (1)** item in the menu line to specify the dimensions of the calibration grid;

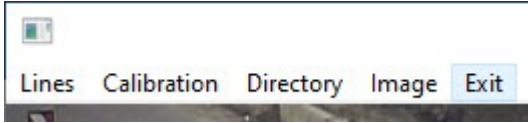


- ii. Double-click a dimension. As a result, the window for editing the corresponding dimension of the calibration grid opens: Height or Width;



- iii. In the **Enter a number** field, set the value in meters;
 - iv. Press the **Enter** key.
 - v. Repeat steps 8a-8aiv for the second dimension of the calibration grid.
- b. Select the **Calibration** → **Make calibration** item in the menu line to calibrate dimensions according to the calibration grid specified in step 8a (2);
- c. Select the **Calibration** → **Save calibration** item in the menu line to save the specified calibration in the file of the JSON format next to the EXE file (3).

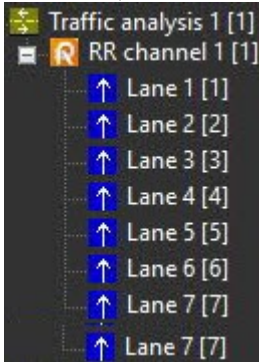
9. Select the **Exit** item in the menu line to close the editing utility.



10. Click the **Apply** button.

The road marking settings are set.

As a result, the **Lane** objects corresponding to the created lanes appear in the object tree.

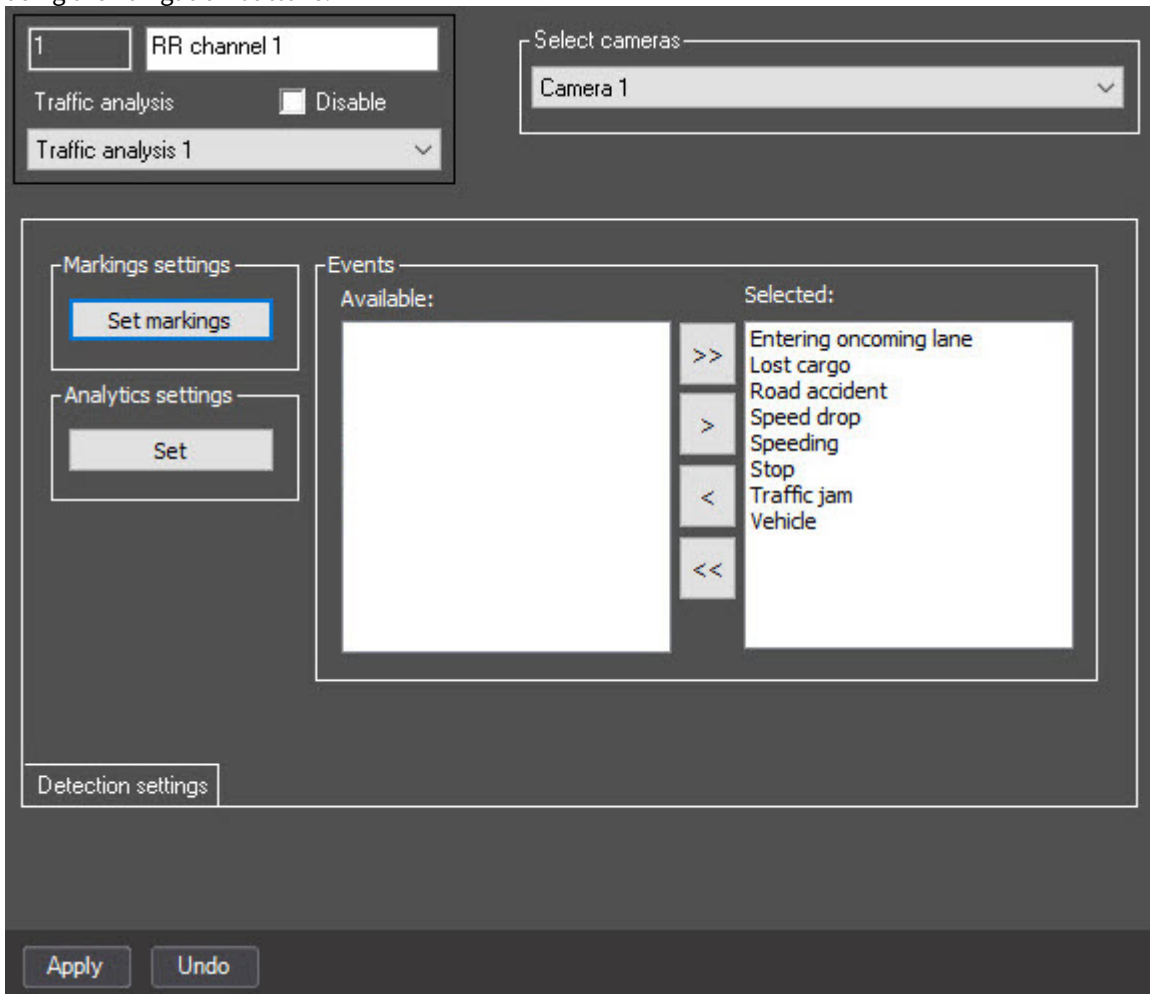


Selecting analytics for SDK

To work with the RR channel of the *Traffic analysis* module, you must select analytics that are included in the SDK. To do this, do the following:

1. Go to the settings panel of the **RR channel** object.

2. Select the required analytics for the SDK by moving them from the **Available** to the **Selected** events list using the navigation buttons.



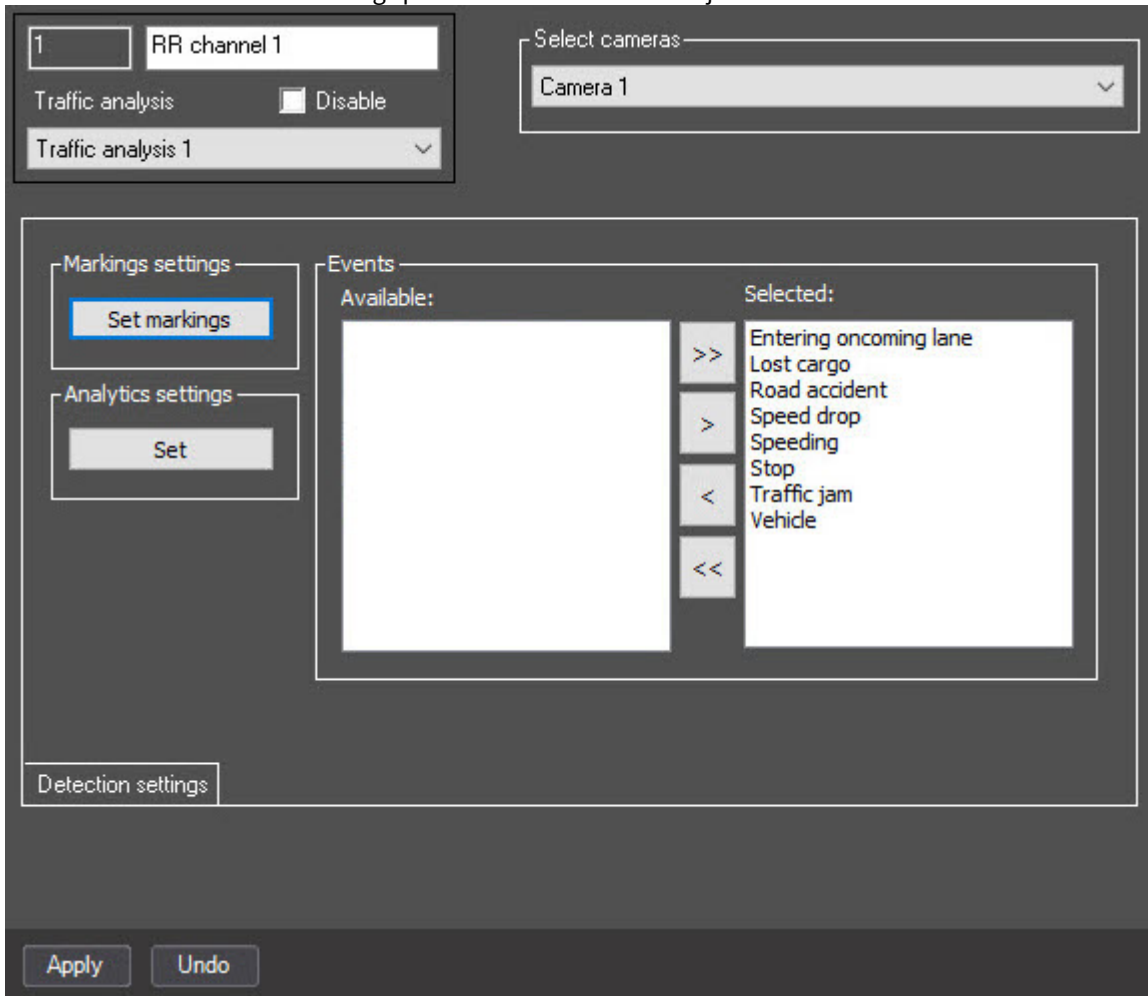
3. Click the **Apply** button to save the settings.

Selecting analytics for the SDK is complete.

Configuring video analytics

To configure the video analytics used for working with the RR channel of the *Traffic analysis* module, do the following:

1. Click the **Set** button on the settings panel of the **RR channel** object.



As a result, the analytics settings window opens.

Analytics settings ✕

<p>Traffic jam</p> <p><input type="text" value="3"/> min. number of vehicles</p> <p><input type="text" value="5"/> max. vehicle speed</p> <p><input type="text" value="10"/> registration time</p>	<p>Road accident</p> <p><input type="text" value="20"/> threshold</p> <p><input type="text" value="180"/> max. stop time</p> <p><input type="text" value="16"/> Weight of vehicle stopping in area</p> <p><input type="text" value="7"/> Weight of vehicle stopping</p> <p><input type="text" value="7"/> Weight of people next to vehicle</p> <p><input type="text" value="5"/> Weight of vehicle boxes intersection</p> <p><input type="text" value="7"/> Weight of hard acceleration</p>	<p>Speeding</p> <p><input type="text" value="10"/> speed limit</p> <p><input type="text" value="3"/> interval</p>
<p>Speed drop</p> <p><input type="text" value="20"/> speed drop</p> <p><input type="text" value="3"/> min. number of vehicles</p> <p><input type="text" value="1"/> interval</p> <p><input type="text" value="20"/> added speed</p>	<p>Entering the oncoming lane</p> <p><input type="text" value="150"/> min. angle</p>	<p>Lost cargo</p> <p><input type="text" value="50"/> min. validity</p> <p><input type="text" value="1"/> min. width</p> <p><input type="text" value="50"/> max. width</p> <p><input type="text" value="1"/> min. height</p> <p><input type="text" value="50"/> max. height</p>
		<p>Vehicle stop</p> <p><input type="text" value="6"/> max. width</p> <p><input type="text" value="6"/> max. height</p> <p><input type="text" value="30"/> min. duration</p> <p><input type="checkbox"/> analyze traffic jams</p>

OK

2. Configure the parameters of the **Traffic jam** video analytics that detect the traffic flow density and sharp decrease of the road bandwidth:
 - a. In the **min. number of vehicles** field, specify the minimum number of vehicles at which the **Traffic jam** event occurs.
 - b. In the **max. vehicle speed** field, specify the maximum speed of vehicles at which the **Traffic jam** event occurs.
 - c. In the **registration time** field, specify the time in minutes during which the **Traffic jam** event occurs.
3. Configure the parameters of the **Speed drop** video analytics that automatically detects the average speed drop of the traffic flow:
 - a. In the **speed drop** field, specify the drop of the vehicle speed as a percentage at which the **Speed drop** event occurs.
 - b. In the **min. number of vehicles** field, specify the minimum number of vehicles at which the **Speed drop** event occurs.
 - c. In the **interval** field, specify the time interval in seconds between the traffic speed measurements.
 - d. In the **added speed** field, enter as a percentage the maximum increase of the vehicle speed on this road section, which is used to calculate the speed drop and register the **Speed drop** event.
4. Configure the parameters of the **Road accident** video analytics that registers road accidents according to certain attributes. Attributes have a weight and are accumulated for each vehicle when you analyze the next frame. If the total weight of attributes exceeds the threshold specified in step 4a, a road accident is registered.
 - a. In the **threshold** field, specify the total weight of attributes above which the road accident is registered. The default value is 20.
 - b. In the **max. stop time** field, specify the maximum time in seconds for vehicles to stop in the danger area/surveillance lane. The default value is 180.

- c. In the **Weight of vehicle stopping in area** field, specify the weight of an attribute when a vehicle stops in the danger area, seriously crosses this area, slows down in this area, and stays in it longer than the time specified in the **max. stop time** field in step 4b.
 - d. In the **Weight of vehicle stopping** field, specify the weight of an attribute when a vehicle stops in the surveillance area (for example, on the road), seriously crosses this area, slows down in this area, and stays in it longer than the time specified in the **max. stop time** field in step 4b. If a vehicle stays longer than the allowed time in the danger area that is applied to this surveillance area, this attribute is ignored as the weaker one.
 - e. In the **Weight of people next to vehicle** field, specify the weight of an attribute when a pedestrian is detected next to the stopped vehicle in the danger area, depending on the position of the camera, it can be 3-5 meters.
 - f. In the **Weight of vehicle boxes intersection** field, specify the weight of an attribute of the vehicle boxes intersection. The attribute generates an event if at least one vehicle exceeds 25 km/h;
 - g. In the **Weight of hard acceleration** field, specify the weight of an attribute at which there is a sudden change of speed that is typical when vehicles crash into each other.
5. Configure the parameters of the **Entering the oncoming lane** video analytics that detects vehicles moving in the prohibited direction:
 - a. In the **min. angle** field, specify the minimum angle of deviation from the direction of the vehicle movement in degrees at which the **Entering the oncoming lane** event occurs.
 6. Configure the parameters of the **Speeding** video analytics that detects speeding.
 - a. In the **speed limit** field, specify the maximum allowed vehicle speed on this road section in km/h, upon exceeding which the **Speeding** event occurs.
 - b. In the **interval** field, specify the time interval in seconds between the vehicle speed measurements.
 7. Configure the parameters of the **Lost cargo** video analytics that detects lost cargo:
 - a. In the **min. validity** field, specify the minimum validity as a percentage at which the **Lost cargo** event occurs.
 - b. In the **min. width** field, specify the minimum width of a cargo in millimeters.
 - c. In the **max. width** field, specify the maximum width of a cargo in millimeters.
 - d. In the **min. height** field, specify the minimum height of a cargo in millimeters.
 - e. In the **max. height** field, specify the maximum height of a cargo in millimeters.

 **Note**

The **Lost cargo** event occurs each time cargo is lost at an interval of two minutes.

8. Configure the parameters of the **Vehicle stop** video analytics that detects vehicle stopping:
 - a. In the **max. width** field, specify the maximum width of a vehicle.
 - b. In the **max. height** field, specify the maximum height of a vehicle.
 - c. In the **min. duration** field, specify the minimum duration of a vehicle stop at which the **Vehicle stop** event occurs.
 - d. Set the **analyze traffic jams** checkbox so that when a vehicle stops, you are able to determine if it is a traffic jam or a stop. If you clear the checkbox, the traffic jam analysis isn't performed.
9. Click the **Apply** button to save the changes.

Configuring video analytics to work with the RR channel of the *Traffic analysis* module is complete.

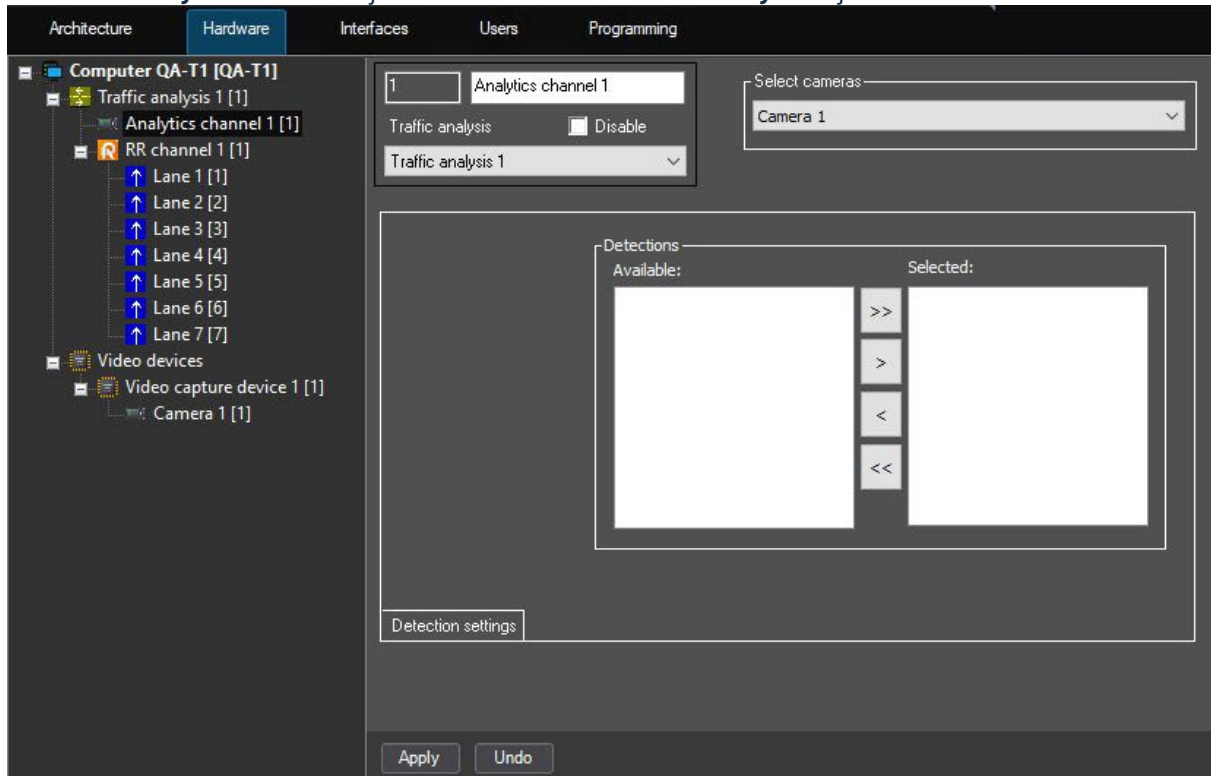
The Analytics channel object

Creating and configuring the analytics channel

The **Analytics channel** is the system object that is responsible for accepting, processing, and storing the camera events.

To work with the *Traffic analysis* module, use the **Analytics channel** system object. To configure it, do the following:

1. Create the **Analytics channel** object on the basis of the **Traffic analysis** object.



2. From the **Select cameras** drop-down list, select the camera the events of which are accepted, processed, and stored by the analytics channel.
3. Select the required detectors for the analytics channel by moving them from the **Available** to the **Selected** events list with navigation buttons.

Note

You must create detectors for the analytics channel beforehand (for more details, see [Embedded detectors](#)).

4. Click the **Apply** button.

Creating and configuring the analytics channel is complete.

The Traffic analysis monitor interface window

Procedure of configuring the Traffic analysis monitor window

To configure the **Traffic analysis monitor** window, do the following:

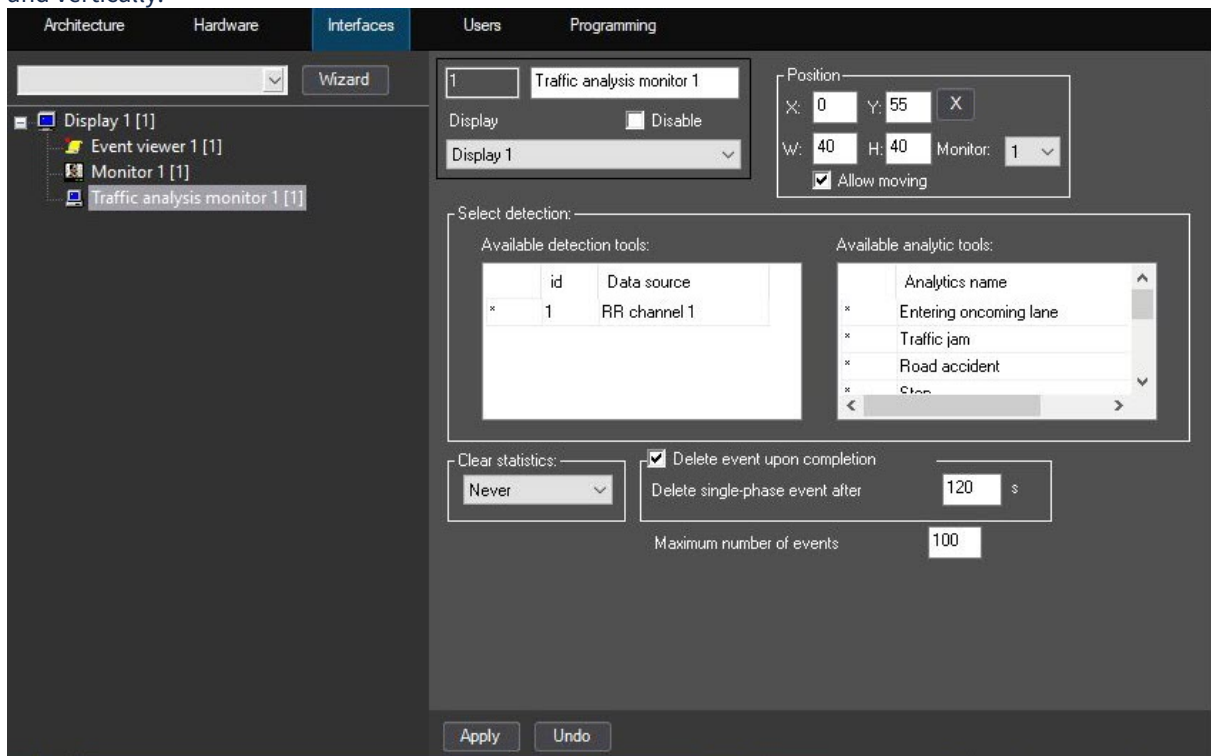
1. Create the Traffic analysis monitor interface object.
2. Configure the position of the Traffic analysis monitor window on the screen.
3. Select the traffic detectors to cooperate with the Traffic analysis monitor window.
4. Configure the periodicity of statistics cleaning.
5. Configure the necessity to remove the event when it ends after a certain period.
6. Configure the maximum number of events.

Configuring position of the Traffic analysis monitor window on the screen

The position of the **Traffic analysis monitor** window on the screen is characterized by the following parameters: coordinates of the upper left corner of the **Traffic analysis monitor** window vertically and horizontally, the width and height of the **Traffic analysis monitor** window, and the ability to move the **Traffic analysis monitor** window across the screen by using the mouse.

To configure the position of the **Traffic analysis monitor** window on the screen, do the following:

1. Create the **Traffic analysis monitor** object on the **Interfaces** tab of the **System settings** window.
2. Go to the settings panel of the **Traffic analysis monitor** object by selecting it in the tree.
3. By default, the **Traffic analysis monitor** window is displayed in the central part of the screen (with the coordinates of the upper left corner: X = 10, Y = 10). To change the position of the window on the screen, specify its coordinates in the **X** and **Y** fields. The values of the **X** and **Y** fields correspond to the coordinates of the upper left corner on the screen and are expressed as a percentage relative to the screen size horizontally and vertically.
4. By default, the **Traffic analysis monitor** window occupies 64 % of the total screen space (80% of the screen width and height). To change the window size, you must specify its width in the **W** field and height in the **H** field. The values of the **W** and **H** fields are expressed as a percentage relative to the screen size horizontally and vertically.



5. By default, you cannot move the **Traffic analysis monitor** window across the screen. To allow moving, set the **Allow moving** checkbox.
6. Click the **Apply** button.

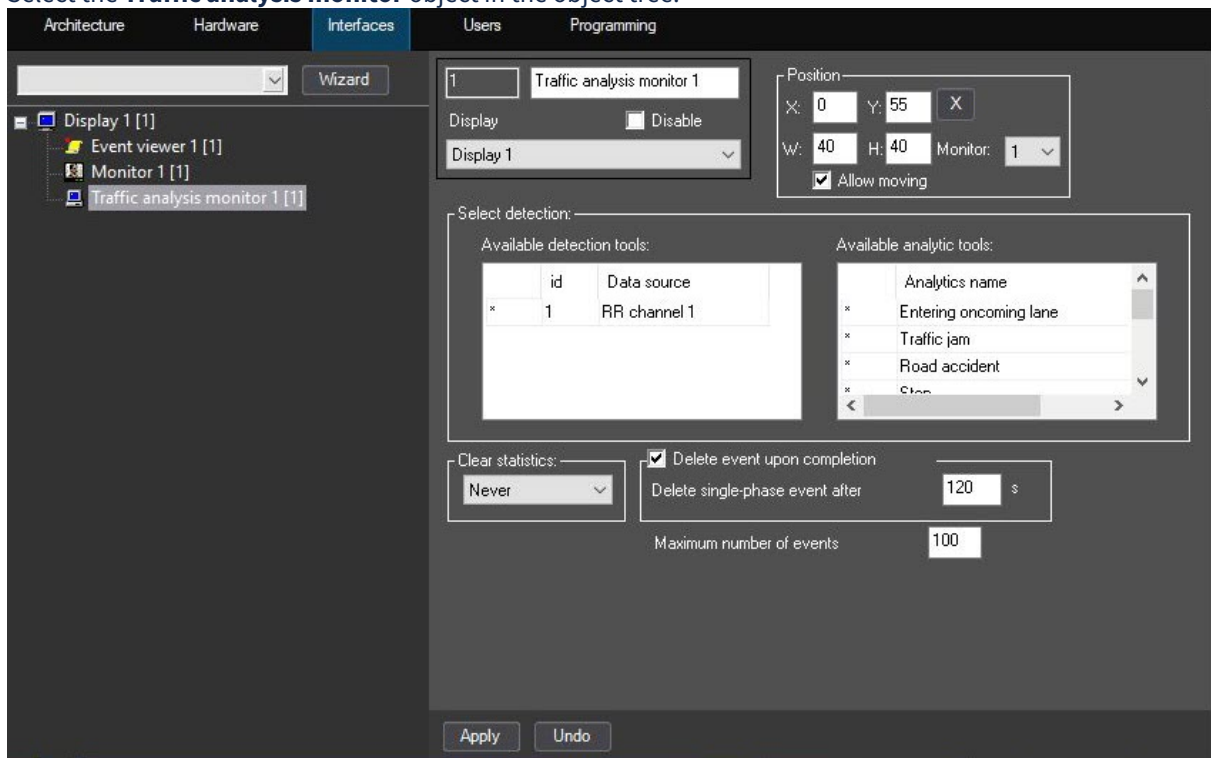
Configuring the position of the **Traffic analysis monitor** window on the screen is complete.

Configuring the Traffic analysis monitor interface window

To configure the **Traffic analysis monitor** window, do the following:

1. Go to the **Interfaces** tab of the **System settings** window.

2. Select the **Traffic analysis monitor** object in the object tree.

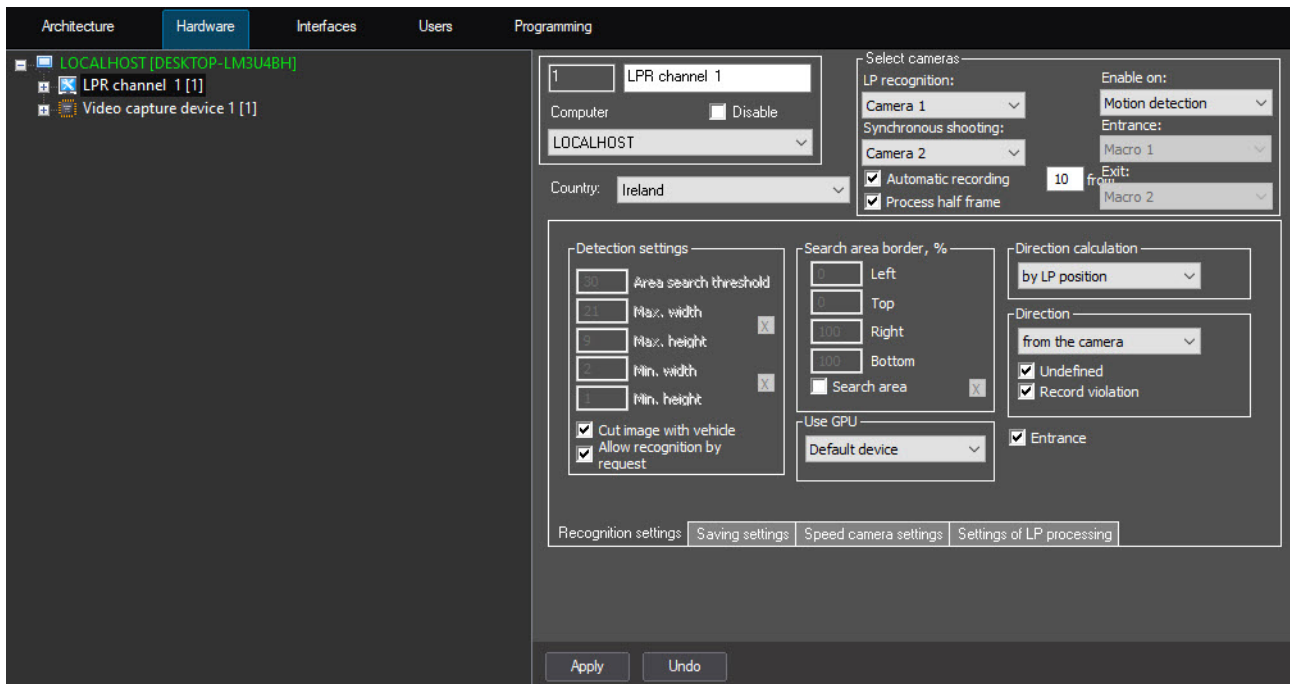


3. Select the required detectors by moving them from the **Available detection tools** to the **Available analytic tools** list with navigation buttons.
4. If necessary, change the periodicity of the statistics cleaning by selecting it from the **Clear statistics** drop-down list:
 - a. **Never** (default)—statistics isn't cleared,
 - b. **Each day**.
 - c. **Each week**.
 - d. **Each month**.
5. The **Delete event upon completion** checkbox is set by default. If you don't want to delete events upon completion, clear the checkbox.
6. If you set the **Delete event upon completion** checkbox, the **Delete single-phase event after _ s** field becomes available for editing. The default value is **120**.
7. Specify the value in the **Maximum number of events** field. The default value is **100**.
8. Click the **Apply** button to save the settings.

Selecting detectors for the traffic analysis is complete.

5.3 Set up the LPR channel

You can configure the recognition channel on the settings panel of the **LPR channel** object that is created on the basis of the **Computer** object on the **Hardware** tab of the **System settings** window.



5.3.1 Select cameras to work with the LPR channel

To set up the **LPR channel** object, you must select the main camera for license plate recognition and, if necessary, an additional synchronous camera.

The main recognition camera is directed at the traffic lane. The synchronous additional camera covers the same area as the main camera, but it can be mounted in another place. You can synchronize the operation of the main and additional cameras using scripts or macros.

Example. Gas filling station. The main camera is directed at the incoming lane and recognizes license plates approaching cars. The additional synchronous camera is mounted at the side of the lane and monitors the fueling process.

To select the cameras, do the following:

1. Go to the settings panel of the **LPR channel** object, corresponding to the activated module (see [Activating the software module used for identifying license plates](#)).

2. From the **LP recognition** drop-down list, select the required **Camera** object (the main camera for license plate recognition).

Note

The same camera can be used for various license plate recognition channels.

3. From the **Synchronous** drop-down list, select the required **Camera** object (the additional synchronous camera). To get contextual frames from an ANPR camera, you must select the same camera that is selected as the main one.

Attention!

Frames from the synchronous camera are recorded only if continuous recording is enabled on both cameras.

4. Click the **Apply** button.

The camera selection for the license plate recognition channel is completed.

5.3.2 Set up the video recording parameters

It is possible to record a video signal received from the license plate recognition camera during a specified time interval. If you enable this function, the recording starts automatically when the LPR channel recognizes a license plate.

Note

In case of heavy traffic, when subsequent license plates are registered in a time period less than that specified, the video signal is recorded continuously.

To enable the function of automatic video recording, do the following:

1. Go to the settings panel of the **LPR channel** object, corresponding to the activated module (see [Activating the software module used for identifying license plates](#)).

The screenshot shows the configuration interface for an LPR channel. Key settings include:

- Channel Name:** LPR channel 1
- Computer:** DESKTOP-LM3U4BH
- Country:** Germany
- Select cameras:** Camera 1
- Synchronous:** <none>
- Automatic recording:** (Duration: 10 s)
- Process half frame:**
- Enable on:** Motion detection
- Entranc:** Macro 1
- Exit:** Macro 2
- Detection settings:**
 - Area search threshold: 30
 - Max. width: 21
 - Max. height: 9
 - Min. width: 2
 - Min. height: 1
 - Cut image with vehicle:
 - Allow recognition by request:
- Search area border, %:**
 - Left: 0
 - Top: 0
 - Right: 100
 - Bottom: 100
 - Search area:
- Direction calculation:** by LP position
- Direction:** any
- Undefined:**
- Record violation:**
- Entrance:**

2. Set the **Automatic recording** checkbox to enable the automatic recording of the video upon recognizing a license plate.
3. In the field next to the checkbox, specify for how many seconds the video must be recorded after license plate recognition.

Note

If you enter 0 seconds in this field, continuous recording starts when a license plate is recognized.

4. Click the **Apply** button to save the settings.

Configuration of automatic video recording when a license plate is recognized is complete.

5.3.3 Configuration of the LPR channel detector


To configure the LPR channel detector, do the following:

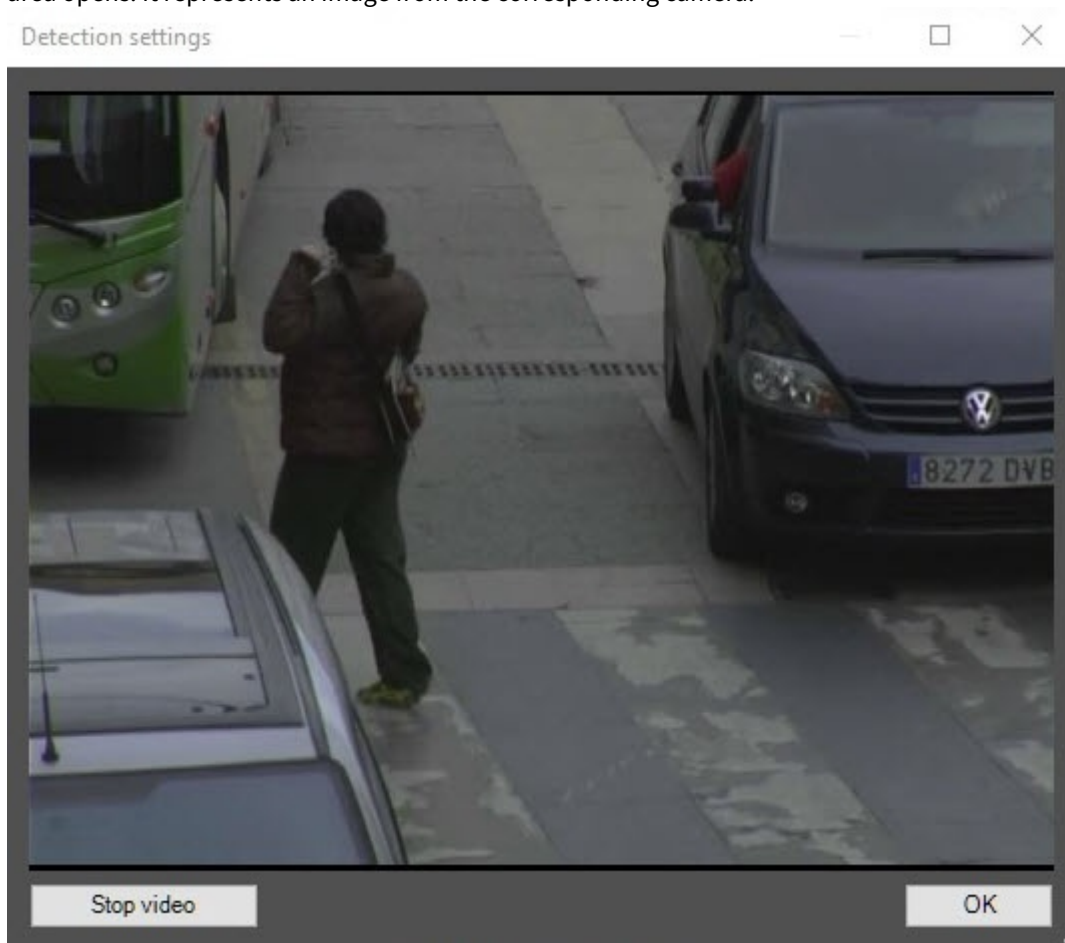
1. Go to the settings panel of the **LPR channel** object corresponding to the activated software module (see [Activating the software module used for identifying license plates](#)).

Note

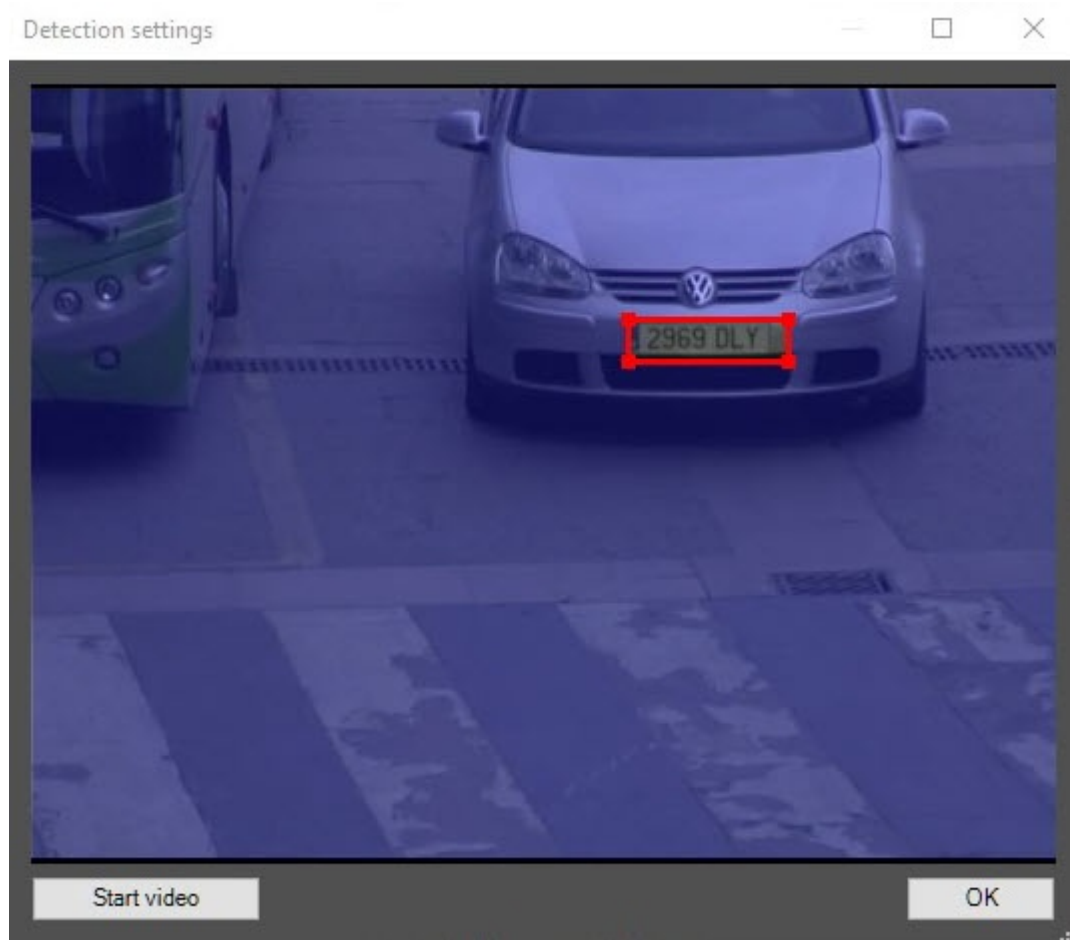
The availability of the parameters depends on the activated software modules (for details, see [The settings panel of the LPR channel object](#)).

2. Specify the **Area search threshold** parameter.
3. Specify the **Max. width** and **Max. height** parameters:

- a. Click the  button next to the parameters. An interactive interface for setting up parameters of an area opens. It represents an image from the corresponding camera.



- b. At the required moment, click the **Stop video** button, then select the required area using the left mouse button and click the **OK** button.



Note

You can select the required area in the same way in the **Live video** mode.

Results of setting area parameters are automatically entered in the **Max. width** and **Max. height** fields.

Note

We don't recommend setting maximum sizes greater than required, as this slows down the processing but doesn't improve the recognition quality.

4. Specify the **Min. width** and **Min. height** parameters similarly to the **Max. width** and **Max. height** parameters using the button.
5. If necessary, set the **Cut image with vehicle** checkbox.

Note

The **Cut image with vehicle** option is used only when you work with megapixel surveillance cameras.

6. If necessary, set the **Allow recognition by request** checkbox.

Note

Image recognition by request works only for the *RR* (see [Searching for a license plate by image](#)) and *VT* (see [Search for a license plate by image for the VT recognition module](#)) modules. For this, use the POST `http://IP address:port/lprserver/FindNumbersByImage` query.

The response can contain the following errors:

`"Recognizer": "the setting is not set allow",`
 a. `"Status": "OK"`

In this case, the **Allow recognition by request** checkbox isn't set.

`"Recognizer": "incorrect image",`
 b. `"Status": "OK"`

In this case, an image of the incorrect base64 format is used: you must convert the video frame to the JPEG format and not save it in the JPG format.

`"Plate": "Not Found",`
 c. `"Status": "OK"`

In this case, you used the *Urgan* module during the operation; image recognition by request isn't supported.

7. Click the **Apply** button.

Configuring the LPR channel detector is complete.

5.3.4 Set the borders of the license plate search area

By default, the LPR channel scans the whole video image received from the camera for license plates. To decrease the load on the server, specify a smaller area where the license plate must be searched for.

Note

- If you set the license plate search area, only the license plates that completely fit into the area are recognized and identified.
- To ensure the correct license plate recognition, camera captions must not overlap with the license plate search area.

You can set the search area borders in one of the following ways:

1. Manually enter the coordinates of the search area.
2. Set the borders on the video image using the mouse.

To specify the exact borders of the search area, do the following:

1. Go to the settings panel of the **LPR channel** object corresponding to the activated module (see [Activating the software module used for identifying license plates](#)).

The screenshot shows the configuration interface for an LPR channel. Key settings include:

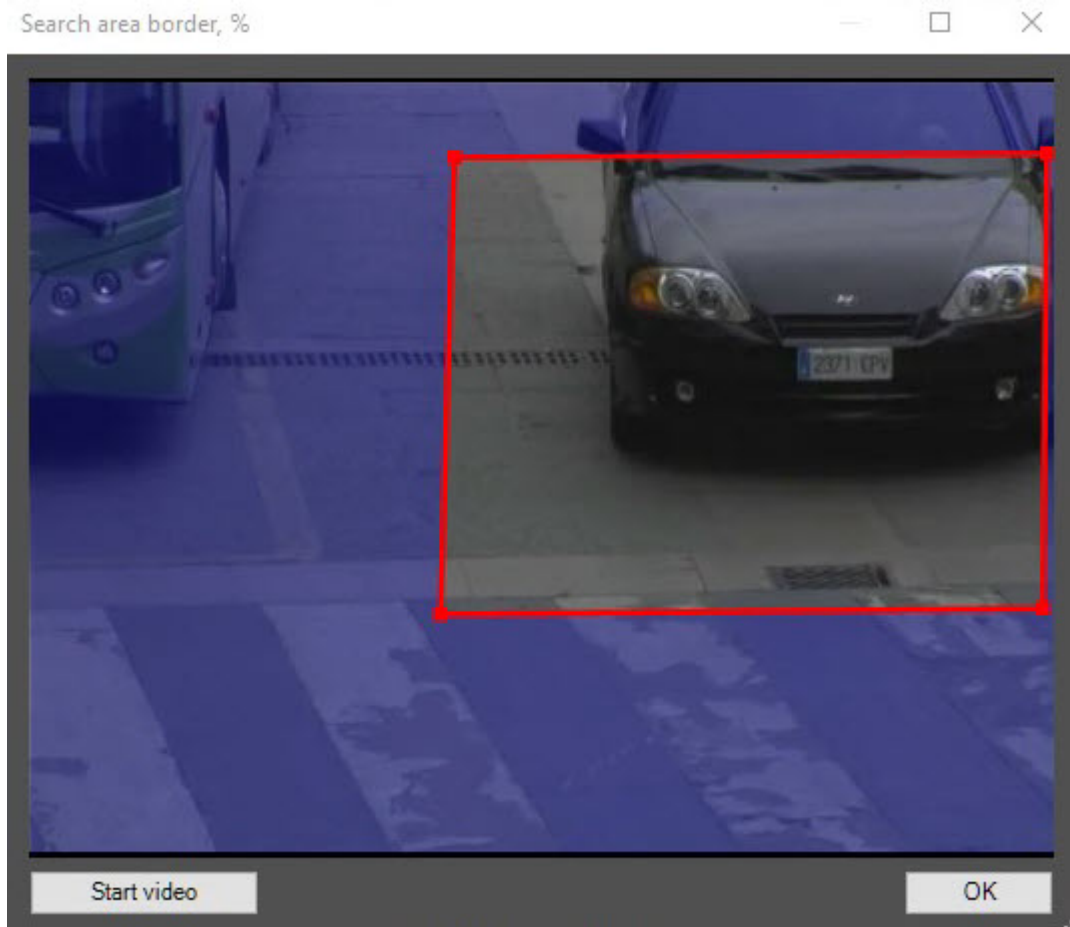
- Channel ID:** 1, **Label:** LPR channel 1
- Computer:** DESKTOP-LM3U4BH
- Country:** Germany
- Select cameras:** Camera 1, Camera 2
- LP recognition:** Synchronous
- Enable on:** Motion detection
- Entrance:** Macro 1
- Exit:** Macro 2
- Automatic recording:** (10 s)
- Process half frame:**
- Detection settings:**
 - Area search threshold: 30
 - Max. width: 21
 - Max. height: 9
 - Min. width: 2
 - Min. height: 1
 - Cut image with vehicle
 - Allow recognition by request
- Search area border, %:**
 - Left: 0
 - Top: 0
 - Right: 100
 - Bottom: 100
 - Search area
- Use GPU:** Default device
- Direction calculation:** by LP position
- Direction:** any
- Undefined
- Record violation
- Entrance

Navigation tabs at the bottom: Recognition settings | Saving settings | **Advanced settings** | Settings of LP processing

Buttons: Apply, Undo

2. Set the **Search area** checkbox to enable specifying the search area borders.
3. In the **Left**, **Top**, **Right**, and **Bottom** fields, specify the required values of the search area borders. These values correspond to the search area border percentage of the size of the surveillance window. To specify the search area borders using the mouse, do the following:

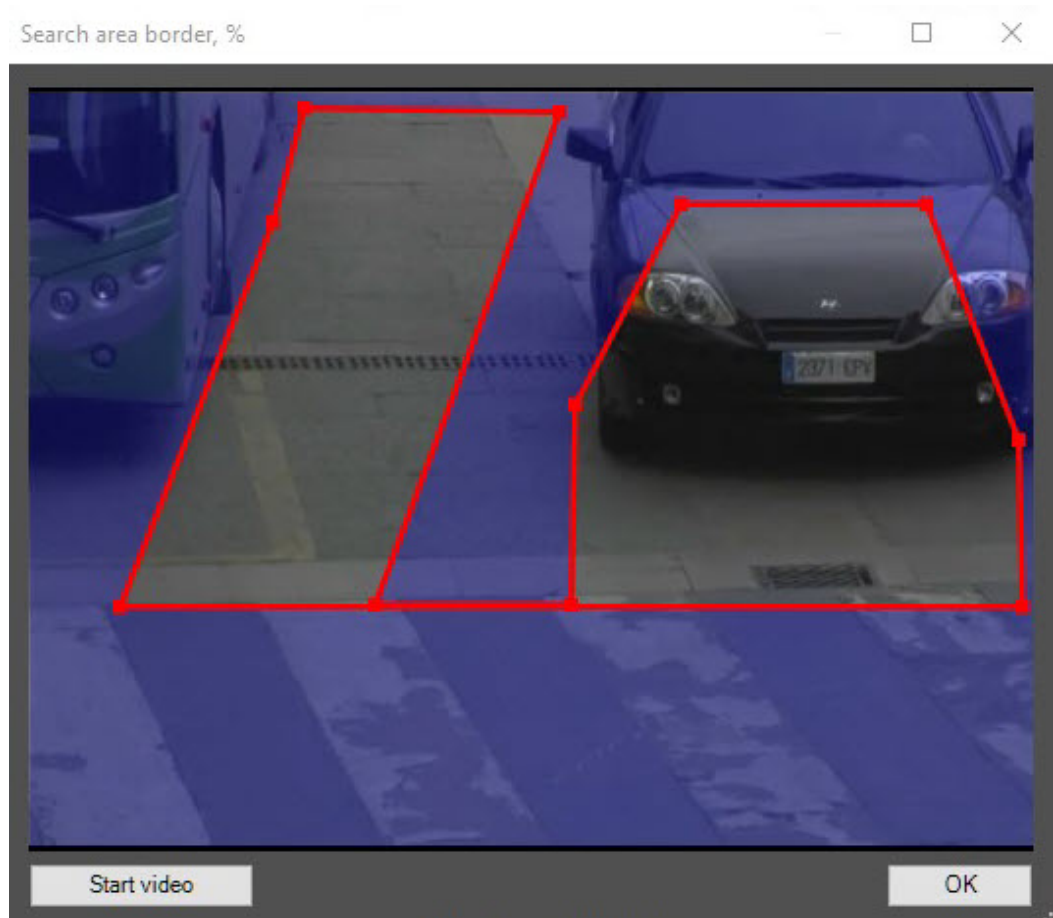
- a. Click the button next to the checkbox. The **Search area border, %** window opens. In this window, do the following:



- i. Left-click and hold the mouse button on the video image at one of the corners of the supposed search area.
- ii. Keep the mouse button pressed and drag the pointer across the supposed search area to the opposite corner.
- iii. Release the left mouse button.
- iv. Click the **OK** button to save the selected area.

Note

If you use *VT* or *RR* software modules, you can specify search area borders of any shape.



To specify a search area of any shape, set the anchor points of the required shape with the left mouse button. After you set the last anchor point, click the right mouse button, and the shape will automatically close.

4. Click the **Apply** button.

The license plate search area border is now set up.

5.3.5 Select the country and license plate recognition SDK

On this page:

- [General information](#)
- [Select the country for license plate recognition](#)
 - [Select the license plate recognition SDK](#)

General information

When you configure the LPR channel with the activated *AUTO-Uragan/VT/RR/IV* module, you must specify the country whose license plates must be recognized.

Note

The list of the supported countries is given in the description of the functional characteristics of the corresponding LPR module in [Configuring the program modules](#).
The license plates of the selected country are recognized with maximum probability. The license plates that don't fit the plate format of the selected country will still be recognized, although with lesser probability.

When you configure the LPR channel with the activated *AR-Auto/AR-Railway* module, you must specify the license plate recognition SDK.

Select the country for license plate recognition

To select the country, do the following:

1. Go to the settings panel of the **LPR channel** object, representing the activated recognition module.

The screenshot shows the configuration interface for an LPR channel. Key elements include:

- Channel Name:** LPR channel 1
- Computer:** DESKTOP-LM3U48H
- Country:** Germany
- LP recognition:** Camera 1, Camera 2, Synchronous
- Enable on:** Motion detection
- Detection settings:** Area search threshold (30), Max. width (21), Max. height (9), Min. width (2), Min. height (1)
- Search area border, %:** Left (0), Top (0), Right (100), Bottom (100)
- Direction calculation:** by LP position
- Direction:** any
- Use GPU:** Default device
- Recognition settings:** Cut image with vehicle, Allow recognition by request
- Entrance:** checked

2. From the **Country** drop-down list, select the country for license plate recognition.

⚠ Attention!

The **By default** value is available for the *IV* module. In this case it is possible to recognize license plates of all supported countries, though the recognition quality can decrease. There is a special utility for the *VT* and *AUTO-Uragan* modules (see [PatCgfr.exe utility for active patterns configuration](#) or [PresetEditor.exe utility for active patterns configuration of VT module](#)) using which you can set template configurations. Each configuration determines what license patterns will be recognized by the camera. Using various configurations, you can set various recognition rules for various cameras.

If the software module supports the two-line license plate recognition, then in order to display them in the **Event viewer** in two lines, it is necessary to set the **RemoveNewLine** registry key value to **0** (for details, see [Registry keys reference guide](#), for more information about working with the registry, see [Working with Windows OS registry](#)).

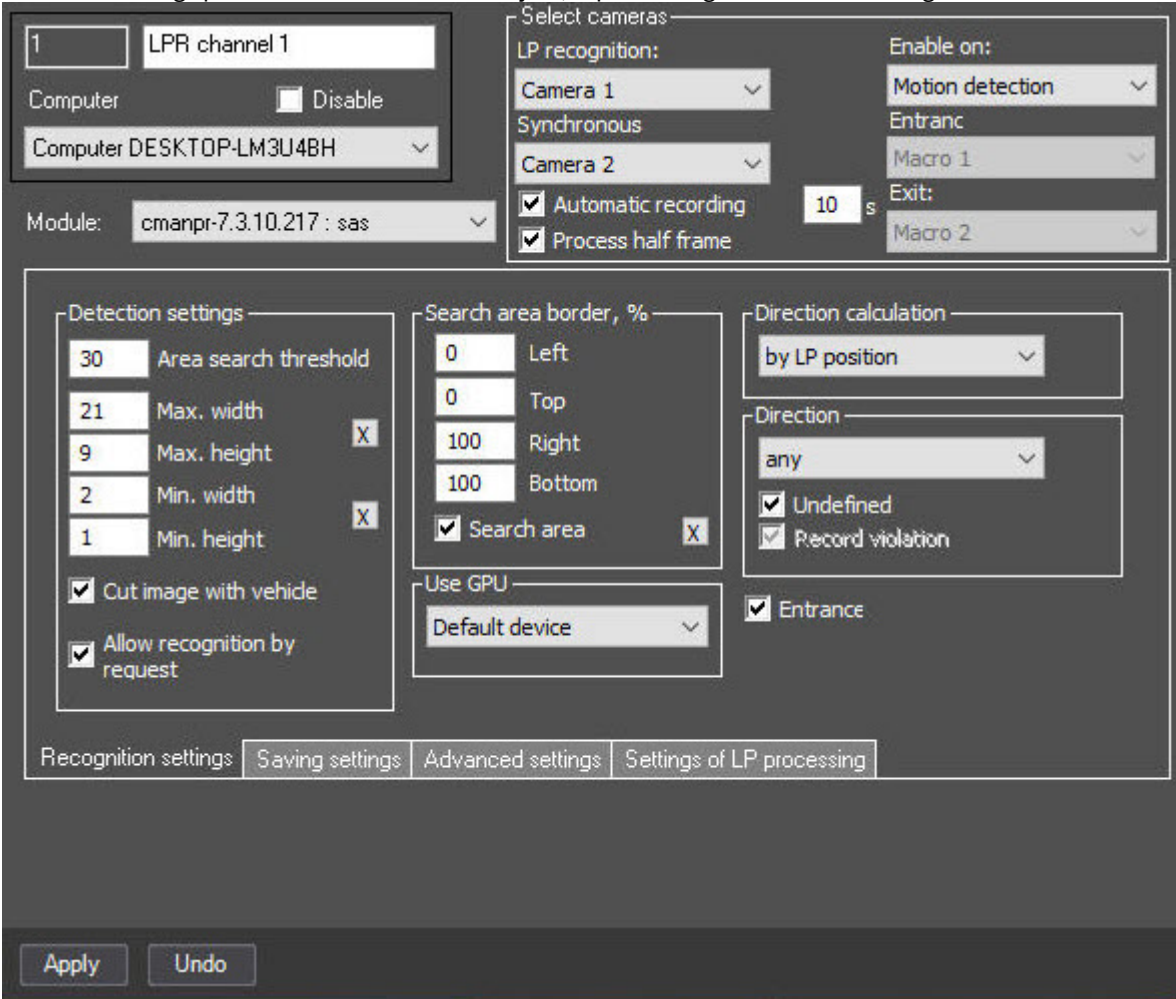
3. Click the **Apply** button.

Selection of a country for license plate recognition is complete.

Select the license plate recognition SDK

To select the license plate recognition SDK, do the following:

1. Go to the settings panel of the **LPR channel** object, representing the activated recognition module.



- From the **Module** drop-down list, select the SDK for license plate recognition.

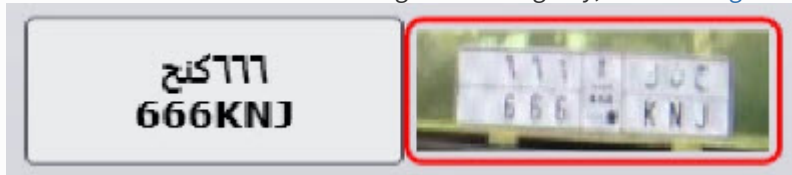
Note

To add the SDK for license plate recognition, you must download the required SDK from the [AxxonSoft website](#) and install it using the *EngineManager* utility. The procedure of installing the recognition engines using the *EngineManager* utility is described in the `engine_install_windows.txt` file located in the folder with the corresponding recognition engine.

If the *AR-Auto* module is activated, then the **cmnpr-7.2.7.108: general** SDK is used by default for recognizing all Latin characters of the license plates (for example, corresponding to countries such as Argentina, India, Africa, and Singapore), although the country recognition function is not used. The Hazard Identification Number Recognition Engine (ADR) SDK can be added to the list of the countries as a separate "country". This SDK is named **cmnpr- <version number>: latin_eadr** in the list of countries. If you select it as the country issuing the license plate, the recognition module can identify the license plates of the states using the Latin alphabet, as well as the specialized license plates of vehicles carrying hazardous goods, with detection and recognition of the type of cargo being transported. The information about the transported cargo will be displayed by the [Vehicle Tracer](#) module in the list of vehicle parameters and also sent in the event about the recognized number.

Two-line license plates are supported in the *AR-Auto* module when the **cmnpr-<version number> : arab** recognizer is selected.

In the online monitor, the recognized Arabic license plates are always displayed in two lines. The first line begins with the Arabic numbers, and then the Arabic letters are displayed. The second line, by default, begins with the Latin letters, then numbers. To display in the second line the Latin numbers first and then the letters, it is necessary to set the value of the string parameter of the **VehiclePlateSearch.RightToLeft** registry key to **0** (for details, see [Registry keys reference guide](#), for more information about working with the registry, see [Working with Windows OS registry](#)).



- Click the **Apply** button.

Selection of the license plate recognition SDK is complete.

5.3.6 Select a device for license plate recognition

Attention!

In addition to *Auto PSIM*, Nvidia CUDA Toolkit drivers must also be installed on the computer. You can download the drivers from the Nvidia manufacturer's website. Otherwise, you cannot use graphics cards for license plate recognition.

You can use GPU for license plate recognition in *Auto PSIM*. To do this, do the following:

- Go to the settings panel of the **LPR channel** object corresponding to the activated software module (see [Activating the software module used for identifying license plates](#)).

The screenshot shows the configuration window for license plate recognition. It is divided into several sections:

- Top Left:** Channel selection (1), LPR channel name (LPR channel 1), Computer selection (Computer DESKTOP-LM3U4BH), and a Disable checkbox.
- Top Right:** Select cameras (Camera 1, Camera 2), LP recognition (Synchronous), Automatic recording (checked, 10s), Process half frame (checked), and Enable on (Motion detection, Entranc, Macro 1, Macro 2).
- Middle Left:** Detection settings including Area search threshold (30), Max. width (21), Max. height (9), Min. width (2), Min. height (1), Cut image with vehicle (checked), and Allow recognition by request (checked).
- Middle Center:** Search area border, % (Left: 0, Top: 0, Right: 100, Bottom: 100), Search area (checked), and Use GPU (Default device).
- Middle Right:** Direction calculation (by LP position), Direction (any), Undefined (checked), Record violation (checked), and Entrance (checked).
- Bottom:** Tabbed interface with 'Recognition settings' selected, and Apply and Undo buttons.

2. From the **Use GPU** drop-down list, select the device that is used for license plate recognition:
 - a. **Do not use**—The ability to use a GPU is disabled. The default value.
 - b. **Default device**—All available GPUs are used during recognition.
 - c. **Intel GPU**—the integrated Intel GPU is used during recognition.

Note

Only the *VT* recognition module currently uses the Intel GPU.

3. Click the **Apply** button to save the settings.

Selecting a device for license plate recognition is complete.

Note

1. The device selection for license plate recognition described on this page is implemented only for the *RR*, *RR vendor and model recognizer*, *VT*, and *IV* software modules.
2. To enable the usage of the GPU computing resources of the *VT* software module, follow the steps described in [Configuring the VT software module](#).
3. To connect the GPU for license plate recognition for the *IV* software module, you must activate this feature in the module settings (see [Configuring the CIDR IV module](#), [Configuring the RIDR IV module](#), and [Setting up the IV module](#)).

4. To connect the GPU for license plate recognition for the *Vehicle type recognition module* software module, you must select **GPU** from the **Device** drop-down list in the module settings (see [Setting up the Vehicle type recognition module](#)).

5.3.7 Select the traffic direction for license plate recognition

By default, the LPR channel recognizes license plates of all vehicles passing the camera FOV: moving toward the camera and away from it. You can set the module to recognize and save the license plates of vehicles moving in certain direction: **from the camera, to the camera**, or **any**. The following results can appear as an outcome of the vehicle movement direction recognition: **From the camera, To the camera, Undefined**.

If traffic direction is set, then by default, if the direction of vehicle movement does not coincide with the specified value, the **Entered the oncoming lane** alarm event is generated. You can disable this event. If the direction of vehicle movement is undefined, the **Entered the oncoming lane** alarm event isn't generated.

Attention!

The availability of the parameters depends on the activated software module (for details, see [The settings panel of the LPR channel object](#)).

To select the direction of traffic for license plate recognition, do the following:

- Go to the settings panel of the **LPR channel** object, corresponding to the activated module (see [Activating the software module used for identifying license plates](#)).

The screenshot shows the configuration interface for an LPR channel. Key settings include:

- Channel ID:** 1, **Name:** LPR channel 1
- Computer:** DESKTOP-LM3U4BH
- Country:** Germany
- Select cameras:** Camera 1 and Camera 2
- LP recognition:** Synchronous
- Enable on:** Motion detection
- Entrance:** Macro 1
- Exit:** Macro 2
- Automatic recording:** 10 s
- Process half frame:** checked
- Detection settings:**
 - Area search threshold: 30
 - Max. width: 21
 - Max. height: 9
 - Min. width: 2
 - Min. height: 1
 - Cut image with vehicle: checked
 - Allow recognition by request: checked
- Search area border, %:**
 - Left: 0
 - Top: 0
 - Right: 100
 - Bottom: 100
 - Search area: checked
- Direction calculation:** by LP position
- Direction:** any
- Undefined:** checked
- Record violation:** checked
- Entrance:** checked

- From the **Direction calculation** drop-down list, select the mode of determining the vehicle's movement direction:
 - by LP position**—the direction is determined by the position of the upper part of the license plate. If the upper part of the license plate at the start of tracking is lower than the upper part of the license plate at the end of tracking, then the direction is determined as "from the camera", otherwise—"to the camera".
 - by LP area**—the direction is determined by the license plate area. If the license plate area at the start of tracking is larger than the license plate area at the end of tracking, then the direction is determined as "from the camera", otherwise—"To the camera".
 - by SDK**—the direction is determined by the SDK. Currently, the following license plate recognition modules support this mode: *RR, VT, AUTO-Uragan, IV*.

Note

If the direction of movement is detected incorrectly or the license plate recognition stops, it is recommended to select the **by LP area** mode.

- From the **Direction** drop-down list, select the traffic direction relative to the camera in which it is necessary to recognize the license plates.

Note

For the *RIDR IV* and *CIDR IV* modules, the direction of carriages in the camera view is selected from left to right or from right to left.

- Set the **Undefined** checkbox to display the direction as **Undefined** in the *Vehicle Tracer* module if it is impossible to determine the vehicle direction.
- If you select the **from the camera** or **to the camera** value in the **Direction** drop-down list, the **Record violation** checkbox becomes available. By default this checkbox is set. That means that if the direction of vehicle movement doesn't coincide with the specified value, the **Entering an oncoming lane** alarm event is generated. If this event must not be created, clear the checkbox.

Note

The following variations are possible depending on the selected traffic direction:

- If you select the **to the camera** direction and set the **Record violation** checkbox, the recognition is performed in both directions; if the movement is from the camera, the alarm event is generated.
- If you select the **from the camera** direction and set the **Record violation** checkbox, the recognition is performed in both directions; if the movement is towards the camera, the alarm event is generated.
- If you select the **to the camera** direction and the **Record violation** checkbox is clear, the recognition is performed only in the direction of the camera.
- If you select the **from the camera** direction and the **Record violation** checkbox is clear, the recognition is performed only in the direction from the camera.

- If you want the LPR channel to record the direction of vehicle movement as **Entrance** to the territory, set the **Entrance** checkbox.

Note

This setting is taken into account in the *WEB Report System PSIM* when working with AUTO reports (see [WEB Report System PSIM. User Guide](#)).

- Click the **Apply** button to save the settings.

The direction of traffic movement for license plate recognition is selected.

5.3.8 Set up the storage of license plates and depth of record storage in a database

Configuration of archive size in the database

 [Registry keys reference guide](#)

All events that *Auto PSIM* receives from the *LPR channel* are stored in the SQL database. Eventually, the SQL database reaches a large size, which leads to the increase in server load. To limit the size of the SQL database, you can specify the archive size in the database.

Note

In this case, when you configure the LPR channel and specify the retention period of the database records that is shorter than it was before, the database gradually cleans itself.

If the **Debug 4** debugging mode is enabled, then when the SQL database queue reaches 1000 or more queries, the events are generated in the *Event viewer* every 10 seconds, indicating the current queue until the queue is less than 1000 (for details, see [Enable, disable, change the mode of the Debug window](#)).

To configure the archive size in the database, do the following:

1. Go to the settings panel of the **LPR channel** object, corresponding to the activated module (see [Activating the software module used for identifying license plates](#)).
2. Go to the **Saving settings** tab.

The screenshot shows the 'Saving settings' tab of the LPR channel configuration. The 'Archive size, days' field is set to 30. Other settings include 'Record frames to SQL DB' checked, 'Show captions' checked, 'Deinterlace' unchecked, 'Ratio 4:3' checked, and 'Notification port' set to 55555. The 'Advanced settings' tab is also visible, showing 'Min. number of characters in LP' set to 50 and 'Min. recognition quality, %' set to 50. The 'Apply' button is highlighted.

3. In the **Archive size, days** field, specify the number of days that records are stored in the database. The default value is 30. The value range is 0–5000.
4. Click the **Apply** button.

Configuration of archive size in the database is complete.

Methods of storing images of recognized license plates and images of vehicles

When a license plate is recognized by the LPR channel, this event and the corresponding metadata are recorded to the *Auto PSIM* database. The image of the vehicle, whose license plate was recognized, and the image of license plate can also be stored.

There are two methods of storing the images of recognized license plates and images of vehicles:

1. In the *Auto PSIM* database (see [Set up storage of images of recognized license plates and vehicles in the Auto PSIM database](#))
2. On the computer disk in the folder (see [Set up storage of images of recognized license plates and vehicles on disk](#)).

Set up storage of images of recognized license plates and vehicles in the Auto PSIM database

Note

Storage of images of recognized license plates and vehicles in the *Auto PSIM* database rapidly increases the size of the database. This leads to the increase in the server load.

To store the images of recognized license plates and vehicles in the *Auto PSIM* database, do the following:

1. Go to the settings panel of the **LPR channel** object, corresponding to the activated module (see [Activating the software module used for identifying license plates](#)).
2. Go to the **Saving settings** tab.

The screenshot displays the 'Saving settings' tab for an LPR channel. Key settings include:

- Channel:** LPR channel 1
- Computer:** Computer DESKTOP-LM3U4BH
- Country:** Germany
- Select cameras:** Camera 1
- LP recognition:** Synchronous
- Enable on:** Macros, Entranc, Macro 1, Exit, Macro 2
- Automatic recording:** 10 s
- Process half frame:** (unchecked)
- Record frames to SQL DB:** (checked)
- Show captions:** (checked)
- Deinterlace:** (unchecked)
- Ratio 4:3:** (checked)
- Archive size, days:** 30
- Notification settings:** Notification port: 55555, Xml notification port: 35555
- Results filtering settings:**
 - Min. number of characters in LP: (empty)
 - Min. recognition quality, %: 50
 - Min. time of LP repetition, s: (empty)

Navigation tabs at the bottom: Recognition settings, Saving settings, Advanced settings, Settings of LP processing.

3. Set the **Record frames to SQL DB** checkbox to store the images of recognized license plates and vehicles in the *Auto PSIM* database.

Note

Captions with the information about the recognized license plates can be overlaid on the video image that is recorded to the license plate database. If this option is enabled, the captions are overlaid on the video image when you view the full info about the vehicle with the recognized license plate.

4. Set the **Show captions** checkbox to enable the caption overlay on the video image when generating the report on the recognized license plate. You can use the parameters of the **FontSize.N** and **TimestampFontSize.N** registry keys to change the size of the black area containing captions and their font (see [Registry keys reference guide](#). For more information on working with the registry, see [Working with Windows OS registry](#)).
5. In case the video image is received in full resolution, set the **Deinterlace** checkbox to convert mixed frames to regular video frames and remove interlaced horizontal lines (deinterlacing) from a frame with a vehicle.
6. If the report on the recognized license plate must contain a frame with a width to height ratio of 4:3, set the **Ratio 4:3** checkbox.
7. Click the **Apply** button to save the settings.

Note

You can export the images of recognized license plates and vehicles from the *Auto PSIM* database to the disk using the `LprFsTool.exe` utility (see [LprFsTool.exe utility for loading images of recognized license plates from database to disk](#)).

Configuration of the storage of images of recognized license plates and vehicles in the *Auto PSIM* database is complete.

Set up storage of images of recognized license plates and vehicles on disk

The storage of images of recognized license plates and vehicles on disk depends on the following registry keys (see [Registry keys reference guide](#). For information on working with registry, see [Working with Windows OS registry](#)):

- **LprDB.Use**: The key specifies the method of storing the images of recognized license plates and vehicles. By default, the key value is **1**.
- **LprDB.Path**: The key specifies the folder on the computer for storing the images of recognized license plates and vehicles (you can specify either a local or a network folder). The default folder is **C:\ProgramData\AxxonSoft\LprDB**.
- **LprDB.FreeMB**: The key specifies the amount of free storage space in a directory. When the limit is exceeded, the overwriting process starts, rewriting the oldest images with the most recent ones. By default, the limit is **5000** MB.

Operation modes of *Auto PSIM* and storage of images of recognized license plates and vehicles at each value of the **LprDB.Use** key are described in the table below.

LprDB.Use	Operation mode
0	The images of recognized license plates and vehicles are stored either in the <i>Auto PSIM</i> database, or nowhere
1	The images of recognized license plates and vehicles are stored in the folder specified in the LprDB.Path key. The disk space limit of this folder is specified in the LprDB.FreeMB key

To change the operation mode, specify the appropriate value for the **LprDB.Use** key corresponding to the necessary mode of storing the images of recognized license plates and vehicles.

To select the folder on disk for storing the images of recognized license plates and vehicles, specify the folder path in the parameter of the **LprDB.Path** key.

To specify the amount of free storage space in a directory, upon reaching which the images are overwritten in a loop, specify the corresponding value in megabytes in the parameter of the **LprDB.FreeMB** key.

 **Note**

You can access the images stored in the folder on disk using the HTTP GET requests (see [Receiving an image by ID](#)).

Configuring the storage of images of recognized license plates and vehicles on disk is complete.

5.3.9 Set up the results filtering

You can configure the filtering of the recognized license plates according to a number of criteria.

 **Note**

By default, the recognized license plates that have been filtered are not saved in the database. In order for the filtered license plates to be saved in the database, you must set the **0** value for the **SaveFilterToDB** key (for details, see [Registry keys reference guide](#). For more information about working with the registry, see [Working with Windows OS registry](#)).

To configure the filtering of the license plates, do the following:

1. Go to the settings panel of the **LPR channel** object, corresponding to the activated module (see [Activating the software module used for identifying license plates](#)).

2. Go to the **Saving settings** tab.
3. In the **Min. number of characters in LP** field, specify the minimum number of characters in the recognized license plate.
4. In the **Min. recognition quality, %** field, specify as a percentage the minimum recognition accuracy that is determined by the SDK's internal logic and allows you to distinguish a license plate from an unrelated caption on a vehicle. In the online monitor, all results with an accuracy level lower than the specified one are discarded (see [Viewing the data about the last identified vehicle](#)).
5. In the **Min. time of LP repetition, s** field, specify in seconds the minimum time of license plate repetition in the video in the range 0–3600.
6. Click the **Apply** button to save the settings.

Setting up the filtering of the recognized license plates is complete.

5.3.10 Set up frame processing

Half-frame processing is performed using the image interlaced scanning (the **Process half frame** checkbox is set). If you enable the half-frame processing, when the next frame is received, a new frame is created and processed, consisting only of the even rows of the initial frame. By default, the LPR channel uses full resolution, and the **Process half frame** checkbox is clear.

Note

You can specify the frame processing settings only when you use the following program modules: *AUTO-Uragan*, *AR-Auto*, *AR-Railway*, *VT*, *IV*.

To set the frame processing, do the following:

1. Go to the settings panel of the **LPR channel** object, corresponding to the activated module (see [Activating the program module, used for identifying the plates](#)).

2. Set the **Process half frame** checkbox.

Note

We recommend always setting the **Process half frame** checkbox in order to decrease the CPU load.

3. Click the **Apply** button.

The frame processing setup is now complete.

5.3.11 Configuration of speed estimation by video

The *AUTO-Uragan*, *AR-Auto*, *RR*, and *VT* recognition modules enable estimating vehicle speed by video via the *Auto PSIM* algorithm. The results are displayed over the video image as captions.

Note

The *RR* module also allows video speed estimation using a proprietary algorithm. You can configure the speed estimation by video for the *RR* recognition module on its settings panel (see [Configuring the RR software module](#)). If you enable the speed estimation by video on both the settings panel of the **LPR channel** and on the settings panel of the **RR** object, then speed is estimated using the *Auto PSIM* algorithm.

To configure speed estimation by video, do the following:

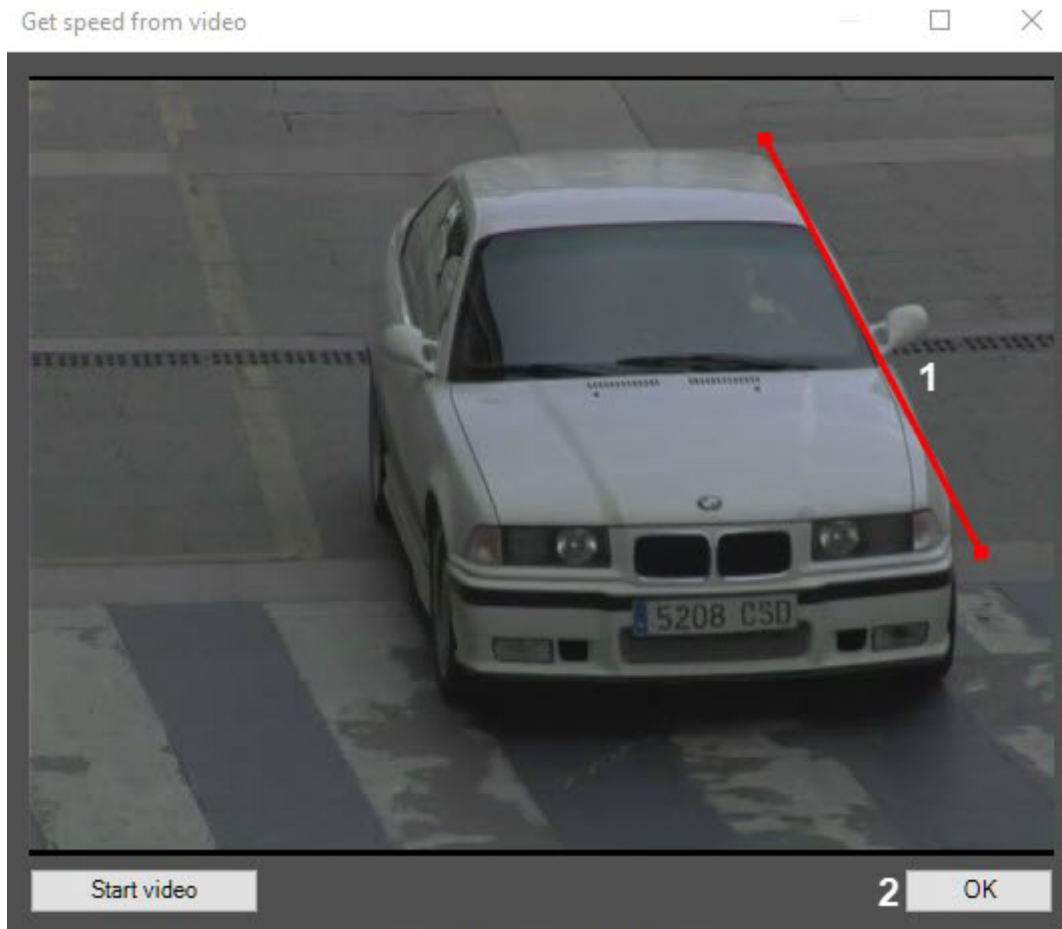
1. Go to the settings panel of the **LPR channel** object, corresponding to the activated module (see [Activating the software module used for identifying license plates](#)).

The screenshot displays the settings panel for 'LPR channel 1'. The interface is divided into several sections:

- Channel Information:** Channel ID '1', name 'LPR channel 1', and a 'Disable' checkbox.
- Computer:** A dropdown menu showing 'Computer DESKTOP-LM3U4BH'.
- Country:** A dropdown menu set to 'Germany'.
- Select cameras:** A section with two columns:
 - LP recognition:** Includes 'Camera 1' and 'Synchronous' dropdowns, and checkboxes for 'Automatic recording' (checked) and 'Process half frame'.
 - Enable on:** Includes 'Macros', 'Entranc', 'Macro 1', and 'Exit' dropdowns, and a 'Macro 2' dropdown.
- Speed Estimation Section:**
 - A checked checkbox 'Get speed from video' and a 'Create frame caption' button.
 - Input fields for 'Distance: 170 cm', 'Permitted speed: 60 km/h', and 'Alarm on speed limit: 80 km/h'. A 'Configuration' button is next to the distance field.
 - A checkbox 'Use decoder NGP(GPU+CPU)'.
- Navigation Tabs:** 'Recognition settings', 'Saving settings', 'Advanced settings', and 'Settings of LP processing'.
- Buttons:** 'Apply' and 'Undo' at the bottom.

2. Go to the **Advanced settings** tab.
3. Set the **Get speed from video** checkbox. As a result, settings for speed estimation become available.

- Click the **Configuration** button. The **Get speed from video** window opens.



- Click the button.
 - Add a line segment of a known length in centimeters to the video image (**1**).
 - Click the **OK** button (**2**).
The **Get speed from video** window closes, and you return to the settings panel of the **LPR channel** object.
- In the **Distance** field, enter in centimeters the length of the line segment specified in the **Get speed from video** window.
 - In the **Permitted speed...km/h** field, enter the permitted vehicle speed.
 - In the **Alarm on speed limit...km/h** field, enter the maximum vehicle speed. If this speed is exceeded, an alarm event is generated.
 - Set the **Use decoder NGP (GPU + CPU)** checkbox to enable video decoding using the GPU, reducing the load on the CPU.
 - Click the **Apply** button.

Configuring speed estimation by video is completed.

5.3.12 Set up license plate processing

Settings of license plate processing include the following functionality:

- Automatic conversion of Latin characters into Cyrillic characters and vice versa. You can use it if the license plate recognition module returns recognized license plates in Latin characters (for example, *RR*), or Cyrillic characters (for example, *VT*).

2. Ignoring license plates that are contained in the given list of rules. Rules can contain either an exact license plate or a regular expression. This allows, for example, ignoring the license plates of a certain region.
3. Ignoring repeated license plate recognition.

To configure license plate processing, do the following:

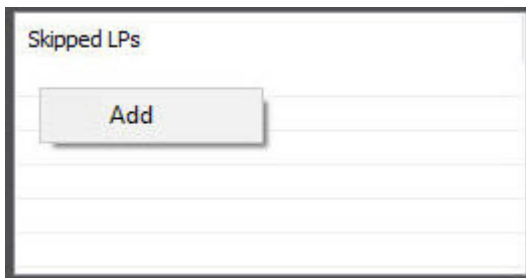
1. On the settings panel of the **LPR channel** object, go to the **Settings of LP processing** tab.

2. In the **Character conversion** group, select the required position:
 - a. **No character conversion** in order for the license plates to come without conversion.
 - b. **Latin->Cyrillic** for automatic conversion of Latin characters into Cyrillic characters.
 - c. **Cyrillic->Latin** for automatic conversion of Cyrillic characters into Latin characters.
3. If it is necessary to ignore repeated license plate recognition, in the **Skip repeated recognitions, s** field, enter the time period in seconds greater than 0 during which the captured license plate must not be recognized again.

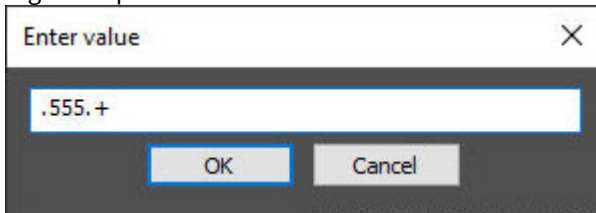
Note

The value of the **Skip repeated recognitions, s** field has a limit of 86400 seconds (number of seconds in a day).

4. To configure the ignoring of license plates according to the list of rules, do the following:
 - a. Right-click the **Skipped LPs** field, and then click the **Add** button.



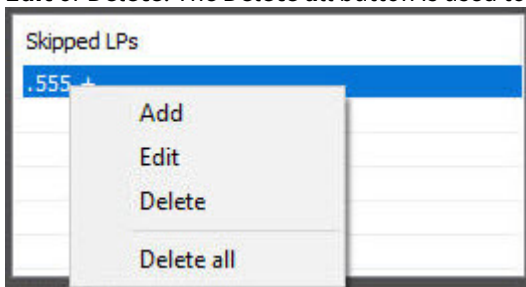
- b. Enter the required rule using regular expressions. A rule can contain either an exact license plate or a regular expression.



Note

For example, the regular expression ".555.+" means that there can be only one arbitrary character before "555", and many arbitrary characters after "555".

- c. Click the **OK** button.
- d. To edit or delete an already added rule, right-click it and select the appropriate action by clicking **Edit** or **Delete**. The **Delete all** button is used to delete all rules.



- e. You can check if a rule is correct. To do this, enter the test license plate in the **Enter LP** field and click the **Check** button. The result appears in the area below the **Check** button.

Note

The maximum number of characters in the **Enter LP** field is 30.

5. Click the **Apply** button.

The license plate processing is now set up.

5.3.13 Set up the display of license plate recognition results

The license plates of passing vehicles are automatically recognized and subsequently displayed in the **Vehicle Tracer** interface window. By default, the recognized license plate is displayed after the vehicle leaves the camera FOV.

It is possible to display the license plate on the screen before the vehicle leaves the frame only if you use the *VT*, *AUTO-Uragan*, *AR-Auto*, *RR* (including the *RR vendor and model recognizer* module) software modules.

To set up the display of license plate recognition results, do the following:

1. Go to the **Settings of LP processing** tab on the settings panel of the **LPR channel** object, corresponding to the activated module (see [Activating the program module, used for identifying the plates](#)).

The screenshot shows the 'Settings of LP processing' window in Auto PSIM 2.0. The interface is divided into several sections:

- Top Left:** LPR channel 1, Computer (Computer DESKTOP-LM3U4BH), and Country (Germany).
- Top Right:** Select cameras (Camera 1, Camera 2), LP recognition (Synchronous), and Enable on (Motion detection, Entranc, Macro 1, Macro 2). Checkboxes for Automatic recording (checked) and Process half frame (checked) are present, along with a 10 s timer.
- Middle Left:** Skipped LPs list showing '.555.+'. Character conversion options: No conversion (selected), Latin->Cyrillic, and Cyrillic->Latin.
- Middle Right:** Enter LP: J555V23, Check button, and Rule for LP 'J555V23' found in '.555.+'. Parameters: Skip repeated recognitions, s (60), Display result before vehicle leaves (checked), Result display delay (3), and Recognition number threshold (10).
- Bottom:** Navigation tabs (Recognition settings, Saving settings, Advanced settings, Settings of LP processing) and Apply/Undo buttons.

2. Set the **Display result before vehicle leaves** checkbox to show the result before the vehicle actually leaves the frame (more precisely, before the license plate leaves the detection area). If you leave the checkbox clear, the result is shown only after the vehicle actually leaves the frame.
3. In the **Result display delay** field, specify the time in seconds after which the recognition result is displayed. This period of time starts after the first license plate recognition.

Note

This parameter is enabled if you set the **Display result before vehicle leaves** checkbox.

4. In the **Recognition number threshold** field, specify the number of reliable license plate recognitions, upon reaching which the recognition result is displayed. The recognition number counter is cumulative and is not reset in case of temporary loss of a given area or false recognitions.

Note

This parameter is enabled if you set the **Display result before vehicle leaves** checkbox.

5. Click the **Apply** button.

Note

To save the changes, also click the **Apply** button on the settings panel of the corresponding software module.

The display of license plate recognition results is set up.

Note

1. If both **Result display delay** and **Recognition number threshold** fields are specified, the results are displayed upon the event that occurs first (either the **Result display delay** time passes or the **Recognition number threshold** is reached). If the values of these parameters are set to **0** or not set at all, then the parameters **Result display delay** and **Recognition number threshold** are not taken into account, and the license plate recognition results are displayed after the vehicle leaves the FOV.
2. The **Display result before vehicle leaves**, **Result display delay**, and **Recognition number threshold** parameters do not work with the **Parking mode**.
3. When you use the *VT* software module, if you enable the **Display result before vehicle leaves** parameter, the values of the fine-tuning parameters of the SDK are also changed: **VodiCTL_VPW_DYNAMIC_WITH_DUPLICATE** is changed to **True**, **VodiCTL_VPW_DYNAMIC_OUTPUT_TIMEOUT** and **VodiCTL_VPW_DYNAMIC_OUTPUT_FRAMECOUNT** are changed according to the values in the **Result display delay** and **Recognition number threshold** fields. The opposite is also true: changes in the **VodiCTL_VPW_DYNAMIC_WITH_DUPLICATE**, **VodiCTL_VPW_DYNAMIC_OUTPUT_TIMEOUT**, and **VodiCTL_VPW_DYNAMIC_OUTPUT_FRAMECOUNT** fine-tuning parameters of the SDK are also displayed in the settings of the recognition channel. The value of the **VodiCTL_VPW_DYNAMIC_OUTPUT_TIMEOUT** parameter is rounded down to whole seconds (for details on fine-tuning, see [Configuring the VT software module](#) and [The settings panel of the VT module object](#)).

5.3.14 Set up the frame caption

If the frame recording to the license plate database is activated, a frame caption is automatically assigned to every frame with a license plate.

You can change the parameters of the frame caption.

Note

This setting isn't available for the following modules: *Remote recognition*, *AR-Railway*, *AR-Auto*.

To set up the parameters of the frame caption, do the following:

1. Go to the **Advanced settings** tab on the settings panel of the **LPR channel** object, corresponding to the activated module (see [Activating the software module used for identifying license plates](#)).

1 LPR channel 1

Computer Disable

Computer DESKTOP-LM3U4BH

Country: Germany

Select cameras

LP recognition: Camera 1

Synchronous <none>

Automatic recording 10 s

Process half frame

Enable on: Macros

Entranc Macro 1

Exit: Macro 2

Get speed from video

Create frame caption

Distance: 170 cm Configuration

Permitted speed: 60 km/h

Alarm on speed limit: 80 km/h

Use decoder NGP(GPU+CPU)

Recognition settings Saving settings Advanced settings Settings of LP processing

Apply Undo

2. Click the **Create frame caption** button. A window with the same name opens.
3. Add one or several parameters of camera installation and speed detector used together with the LPR channel to a frame caption. Set the **Enabled** checkboxes next to the necessary parameters in the **SD installation parameters** group and then enter in the field or select the values of corresponding parameters

from the list.

SD installation parameters

SD installation height
 Enabled 5 Installation height in meters **1**

Shooting angle
 Enabled 8 Camera vertical angle **2**

Setting angle
 Enabled 25 Angle between device normal and vehicle movement trajectory **3**

Installation type
 Enabled Bottom side (from t Installation type **4**

Lane number
 Enabled 1 Number of lane controlled by speed detector **5**

GPS coordinates
 Enabled GPS coordinates GPS coordinates **6**

No	Parameter	Parameter description
1	SD installation height	Speed detector installation height in meters
2	Shooting angle	The angle formed by the optical axis of the lens of license plate recognition camera and the vertical support of the camera, in degrees
3	Setting angle	Projection onto the horizontal plane of the angle formed by the normal of the speed detector and the trajectory of vehicle direction, in degrees
4	Installation type	Installation type of speed detector
5	Lane number	The number of lane controlled by speed detector
6	GPS coordinates	GPS coordinates of speed detector. The maximum number of characters is 21

4. Add one or several speed detector parameters to the frame caption. Set the **Enabled** checkboxes next to the necessary parameters in the **Information about SD** group and then enter in the field or select the values of

corresponding parameters from the list.

Information about SD

SD serial number	<input checked="" type="checkbox"/> Enabled	<input type="text" value="SD serial number"/>	SD serial number	1
SD name	<input checked="" type="checkbox"/> Enabled	<input type="text" value="SD name"/>	SD name	2
Manufacturer ID	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Manufacturer ID"/>	Manufacturer ID	3
Inspection expiring	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Inspection expiring"/>	YYYYMMDD	4
Inspection certificate number	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Inspection certificate n"/>	Inspection certificate number	5
Inspection performed by	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Inspection performed b"/>	Inspection performed by	6
Expiry date of certificate of measuring tools type approval	<input checked="" type="checkbox"/> Enabled	<input type="text" value="YYYYMMDD"/>	Expiry date of certificate of measuring tools type approval	7
ID of certificate of measuring tools type approval	<input checked="" type="checkbox"/> Enabled	<input type="text" value="ID of certificate of mea"/>	ID of certificate of measuring tools type approval	8
Issue date of certificate of measuring tools type approval	<input checked="" type="checkbox"/> Enabled	<input type="text" value="YYYYMMDD"/>	Issue date of certificate of measuring tools type approval	9
Inspection date	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Inspection date"/>	YYYYMMDD	10
Receiver code	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Receiver code"/>	Receiver code	11
Sender code	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Sender code"/>	Sender code	12

No	Parameter	Parameter description
1	SD serial number	Serial number of speed detector

№	Parameter	Parameter description
2	SD name	Name of speed detector
3	Manufacturer ID	ID of speed detector manufacturer
4	Inspection expiring	Date in the YYYY.MM.DD format until which the metrological check of speed detector is valid
5	Inspection certificate number	Number of inspection certificate of the last metrological check of speed detector
6	Inspection performed by	Authority who performed the last metrological check of speed detector
7	Expiry date of certificate of measuring tools type approval	Date in the YYYY.MM.DD format until which the certificate of measuring tools type approval is valid
8	ID of certificate of measuring tools type approval	ID of certificate of measuring tools type approval
9	Issue date of certificate of measuring tools type approval	Date in the YYYY.MM.DD format when the certificate of measuring tools type approval was issued
10	Inspection date	Date in the YYYY.MM.DD format of the last metrological check of speed detector
11	Receiver code	Receiver code of the speed detector
12	Sender code	Sender code of the speed detector

5. Add one or several speed detector parameters to the frame caption. Set the **Enabled** checkboxes next to the necessary parameters in the **Info about SD installation site** and then enter in the field or select the values

of the corresponding parameters from the list.

Info about SD installation site


System code name	<input checked="" type="checkbox"/> Enabled	<input type="text" value="System code name"/>	System code name	1
Unique complex ID	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Unique complex ID"/>	PHSC ID (Photovideofixation hardware and software complex)	2
Complex name	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Complex name"/>	PHSC name	3
Complex installation site (short)	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Complex installation sit"/>	SD installation site (PHSC installation site)	4
Constituents of Russian Federation	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Altai Krai"/>	Constituents of Russian Federation	5
SD number in complex	<input checked="" type="checkbox"/> Enabled	<input type="text" value="1"/>	SD code number in complex (PHSC channel)	6
SD installation site in complex	<input checked="" type="checkbox"/> Enabled	<input type="text" value="SD installation site in c"/>	SD installation site in complex	7
Installation region	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Installation region"/>	Installation region	8
Settlement	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Settlement"/>	Settlement	9
Street	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Street"/>	Street	10
House	<input checked="" type="checkbox"/> Enabled	<input type="text" value="House"/>	House	11
Vehicle direction at complex installation site	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Vehicle direction at co"/>	Vehicle direction at complex installation site	12
OKATO-code	<input checked="" type="checkbox"/> Enabled	<input type="text" value="OKATO-code"/>	OKATO-code	13
Additional info	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Additional info"/>	Additional text info	14
Controlled direction	<input checked="" type="checkbox"/> Enabled	<input type="text" value="Oncoming"/>	Traffic flow direction in relation to SD	15
Critical speed threshold	<input checked="" type="checkbox"/> Enabled	<input type="text" value="10"/>	Additional speed threshold	16

№	Parameter	Parameter description
1	System code name	The code name for the hardware and software system for photo and video recording that includes speed detector
2	Unique complex ID	By default, the identifier of the LPR channel object in <i>Auto PSIM</i> is displayed. If you change the default value, the string indicated in the field is displayed
3	Complex name	Complex name
4	Complex installation site (short)	Short description of complex installation site
5	Constituents of Russian Federation	The constituent member of the Russian Federation where the speed detector is installed
6	SD number in complex	Speed detector number in the complex (channel number)
7	SD installation site in complex	Description of speed detector site in the complex
8	Installation region	Region where speed detector is installed
9	Settlement	Settlement where speed detector is installed
10	Street	Street where speed detector is installed
11	House	House near which speed detector is installed
12	Vehicle direction at complex installation site	Vehicle's direction at the complex site
13	OKATO-code	Speed detector site code in All-Russian classifier of administrative territorial division
14	Additional info	Additional information about speed detector
15	Controlled direction	Vehicle's direction in respect of speed detector that controls it

No	Parameter	Parameter description
16	Critical speed threshold	Vehicle's speed that is considered to be critical (for example, alarm is being generated in the process)
17	Speed limit at installation site	Allowed vehicle speed at the roadside that is controlled by the speed detector

- Click the **OK** button to save the changes and close the window.

Note

Click  button to close the window without saving the changes.



- Click the **Apply** button on the settings panel of the **LPR channel** object.

Setting up the digital frame caption is completed.

5.3.15 Set up license plate recognition by macros and motion detection

In *Auto PSIM*, you can configure license plate recognition by macros and motion detection. To do this, do the following:

- Go to the settings panel of the **LPR channel** object, corresponding to the activated module (see [Activating the software module used for identifying license plates](#)).

2. From the **Enable on** drop-down list, select:
 - a. **Disabled**—License plate recognition by macros or motion detection is disabled (by default). The LPR channel scans each incoming frame.
 - b. **Motion detection**—License plate recognition by motion detection is enabled. It is used to reduce the load on the server.
 - c. **Macros**—License plate recognition by macros is enabled. When you select this option, the **Entrance** and **Exit** drop-down lists become available.
 - i. From the **Entrance** drop-down list, select a macro that starts the license plate recognition.
 - ii. from the **Exit** drop-down list, select a macro that stops the license plate recognition.

3. Click the **Apply** button to save the settings.

Setting up license plate recognition by macros and motion detection is complete.

Note

1. License plate recognition by motion detection is implemented only in the *AUTO-Uragan*, *AR-Auto*, *AR-Railway*, *VT* modules.
2. When you enable license plate recognition by motion detection, the LPR channel scans the video image only when the main motion detector of *Axxon PSIM* is in the **Alarm** state (when motion is detected in the camera's FOV). If the main motion detector isn't alarmed, the LPR channel doesn't scan video images to recognize vehicle license plates.

5.3.16 Set up ports for notification and XML notification

In *Auto PSIM*, you can set up ports for notification and XML notification about license plate recognition of the LPR channel.

To set up ports for notification, do the following:

1. Go to the **Saving settings** tab of the **LPR channel** object.

The screenshot shows the configuration interface for an LPR channel. The 'Saving settings' tab is active. Key fields include:

- Channel ID: 1, Name: LPR channel 1
- Computer: Computer DESKTOP-LM3U4BH
- Country: Germany
- Select cameras: Camera 1
- LP recognition: Synchronous, <none>
- Enable on: Macros, Entranc, Macro 1, Macro 2
- Automatic recording: 10 s
- Process half frame:
- Record frames to SQL DB:
- Show captions:
- Deinterlace:
- Ratio 4:3:
- Archive size, days: 30
- Notification settings:
 - Notification port: 55555
 - Xml notification port: 35555
- Results filtering settings:
 - Min. number of characters in LP: [empty]
 - Min. recognition quality, %: 50
 - Min. time of LP repetition, s: [empty]

Navigation tabs at the bottom: Recognition settings, Saving settings, Advanced settings, Settings of LP processing. Buttons: Apply, Undo.

2. In the **Notification port** field, specify the number of the port for license plate recognition events. The default value is **55555**.
3. In the **Xml notification port** field, specify the number of the port for license plate recognition events in XML format. The default value is **35555**.

 **Note**

To enable the mode of even load distribution, specify the `IsProcessObject=1` parameter of the `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\AxxonSoft\PSIM\URMLPR` registry section (see [Registry keys reference guide](#)). For the information on working with the registry, see [Working with Windows OS registry](#)), then each recognition channel is started in a separate process. In this case, you must specify the notification port and XML notification port for each recognition channel.

4. Click the **Apply** button to save the settings.

Setting up ports for notification and XML notification is complete.

5.4 Setting up the joint operation of Auto PSIM and Axxon One

Auto PSIM and *Axxon One* can operate together. The joint operation allows you to:

- receive video from the *Axxon One* cameras for further license plate recognition using the *Auto PSIM* license plate recognition modules;
- receive events about the license plate recognition as from an external recognizer.

 **Attention!**

Auto PSIM and *Axxon One* must be located on the same Server.

Set up the joint operation of *Auto PSIM* and *Axxon One* as follows:

1. Make sure that the port for connecting to *Axxon One* specified in the **An.port** registry key is **20111** (see [Registry keys reference guide](#), for details about working with the registry, see [Working with Windows OS registry](#)).
2. Create and configure the *NGP manager* module for connecting to *Axxon One* (see the details on configuration of this module in the *Axxon PSIM. Administrator's Guide*, the most current version of the document is located in the [AxxonSoft documentation repository](#)). As a result, the objects of the corresponding *Axxon One* cameras will be automatically created in *Axxon PSIM*.

 **Note**

To ensure the correct connection, *Axxon One* must be launched with administrator rights. Once the joint operation of *Axxon PSIM* and *Axxon One* is enabled, the creation of **Video capture device** objects becomes unavailable.

3. If it is necessary to recognize the license plates using the *Auto PSIM* license plate recognition module, then *Auto PSIM* must be configured in a standard way, and the appropriate *Axxon One* camera must be selected on the settings panel of the **LPR channel** object (see [Select cameras to work with the LPR channel](#)).
4. If the license plates are recognized on the *Axxon One* side, then in order to receive the license plate recognition events as from an external recognizer, it is necessary to activate the *Remote recognition* module.
5. To view the video archive by the event from the video camera which is used for the license plate recognition, select **AxxonOne monitor** on the settings panel of the **Vehicle Tracer** object (see [Selecting the Monitor object for playing back the video archive](#)).

Setting up the joint operation of *Auto PSIM* and *Axxon One* is now complete.

5.5 The Vehicle Tracer interface module

5.5.1 The Vehicle Tracer functionality

The *Vehicle Tracer* module is designed for identifying vehicles that are on the wanted list or speeding. Identifying is performed in real time.

Note.

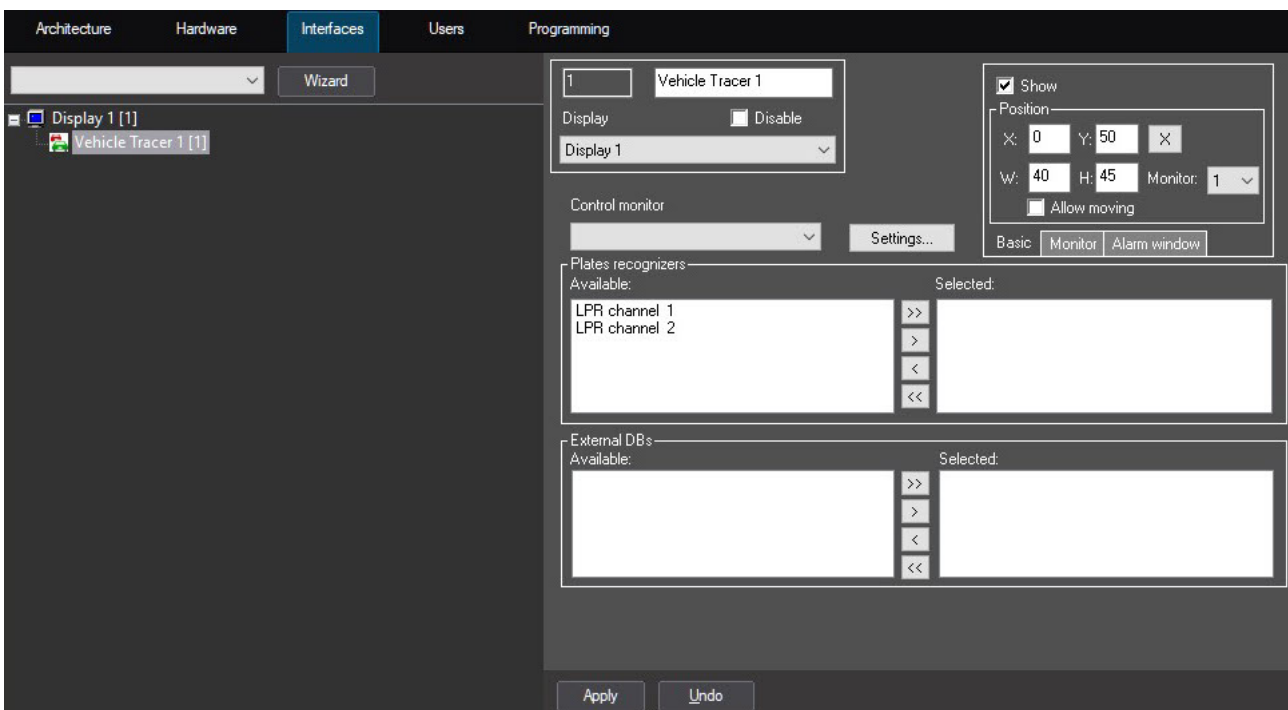
The module is the **Vehicle Tracer** interface object (see [Setting up the Vehicle Tracer interface window](#) section).

The *Vehicle Tracer* module supports the following functionality:

1. Displaying the plates that are in identifying detectors' view.
2. Displaying vehicles' speed.
3. Registering vehicle's speeding with controlled voice notification of the operator.
4. Registering the plate identification in the external database (for example in the search base) with controlled voice notification of the operator.
5. Alarm handling.
6. Search events in the *Auto PSIM* recognizers database.

5.5.2 The Vehicle Tracer setup procedure

Setting up the *Vehicle Tracer* is performed on the settings panel of the similarly-named object. The object is created on the basis of the **Display** object in the **Interfaces** tab of the **System settings** dialog window.



Setting up the **Vehicle Tracer** interface window is used in the following order:

1. Set up the **Vehicle Tracer** window position on the screen.
2. Select the plates recognizers servers to be displayed in the **Vehicle Tracer** window

3. Select the **External databases** to analyze the identified plates.
4. Set up the interface of the **Vehicle Tracer** window.
5. Set up the voice notification when a vehicle exceeds the speed limit and/or when a license plate is identified in the external plates database.
6. Select the **Monitor** interface object for displaying the video archive from the camera, identifying the plates.

5.5.3 Setting up the position of the Vehicle Tracer components on the screen

The **Vehicle Tracer** interface window includes the following components:

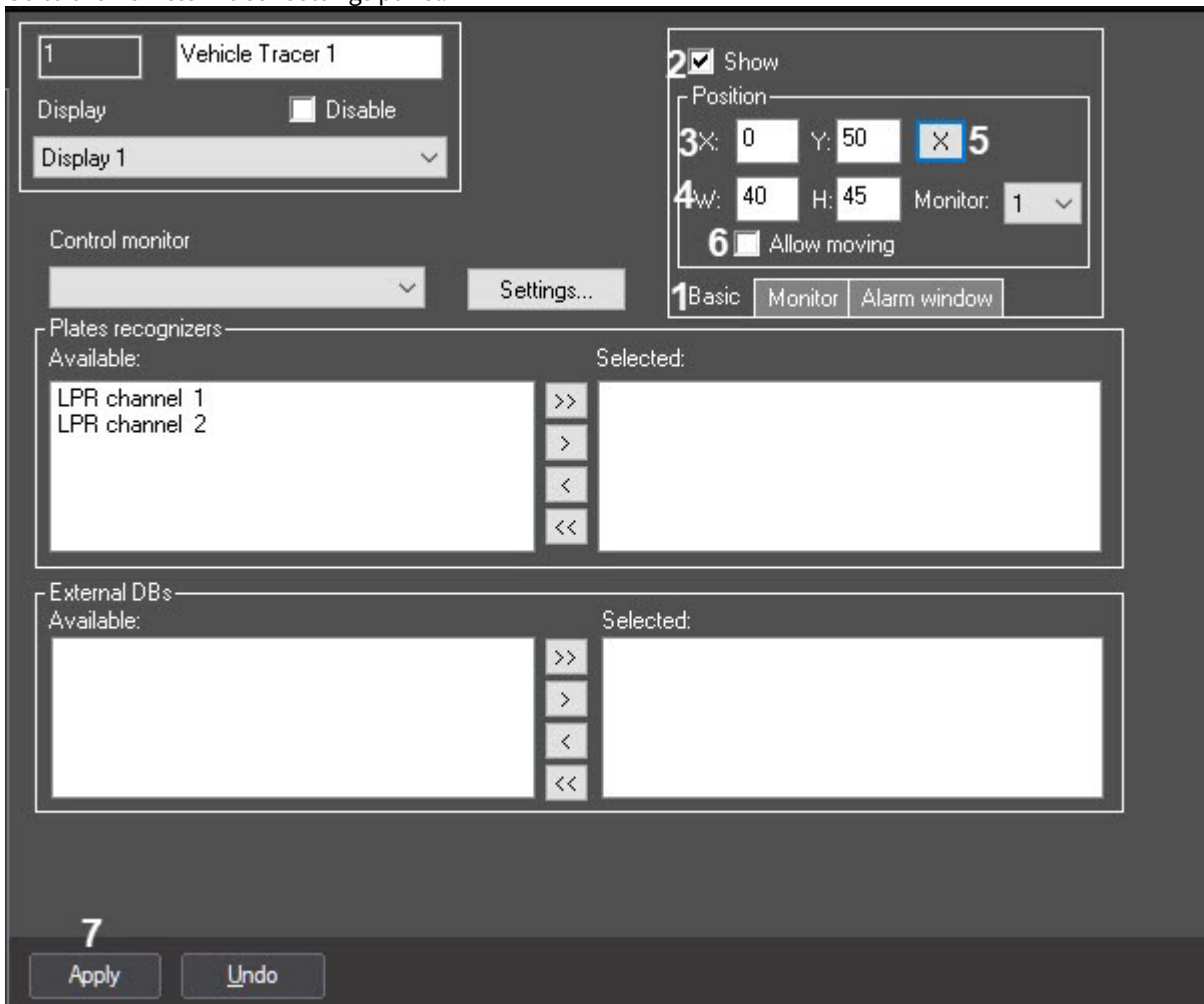
1. **Active monitor** is used to display the data about the identified plates, process the alarm events;
2. **Events monitor** displays a video frame with a vehicle, which plate is being identified at the moment, and also a speed and a number.
3. **Alarm window** is used to display the data about vehicles, in case the recognized plates match the plates that are stored on the external orientation database.

Note

The **Events monitor** and the **Alarm window** components are optional.

To set up the **Vehicle Tracer** components position on the screen, do the following:

1. Go to the **Vehicle Tracer** settings panel.




2. Select the required tab of the corresponding **Vehicle Tracer** component (1):
 - **Basic** tab corresponds to the **Active monitor** component.
 - **Monitor** tab corresponds to the **Events monitor** component.
 - **Alarm window** tab corresponds to the **Alarm window** component.
3. Set the **Show** checkbox (2) if it is necessary to display the selected component on the screen.
4. Set the coordinates of the left upper corner of the selected component (3):
 - The **X** field (horizontal indent from the left border of the computer screen).
 - The **Y** field (vertical indent from the upper border of the computer screen).

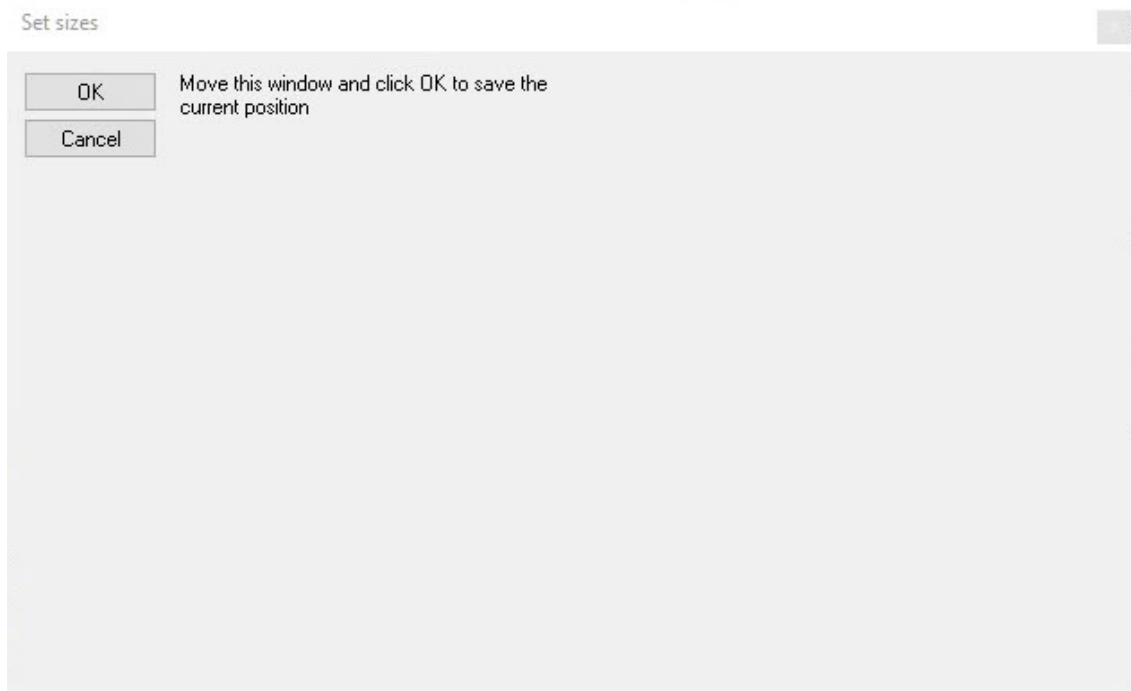
Note

The coordinates are set in percentage in according to screen size horizontally and vertically, respectively.

5. Set the sizes of the selected component on the screen (4):
 - The **W** field (component's width).
 - The **H** field (component's height).

Note

- The coordinates are set in percentage in according to screen size horizontally and vertically, respectively.
- Minimum sizes of the **Active monitor** component are 70% horizontally (**W**) and 39% vertically (**H**).
- To ensure the Operator's efficiency, avoid the mutual overlapping of components.
- To set the coordinates and sizes of the selected component in a convenient way, it is recommended to use the visual method of setting up the coordinates. Click the  button for this (5) and, using the mouse, set the required size and position of the test window and then click the **OK** button. Coordinates of the test window are automatically calculated and copied to the **X**, **Y**, **W** and **H** fields.



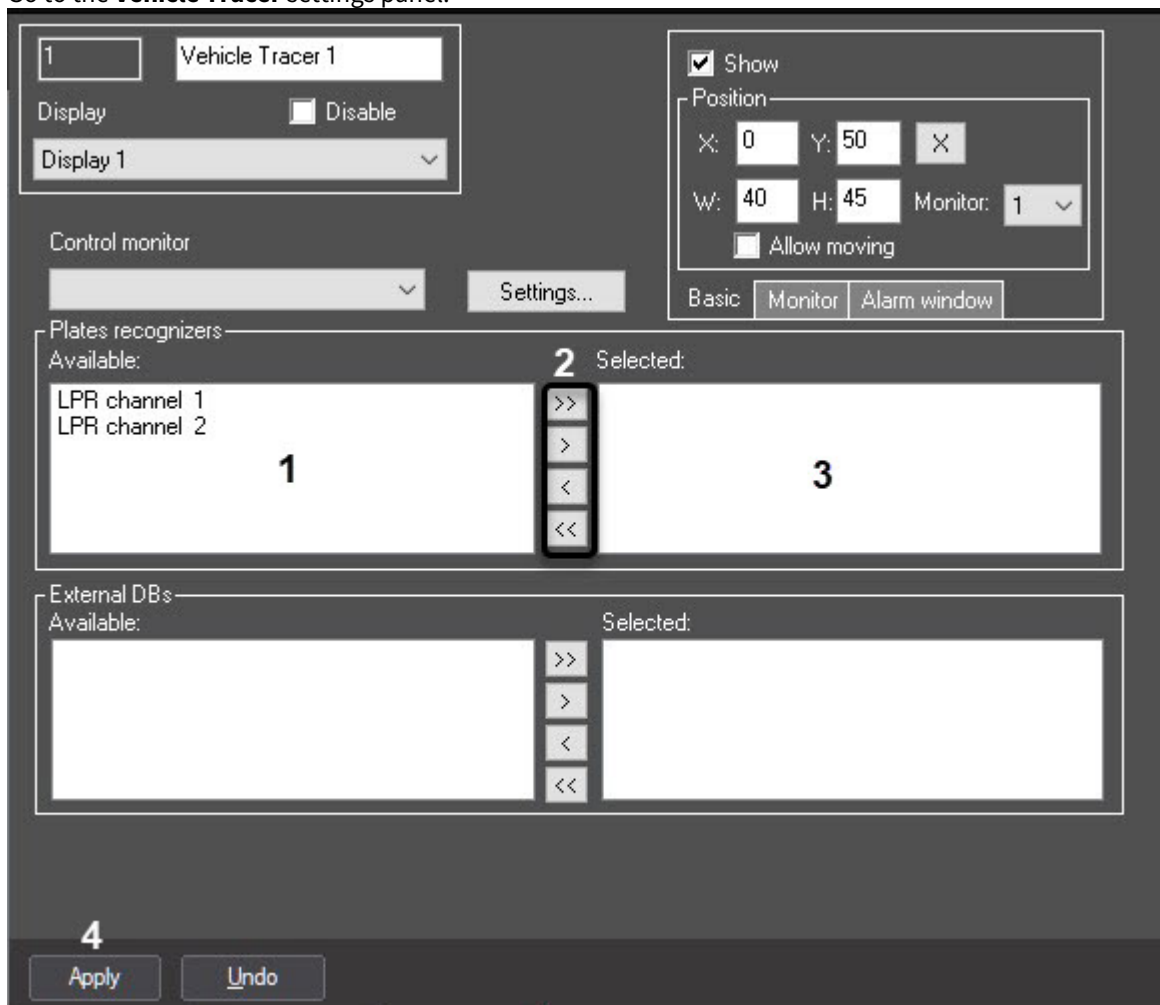
6. Set the **Allow moving** checkbox (6) if it is necessary to allow moving the component across the screen.
7. From the **Monitor** drop-down list, select the number of the physical monitor connected to the computer on which the selected component should be displayed.
8. Click the **Apply** button to save the changes (7).

Setting up the position of the **Vehicle Tracer** components on the screen is complete.

5.5.4 LPR channels selection

Select the LPR channels, the information from which will be displayed in the **Vehicle Tracer** interface window, as follows:

1. Go to the **Vehicle Tracer** settings panel.



2. From the **Available** list of the **Plates recognizers** group (1), select the required LPR channel.
3. Move the selected LPR channel to the **Selected** list (3) using the **>** button (or the **>>** button (2) to move all LPR channels from the list).

Note

The **<** and **<<** buttons are used to move the selected or all LPR channels from the **Selected** list back to the **Available** list.

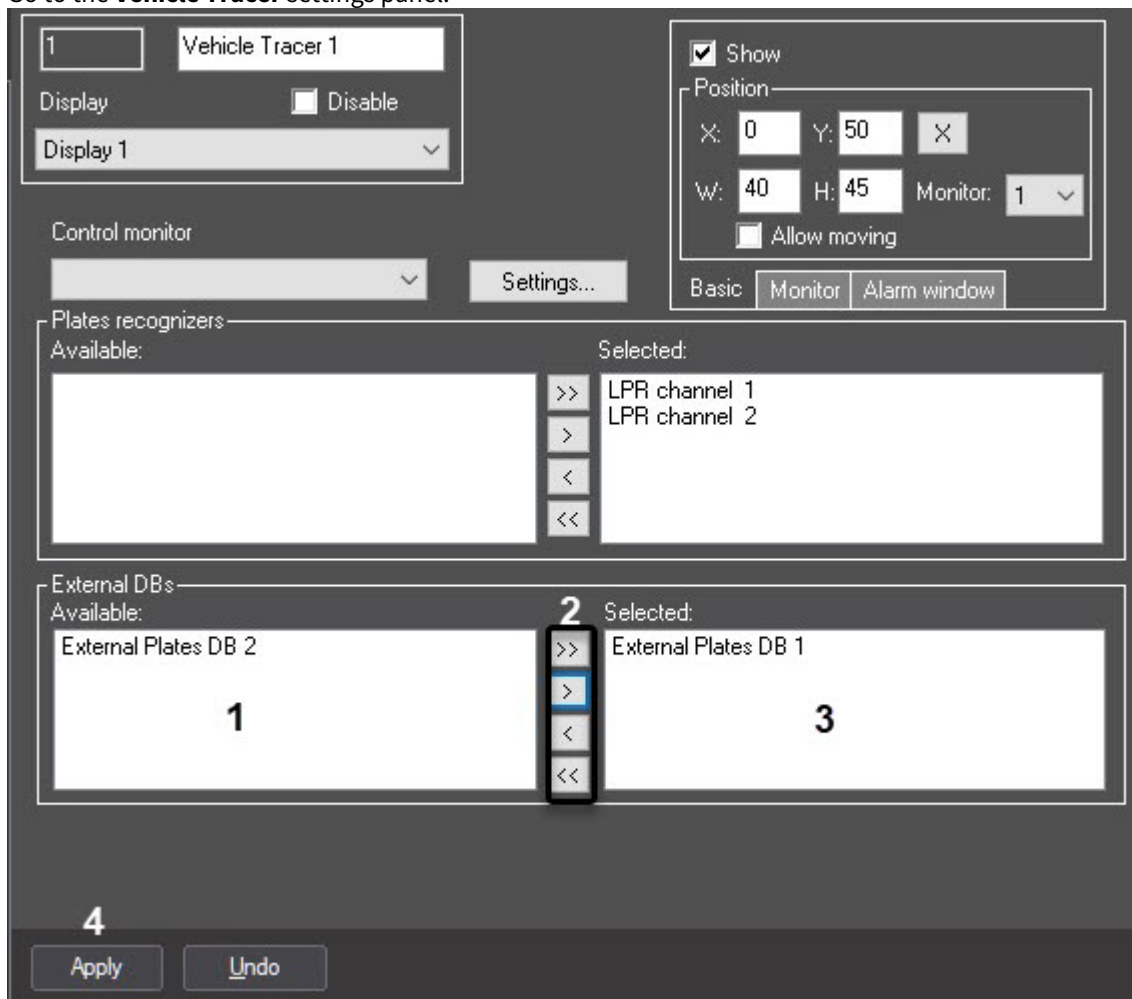
- Click the **Apply** button to save the changes (**4**).

Selecting the LPR channels is completed.

5.5.5 Selecting the External Plates Database

Selecting the **External Plates Database** to analyze the recognized plates is done in the following way:

- Go to the **Vehicle Tracer** settings panel.



- From the **Available** list of the **External DBs** group (**1**), select the required external plates databases.
- Move the selected external plates databases to the **Selected** list (**3**) using the **>** button (or the **>>** button (**2**) to move all external plates databases from the list).

Note

The **<** and **<<** buttons are used to move the selected or all external plates databases from the **Selected** list back to the **Available** list.

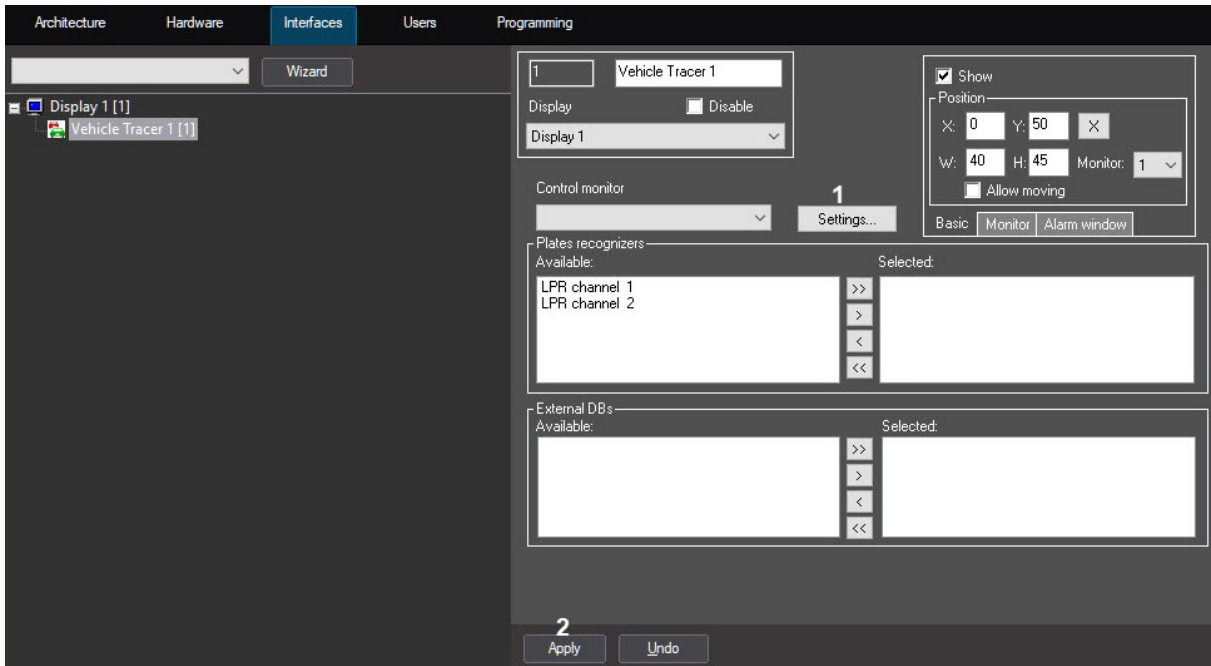
- Click the **Apply** button to save the changes (**4**).

Selecting the **External Plates Database** to analyze the recognized plates is completed.

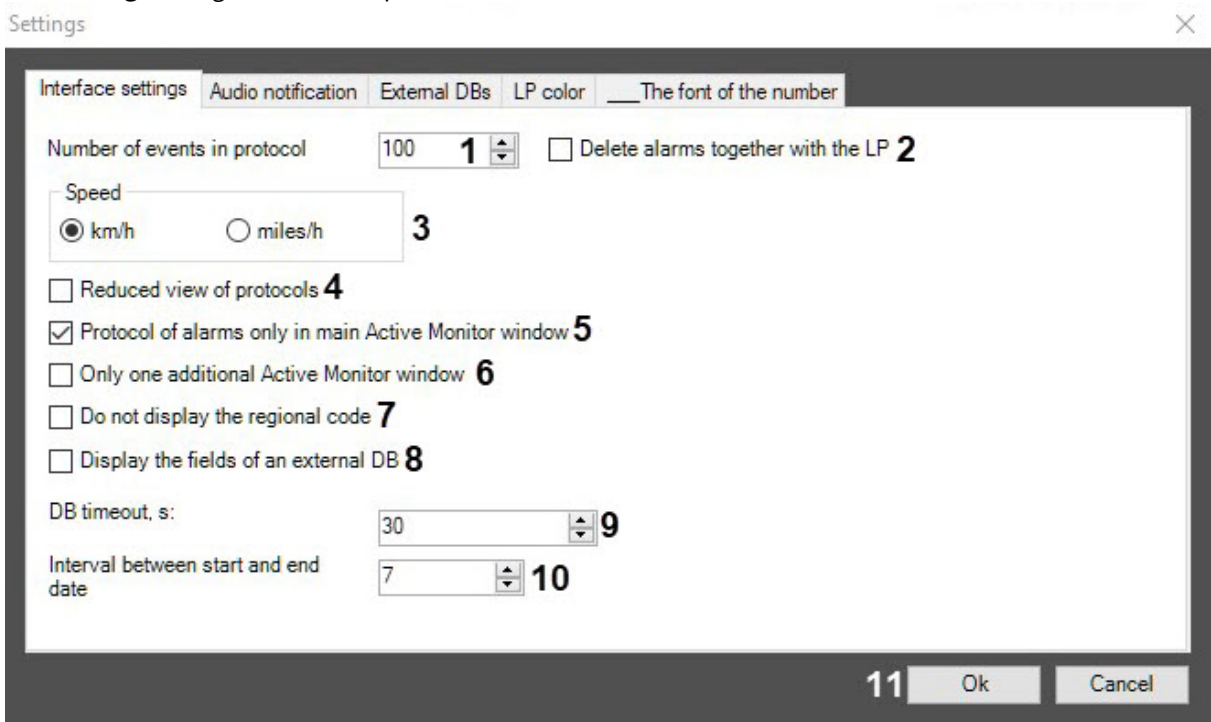
5.5.6 Setting up the Vehicle Tracer interface window

To set up the **Vehicle Tracer** interface window, do the following:

1. Go to the **Vehicle Tracer** settings panel.
2. Click the **Settings** button.



The **Settings** dialog window will open.



3. In the **Number of events in protocol** field (1), enter the maximum number of events from 10 to 10000 that can be displayed in every protocol of the **Active Monitor** component. The update of the protocol which

contains the maximum number of events, is performed in a loop: when the maximum number of events is exceeded, the last event in the queue is deleted.

Note

This entails two protocols:

- a. the protocol of identified vehicles, containing data about the identified vehicles;
- b. the alarms protocol, containing data about the vehicles, for which alarms have been registered. The number of alarms is calculated as follows: "**Number of events in protocol**" minus **2**. For example, if 100 is specified as a value of the **Number of events in protocol** field, then 98 alarms will be displayed in the alarm protocol.

4. Set the **Delete alarms together with the LP** checkbox (2) if it is necessary to delete all events connected to the last number in the queue when exceeding the specified number of events in the protocol.
5. Set the **Speed** switch (3) to the position, corresponding to the vehicle's speed unit of measurement that should be displayed in the **Vehicle Tracer** window (km/h or miles/h).
6. By default, in the **Active Monitor** events protocol the following data for every vehicle is displayed:
 - a. Video frame;
 - b. Identified LP number;
 - c. Name of LP recognizer;
 - d. Date and time of receiving the data;
 - e. Reason of alarm (only for alarms).
7. In case only the identified LP number, name of LP recognizer, and date and time of receiving the data should be displayed for each event in the **Active Monitor** events protocol, set the **Reduced view of protocols** checkbox (4).
8. You can create additional **Active Monitor** components. If the alarms protocol should be displayed only in the main interface component of **Active Monitor** and not in the additional ones, set the **Protocol of alarms only in main Active Monitor window** checkbox (5).
9. By default, the number of additional **Active Monitor** components that should be displayed is not restricted. If only the most recent additional **Active Monitor** component should be displayed, set the **Only one additional Active Monitor window** checkbox (6).
10. Set the **Do not display the regional code** checkbox (7) if it is necessary to hide the **Regional code** field from the **Active Monitor** component.
11. Set the **Display the fields of an external DB** checkbox (8) if it is necessary to display the fields of an external DB in the **Active Monitor** component when the license plate is found in the external license plate database (see [Assigning names to table columns containing LP numbers](#)).
12. In the **DB timeout, s** field (9), specify in seconds the timeout for connecting to the selected *Auto PSIM* servers when the **Event search in the Recognizers DBs** window is opened (see [Configuring the events search](#)). If the specified time is exceeded, all connection attempts are terminated and a list of Servers to which it was not possible to connect is displayed.
13. In the **Interval between start and end date** field (10), specify in days the expiration time of the suspect vehicle profile. The default value is 7 days. After that, the specified interval will be automatically moved to the form for entering a new suspect vehicle profile in the Active tracking database as a difference between the **Start date** and **Expiration date** fields (see [Create the active tracking database](#)).
14. Click the **Ok** button (11) to save the changes and return to the settings panel of the **Vehicle Tracer**.
15. Click the **Apply** (2) button to save the changes on the **Vehicle Tracer** settings panel.

Setting up the **Vehicle Tracer** interface window is complete.

5.5.7 Setting up audio notification when registering alarm events

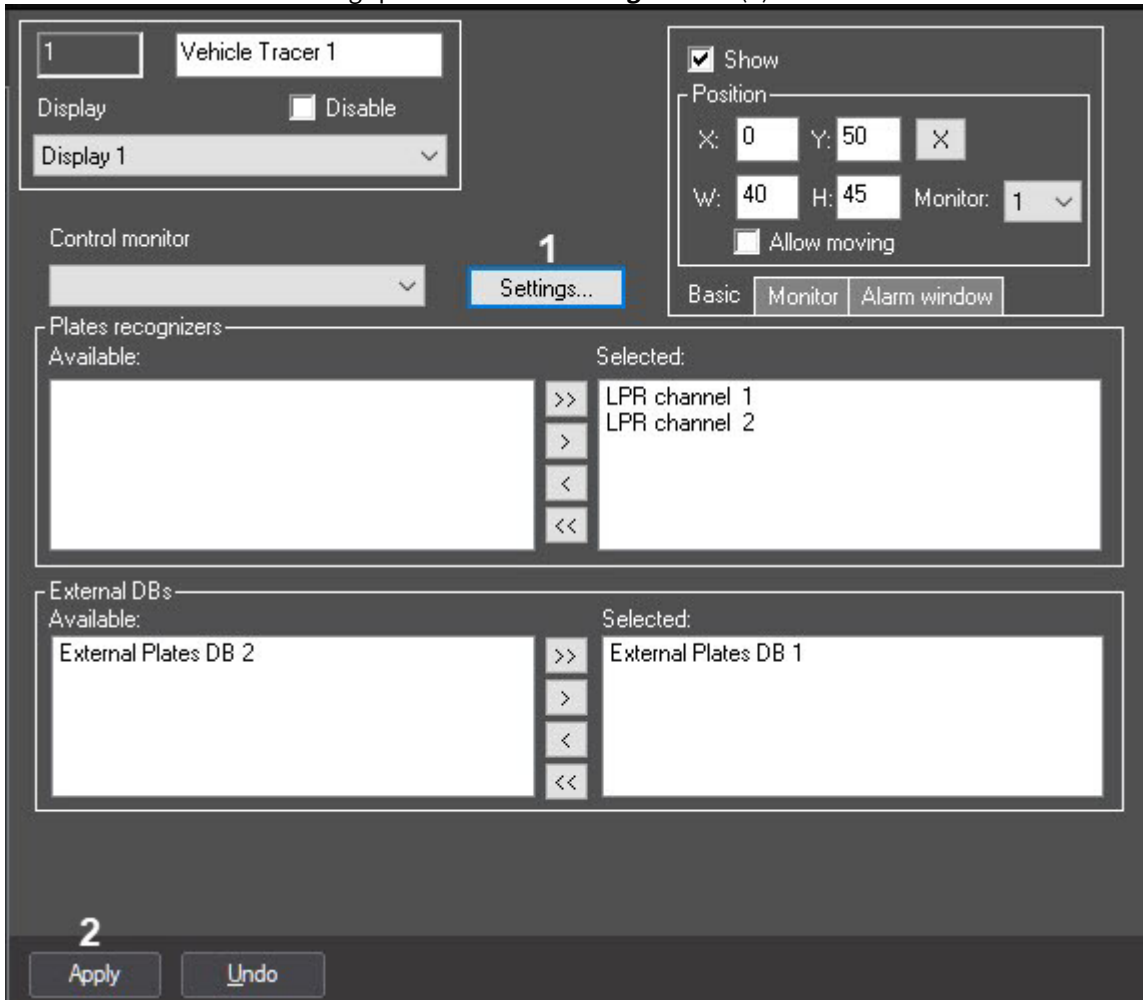
It is possible to set up the audio notification when registering the following alarm events:

1. Vehicle overspeeding.

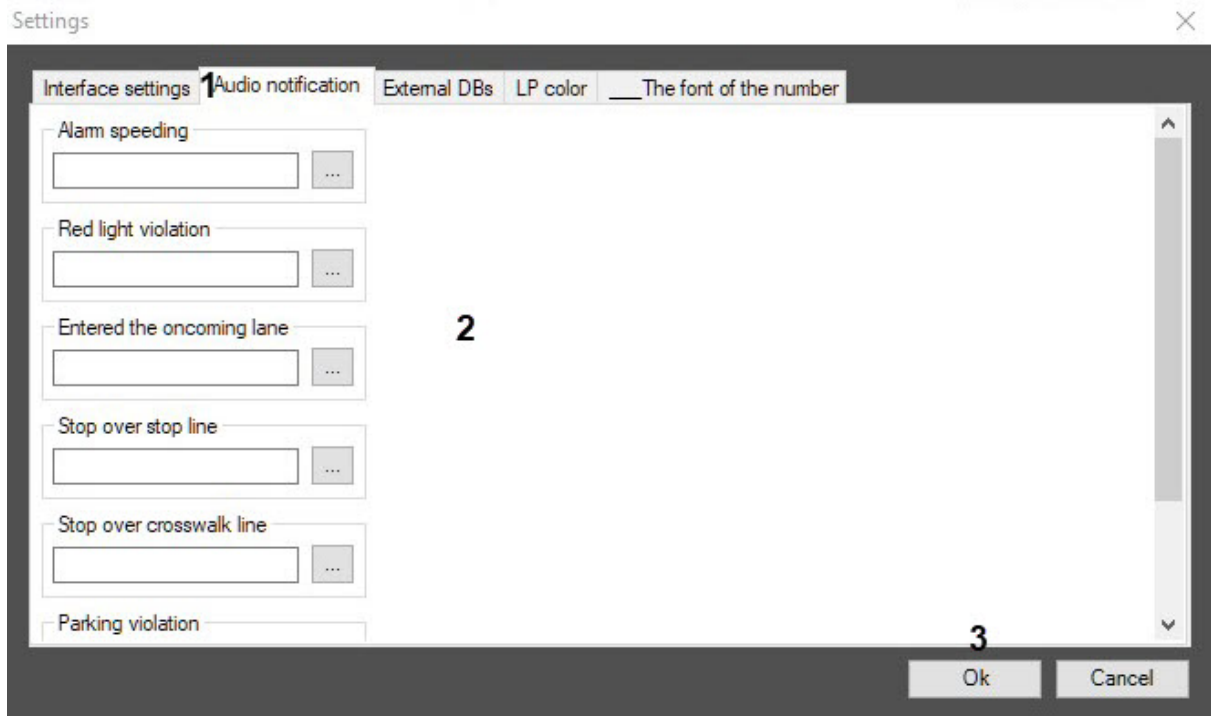
2. Identifying the recognized plate in the External Plates DB.

To set up the audio notification when registering alarm events, do the following:

1. Go to the **Vehicle Tracer** settings panel. Click the **Settings** button (1).



- In the **Settings** dialog window, go to the **Audio notification** tab (1).



- Select the required alarm event or external database from the area (2) and click the button to the right of the required event. In the opened standard **Open** dialog window, select the required audio file in WAV format and then click the **Open** button. As a result, the full path to the audio file will be displayed in the field corresponding to the selected alarm event or external database.

Note

The audio notification file can only be in WAV format. Other formats aren't supported.
The number and the names of the external databases displayed on the **Audio notification** tab correspond to those external databases that were pre-selected for analyzing the identified plates (see [Selecting the External Plates Database](#)).

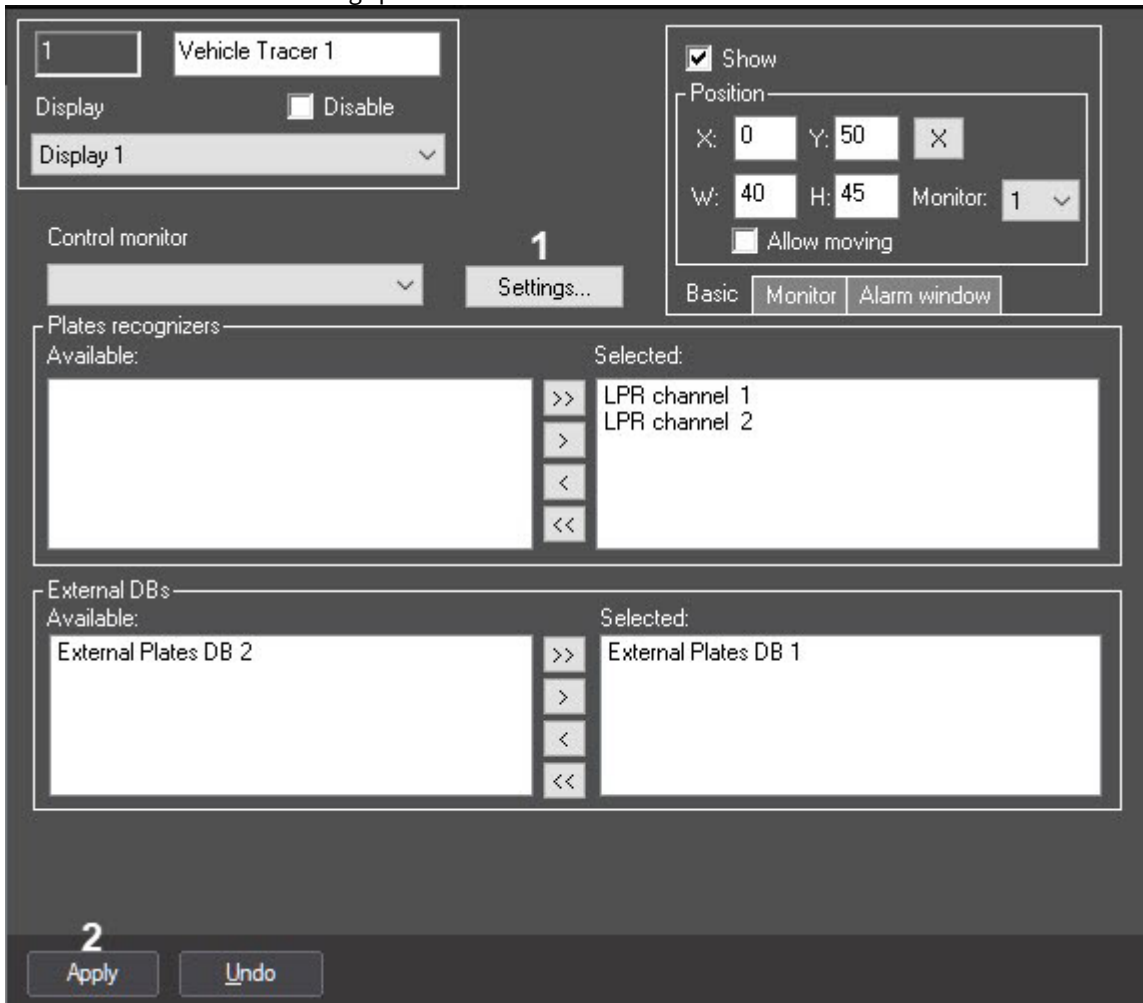
- Repeat step 4 for all required alarm events or external databases.
- Click the **OK** button to save the changes and return to the settings panel of the **Vehicle Tracer** object (3). Click the **Cancel** button to close the **Settings** dialog window without any changes.
- Click the **Apply** button to save the changes on the **Vehicle Tracer** settings panel (2).

Setting up the audio notification when registering the alarm events is completed.

5.5.8 Selecting the External Plates DB as the Active tracking databases

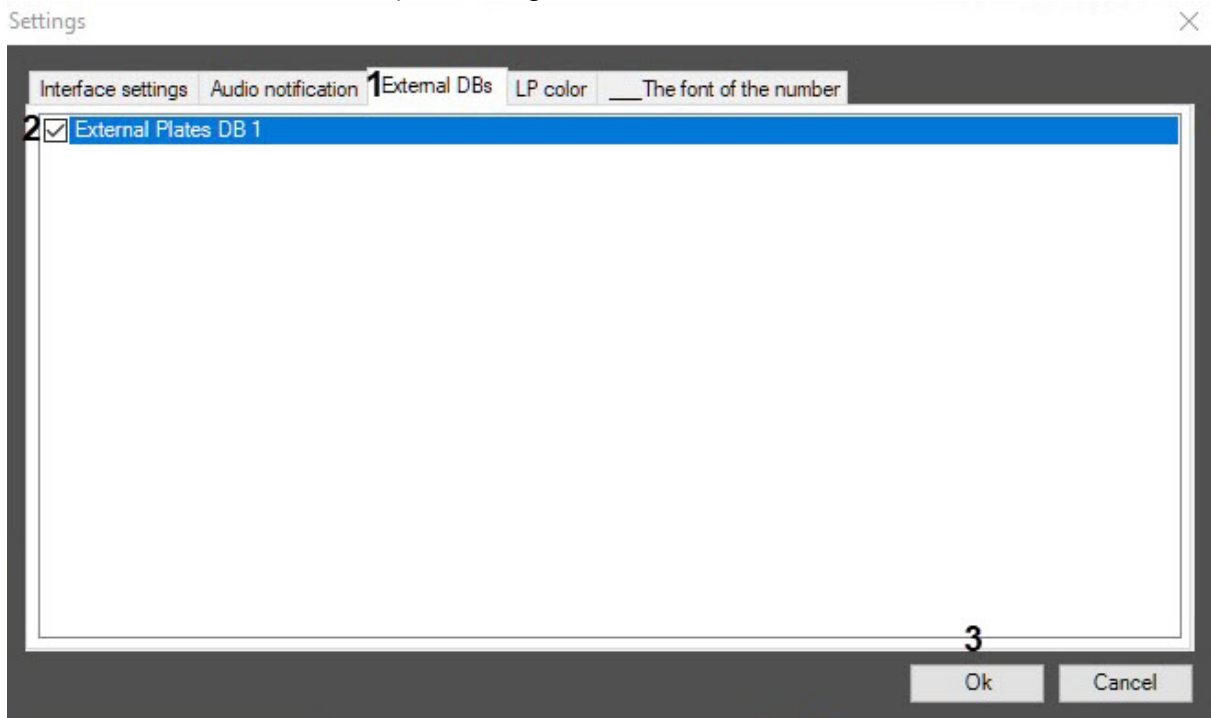
To select the External Plates DBs that should be used as the **Active tracking** databases, do the following:

1. Go to the **Vehicle Tracer** settings panel.



2. Click the **Settings** button (1).

- Go to the **External DBs** tab in the opened dialog window (1).



- Set the checkboxes next to those External Plates DB that should be used as the **Active tracking** databases (2).

Note

To select the external databases as the **Active tracking** databases, it's required to select the local database with specified **Catch_DB** table and **Plate** field when configuring the External Plates databases (for the detailed information about External Plates databases configuring, see [Connecting the external database](#)).

- Click the **OK** button to save the changes and return to the settings panel of the **Vehicle Tracer** object (3).

Note

Click the **Cancel** button to close the **Settings** dialog window without saving the changes.

- Click the **Apply** button to save the changes on the **Vehicle Tracer** settings panel (2)

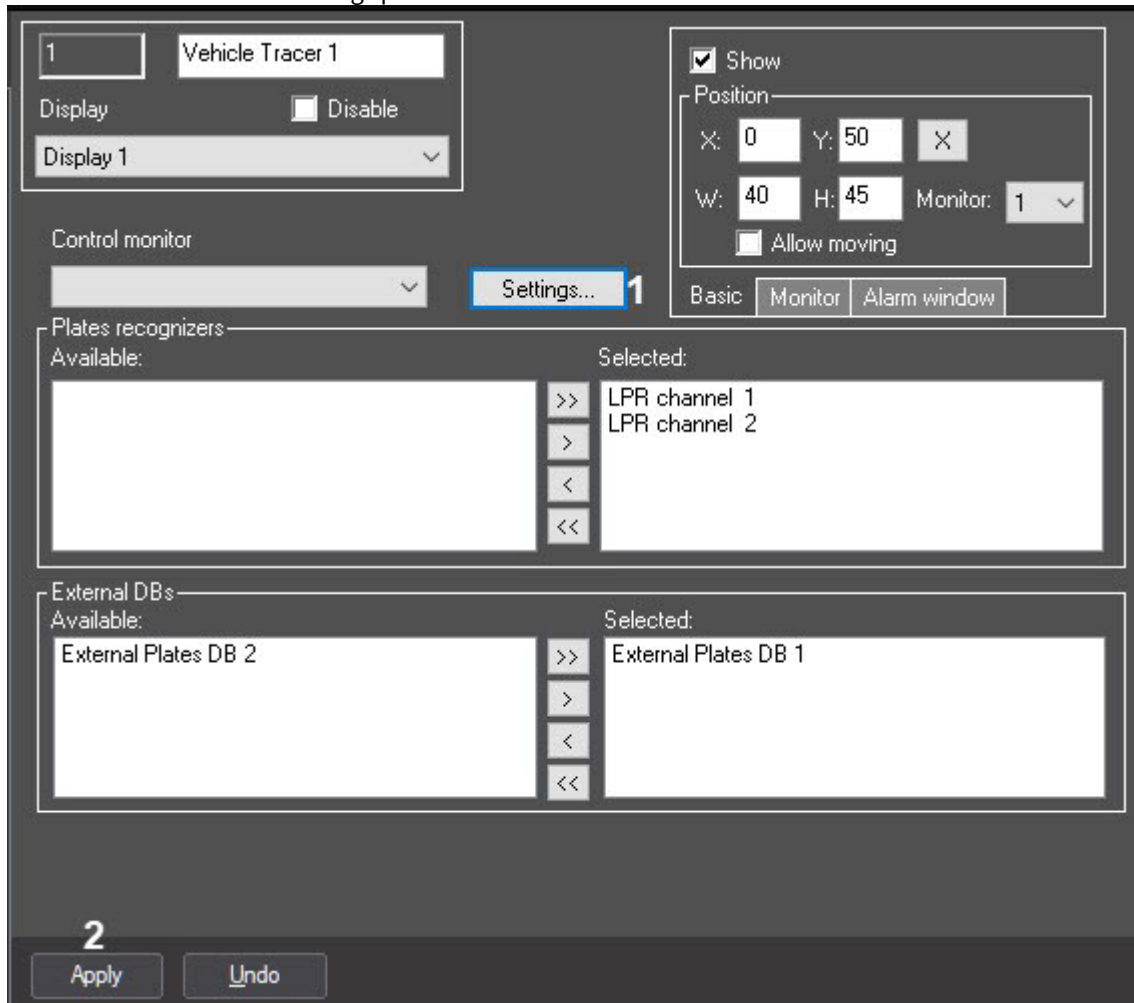
Selecting the External Plates DBs as the Active tracking databases is completed.

5.5.9 Setting up color for LP recognition events

You can set up the color to highlight the events when the violations are detected (for example, speeding), as well as the color to highlight the events when a LP number is detected in the External DBs.

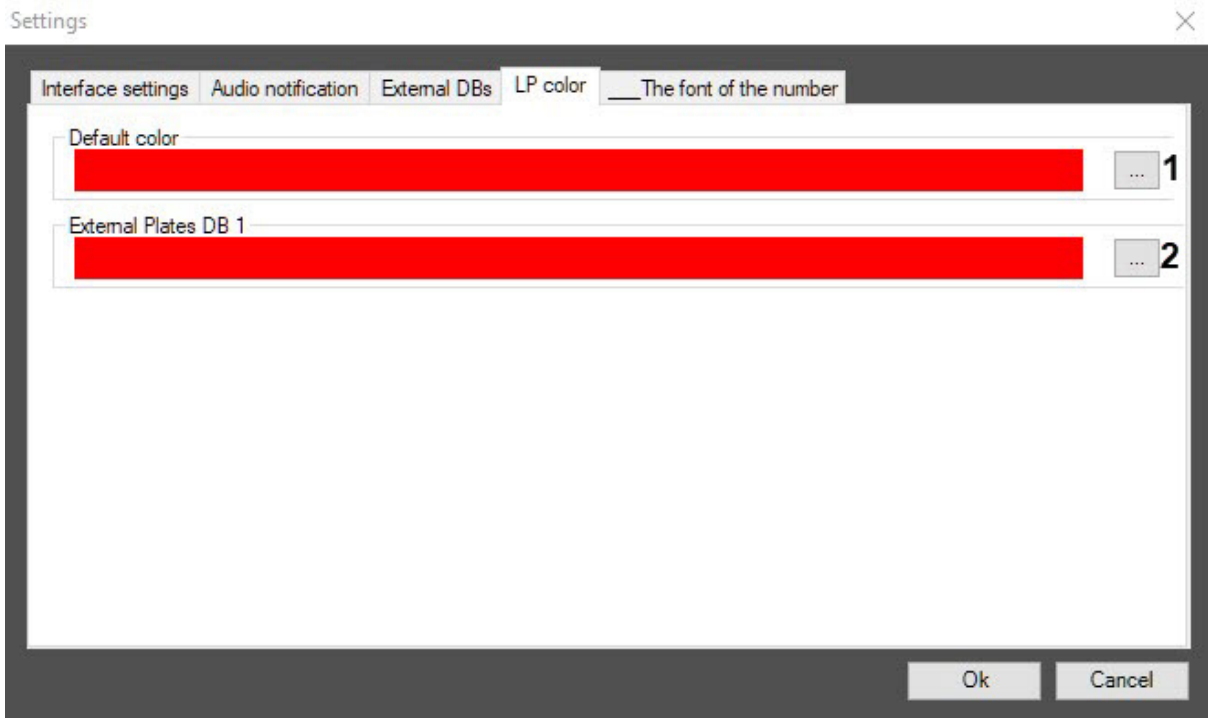
To do that:


1. Go to the **Vehicle Tracer** settings panel.

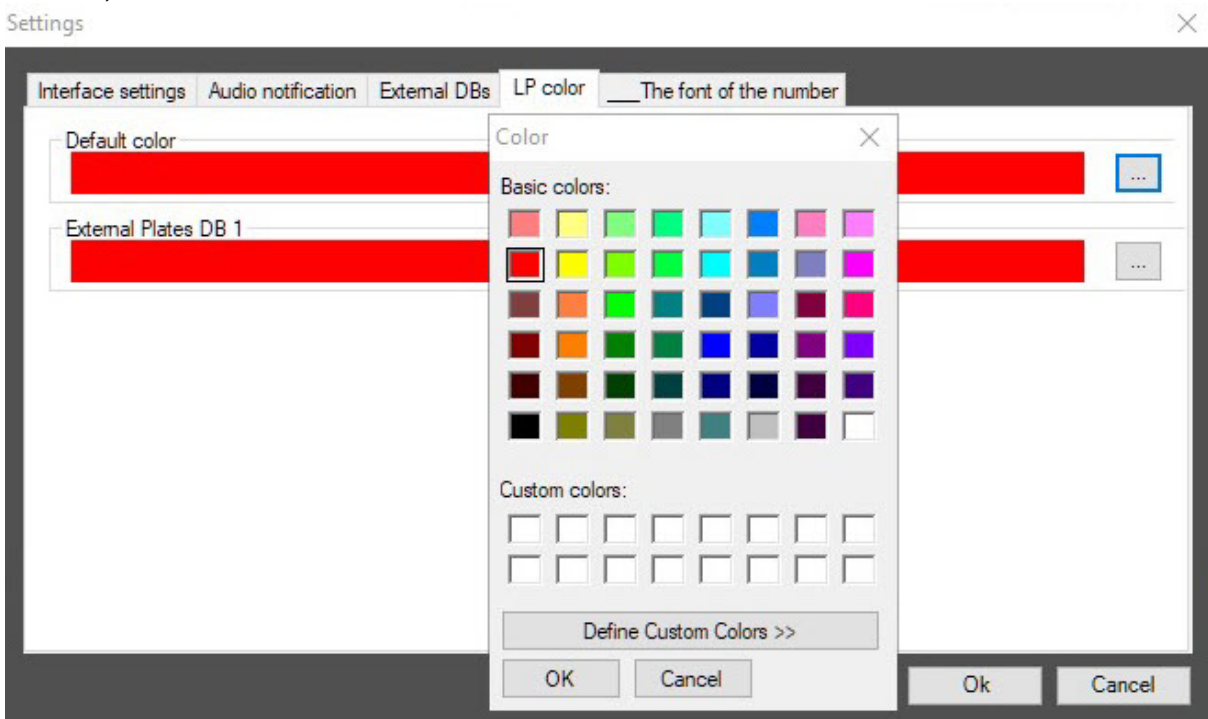


2. Click the **Settings** button.

- In the opened **Settings** dialog window, click the **LP color** tab.

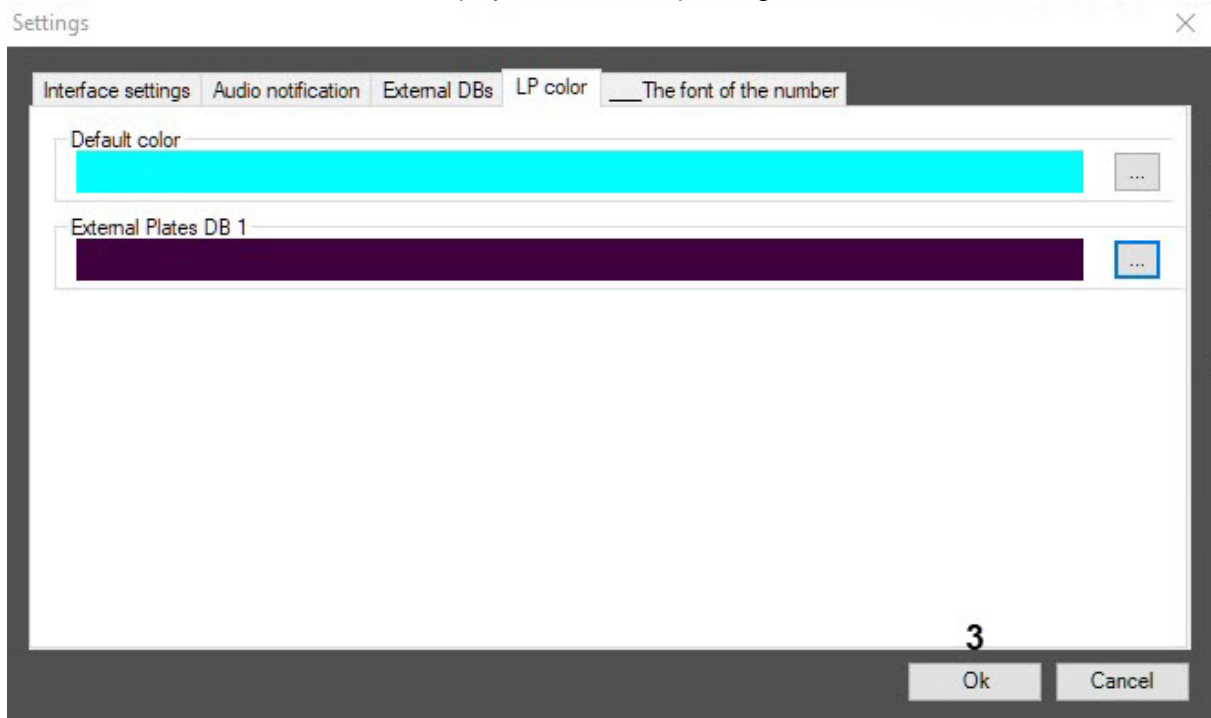


- In the **Default color** field, click the  button (1).
- In the opened **Color** dialog window, select the required color to highlight the events when the violations are detected, and click **OK**.



- Repeat steps 4 and 5 to set up the color for the **External Plates DB** fields (2), if they were pre-selected beforehand (see [Selecting the External Plates DB as the Active tracking databases](#)). This color will be used to highlight the events when a LP number is detected in the External DBs.

7. As a result, the selected colors will be displayed in the corresponding fields.



8. Click **Ok (3)** to save changes and return to the settings panel of the **Vehicle Tracer** object.

Note

To close the dialog window without any changes, click **Cancel**.

9. Click **Apply** to save the changes on the **Vehicle Tracer** settings panel (2).

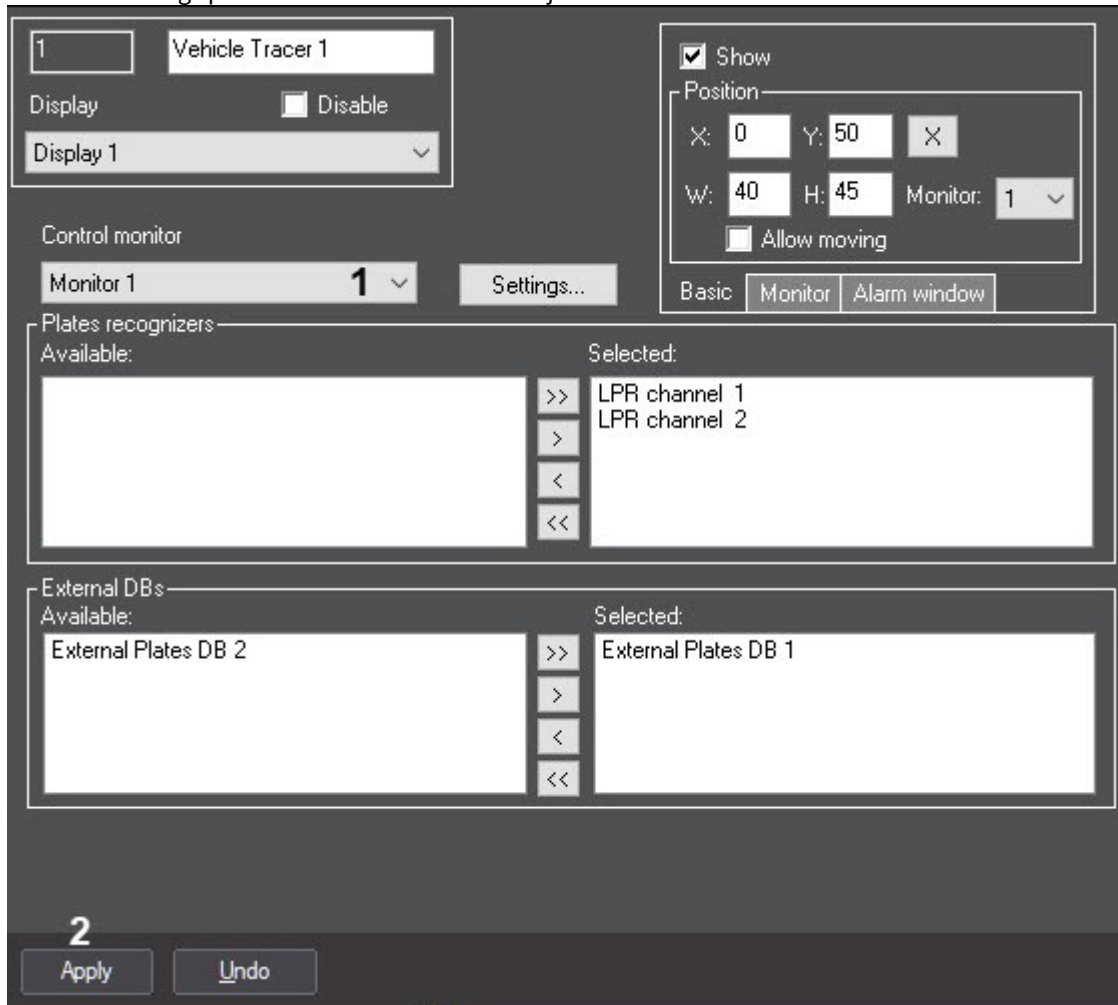
The colors for LP recognition events are set up.

5.5.10 Selecting the Monitor object for playing back the video archive

It is possible from the **Vehicle Tracer** window to view the video archive by event, received from the video camera used for the license plate recognition (see [Viewing the video archive by event](#)).

Select the monitor for displaying the video archive playback as follows:

1. Go to the settings panel of the **Vehicle Tracer** object.



2. From the **Control monitor** drop-down list (1), select the **Monitor** object for playing back the video archive in the specified **Monitor** interface object.

⚠ Attention!

The **Monitor** and **Vehicle Tracer** objects should be created on the basis of one parent object **Screen**.

3. Click **Apply** (2).

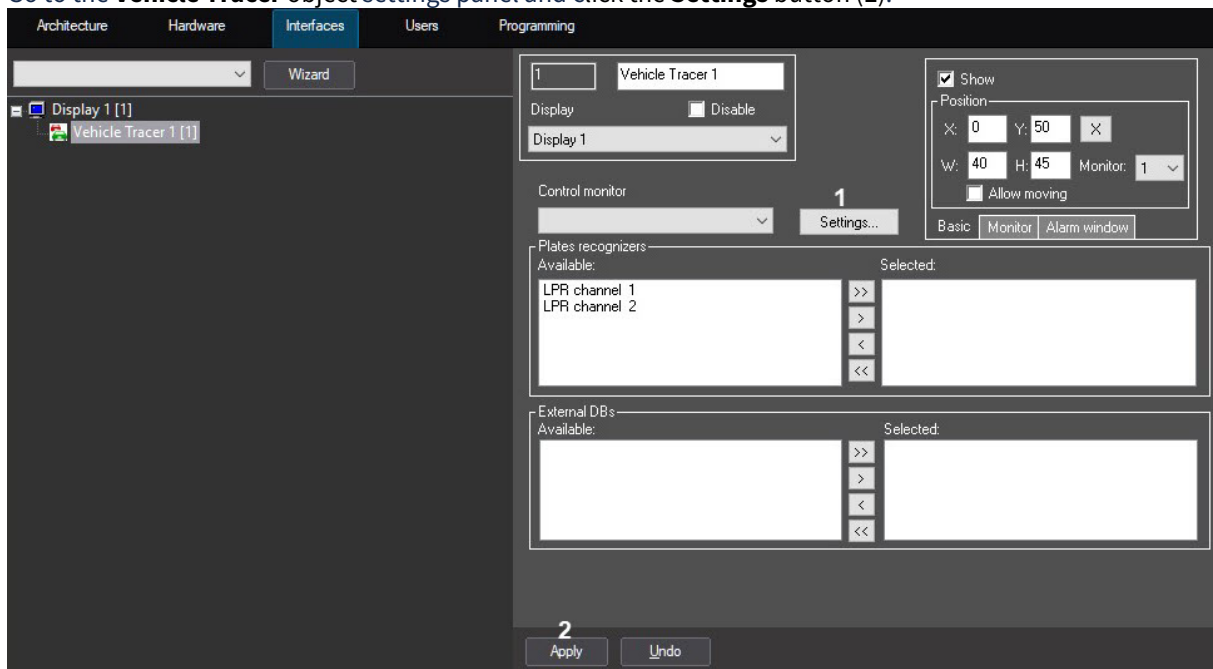
Selecting the **Monitor** object for playing back the video archive is completed.

5.5.11 Setting up the font of the recognized LP number

You can select the font of the recognized license plate in the **Online monitor** and **Event monitor** components. This can be useful if the characters of the recognized license plate are displayed incorrectly due to the lack of these characters in the currently selected font. To ensure the correct display of the recognized number, it is necessary that the selected font and character set correspond to the country whose numbers are to be recognized.

Configure the font of the recognized license plate as follows:

1. Go to the **Vehicle Tracer** object settings panel and click the **Settings** button (1).

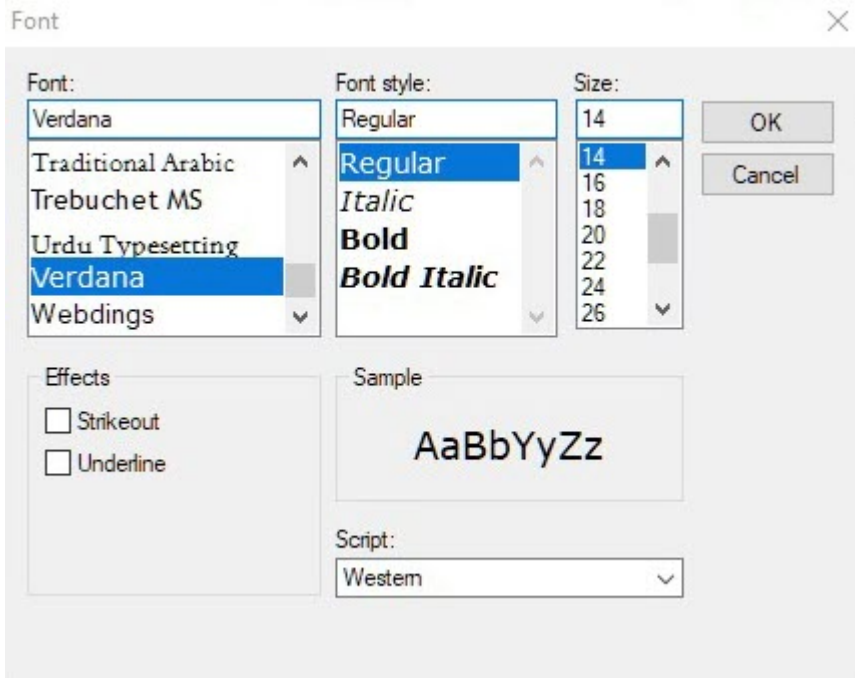


2. In the opened **Settings** dialog window, click the **Number font** tab.



3. Click the button with the font name (1).

- In the **Font** dialog box that opens, select the required font, its style, size and script. Click **OK**.



- Click **OK (2)** to save changes and return to the settings panel of the **Vehicle Tracer** object.
- Click **Apply** on the **Vehicle Tracer** settings panel (2).

Setting up the font of the recognized license plate is complete.

6 Appendices

6.1 Appendix 1. Interface description

6.1.1 The settings panel of the LPR channel object

The settings panel of the **LPR channel** object includes the following interface elements:

The screenshot shows the settings panel for an LPR channel object. The interface is organized as follows:

- General Settings:**
 - Channel ID: 1, Name: LPR channel 1
 - Computer: Computer DESKTOP-LM3U4BH (with a Disable checkbox)
 - Country: Germany (with a dropdown arrow)
- Select cameras (2):**
 - LP recognition: Camera 1, Camera 2 (dropdowns)
 - Synchronous: Camera 2 (dropdown)
 - Automatic recording: (with a 10 s timer)
 - Process half frame:
 - Enable on: Motion detection (dropdown)
 - Entranc: Macro 1 (dropdown)
 - Exit: Macro 2 (dropdown)
- Detection settings:**
 - Area search threshold: 30
 - Max. width: 21 (with an X icon)
 - Max. height: 9 (with an X icon)
 - Min. width: 2 (with an X icon)
 - Min. height: 1 (with an X icon)
 - Cut image with vehicle:
 - Allow recognition by request:
- Search area border, %:**
 - Left: 0
 - Top: 0
 - Right: 100
 - Bottom: 100
 - Search area: (with an X icon)
- Direction calculation:**
 - by LP position (dropdown)
 - Direction: any (dropdown)
 - Undefined:
 - Record violation:
 - Entrance:
- Use GPU:**
 - Default device (dropdown)
- Recognition settings:**
 - Recognition settings (selected)
 - Saving settings
 - Advanced settings
 - Settings of LP processing

At the bottom of the panel are **Apply** and **Undo** buttons.

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
1	Country	Select the value from the drop-down list	For <i>AUTO-Uragan, VT, RR, IV</i> software modules			
			Selection of the country which numbers it is necessary to recognize	List of available national license plate templates	Depending on the recognition module	Depending on the number of available national license plate templates
	Module	Select the value from the drop-down list	For <i>AR-Auto, AR-Railway</i> software modules			
			Selection of the license plate recognition SDK	List of license plate recognition SDK	Depending on the recognition module	Depending on the number of installed license plate recognition SDK

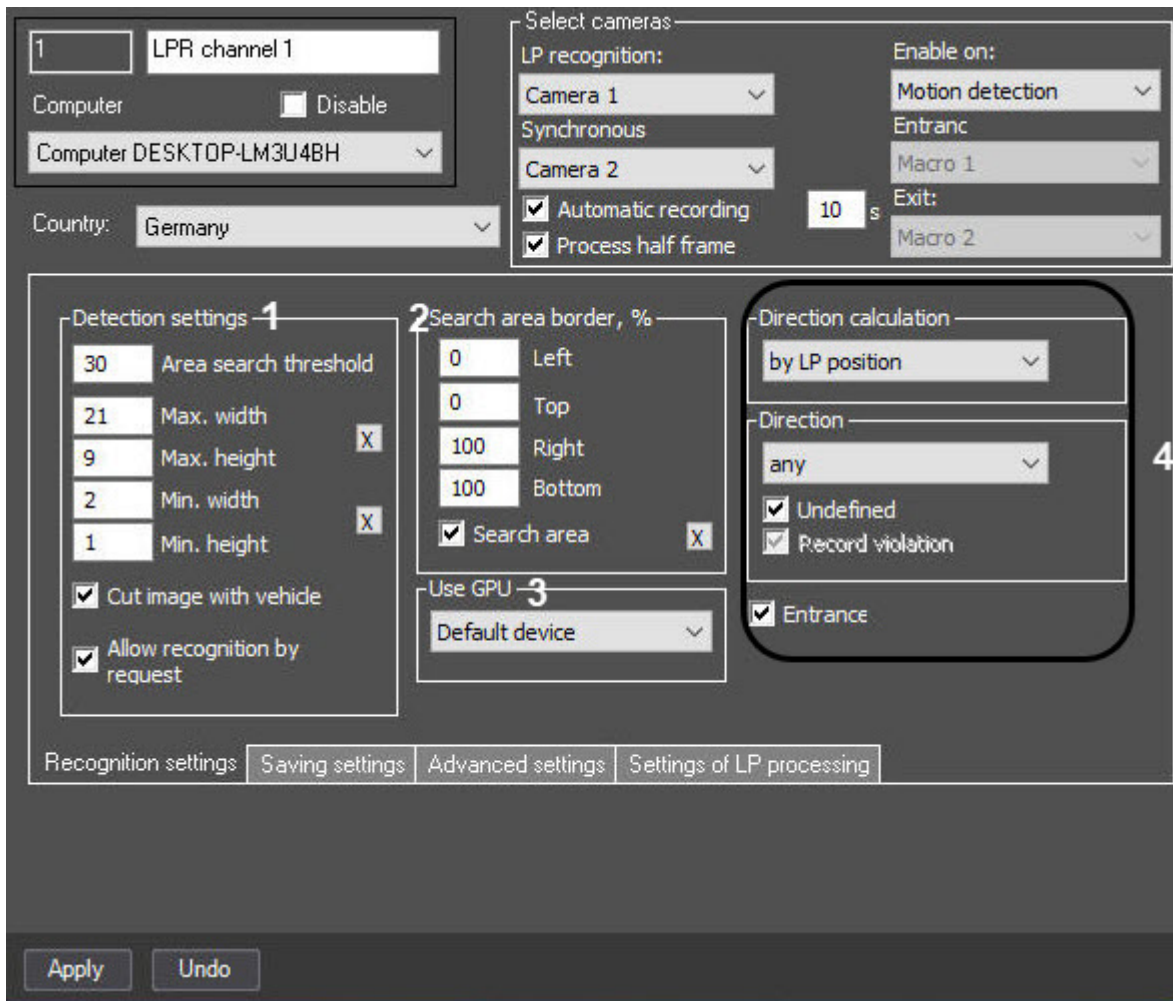
2	The Select cameras group				
LP recognition	Select the value from the drop-down list	Main video camera for license plate recognition	List of available Camera objects	Camera 1	Depending on the number of available Camera objects
Synchronous shooting	Select the value from the drop-down list	Additional video camera operating together with the main camera	List of available Camera objects	None	Depending on the number of available Camera objects
Automatic recording	Set the checkbox	Enabling the automatic recording on the LP number recognition	Boolean	Clear	Set—automatic recording enabled, Clear—automatic recording disabled
Automatic recording, s	Enter the value in the text field	Setting the auto recording duration (in seconds)	Seconds	10	0-86400

Process half frame	Set the checkbox	Specifying the frame processing setting	Boolean	Set	Set—smaller frame is stretched, larger frame is cropped Clear—smaller frame is stretched, larger frame is processed unchanged
---------------------------	------------------	---	---------	-----	--

<p>Enable on</p>	<p>Select the value from the drop-down list</p>	<p>Enabling and disabling LP recognition by main motion detection or by macros</p>	<p>List</p>	<p>Disabled</p>	<p>Disabled—LPR channel continuously scans the video image.</p> <p>By macros—enables LP recognition on macros. When you select this option, the Entrance and Exit drop-down lists become available.</p> <p>Motion detection—enables LP recognition on motion detection. Used to reduce the load on the server. It works differently depending on the selected recognizer mode.</p> <p>For normal mode:</p> <p>Yes—if the camera is armed, the LPR channel scans all video images until the basic motion detection of <i>Axxon PSIM</i> is in the Alarm mode. If the camera is not armed, the LPR doesn't work, but manual start using scripts is available (see item 6 in Scripts used in the Auto PSIM software package). Recognition will process frames until the stop command will be given.</p> <p>For Parking mode:</p>
-------------------------	---	--	-------------	-----------------	--

						<p>If the camera is armed, the LPR channel scans all video images, until the plate will be recognized, after it recognition stops even if the Alarm mode is still in process and procedure repeats when the new trigger of alarm is activated; if the camera is not armed, the LPR doesn't work, but manual start using scripts is available (see item 6 in Scripts used in the Auto PSIM software package). Recognition will process frames until the plate will be recognized and then will stop before new manual start</p>
Entrance	Select the value from the dropdown list	Enabling LP recogniton	List	<no>		Depending on the number of created macros
Exit	Select the value from the dropdown list	Enabling LP recogniton	List	<no>		Depending on the number of created macros

The **Recognition settings** tab:



No	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
1	The Detection settings group					
	Area search threshold Available for: <ul style="list-style-type: none"> <i>AUTO-Uragan</i> <i>IV</i> 	Enter the value in the text field	Detecting zone sensitivity	Number	60	0-100

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
	Max. width Available for: <ul style="list-style-type: none"> • <i>AUTO-Uragan</i> • <i>IV</i> • <i>VT</i> 	Enter the value in the text field	Maximum available width of license plate	Percentage of frame width	21	0-100
	Max. height Available for: <ul style="list-style-type: none"> • <i>AUTO-Uragan</i> • <i>IV</i> 	Enter the value in the text field	Maximum available height of license plate	Percentage of frame height	9	0-100
	Button X Available for: <ul style="list-style-type: none"> • <i>AUTO-Uragan</i> • <i>IV</i> 	Click the button	Access to the interactive interface of setting the area width and height	-	-	-
	Min. width Available for: <ul style="list-style-type: none"> • <i>AUTO-Uragan</i> • <i>IV</i> • <i>VT</i> 	Enter the value in the text field	Minimum available width of license plate	Percentage of frame width	-	0-100
	Min. height Available for: <ul style="list-style-type: none"> • <i>AUTO-Uragan</i> • <i>IV</i> 	Enter the value in the text field	Minimum available height of license plate	Percentage of frame width	-	0-100
	Button X Available for: <ul style="list-style-type: none"> • <i>AUTO-Uragan</i> • <i>IV</i> 	Click the button	Access to the interactive interface of setting the area width and height	-	-	-

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
	Cut image with vehicle Available for: <ul style="list-style-type: none"> • <i>AUTO-Uragan</i> • <i>AR-Auto</i> • <i>IV</i> • <i>Remote recognition</i> • <i>RR</i> • <i>VT</i> 	Set the checkbox	Set up the detection settings to the image with a vehicle	Boolean	Clear	Set—frame with a vehicle is cut Clear—frame with a vehicle is not cut
	Allow recognition by request Available for: <ul style="list-style-type: none"> • <i>AR-Auto</i> • <i>RR</i> • <i>VT</i> • <i>AR-Railway</i> 	Set the checkbox	Enable the image recognition on demand	Boolean	Clear	Set—on-demand image recognition is enabled Clear—on-demand image recognition is disabled
2	The Search area border, % group					
	Left	Enter the value in the text field	Left edge of the LP number search area (%)	% relative to the width of the surveillance window	0	0-100
	Top	Enter the value in the text field	Top edge of the LP number search area (%)	% relative to the width of the surveillance window	0	0-100

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
	Right	Enter the value in the text field	Right edge of the LP number search area (%)	% relative to the width of the surveillance window	100	0-100
	Bottom	Enter the value in the text field	Bottom edge of the LP number search area (%)	% relative to the width of the surveillance window	100	0-100
	Search area	Set the checkbox	Enabling the function of setting borders in the frame to search for a license plate	Boolean	Clear	Set—function of setting borders in the frame to search for a license plate is enabled Clear—function of setting borders in the frame to search for a license plate is disabled
	The X button	Click the button	Sets the search area using the mouse	NA	NA	NA
3	The Use GPU group					

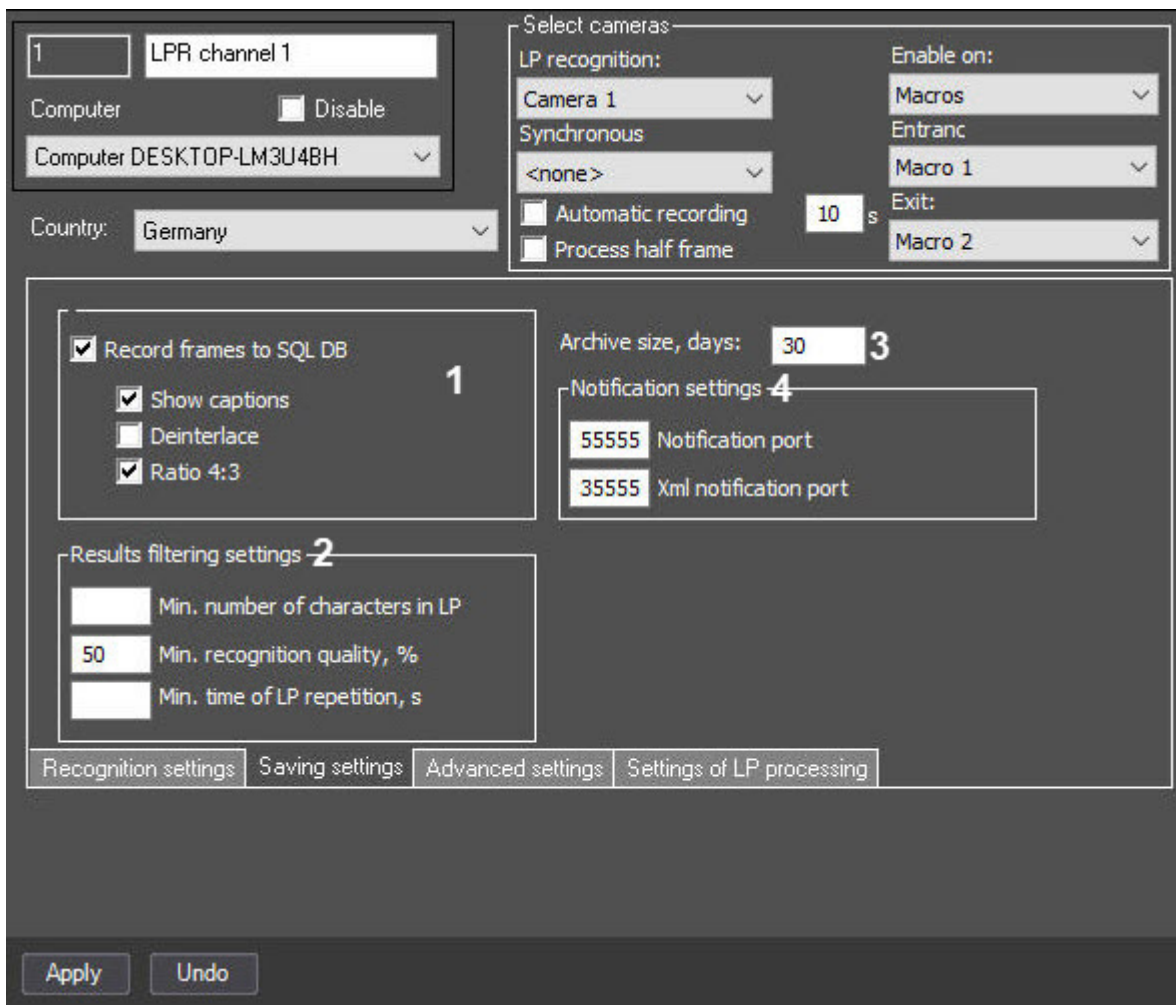
№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
	Use GPU	Select the value from the drop-down list	Determines the device that will be used for LP recognition	List	Do not use	<p>Depending on the number of available graphics cards.</p> <p>Do not use—possibility of using a graphics card is disabled. The default value</p> <p>Default device—all available graphics cards will be used during recognition</p> <p>Intel GPU—NVIDIA GPU integrated graphics card will be used during recognition</p>
4	The Direction group					

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
	Direction calculation	Select the value from the drop-down list	Sets the mode of determining the vehicle's movement direction	List	by LP position	<p>by LP position—the direction is determined by the position of the upper part of the LP number. If the upper part of the LP number at the start of tracking is lower than the upper part of the LP number at the end of tracking, then the direction is defined as From the camera, otherwise — To the camera.</p> <p>by LP area—the direction is determined by the license plate area. If the LP area at the start of tracking is larger than the LP area at the end of tracking, then the direction is defined as From the camera, otherwise —To the camera.</p> <p>by SDK—the direction is determined by the SDK. Currently, the following LP recognition modules support this mode: <i>RR, VT, AUTO-Uragan, IV</i></p>

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
	<p>Direction</p> <p>Available for:</p> <ul style="list-style-type: none"> • <i>AUTO-Uragan</i> • <i>Remote recognition</i> • <i>RR</i> • <i>VT</i> • <i>RIDR IV</i> • <i>CIDR IV</i> 	Select the value from the drop-down list	Sets the traffic direction to detect the LP numbers	List	any	<p>Any—the direction of movement from the video camera or towards the video camera</p> <p>From the camera—the direction of movement from the video camera</p> <p>To the camera—the direction of movement towards the video camera</p> <p>For the <i>RIDR IV</i> and <i>CIDR IV</i> modules, the direction of carriage movement in the camera view is selected from left to right or from right to left</p>
	<p>Undefined</p> <p>Available for:</p> <ul style="list-style-type: none"> • <i>ARENA</i> • <i>AUTO-Uragan</i> • <i>AR-Auto</i> • <i>Remote recognition</i> • <i>RR</i> • <i>VT</i> • <i>RIDR IV</i> • <i>CIDR IV</i> 	Set the checkbox	Enables to display the direction as Undefined in the <i>Vehicle Tracer</i> module, if it is impossible to determine the vehicle direction	Boolean	Set	<p>Set—if it is impossible to determine the direction of vehicle movement, the direction is displayed as Undefined</p> <p>Clear—if it is impossible to determine the direction of vehicle movement, the direction is not determined</p>

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
	<p>Record violation</p> <p>Only used when direction is selected in the Direction list (To the camera/From the camera)</p>	Set the checkbox	Enables event generating in case of vehicle entering an oncoming lane	Boolean	Set	<p>Set—in case the direction of vehicle moving doesn't coincide with the direction specified in the Direction list, the Entered the oncoming lane alarm event is generated</p> <p>Clear—the Entered the oncoming lane alarm event isn't generated</p>
	<p>Entrance</p>	Set the checkbox	Enables the recording of the vehicle movement direction as Entrance to the territory	Boolean	Clear	<p>Set—LPR channel for the recognized license plates records the direction of vehicle movement as Entrance to the territory</p> <p>Clear—LPR channel for the recognized license plates doesn't record the direction of vehicle movement as Entrance to the territory</p> <p><i>Note. This setting is taken into account in the WEB Report System PSIM when working with the AUTO reports (see WEB Report System PSIM. User Guide)</i></p>

The **Saving settings** tab



No	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
1	Record frames to SQL DB	Set the checkbox	Saves video frames of vehicle's recognized license plate into SQL DB	Boolean	Set	Set—the frame with a vehicle is saved into the database Clear—the frame with a vehicle is not saved into the database

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
	Show captions	Set the checkbox	Enables the license plate overlay as titles on the video image while making report about the recognized license plate	Boolean	Set	Set—captions overlay enabled. Clear—captions overlay disabled
	Deinterlace	Set the checkbox	Enables de-interlacing of video frame with a vehicle when the image is received in full resolution	Boolean	Clear	Set—de-interlacing of video frame with a vehicle is implemented Clear—de-interlacing of video frame with a vehicle is not implemented
	Ratio 4:3	Set the checkbox	Sets the ratio 4:3 of video frame's width and height while making report about the recognized license plate	Boolean	Set	Set—video frame with a vehicle is displayed in ratio 4:3 Clear—initial ratio of the frame while making report about the recognized license plate is not changed
2	The Results filtering settings group					
	Min. number of characters in LP	Enter the value in the text field	Minimum number of characters in the license plate	Number	NA	>0

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
	Min. recognition quality, %	Enter the value in the text field	Minimum recognition accuracy, which is determined by the SDK internal logic and allows you to distinguish a license plate from an unrelated caption on a vehicle. In the online monitor, all results with an accuracy level lower than the specified one are discarded	%	NA	0-100%
	Min. time of LP repetition, s	Enter the value in the text field	Minimum time of repetition of the license plate on video	Seconds	NA	0-3600
3	Archive size, days	Enter the value in the text field	Database archive depth	Days	30	0-5000
4	The Notification settings group					
	Notification port	Enter the value in the text field	Specifies the number of the port for license plate recognition events	Natural number series	55555	Any valid unused port numbers. The number of ports is determined by the system administrator

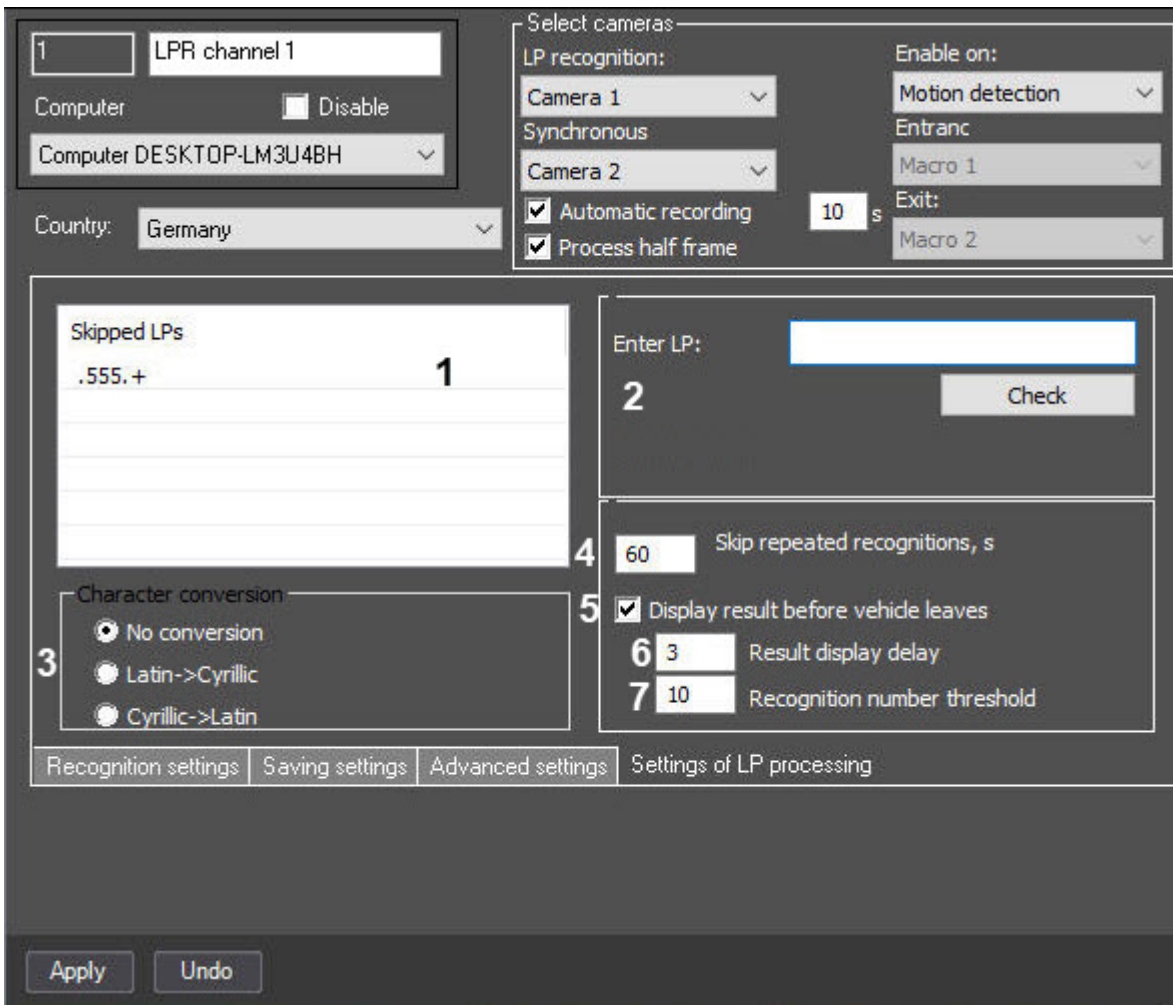
No	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
	Xml notification port	Enter the value in the text field	Specifies the number of the port for license plate recognition events in xml format	Natural number series	35555	Any valid unused port numbers. The number of ports is determined by the system administrator

The **Advanced settings** tab

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
1	Get speed from video Available for: <ul style="list-style-type: none"> • <i>AUTO-Uragn</i> • <i>AR-Auto</i> • <i>VT</i> • <i>RR</i> 	Set the checkbox	Enables estimation of speed by video via the <i>Auto PSIM</i> algorithm	Boolean	Clear	Set—vehicle speed is estimated by video, the results are displayed over video image as captions Clear—vehicle speed is not estimated by video
	Configuration	Click the button	Opens a window to set a line segment	NA	NA	NA
	Distance	Enter the value in the text field	Sets length of the line segment in the Get speed from video window, in centimeters	Natural number series	NA	>0
	Permitted speed...km/h	Enter the value in the text field	Sets permitted vehicle speed on the observed lane	Natural number series	60	>0
	Alarm on speed limit...km/h	Enter the value in the text field	Sets maximum vehicle speed. If this speed is exceed, an alarm event is generated	Natural number series	80	>0

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
2	Create frame caption Unavailable for: <ul style="list-style-type: none"> • <i>External recognizer</i> • <i>AR-Railway</i> • <i>AR-Auto</i> 	Click the button	Access to frame caption settings	NA	NA	NA
3	Use decoder NGP (GPU + CPU) Available for: <ul style="list-style-type: none"> • <i>AUTO-Uragn</i> • <i>AR-Auto</i> • <i>VT</i> • <i>RR</i> • <i>AR-Railway</i> • <i>IV</i> 	Set the checkbox	Enables video decoding with the GPU and reduces the load on the CPU	Boolean	Clear	Set—decoding with GPU is enabled Clear—decoding with GPU is disabled

The **Settings of LP processing** tab



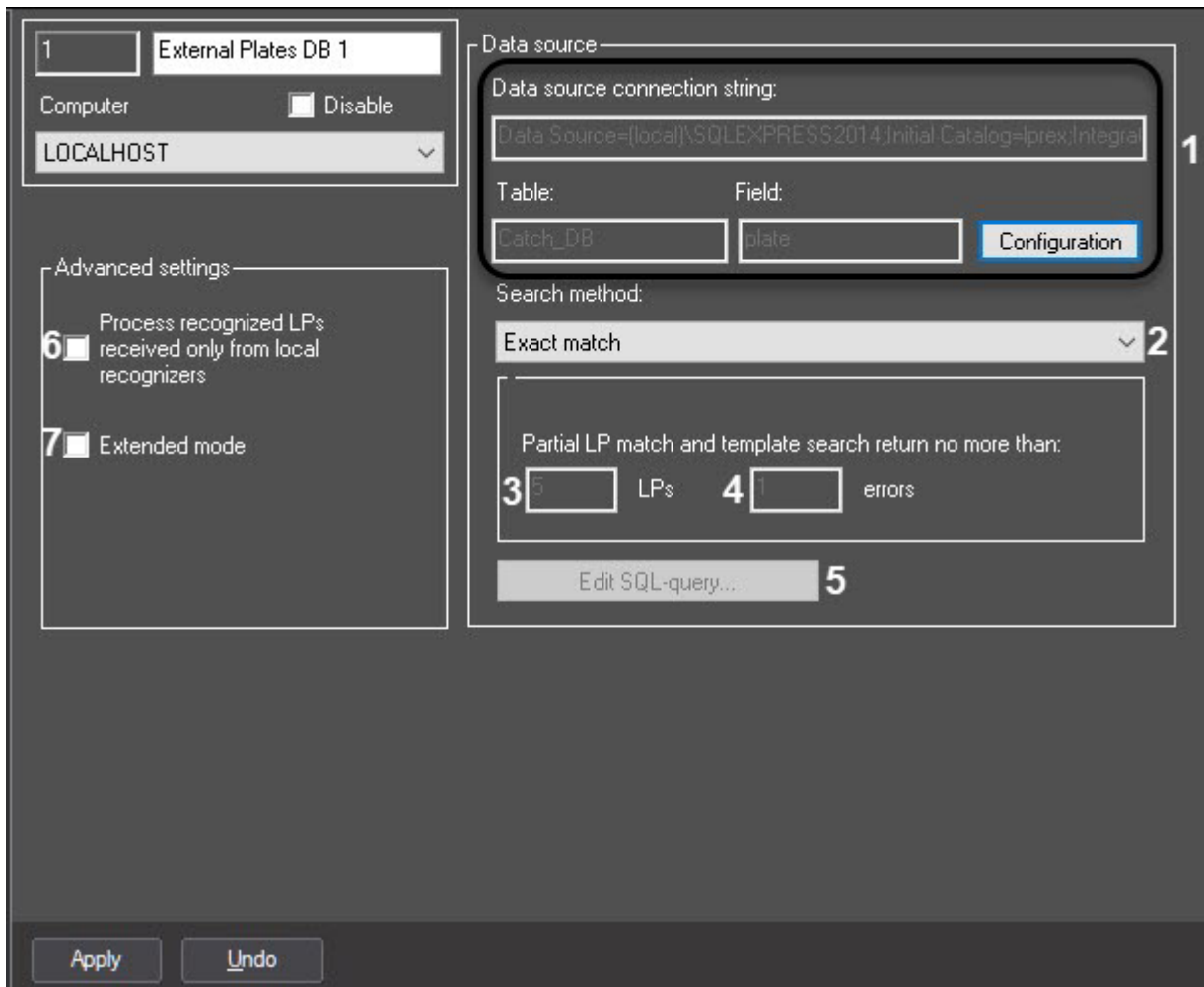
No	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
1	Skipped LPs	Use function menu	Contains the license plate templates by which the recognized license plates are ignored if they match the created list by some criterion. For example, license plates of a specific region can be ignored	String	NA	NA

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
2	Enter LP	Enter the value in the text field	Specifies a license plate to check if it is contained in an existing template or not	Natural number series	NA	>0
	Check	Click the button	Activates the check of the specified license plate against the existing template	NA	NA	NA
3	Character conversion	Set the switch	Enables the automatic conversion of Latin characters into Cyrillic characters, if the license plate recognition module returns the recognized license plate in Latin characters. Enables the automatic conversion of Cyrillic characters into Latin characters, if the license plate recognition module returns the recognized license plate in Cyrillic characters	Position of the switch	No character conversion	<p>No character conversion— automatic conversion is disabled</p> <p>Latin->Cyrillic — automatic conversion of Latin characters into Cyrillic characters is enabled</p> <p>Cyrillic->Latin— automatic conversion of Cyrillic characters into Latin characters is enabled</p>
4	Skip repeated recognitions, s	Enter the value in the text field	Specifies the time period in seconds during which the repeated recognition of one captured license plate will be ignored by the system	Seconds	0	>=0

№	Parameter name	Method of setting the parameter value	Description	Representation	Default value	Value range
5	<p>Display result before vehicle leaves</p> <p>Available for:</p> <ul style="list-style-type: none"> • <i>AUTO-Uragan</i> • <i>AR-Auto</i> • <i>VT</i> • <i>RR</i> (including the <i>RR vendor and model recognizer module</i>) 	Set the checkbox	Enables the results to be displayed before the car leaves the viewing area	Boolean	Set	<p>Set—the result is displayed before the vehicle leaves the frame (the license plate of the given vehicle is out of the license plate search boundaries)</p> <p>Clear—the result is displayed only after the vehicle leaves the frame</p>
6	Result display delay	Enter the value in the text field	The time delay between the first recognition of a license plate and displaying the results	Seconds	3	0-100
7	Recognition number threshold	Enter the value in the text field	The number of reliable license plate recognitions, after which the recognition result is displayed	Natural number series	2	0-1000

6.1.2 The External Plates DB object settings panel

The **External Plates DB** object settings panel includes the following interface elements:



The following table describes the elements of the **External Plates DB** object settings panel.

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Data source connection string text field	Automatically , after setting up the connection	Connection string to the external database	Latin and special symbols	-	A sting, containing a sequence of characters (letters, digits, characters) non case-sensitive
	Table text field	Automatically , after setting up the connection	Plates table name in the database	Latin and special symbols	-	A sting, containing a sequence of characters (letters, digits, characters) non case-sensitive

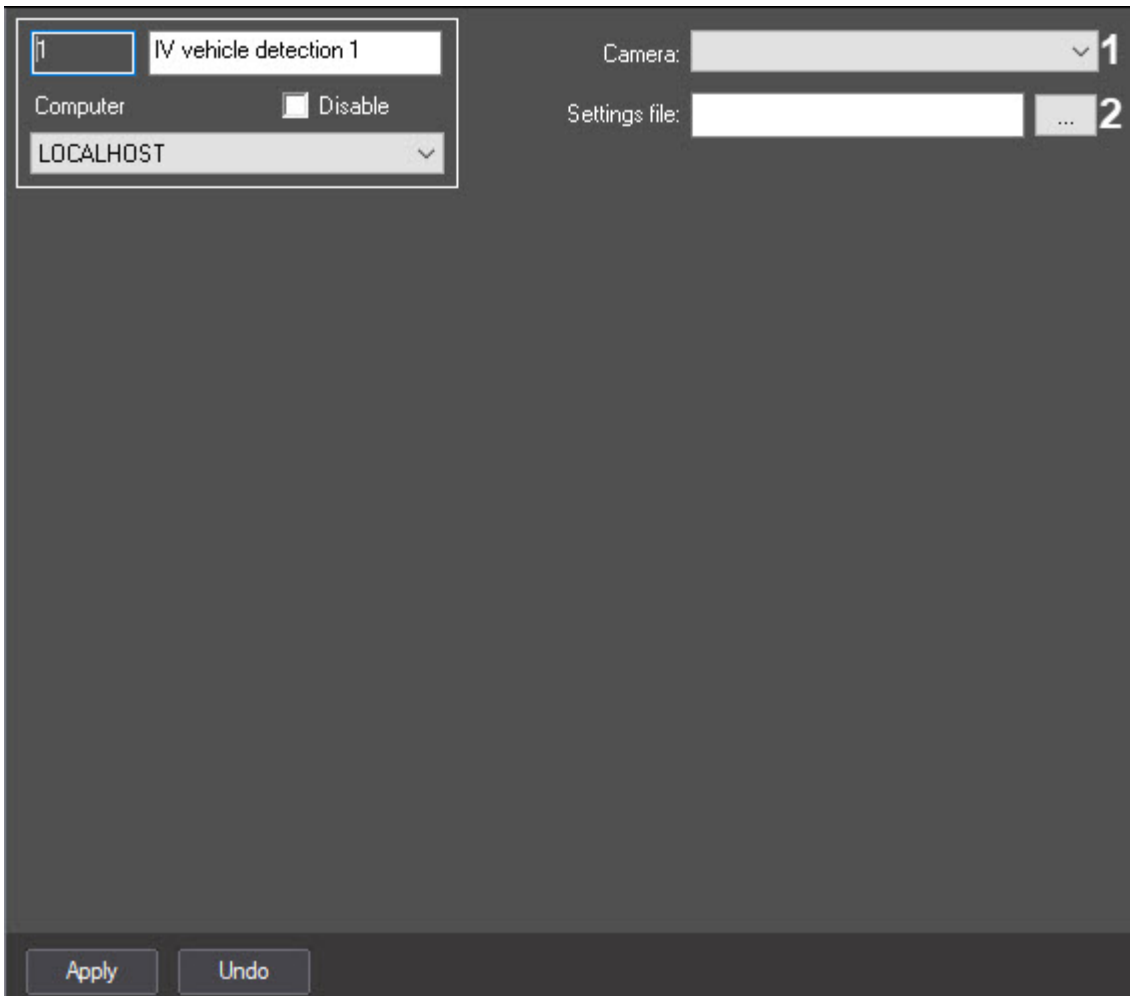
№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Field text field	Automatically , after setting up the connection	Plates table name in the database	Latin and special symbols	-	A sting, containing a sequence of characters (letters, digits, characters) non case-sensitive
	Configuration button	Click the button	Access to connection settings	-	-	-

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
2	Search method drop-down list	Select the value from the list	Search method selection of identified number in the external database	A list of available search methods	Exact match	<p>Partial search – the found expressions containing the key word in any position and order are returned.</p> <p>Wildcard search – the found expressions matching the given wildcard are returned.</p> <p>Exact match – the found expressions that exactly match the key word are returned.</p> <p>SQL query – the expressions defined by the SQL query are returned.</p> <p>With acceptable number of errors – the found expressions that are partially or completely contained in the number in the external plate database are returned. You can select the maximum number of errors (mismatches of characters) in the number</p>

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
3	Partial LP match and template search return no more than...LPs text field	Enter the value in the field	Setting the maximum number of license plates returned when searching by part of the number or number template in the external plates database.	integer	5	1-1000
4	Partial LP match and template search return no more than...errors text field	Enter the value in the field	Setting the maximum number of errors (character mismatches) in the search request and numbers in the external plate database.	integer	1	>0
5	Edit SQL-query button	Click the button	Access to SQL-query, used in the search method «SQL-query»	-	-	-
6	Process recognized LPs received only from local recognizers checkbox	Set the checkbox	Specifies the mode when LPs only from local recognizers are processed	Boolean type	No	Yes – the mode when LPs only from local recognizers are processed is enabled. No – the mode when LPs from all recognizers are processed is disabled
7	Extended mode checkbox	Set the checkbox	Enables the extended mode	Boolean type	No	Yes – the extended mode is enabled. No – the extended mode is disabled

6.1.3 The IV vehicle detection settings panel

The **IV vehicle detection** object settings panel includes the following interface elements:



The following table describes the elements of the **IV vehicle detection** object settings panel.

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Camera	Select the value from the list	Set the number of cameras in the IV vehicle detection	Names of objects, registered in the system Camera	-	Depends on the objects number Camera in the system
2	Settings file	Entering the value in the field/ Clicking the button	Specifies the path to the setup file in the .json format created with the TestAppTMD.exe utility (see TestAppTMD.exe utility for setting up the IV vehicle detection)	-	-	-

6.1.4 The Parking violation detection module settings panel

The **Parking violation detection** object settings panel contains the following interface elements:

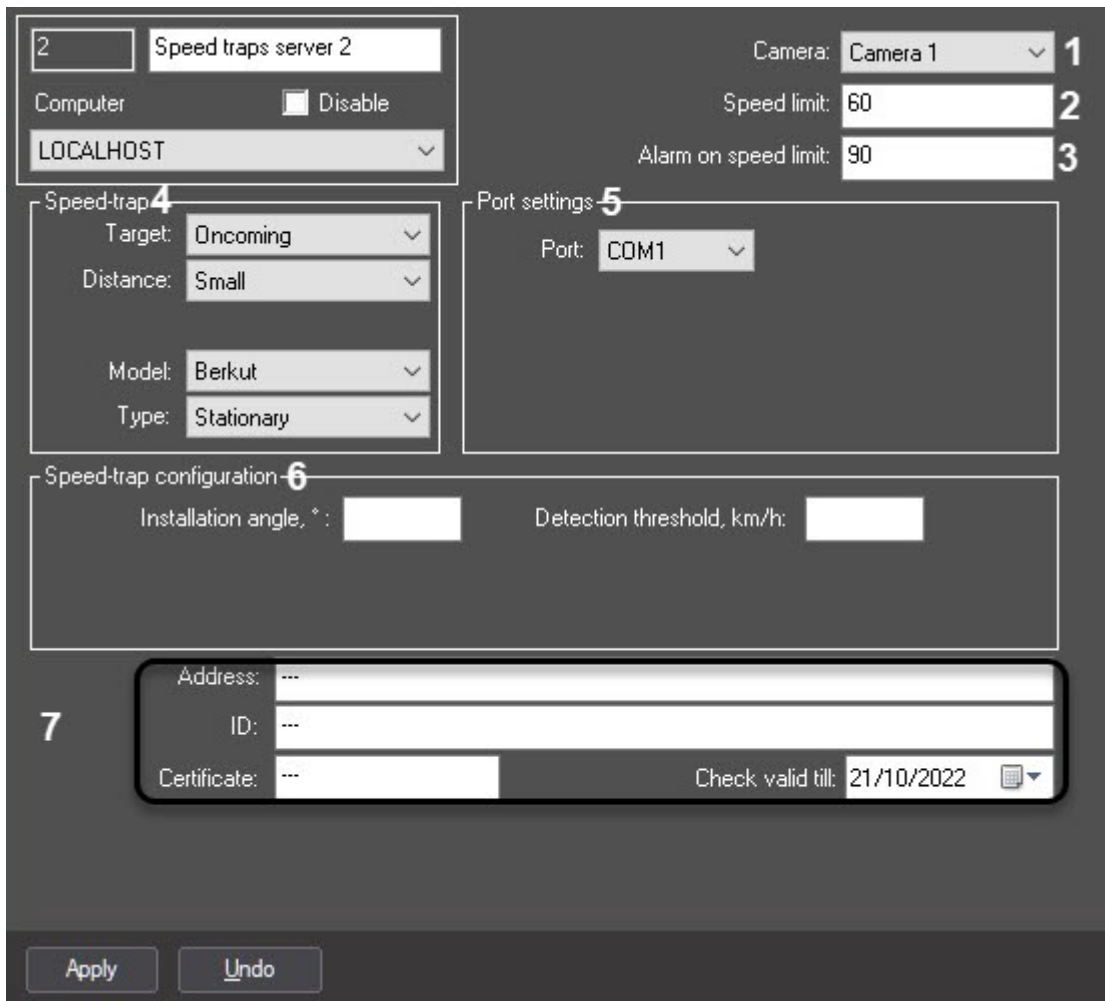
The following table describes the elements of the **Parking violation detection** object settings panel.

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	PTZ device drop-down list	Selecting the value in the list	Selecting PTZ device object which will perform the passage between presets	List of accessible PTZ device objects	No	Depending on number of accessible PTZ device

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
2	Priority drop-down list	Selecting the value in the list	Selecting ptz priority	List of accessible priorities	Low	Low – low ptz priority Standard – middle ptz priority High – high ptz priority
3	Time of stop for recording, s field	Setting the value in the field	Set time interval during which the vehicle can be in the frame of the same preset until generating the Parking violation alarm.	Second	30	0-99999
4	Initial preset field	Setting the value in the field	Set the number of initial preset of ptz device	Whole nonnegative number	1	1-99999
5	Final preset field	Setting the value in the field	Set the number of final preset of ptz device	Whole nonnegative number	10	1-99999
6	Timeout, s field	Setting the value in the field	Set time interval after which passage to the next preset is performed	Second	10	0-99999

6.1.5 The Speed traps server object settings panel

The figure shows the **Speed traps server** object settings panel.



The following table shows the elements in the **Speed traps server** settings panel.

	Parameter name	Field type	Description	Data type	Default value	Value range
1	Camera	List	Selecting the camera to work together with the Auto-Uragan module	List of available Camera objects	Not specified	Depending on the number of available Camera objects
2	Speed limit	Enter the value in the field	Entering the permitted vehicle speed on the controlled area for displaying in the report concerning the recognized number.	Km/h	-	Unlimited

	Parameter name	Field type	Description	Data type	Default value	Value range
3	Alarm on speed limit	Text field	Entering the maximum allowed vehicle speed the exceeding of which leads to the alarm registration	Km/h	-	Unlimited
Speed-trap group						
4	Target	List	Driving direction of the vehicle to be recognized	List of available directions	Oncoming	Oncoming – vehicles driving toward the speed-trap Passing – vehicles driving away from the speed-trap
	Distance	List	Setting an approximate distance between the speed-trap and the vehicles to be recognized	List of available distances	Small	Small Medium Large
	Model	List	Selecting the speed-trap model	List of integrated speed-trap devices	-	Berkut Iskra-1 Iskra-1B Iskra-1D Iskra-1KRIS Python Radis Rapira Rapira 2M Rapira 2M-A Rapira 2M-ART
	Type	List	Specifying the type of the speed-trap installation	List of installation parameters of the speed-trap devices	Stationary	Stationary – the speed-trap is static Moving – the speed-trap is installed on the moving vehicle

	Parameter name	Field type	Description	Data type	Default value	Value range
Port settings group						
5	Port	List	COM-port number	List of available COM-ports	COM1	Depending on the system configuration
Speed-trap configuration group						
6	Installation angle, *	Text field	The angle of the speed-trap installation in relation to the horizon	Degrees	Not specified	0 - 360
	Detection threshold, km/h	Text field	Minimum speed detectable by the speed-trap	Km/h	Not specified	Unlimited
7	Address	Enter the value in the field	Set the address of speed-trap position	-	-	-
	ID	Enter the value in the field	Set the factory ID number of speed-trap device	-	-	Depends on the producer of the device
	Certificate	Enter the value in the field	Set the number of the certificate, corresponding to speed-trap device	Number	-	-
	Checking valid till	Select from the list (calendar is used)	Set the date until which verification is valid	Date in format: dd, mm, yy	Current date	-

6.1.6 The Traffic violations detection module object settings panel

The **Traffic violations detection** object settings panel contains the following interface elements:

The screenshot shows the 'Traffic violations detection' settings panel. It features several configuration options:

- 1**: Traffic violations detection 1 (Title)
- LPR channel**: A dropdown menu currently showing 'LPR channel 1'.
- Traffic lights signal**: A dropdown menu showing 'Traffic lights detection 1' with a small '1' next to it.
- Alarm direction**: A dropdown menu showing 'Basic' with a small '2' next to it.
- Draw stop line**: A checkbox labeled '3'.
- 4**: Stop line settings (Tab)
- 5**: Setting violation areas (Tab)
- 6** Delay in violation registering: 1000 ms
- 7** Time of stop for recording: 3000 ms
- Number of pictures to track alarm: 3 **10**
- Additional recognizers: (Empty field)
- Red light violation** section:
 - Add photos: 2 **8**
 - 9** Interval: 1000 ms
- A table with columns: LPR channel, Sensor, State, Alarm type. The table contains a large '11' in the center.
- Buttons: Apply, Undo

The following table describes the elements of the **Traffic violations detection** object settings panel.

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Traffic lights signal dropdown list	Selecting the value in the list	Selecting Sensor/ Detector object, by signal of which traffic light is detected	List of accessible Sensor/ Detector objects	no	Depending on number of accessible Sensor/ Detector objects

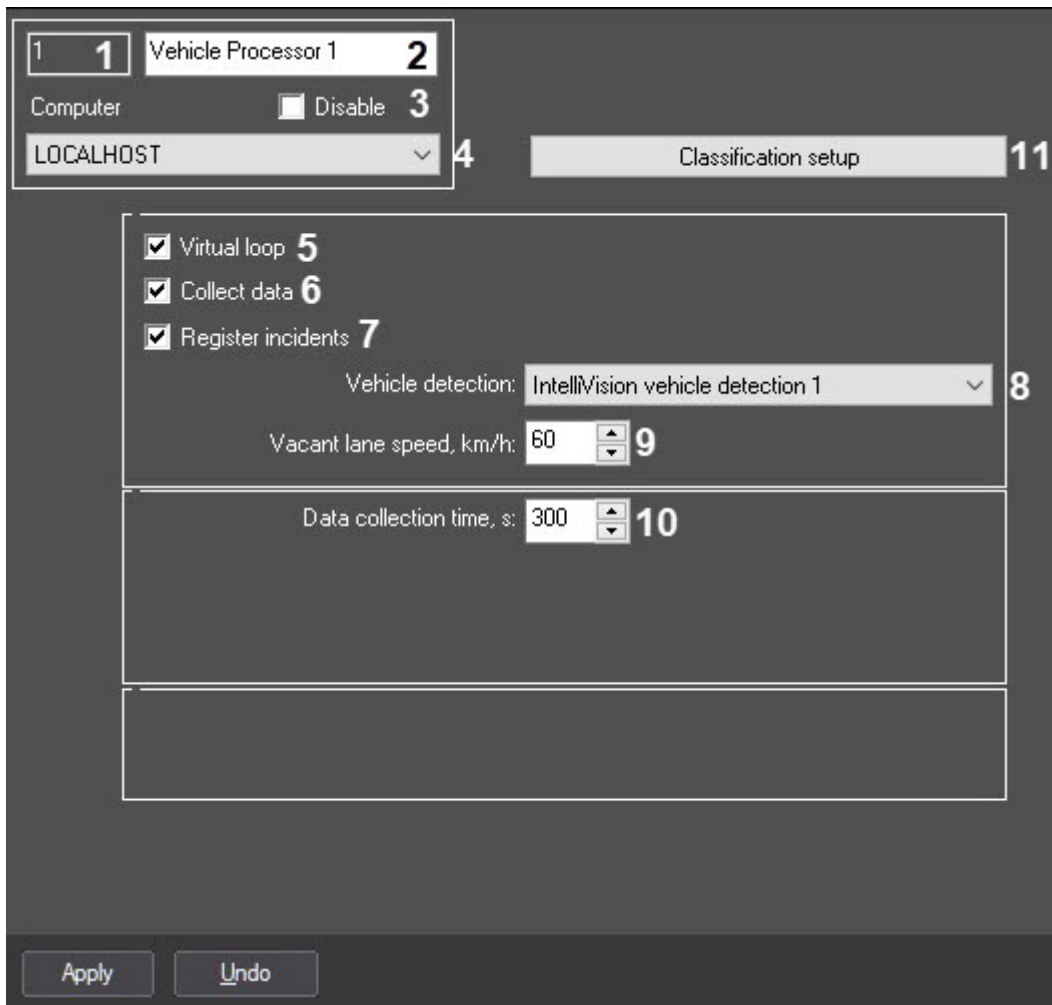
№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
2	Alarm direction dropdown list	Selecting the value in the list	Selecting the signal of traffic light detection on which the traffic violations detection is to be responded	List of accessible directions	Basic	Basic – use the basic signal of the traffic light. Left – use the left arrow of the traffic light. Right – use the right arrow of the traffic light
3	Draw stop line checkbox	Setting check box	Draw a stop line on video in front of traffic light function activation	Boolean type	no	Yes – drawing a stop line function is active. No – drawing a stop line function is off
4	Stop line settings button	Clicking	Access to stop line settings	-	-	-
5	Setting violation areas button	Clicking	Access to stop line settings	-	-	-
6	Delay in violation registering... ms field	Setting the value in the field	Set period after which the running a red light or stop will be considered as a violation	Millisecond	1000	0-99999
7	Time of stop for recording... ms field	Setting the value in the field	Set period that determines the time interval during which the vehicle should stay still while registering the Stop over crosswalk line violation	Millisecond	3000	0-99999

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
8	Add.photos field	Setting the value in the field	Set the number of photos made before the licence plate fixing and after its going out the control zone	Whole nonnegative number	2	0-99
9	Interval...ms field	Setting the value in the field	Set period that determines the time interval between saving additional photos	Millisecond	1000	0-99999
10	Number of pictures to track alarm field	Setting the value in the field	Specifying number of photos which will be stored from the moment of LP recognizing on the base recognizer to the moment of LP recognizing on the additional recognizer	Whole nonnegative number	3	0-99
Additional recognizers table						
11	LPR channel column	Selecting the value in the field	Selecting the additional LPR channel if it's required to use additional recognizers along with the base recognizer	List of accessible LPR channel objects	-	Depending on number of accessible LPR channel objects
	Sensor column	Selecting the value in the field	Selecting sensor from which events about traffic light operation will be received	List of accessible Sensor objects	-	Depending on number of accessible Sensor objects

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	State column	Selecting the value in the field	Selecting event from the sensor on which violation will be fixed	-	-	Active (on) – sensor is closed. Normal (off) – sensor is opened
	Alarm type column	Selecting the value in the field	Selecting type of violation which will be fixed in result of joint operation of additional and base recognizers	-	-	Marking violation. Red light violation

6.1.7 The Vehicle processor settings panel

The **Vehicle processor** object settings panel includes the following interface elements:



The following table describes the elements of the **Vehicle processor** object settings panel.

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	ID*	Automaticall y	Displays Vehicle processor object's ID in the system	Numbers	-	From 1 and above. Depends on the Vehicle processor objects number in the system

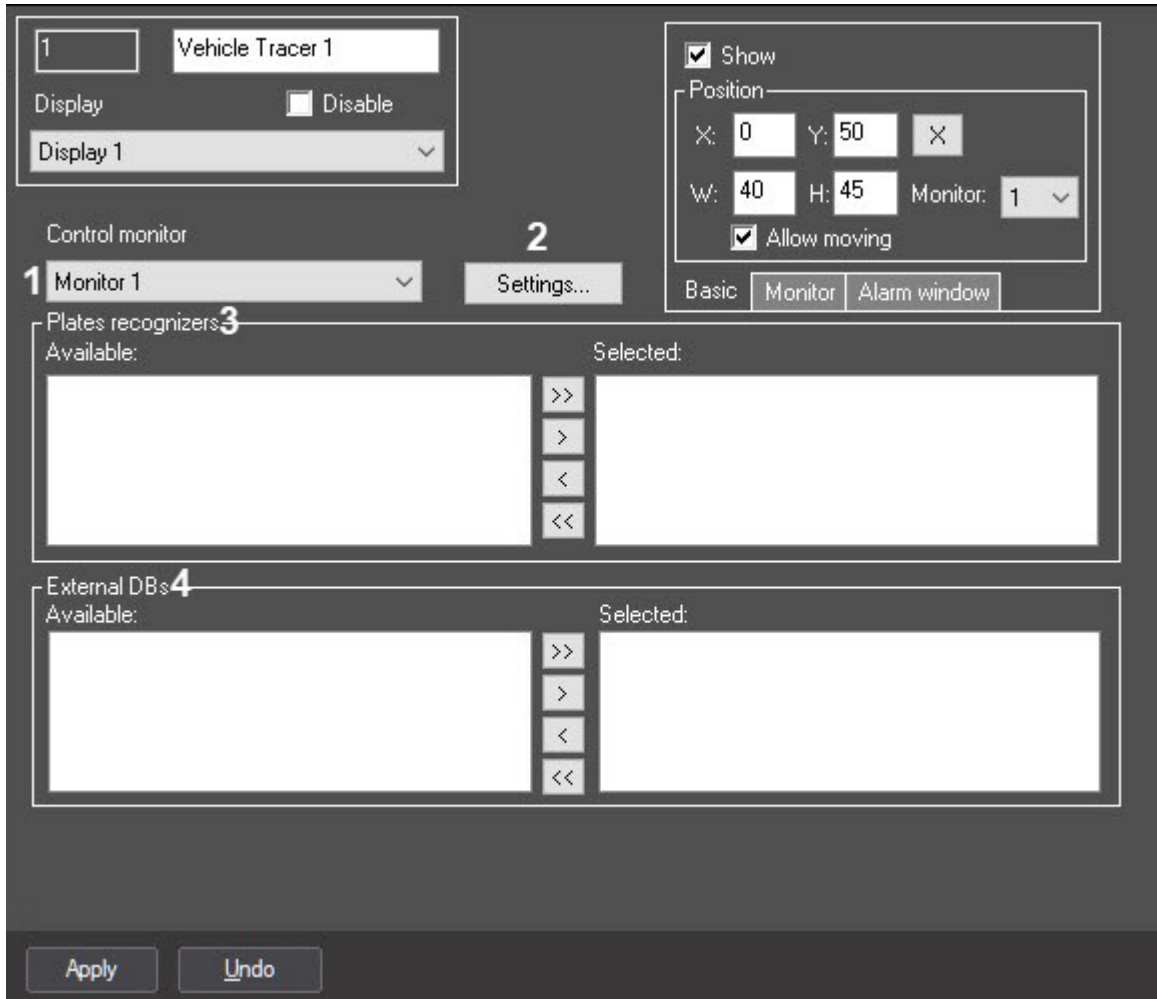
No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
2	Name*	Enter the value in the field	Set the object's name Vehicle processor in the system	Latin, Cyrillic and special symbols	Vehicle's processor	A sting, containing a sequence of characters (letters, digits, characters) non case-sensitive. Number of characters if from 1 to 60
3	Disable	Is set by a checkbox	Set the Vehicle processor object state (enabled or disabled) in the system	Boolean type	No	Yes – Vehicle processor object is disabled and is not in use. No – Vehicle processor object is enabled and in use
4	Computer	Select the value from the list	Set the Computer parent object in the system, to which Vehicle processor object is related	Names of objects, registered in the system Computer	Name of the parent object Computer	Depends on the Computer objects number in the system
5	Virtual loop	Is set by a checkbox	Enables the mode that is resulted in retranslation of messages about vehicle's passing in or out of the detection zone	Boolean type	No	Yes – Virtual loop imitation mode is enabled. No – Virtual loop imitation mode is disabled
6	Collect data	Is set by a checkbox	Enables the mode that is resulted in traffic data acquisition and storing them to the database	Boolean type	No	Yes – traffic data acquisition mode is enabled. No – traffic data acquisition mode is disabled

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
7	Register incidents	Is set by a checkbox	Enables the mode that is resulted in accidents fixation in the traffic stream	Boolean type	No	Yes – accidents fixation mode is enabled. No – accidents fixation mode is disabled
8	Vehicle detection	Select the value from the list	Set the module <i>Vehicle detector</i> which data have to be processed	Names of objects, registered in the system Vehicle detector	-	Depends on the Vehicle detector objects number, registered in the system
9	Vacant lane speed, km/h	Enter the value in the field	Set the Free stream speed constant which is to be entered in the database in case when at least 5 vehicles have entered the detection zone for the data acquisition time	Number. Speed in km/h	-	From 0 to 200
10	Data collection time, s	Enter the value in the field	Set the Data acquisition time, coming from vehicle detector module. Upon the end of this time validity the data are stored in the database	Number. Time in seconds	-	From 60 to 3600
11	Classification setup	Press the button	Access to Classification settings of detected vehicles	-	-	-

*The element name is not displayed in the settings panel.

6.1.8 The Vehicle Tracer object settings panel

The following table describes the elements of the **Vehicle Tracer** object settings panel.

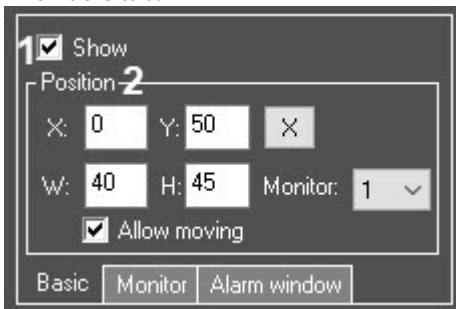


No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Control monitor	Select from the list	Set the Monitor interface object to play back the video archive from the LP recognition camera upon the command from the Vehicle Tracer window	Names of Monitor objects, registered in the system	-	Depends on the number of Monitor objects, registered in the system

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
3	Settings	Click the button	Access to The Vehicle Tracer interface and also to the voice notification settings while registering the alarms: overspeeding, identification of the plate in the external database	-	-	-
Plates recognizers group						
3	Available	Automatically	Displays the list of LP recognizers servers, available for displaying in the Vehicle Tracer interface window	-	-	-
	Selected	Automatically	Displays the list of LP recognizers servers, displayed in the Vehicle Tracer interface window	-	-	-
	Buttons >, <, >>, <<	Click the button	Selection of LP recognizers servers, to be displayed in the Vehicle Tracer interface window	-	-	-
External databases group						
4	Available	Automatically	Displays the list of External Plates databases, that may be used for the identified objects analysis	-	-	-
	Selected	Automatically	Displays the list of External Plates databases, selected for the identified objects analysis	-	-	-

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Buttons >, <, >>, <<	Click the button	Selection of Plates databases for the identified objects analysis	-	-	-


The **Basic** tab:



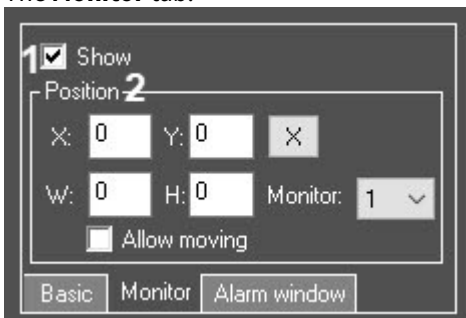
No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Show	Is set with a checkbox	Displays the Active monitor component on the screen	Boolean type	No	Yes – Active monitor components is displayed on the screen. No – Active monitor components is not displayed on the screen


Coordinates group on the **Basic** tab

2	Field X	Enter the value in the field	Set the horizontal coordinate of the X axis of the Active monitor's component left upper corner on the screen	% regarding the screen's width	-	From 0 to M*100, where M is the number of installed video surveillance monitors
---	----------------	------------------------------	---	--------------------------------	---	---

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Field Y	Enter the value in the field	Set the vertical coordinate of the Y axis of the Active monitor's component left upper corner on the screen	% regarding the screen's height		From 0 to M*100, where M is the number of installed video surveillance monitors
	Field W	Enter the value in the field	Set the width of the Active monitor's component	% regarding the screen's width	-	From 70 to M*100, where M is the number of installed video surveillance monitors
	Field H	Enter the value in the field	Set the height of the Active monitor's component	% regarding the screen's height	-	From 39 to M*100, where M is the number of installed video surveillance monitors
	Button 	Click the button	Entering the text window for visual setting the coordinates and sizes of the Active monitor's component	-	-	-
	Allow moving	Is set with a checkbox	Enables moving the Active monitor's component	Boolean type	No	Yes – moving is permitted. No – moving is unavailable

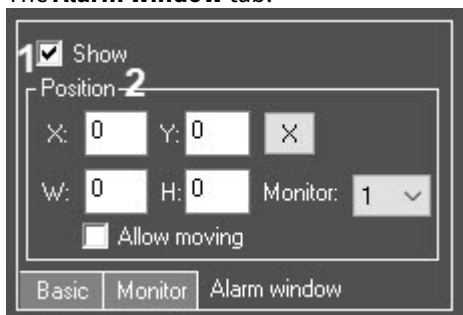
The **Monitor** tab:



No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Show	Is set with a checkbox	Displays the Events monitor component on the screen	Boolean type	No	Yes – the Events monitor component is displayed on the screen No – the Events monitor component is not displayed on the screen
Position group on the Monitor tab						
2	Field X	Enter the value in the field	Set the horizontal coordinate of the X axis of the Events monitor 's component left upper corner on the screen	% regarding the screen's width	-	From 0 to M*100, where M is the number of installed video surveillance monitors
	Field Y	Enter the value in the field	Set the vertical coordinate of the Y axis of the Events monitor 's component left upper corner on the screen	% regarding the screen's height	-	From 0 to M*100, where M is the number of installed video surveillance monitors
	Field W	Enter the value in the field	Set the width of the Events monitor 's component	% regarding the screen's width	-	From 0 to M*100, where M is the number of installed video surveillance monitors
	Field H	Enter the value in the field	Set the height of the Active monitor 's component	% regarding the screen's height	-	From 0 to M*100, where M is the number of installed video surveillance monitors
	Button 	Click the button	Entering the text window for visual setting the coordinates and sizes of the Events monitor 's component	-	-	-

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Allow moving	Is set with a checkbox	Set the possibility of moving the Events monitor 's component	Boolean type	No	Yes – moving is permitted. No – moving is unavailable


The **Alarm window** tab:



No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Show	Is set with a checkbox	Displays the Alarm window component on the screen	Boolean type	No	Yes – the Alarm window component is displayed on the screen. No – the Alarm window component is not displayed on the screen

Position group on the **Alarm window** tab

2	Field X	Enter the value in the field	Set the horizontal coordinate of the X axis of the Active monitor 's component left upper corner on the screen	% regarding the screen's width	-	From 0 to M*100, where M is the number of installed video surveillance monitors
	Field Y	Enter the value in the field	Set the vertical coordinate of the Y axis of the Active monitor 's component left upper corner on the screen	% regarding the screen's height		From 0 to M*100, where M is the number of installed video surveillance monitors

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Field W	Enter the value in the field	Set the width of the Active monitor's component	% regarding the screen's width	-	From 70 to M*100, where M is the number of installed video surveillance monitors
	Field H	Enter the value in the field	Set the height of the Active monitor's component	% regarding the screen's height	-	From 39 to M*100, where M is the number of installed video surveillance monitors
	Button 	Click the button	Entering the text window for visual setting the coordinates and sizes of the Active monitor's component	-	-	-
	Allow moving	Is set with a checkbox	Enables moving the Alarm window's component	Boolean type	No	Yes – moving is permitted. No – moving is unavailable

6.1.9 The ARENA module object settings panel

The **ARENA Module** object settings panel contains the following interface elements:

The screenshot shows the configuration interface for an ARENA module. It features a dropdown menu for selecting the module (currently 'ARENA module 1') and another for the LPR channel ('LPR channel 1'). Below these are seven numbered input fields: 1. IP address (127.0.0.1), 2. FTP port (21), 3. TCP/IP port (6408), 4. Login (anonymous), 5. Password (anonymous), 6. Frames polling interval in milliseconds (1000), and 7. Alarm on speed limit in km/h (80). The interface concludes with 'Apply' and 'Undo' buttons.

The following table describes the elements of the **ARENA Module** object settings panel.

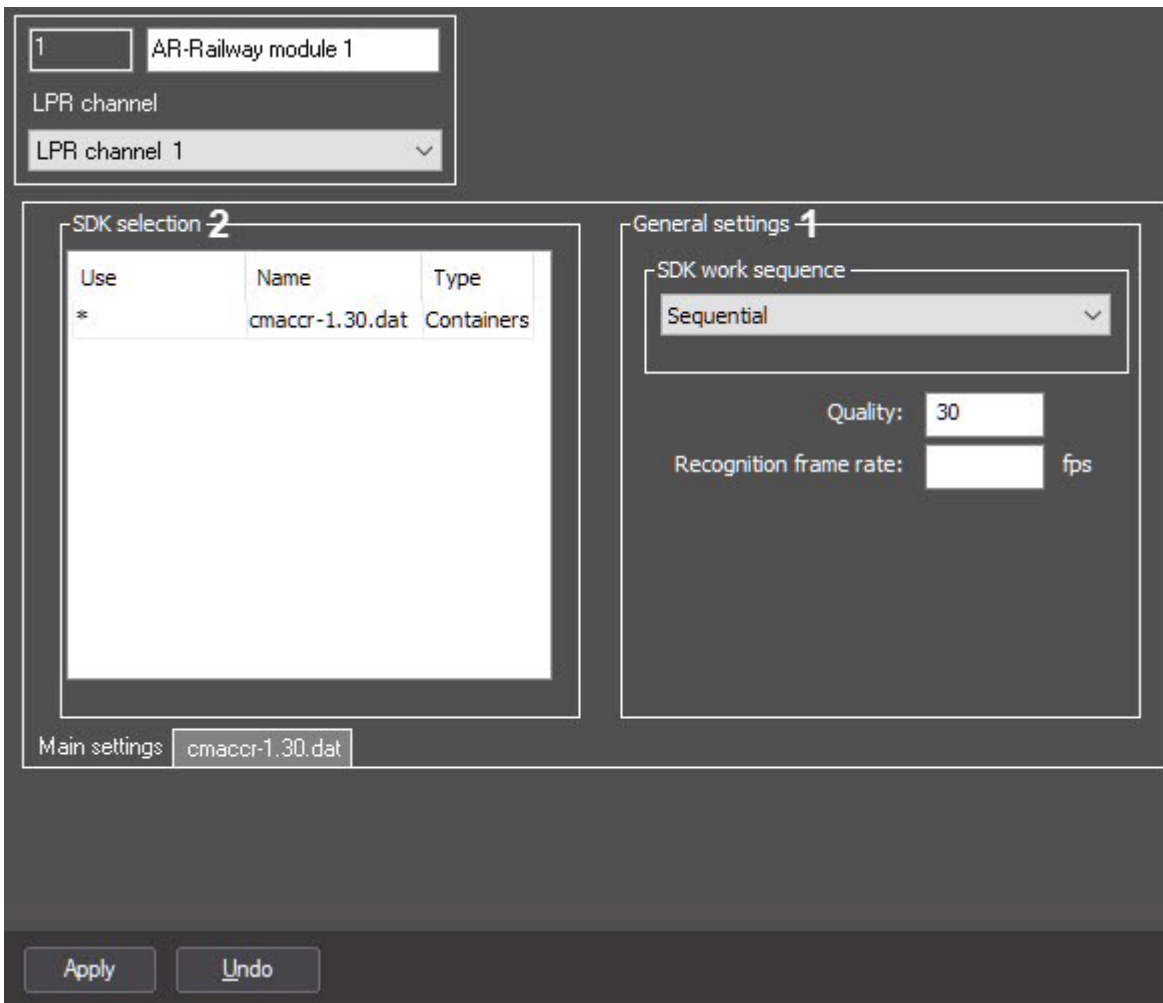
No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	IP address field	Setting the value in the field	Set IP address of network device	Natural number series	127.0.0.1	Expression: xxx.xxx.xxx.xxx. consists values from 0.0.0.0 to 255.255.255.255 depending on network settings that are registered in IP devices system
2	FTP port field	Setting the value in the field	Set connecting port to FTP-server	Whole nonnegative number	21	Depending on system configuration

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
3	TCP/IP port field	Setting the value in the field	Set connecting port to FTP-server	Whole nonnegative number	6408	Depending on system configuration
4	Login field	Setting the value in the field	Set user name for connecting to FTP-server	Roman alphabet Cyrillic alphabet and service digits	anonymous	Line consisting sequence of any symbols (letters, figures, service digits) taking into account register. Number of symbols is from 1 to 60
5	Password field	Setting the value in the field	Set user password that is used for connecting to FTP-server	Roman alphabet Cyrillic alphabet and service digits	anonymous	Line consisting sequence of any symbols (letters, figures, service digits) taking into account register. Number of symbols is from 1 to 60
6	Frames polling interval, ms field	Setting the value in the field	Set time between two logical queries in <i>Auto PSIM PC</i> for downloading photos from Arena	Millisecond	1000	0-20000
7	Alarm on speed limit, km/h field	Setting the value in the field	Setting maximum allowed vehicle rate of movement	Km/h	80	No restrictions

6.1.10 The AR-Railway module object settings panel

The **AR-Railway module** object settings panel contains the following interface elements.

The **Main settings** tab:



The following table describes the elements of the **AR-Railway module** object settings panel.

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	The General settings group					
	SDK work sequence	Select the value from the list	Sets the work sequence of SDKs	-	Sequential	Sequential —the SDKs work sequentially Parallel —the SDKs work in parallel

№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Quality	Enter the value in the text field	Sets the image quality of the carriage numbers, starting from which the numbers will be recognized. The value is determined experimentally	Percent	60	>=0
	Recognition frame rate, fps	Enter the value in the text field	Sets the number of the frames per second processed by the recognizer. If you enter 0 or leave the field blank, the recognizer will process the maximum possible number of frames	FPS	-	>=0
2	The SDK selection table					
	Use	Click the mouse button	Determines if the corresponding SDK is going to be used for recognition	List	-	-
	Name	Automatically	The SDK name	List	-	-
	Type	Automatically	The SDK type of recognition	List	-	-

The SDK tab:

The screenshot shows the SDK tab interface for 'AR-Railway module 1'. It features a title bar with a tab index '1' and the module name. Below the title bar is an 'LPR channel' dropdown menu currently set to 'LPR channel 1'. The main configuration area is divided into several sections:

- Symbol height 1:** Contains three input fields: 'Minimum' (28), 'Average' (32), and 'Maximum' (40), each with a small 'X' icon to its right.
- Symbol inclination 2:** Contains three input fields: 'Average (%)' (-2), 'Minimum (%)' (-30), and 'Maximum (%)' (21).
- Advanced settings 3:** Contains four input fields: 'Slope (%)' (1), 'Min.contrast' (15), 'X in Y (%)' (100), and 'Delay' (1000).
- Filters 4:** Contains three checkboxes: 'ISO filter' (checked), 'Long code filter' (checked), and 'Checksum test' (unchecked).

At the bottom of the configuration area, there is a 'Main settings' field containing the file path 'cmaccr-1.30.dat'. Below this are two buttons: 'Apply' and 'Undo'.

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	The Symbol height group					
	Minimum	Enter the value in the text field	Sets the minimum height of the carriage number symbol in the video image from the camera	Pixels	28	≥ 0
	Average	Enter the value in the text field	Sets the average height of the carriage number symbol in the video image from the camera	Pixels	32	≥ 0

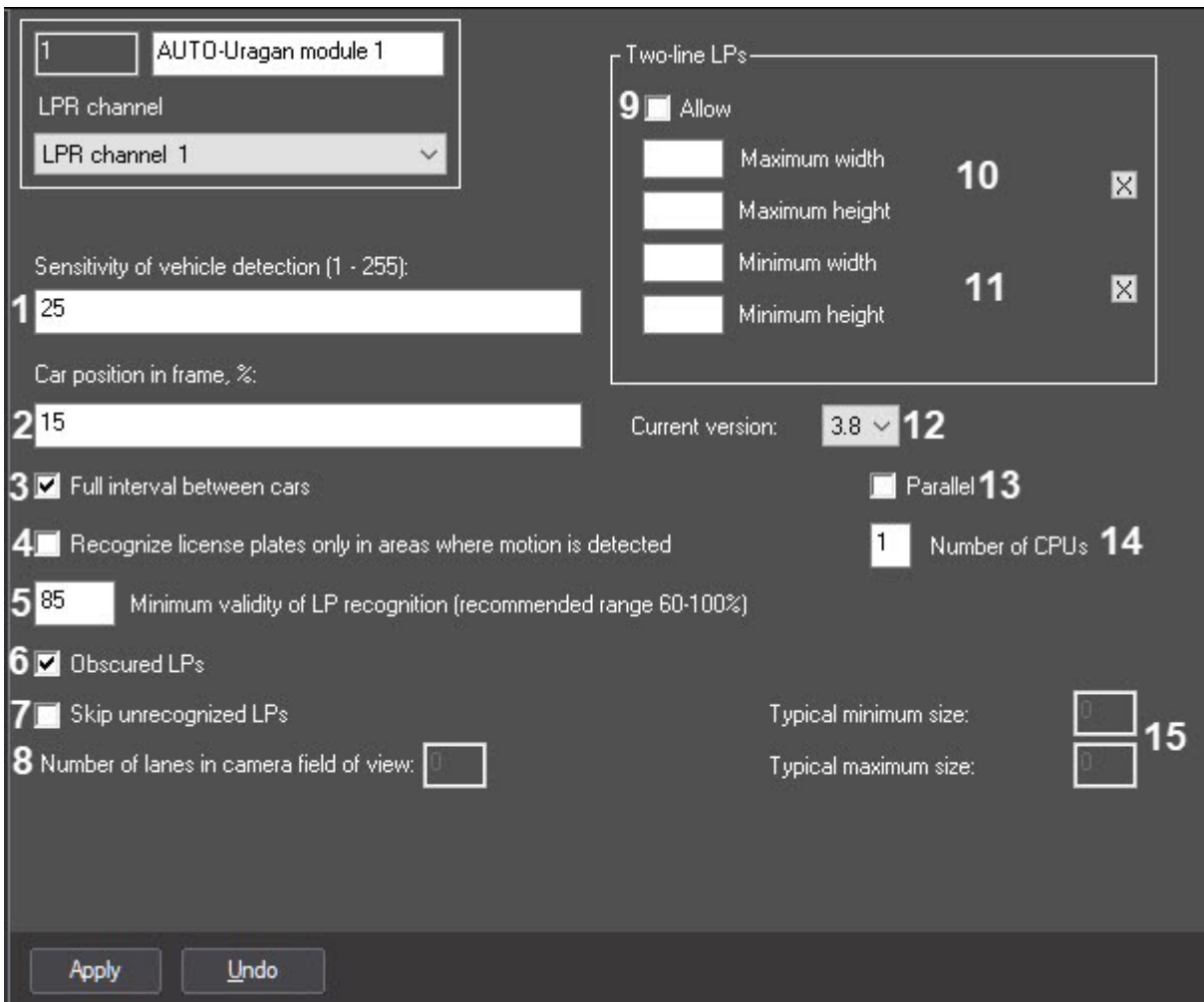
№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Maximum	Enter the value in the text field	Sets the maximum height of the carriage number symbol in the video image from the camera	Pixels	40	>=0
2	The Symbol inclination group					
	Average (%)	Enter the value in the text field	Sets the average inclination of the symbol. The value is positive if the horizontal axis of the LP symbols is tilted down when viewed from left to right, and negative if this axis is tilted up	Percent	-2	<=>0
	Minimum (%)	Enter the value in the text field	Sets the minimum inclination of the symbol. The value is positive if the horizontal axis of the LP symbols is tilted down when viewed from left to right, and negative if this axis is tilted up	Percent	-30	<=>0
	Maximum (%)	Enter the value in the text field	Sets the maximum inclination of the symbol. The value is positive if the horizontal axis of the LP symbols is tilted down when viewed from left to right, and negative if this axis is tilted up	Percent	21	<=>0
3	The Advanced settings group					

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Slope (%)	Enter the value in the text field	Sets the slope of the carriage number in relation to the video image received from the camera. The value is positive if the horizontal axis of the LP symbols is tilted down when viewed from left to right, and negative if this axis is tilted up	Percent	1	<=>0
	Min. contrast	Enter the value in the text field	Sets the estimated difference between the shades of gray of the LP symbols and the background	Shades of gray	15	>=0
	X in Y (%)	Enter the value in the text field	Sets the ratio of the horizontal and vertical symbol resolution. The horizontal resolution is the ratio of the symbol width on the video image to its actual width, and the vertical resolution is the ratio of the symbol height on the video image to its real height. If you enter zero or a negative value, then the value will automatically changed to 100	Percent	100	>=0
	Delay	Enter the value in the text field	Sets the time interval in milliseconds that should expire in order for the recognition module to display the next number recognition result. A value of zero means no delay	Milliseconds	1000	>=0
4	The Filters group					

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	ISO filter	Set the checkbox	Enables the ISO carriage numbers filtering. When reading a number that consists of 11 symbols, the recognition module will attempt to read the ISO code (examples of ISO codes: GB4310, 22G1)	-	Set	Set—the filtering is enabled Clear—the filtering is disabled
	Long code filter	Set the checkbox	Enables the long numbers filtering. If the video image does not contain the carriage number, but contains some other text, the recognition module can display a false carriage number. The long numbers filtering reduces the likelihood of the false codes appearing, increases the runtime (by about 5%), and degrades the recognition of the carriage codes on the images with a carriage code (by about 0.5%)	-	Set	Set—the filtering is enabled Clear—the filtering is disabled
	Checksum test	Set the checkbox	Enables the testing of the checksum of the numbers	-	Clear	Set—the testing is enabled Clear—the testing is disabled

6.1.11 The AUTO-Urgan module object settings panel

The **AUTO-Urgan module** object settings panel contains the following interface elements:



The following table describes the elements of the **AUTO-Uragan module** object settings panel.

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Sensitivity of vehicle detection (1-255) field	Setting the value in the field	Set detector sensitivity to picture contrast of the car	Lux	25	1-255
2	Car position in frame, % field	Setting the value in the field	Set car position in frame between the moments of car appearance and disappearance from the frame	% regarding the frame	15	0-100

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
3	Full interval between cars checkbox	Setting check box	Switch recognizer to waiting mode of motion absence all over the frame	Boolean type	No	Yes – recognizer is in waiting mode of motion absence all over the frame. No – recognizer is not in waiting mode of motion absence all over the frame
4	Recognize license plates only in areas where motion is detected checkbox	Setting check box	Switch recognizer into the mode in which the plate recognizing is performed only in areas where motions was detected	Boolean type	No	Yes – recognizer works with those areas where the motion was detected. No – recognizer works with all frame areas
5	Minimum validity of LP recognition (recommended range 60-100%) field	Setting the value in the field	Set the minimal allowed validity of LP recognition	Integer non-negative number	85	60-100
6	Obscured LPs checkbox	Setting check box	Enable the possibility of obscured LP recognition	Boolean type	No	Yes – recognition of cars with obscured plates is enabled. No – recognition of cars with obscured plates is disabled
7	Skip unrecognized LPs checkbox	Setting check box	Enable the ignoring of unrecognized LP numbers	Boolean type	No	Yes – unrecognized LP numbers are ignored. No – unrecognized LP numbers are not ignored

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
8	Number of lanes in camera field of view	Non-edited field	Displays the number of lanes in camera field of view	Integer non-negative number	-	-
9	Allow	Setting check box	Enable the possibility of two-lines license plates recognizing	Boolean type	No	Yes – two-lines LPs are recognized. No – two-lines LPs are not recognized
10	Maximal width	Setting the value in the field	Maximal width of the two-lines license plates	% regarding the frame	-	Unlimited
	Maximal height	Setting the value in the field	Maximal height of the two-lines license plates	% regarding the frame	-	Unlimited
	Button 	Click the button	Access to the interactive interface of setting the area width and height of two-lines license plates	-	-	-
11	Minimal width	Setting the value in the field	Minimal width of the two-lines license plates	% regarding the frame	-	Unlimited
	Minimal height	Setting the value in the field	Minimal height of the two-lines license plates	% regarding the frame	-	Unlimited
	Button 	Click the button	Access to the interactive interface of setting the area width and height of two-lines license plates	-	-	-

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
12	Current version	Drop-down list	Select the SDK version which is being used	Selecting the value from the drop-down list	3.7	3.5, 3.7
13	Parallel	Setting check box	Enable the LP numbers recognition simultaneously on several processors using parallel computing, which improves the performance of the <i>AUTO-Uragan</i> module	Boolean type	No	Yes – parallel computing is enabled. No – parallel computing is disabled
14	Number of CPUs	Setting the value in the field	Displays the number of processors which will be used for the parallel computing, if the Parallel check box is set	Integer non-negative number	1	>0
15	Typical minimum size	Non-edited field	Displays the typical minimum size of license plate	Integer non-negative number	-	-
	Typical maximum size	Non-edited field	Displays the typical maximum size of license plate	Integer non-negative number	-	-

6.1.12 The AR-Auto module object settings panel

AR-Auto module object settings panel contains the following interface elements:

1 AR-Auto module 1

LPR channel

LPR channel 1

Recognition frame rate: 3 fps

1 2 Minimum validity of LP type recognition

2 - LP delimiter

Apply Undo

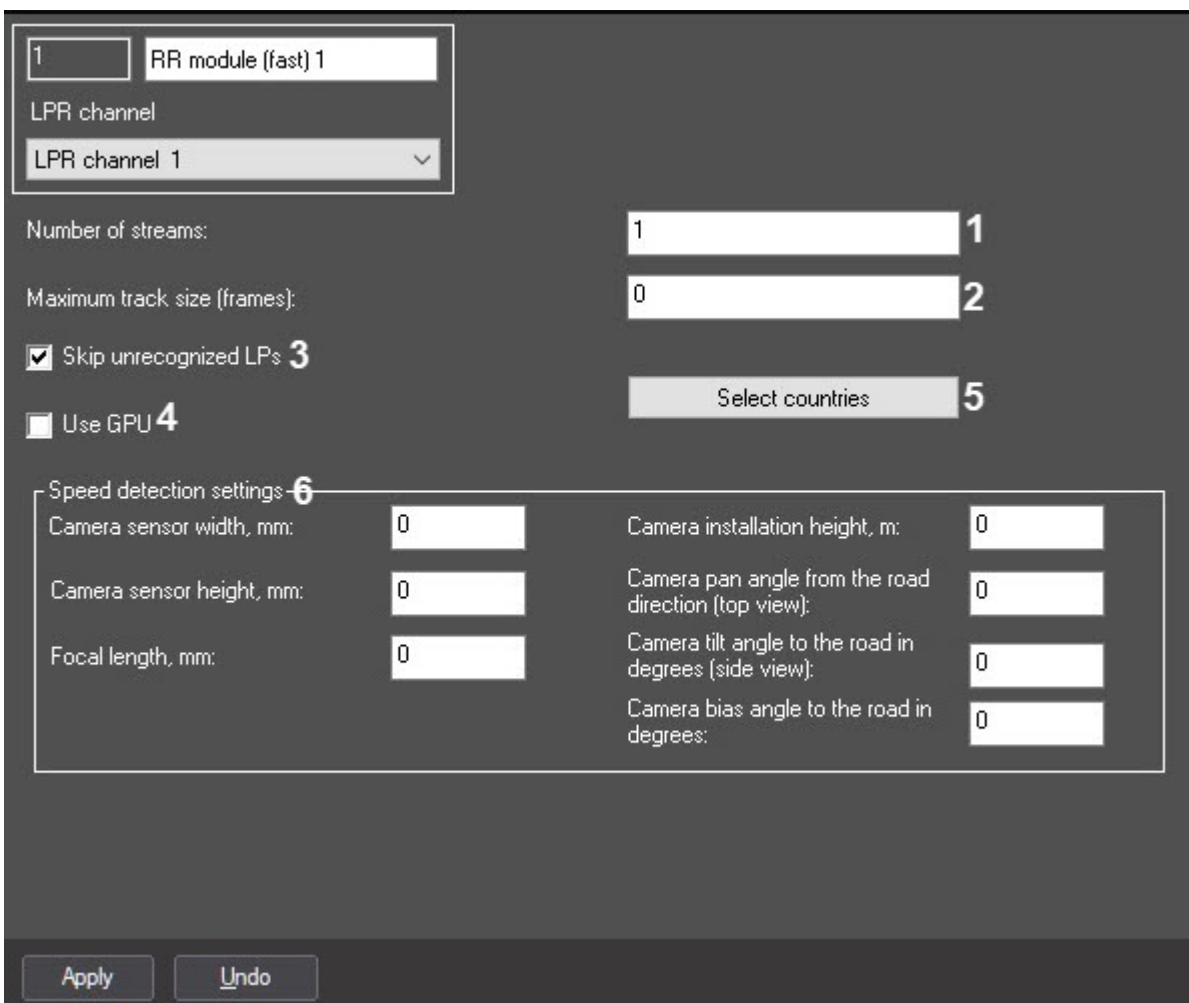
The following table describes the elements of the **AR-Auto module** object settings panel.

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Minimum validity of LP type recognition field	Setting the value in the field	Set the minimal allowed validity of LP recognition	Integer non-negative number	2	1-100
2	LP delimiter field	Setting the value in the field	Set delimiter in recognized license plates	-	-	-

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
3	Recognition frame rate, fps field	Setting the value in the field	Set the number of frames per second processed by the recognizer. If you enter 0 or leave the field empty, the recognizer will process the maximum possible number of frames	Integer non-negative number	-	>=0

6.1.13 The RR module object settings panel

The **RR module** object settings panel contains the following interface elements.



The following table describes the elements of the **RR module** object settings panel.

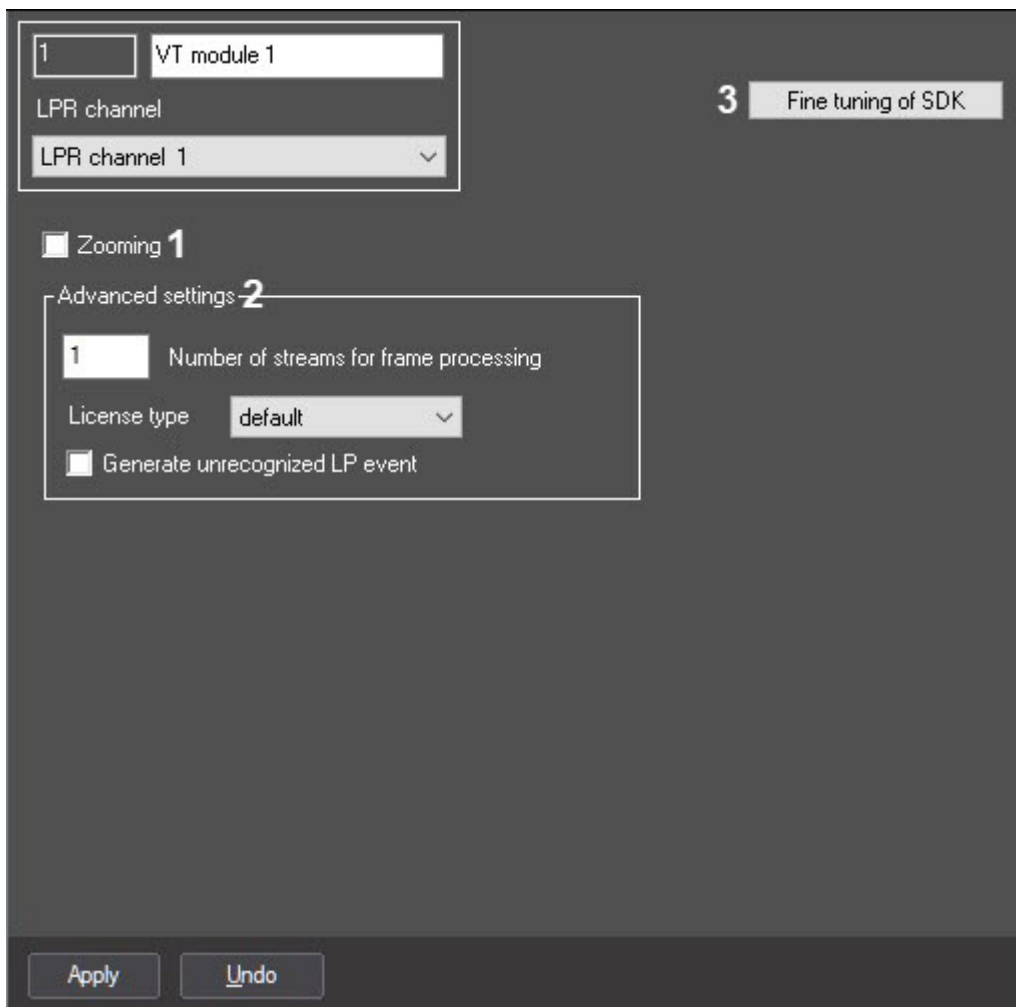
№	Parameter name	Parameter setting method	Description	Default value	Value range
1	Number of streams field	Enter the value in the text field	Sets the number of streams that the <i>RR</i> SDK will use in parallel computations. A value of 0 disables the calculating process paralleling for the license plate recognition	0	>=0
2	Maximum track size (frames) field	Enter the value in the text field	Sets the maximum number of frames for one track that will be processed by the <i>RR</i> SDK (the smaller the value, the faster the recognition result will be given, but it will also be less accurate). The default value is 0 – the number of frames is not limited	0	>=0
3	Skip unrecognized LPs checkbox	Check the box	Enables/disables ignoring the vehicles with unrecognized LP numbers	Yes	Yes – vehicles with unrecognized license plates are skipped. No – vehicles with unrecognized license plates are displayed

№	Parameter name	Parameter setting method	Description	Default value	Value range
4	Use GPU checkbox	Check the box	Enables the use of GPU (graphics processing unit) computing resources to improve the license plate recognition performance	No	<p>Checkbox is set – the GPU computing resources are used to increase the performance of license plate recognition .</p> <p>Checkbox is not set – the CPU (central processing unit) computing resources are used</p>
5	Select countries button	Click the button	Opens the Country selection window with a list of additional countries whose LP numbers can be recognized	-	-
Speed detection settings group					
6	Camera sensor width, mm field	Enter the value in the text field	Sets the camera sensor width in millimeters	0	>=0
	Camera sensor height, mm field	Enter the value in the text field	Sets the camera sensor height in millimeters	0	>=0
	Focal length, mm field	Enter the value in the text field	Sets the focal length in millimeters	0	>=0

No	Parameter name	Parameter setting method	Description	Default value	Value range
	Camera installation height, m field	Enter the value in the text field	Sets the camera installation height in meters	0	≥ 0
	Camera pan angle from the road direction (top view) field	Enter the value in the text field	Sets the camera pan angle from the road direction (top view)	0	≥ 0
	Camera tilt angle to the road in degrees (side view) field	Enter the value in the text field	Sets the camera tilt angle to the road in degrees (side view)	0	≥ 0
	Camera bias angle to the road in degrees field	Enter the value in the text field	Sets the camera bias angle to the road in degrees	0	≥ 0

6.1.14 The settings panel of the VT module object

The settings panel of the **VT module** object contains the following interface elements:



Parameters of the **VT module** object are described in the table.

No	Parameter name	Method for setting the parameter value	Description	Representation	Default value	Value range
1	Zooming	Set the checkbox	Reduces the frame size during recognition depending on the value of the Zone width parameter	Boolean type	Clear	Set—the frame size is reduced during recognition Clear—the frame size isn't reduced during recognition
2	The Advanced settings group					

No	Parameter name	Method for setting the parameter value	Description	Representation	Default value	Value range
	Number of streams for frame processing	Enter the value in the field	Sets the maximum recognition streams. We don't recommend using more than two streams	Non-negative integer	1	0-255
	License type	Select the value from the drop-down list	Sets the used license type	List of license types	default	<ul style="list-style-type: none"> • default—the license type is determined automatically • fast (25 FPS) • slow (6 FPS)
	Generate unrecognized LP event	Set the checkbox	Enables the generation of the NOT DETECTED event for vehicles whose license plates could not be recognized	Boolean type	Clear	Set—if the license plate is unrecognized, the corresponding event is generated Clear—if the license plate is unrecognized, then such a vehicle is ignored
3	Fine tuning of SDK	Click the button	Opens the Fine tuning of SDK (see the table below)	NA	NA	NA

 **Attention!**

You must perform fine-tuning of the SDK only with the help of AxonSoft specialists!
Parameter values that are not specified in this table must not be changed!

Parameter	Description
VodiCTL_VPW_PLATE_RATIO_TYPE	Information about how much the initial image is reduced or increased in height. The default value is 0 . There are three options available: <ol style="list-style-type: none"> 1. No distortions 2. Automatically depending on the image size 3. User value

VodiCTL_VPW_IMAGE_THRESHOLD	Base level of image thresholding. The default value is 40
VodiCTL_VPW_IMAGE_BLUR	The parameter for internal use. The recommended value is 13
VodiCTL_VPW_PLATE_EXTRA_ANGLE_ANALYSE	Enable/disable the angle analysis algorithm of the license plate image. The default value is True
VodiCTL_VPW_PLATE_EXTRA_RANGES_ANALYSE	Enable/disable the algorithm of a thorough search for license plate candidates
VodiCTL_VPW_PLATE_STAR_MAX	Maximum unrecognized characters on the license plate at which the result will still be considered the result of the recognition of the license plate
VodiCTL_VPW_PLATE_PROBABILITY_MIN	Minimum percentage of similarity between the recognition result and the corresponding license plate template at which this result can be considered the result of the recognition of the license plate. Using this parameter, the results obtained are filtered according to the authenticity
VodiCTL_VPW_PLATE_FILTER_ROFACTOR	The license plate filter coefficient by the so-called image density—ratio of white pixels to total pixels (first strategy). The type is unsigned. This coefficient is used for image thresholding and has the optimal values, which are determined by AutoSDK developers using their own test samples. The parameter is considered as a service one, and its value must be set according to the recommendations of technical support specialists
VodiCTL_VPW_PLATE_FILTER_RODROFFACTOR	The license plate filter coefficient by the so-called image density—ratio of white pixels to total pixels (second strategy). The type is unsigned. This coefficient is used for image thresholding and has the optimal values, which are determined by AutoSDK developers using their own test samples. The parameter is considered as a service one, and its value must be set according to the recommendations of technical support specialists
VodiCTL_VPW_PLATE_FILTER_SYMCOUNT	Enable/disable the algorithm of simple license plates filter by the minimum number of recognized characters on them. If the algorithm is enabled (the value of the parameter is greater than 0), the base search for characters on the license plate candidate (geometry, proportions) is performed. If fewer characters are recognized on the license plate candidate than specified in this parameter, this license plate candidate is not considered a license plate. That is, the value of this parameter is the minimum characters that must be present on the license plate candidate when the basic algorithm is used
VodiCTL_VPW_LOG_SETTINGS	Enable/disable logging of all recognition parameters

VodiCTL_VPW_PLATE_PRECISE_ANALYSE	Enable/disable precise image analysis. It increases the quality of recognition under adverse conditions (for example, if the characteristics/settings of the camera do not fully meet the requirements or in bad weather). It increases the processing time of the frame by 20-30%, depending on its size. Under normal conditions, this parameter does not affect the quality of recognition
VodiCTL_VPW_DYNAMIC_ENABLE	Enable/disable dynamics of license plate recognition (by default, the dynamics is enabled). If the value is True , then tracking is enabled, and the license plate is recognized by the set of frames. If the value is False , then tracking is disabled, and the license plate is recognized by each frame separately without taking to account the previous ones, and the quality can vary from 0% to 100%
VodiCTL_VPW_DYNAMIC_OUTPUT_FRAMECOUNT	Number of frames required to display a license plate. The default value is 0. This is necessary, but not sufficient, for the first output of the result. This condition delays displaying from the first moment of recognition of the license plate in dynamics. The setting is designed to improve authenticity of the results, as well as to hide possible false events
VodiCTL_VPW_DYNAMIC_WITH_DUPLICATE	Enable/disable the periodic output of license plate recognition results
VodiCTL_VPW_DYNAMIC_OUTPUT_TIMEOUT	The minimum time required to monitor the license plate (in milliseconds) before displaying the recognition result to the user. This parameter can only be used when the “Dynamic” mode is on. In this mode, the track of the vehicle is monitored, and the user does not immediately receive the recognition result of the license plate, but after the time specified for this setting. In this case, the first recognition result will be replaced by the result of higher quality and subsequently displayed to the user. If parameter 0 is set for this value, the user gets the first result of recognizing the detected license plate. After the time specified in this parameter expires, the monitoring of the track of the license plate continues until it disappears from the frame
VodiCTL_VPW_DYNAMIC_OUTPUT_PERIOD	Time period (in milliseconds) over which the recognition result must be displayed to the user. This parameter can be used only if the VodiCTL_VPW_DYNAMIC_WITH_DUPLICATE parameter is set
VodiCTL_VPW_DYNAMIC_DURATION_WITHOUT_ACCESS	Maximum permissible absence time of the license plate in the monitoring area (in milliseconds). After this time, the license plate is considered lost and is displayed to the user with the set checkbox VodiF_RESULT_LOST
VodiCTL_VPW_DYNAMIC_COMPARABLE_TIME_MAX	Time interval (in milliseconds) that affects the algorithm for comparing the preliminary recognition results. That is, if the results fall within a given interval and the geometric distance between the license plates is small compared to the license plates size, then it is considered to be the same object

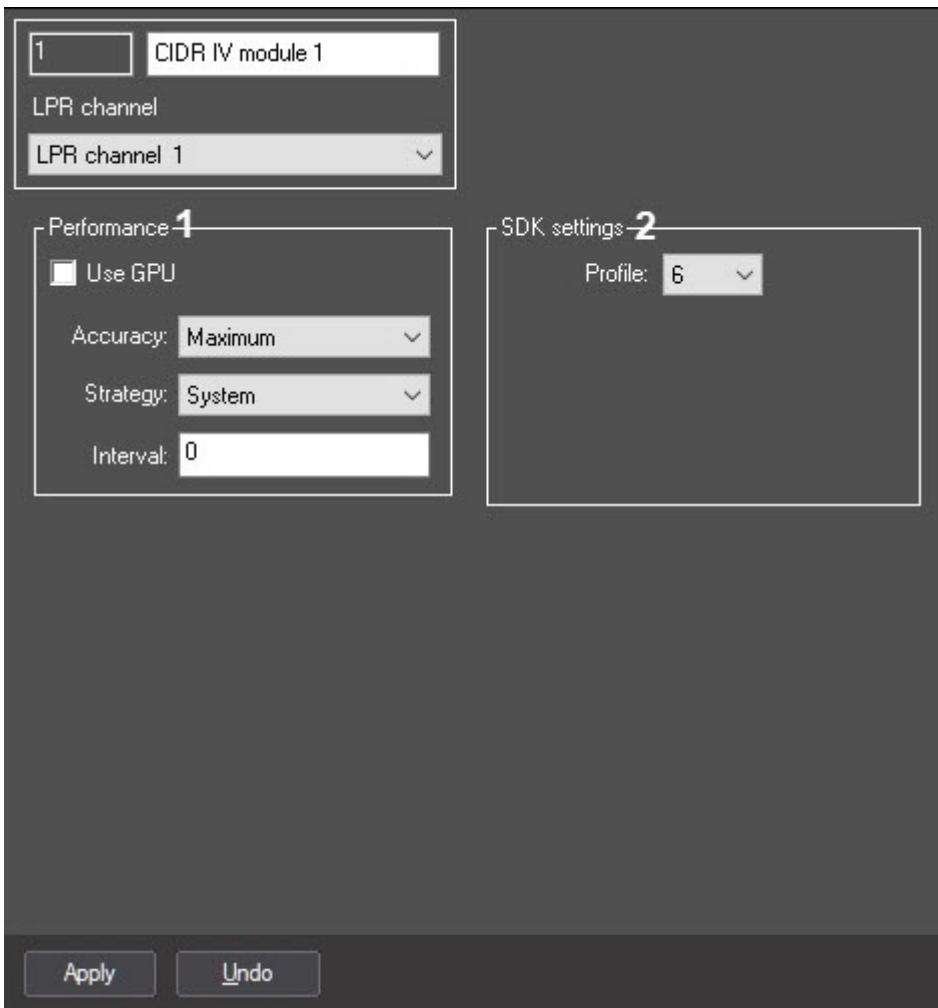
VodiCTL_VPW_DNN_DEVICES	<p>A list of devices on which the deep neural network (DNN) computations is performed. The set of available devices is defined in the <Vodi/devType.h> file.</p> <p>This parameter can also be set via the Windows environment variable: VPW_DNN_DEVICES={comma-separated list of devices}. For example: CPU, GPU, MYRIA</p>
VodiCTL_VPW_PLATECANDS_METHODS	<p>A variety of methods for obtaining the license plate candidates. Available methods:</p> <ul style="list-style-type: none"> • VodiF_VPW_PLATECANDS_BY_MORPH is an old method • VodiF_VPW_PLATECANDS_BY_DNN is a method based on deep neural networks (DNN) • VodiF_VPW_PLATECANDS_BY_2_DNN is a new method based on deep neural networks (DNN), it is set by default. We recommend using this method. <p>To ensure the operation in the VodiF_VPW_PLATECANDS_BY_2_DNN and VodiF_VPW_PLATECANDS_BY_DNN modes, it is important to correctly set the minimum size of the license plate on the image; the larger it is (for example, from 100 pixels or more), the higher the performance will be.</p> <p>This parameter can also be set via the Windows environment variable: VPW_PLATECANDS_METHODS={number}. For example: 1, 2</p>
VodiCTL_VPW_ANALYSE_LEVEL	<p>The level of the license plate analysis. The following levels of analysis are available:</p> <ul style="list-style-type: none"> • VodiK_VPW_PLATECANDS_ANALYSE—only license plate candidates are found at this level, that is, the rectangles of their areas • VodiK_VPW_SYMCANDS_ANALYSE—the character candidates are also be found at this level, that is, the rectangles of their areas • VodiK_VPW_TEXT_ANALYSE—the complete license plate analysis is performed at this level • VodiK_VPW_TEMPLATE_ANALYSE—the found characters are also recognized at this level. Performs full license plate analysis, set by default

VodiCTL_VPW_PLATE_ANALYSE_METHODS	<p>A variety of methods for analyzing the license plate candidates. Available methods:</p> <ul style="list-style-type: none"> • VodiK_VPW_PLATE_ANALYSE_METHODS_DEFAULT • VodiF_VPW_BLURAN • VodiF_VPW_NAN • VodiF_VPW_TMPLAN • VodiF_VPW_DNNAN • VodiF_VPW_OTSUAN • VodiF_VPW_DNN2AN is a new license plate analysis method based on deep neural networks (DNN). Set by default. We recommend using this method. <p>The VodiF_VPW_DNN2AN VodiF_VPW_BLURAN VodiF_VPW_DNNAN VodiF_VPW_TMPLAN methods provide the highest number of correctly recognized results</p>
VodiCTL_VPW_PLATE_DNN_FILTER_ENABLE	<p>Enable/disable the filtering of license plate candidates by the deep neural network (DNN)</p>
VodiCTL_VPW_TREAT_PLATE_CANDAS_PLATE	<p>Enable/disable the ability to consider each license plate candidate as a license plate. This means that if the analysis of a candidate was unsuccessful for any reason (for example, it was not possible to recognize the license plate), then such a candidate will not be lost, but will be given as a license plate, while some of the information will be missing, namely the <code>pis_plate_variantc</code> will be 0</p>
VPW_RECOGN_OUTSIDE_PLATE_CAND	<p>This Windows environment variable makes it possible to prohibit the analysis of a license plate outside the rectangular area (that is, a license plate candidate) found by the license plate detector. This is an experimental parameter and it can be removed later</p>
VodiCTL_VPW_SEQUENTIAL_FLUSH_ENABLE	<p>Enable/disable the ability to change the behavior of the <code>VodiprincFlush</code> operation. Without this parameter, the operation waits for the completion of the analysis of all frames, then transfers the results to the dynamics (if enabled), accumulates the dynamics results, performs the flush operation for the dynamics and finally returns the accumulated result.</p> <p>With this parameter, the operation waits for the completion of the analysis of the earliest frame, then transfers its result to the dynamics (if enabled) and returns its result. Thus, to get all the results that are still being analyzed, it is necessary to sequentially call the <code>VodiprincFlush</code> operation while it returns the <code>>=BoS_OK</code> status</p>
VodiCTL_VPW_TREAT_SYMBOLS_AS_TEXT	<p>Allows you to interpret recognized characters as text if, for example, there are problems with template recognition or if the recognized license plates don't match known templates</p>
VodiCTL_VPW_DYNAMIC_VELOCITY_MAX	<p>System parameters. It is strongly discouraged to change the default values</p>

VodiCTL_VPW_DYNAMIC_COMPARABLE_SYMBOLS_MIN
VodiCTL_VPW_DYNAMIC_BEFORE_LOST_TRACK_TIME_MAX
VodiCTL_VPW_DYNAMIC_AFTER_LOST_TIME_MAX
VodiCTL_VPW_DYNAMIC_AFTER_LOST_FACTOR
VodiCTL_VPW_DYNAMIC_PLATFORM_LOCATION_MISMATCH_FACTOR
VodiCTL_VPW_DYNAMIC_COMPARABLE_TIME_FACTOR
VodiCTL_VPW_DYNAMIC_PLATFORM_LOCATION_MISMATCH_FACTOR2
VodiCTL_VPW_DYNAMIC_TRACK_LIMIT
VodiCTL_VPW_DYNAMIC_BEFORE_LOST_TRACK_FACTOR

6.1.15 The CIDR IV module object settings panel

The **CIDR IV module** object settings panel contains the following interface elements.



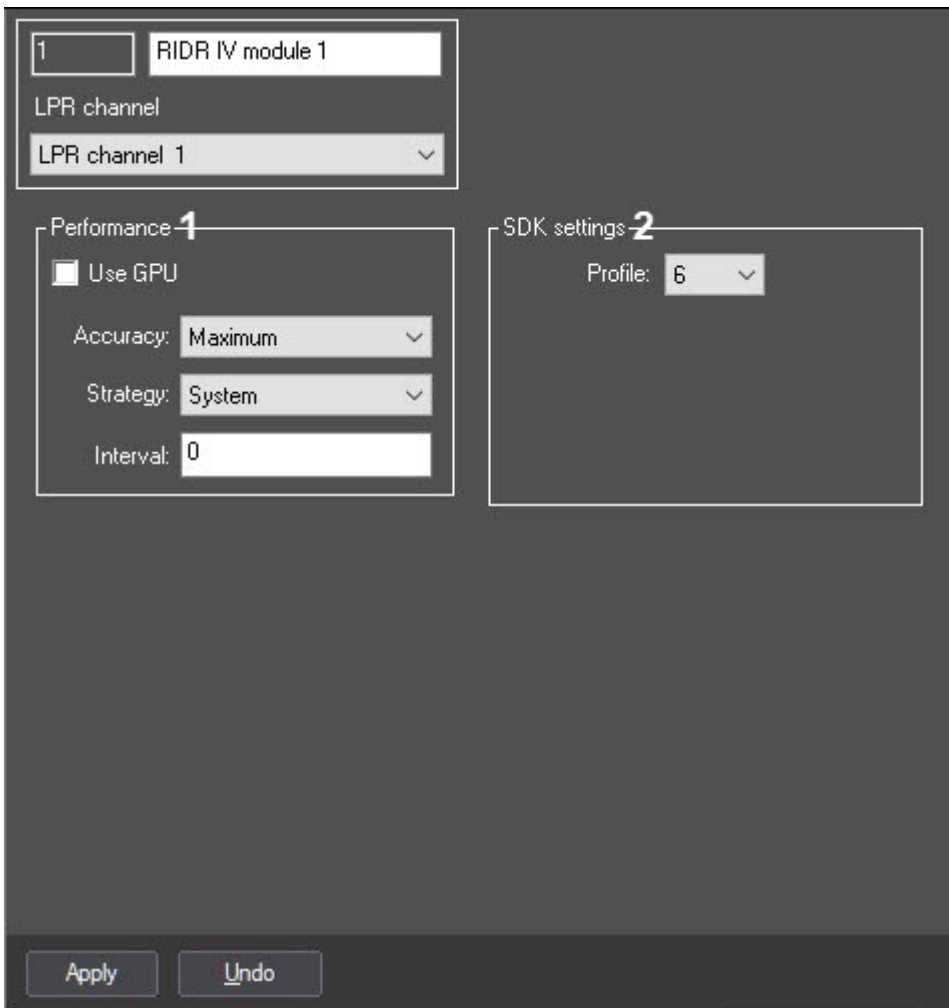
The following table describes the elements of the **CIDR IV module** object settings panel.

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Performance group					
	Use GPU checkbox	Check the box	Enables the use of GPU (graphics processing unit) computing resources to improve the license plate recognition performance	-	-	<ul style="list-style-type: none"> • Checkbox is set – the GPU computing resources are used to increase the performance of license plate recognition. • Checkbox is not set – the CPU (central processing unit) computing resources are used

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Accuracy drop-down list	Selecting the value in the list	Selecting the numbers recognition accuracy	List	Maximum	<ol style="list-style-type: none"> 1. Maximum – enables maximum recognition accuracy, but it causes great CPU and/or GPU load. 2. High – enables high recognition accuracy, it requires less computing resources than for maximum accuracy. 3. Fast – enables high recognition speed, but the accuracy becomes worse
	Strategy drop-down list	Selecting the value in the list	Selecting the computing resources use mode	List	System	<ol style="list-style-type: none"> 1. Process – mild mode: no more than 1 core for 1 license plate. 2. System – default mode: all available computing cores are in use. 3. Core – strict mode: 1 core per stream
	Interval field	Enter the value in the text field	Specifying the minimum time interval lasting between the frames processing (i.e. all frames within this interval will not be processed)	ms	0	In range of 0 to 999
2	SDK settings group					
	Profile drop-down list	Selecting the value in the list	Selecting a license plate recognition quality profile	List	6	6 – provides high performance (high processing speed and low CPU usage)

6.1.16 The RIDR IV module object settings panel

The **RIDR IV module** object settings panel contains the following interface elements.



The following table describes the elements of the **RIDR IV module** object settings panel.

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
1	Performance group					

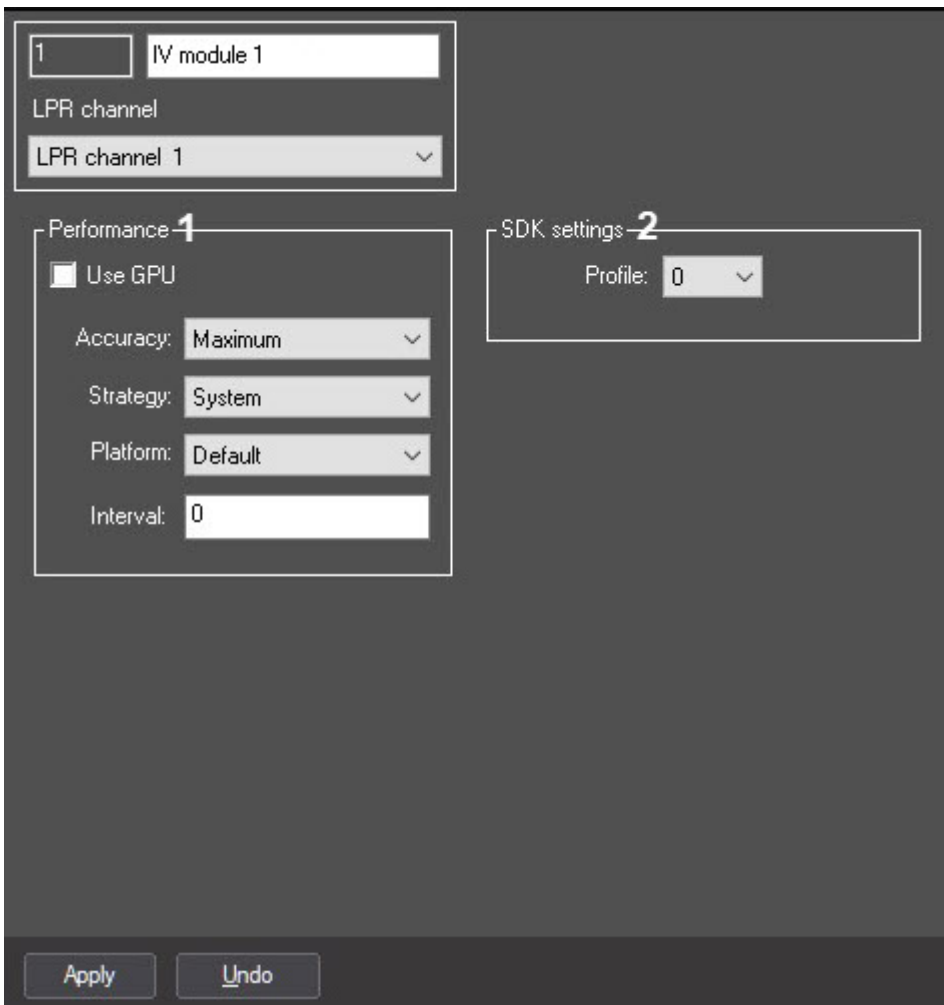
№	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Use GPU check box	Check the box	Enables the use of GPU (graphics processing unit) computing resources to improve the license plate recognition performance	-	-	<ul style="list-style-type: none"> • Checkbox is set – the GPU computing resources are used to increase the performance of license plate recognition; • Checkbox is not set – the CPU (central processing unit) computing resources are used
	Accuracy drop-down list	Selecting the value in the list	Selecting the numbers recognition accuracy	List	Maximum	<ol style="list-style-type: none"> 1. Maximum – enables maximum recognition accuracy, but it causes great CPU and/or GPU load. 2. High –enables high recognition accuracy, it requires less computing resources than for maximum accuracy. 3. Fast – enables high recognition speed, but the accuracy becomes worse

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Strategy dropdown list	Selecting the value in the list	Selecting the computing resources use mode	List	System	<ol style="list-style-type: none"> 1. Process - mild mode: no more than 1 core for 1 license plate. 2. System - default mode: all available computing cores are in use. 3. Core - strict mode: 1 core per stream
	Interval field	Enter the value in the text field	Specifying the minimum time interval lasting between the frames processing (i.e. all frames within this interval will not be processed)	ms	0	In range of 0 to 999
2	SDK settings group					

No	Parameter name	Parameter setting method	Description	Data type	Default value	Value range
	Profile drop-down list	Selecting the value in the list	Selecting a license plate recognition quality profile	List	6	<ul style="list-style-type: none"> • 6 – provides higher performance (higher processing speed and less CPU usage) relative to profile 9, but has a lower recognition accuracy. • 9 – provides higher recognition accuracy (works well on noisy and complex scenes) relative to profile 6, but has lower performance (lower processing speed and more CPU consumption)

6.1.17 The IV module object settings panel

The **IV module** object settings panel contains the following interface elements.



The following table describes the elements of the **IV module** object settings panel.

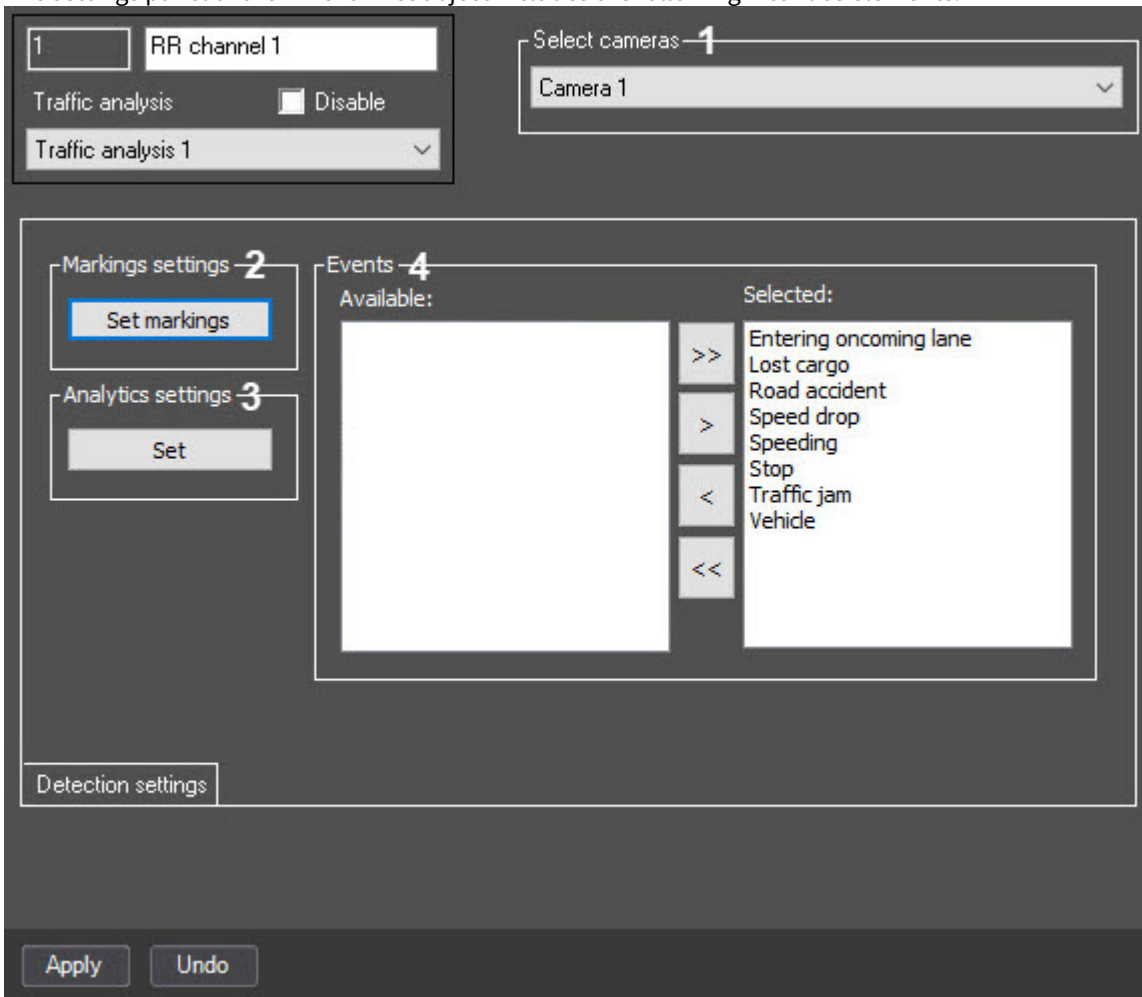
No	Parameter name	Parameter setting method	Description	Default type	Default value	Value range
1	Performance group					

№	Parameter name	Parameter setting method	Description	Default type	Default value	Value range
	Use GPU checkbox	Check the checkbox	Enables the use of GPU (graphics processing unit) computing resources to improve the license plate recognition performance	-	No	<ul style="list-style-type: none"> • Checkbox is set – the GPU computing resources are used to increase the performance of license plate recognition. • Checkbox is not set – the CPU (central processing unit) computing resources are used.
	Accuracy drop-down list	Selecting the value in the list	Selecting the numbers recognition accuracy	List	Maximum	<ol style="list-style-type: none"> 1. Maximum – enables maximum recognition accuracy, but it causes great CPU and/or GPU load. 2. High – enables high recognition accuracy, it requires less computing resources than for maximum accuracy. 3. Fast – enables high recognition speed, but the accuracy becomes worse
	Strategy drop-down list	Selecting the value in the list	Selecting the computing resources use mode	List	System	<ol style="list-style-type: none"> 1. Process – mild mode: no more than 1 core for 1 license plate. 2. System – default mode: all available computing cores are in use. 3. Core – strict mode: 1 core per stream

No	Parameter name	Parameter setting method	Description	Default type	Default value	Value range
	Platform drop-down list	Selecting the value in the list	Selecting the device on which the module will operate	List	CPU	<ul style="list-style-type: none"> • Default – CPU resources are used for computing. • TensorRT – NVIDIA GPU resources are used for computing. • CV22, NCNN, HISI, Qualcomm, TFLite, OpenVino – other device resources are used for computing, if available. These options apply to platforms other than x86/x64
	Interval field	Enter the value in the text field	Specifying the minimum time interval lasting between the frames processing (i.e. all frames within this interval will not be processed)	ms	0	In range of 0 to 999
2	SDK settings group					
	Profile drop-down list	Selecting the value in the list	Selecting the profile of country license plates that are to be recognized. Greater profile number enables more accurate LPR comparing to the solution with smaller number, but it is more demanding to computing resources	List	0	<ul style="list-style-type: none"> • 0 –common. This profile should be selected if By default is selected for the issuing country; • 3, 6 and 9 – for more information see The IV module functionality section

6.1.18 The settings panel of the RR channel object

The settings panel of the **RR channel** object includes the following interface elements:



The table describes the elements on the settings panel of the **Traffic analysis** object.

No	Parameter name	Parameter setting method	Description	Representation	Default value	Value range
1	The Select cameras group					
	The camera's drop-down list	Select the value from the list	Selects the camera to work with the RR channel of the <i>Traffic analysis</i> module	List of available Camera objects	NA	Depends on the number of available Camera objects

The **Detection settings** tab

No	Parameter name	Parameter setting method	Description	Representation	Default value	Value range
2	The Markings settings group					
	The Set markings button	Click the button	Sets the marking	NA	NA	NA
3	The Analytics settings group					
	The Set button	Click the button	Sets the analytics	NA	NA	NA
4	The Events group					
	The Available list	Click buttons	The list of available RR channel events of the <i>Traffic analysis</i> module	The list of available RR channel events of the <i>Traffic analysis</i> module	All possible events for the <i>Traffic analysis</i> module	Depends on the number of available RR channel event types of the <i>Traffic analysis</i> module
	The Selected list	Click buttons	The list of events used by the RR channel of the <i>Traffic analysis</i> module	The list of selected RR channel events of the <i>Traffic analysis</i> module	NA	Depends on the number of available RR channel event types of the <i>Traffic analysis</i> module

No	Parameter name	Parameter setting method	Description	Representation	Default value	Value range
	The > button	Click the button	Moves the selected event from the Available to the Selected list	NA	NA	NA
	The >> button	Click the button	Moves all events from the Available to the Selected list	NA	NA	NA
	The < button	Click the button	Moves the selected event from the Selected to the Available list	NA	NA	NA
	The << button	Click the button	Moves all events from the Selected to the Available list	NA	NA	NA

6.2 Appendix 2. Examples of widely used scripts

6.2.1 General information about scripts

User scripts are designed for partial automation of processes while the *Auto PSIM* software package configuring. In the [Axxon PSIM Software Package. Programming Guide](#) document there is description of programming objects and methods which are in use for scripts creation in the *Axxon PSIM* software.

Usually scripts are created for tasks of concrete video surveillance system.

6.2.2 Scripts used in the Auto PSIM software package

The following scripts are widely used in the *Auto PSIM* software package.

No	Purpose of script	Script

1	Start of <i>Auto-Uragan</i> program module	<pre> if(Event.SourceType == "MACRO" && Event.Sourceld == "1" && Event.Action == "RUN"){ DoReactStr("ULPR", "1", "START", ""); } </pre>
2	Shutdown of <i>Auto-Uragan</i> program module	<pre> if(Event.SourceType == "MACRO" && Event.Sourceld == "1" && Event.Action == "RUN"){ DoReactStr("ULPR", "1", "STOP", ""); } </pre>
3	Activation of window of operator request by results of recognized vehicle license plate found in the external database	<pre> if(Event.SourceType == "LPRDB" && Event.Sourceld == "1" && Event.Action == "SEARCH_RESULT") { DoReactStr("ULPR", "1", "STOP", ""); var msg=Event.Clone(); var m=msg.GetParam("comment"); var d=msg.GetParam("date"); var number=msg.GetParam("column.0.value"); DoReactStr("DIALOG", "black_list", "RUN", "par am0<"+number+">,column.4.value<"+m+">,d ate<"+d+">"); } </pre>

4	Video convertation to AVI format with record of vehicle, license plate of which is recognized	<pre> function printDate(temp) { var dateStr = padStr(temp.getDate())+"-"+ padStr(temp.getMonth())+"-"+ padStr(temp.getFullYear())+" "+ padStr(temp.getHours())+": "+ padStr(temp.getMinutes())+": "+ padStr(temp.getSeconds()); return dateStr; } function padStr(i) { if(i > 1000) { var temp = ""+i; temp = temp.substr(2,2); return temp; } return (i < 10) ? "0" + i : "" + i; } if(Event.Action == "NUMBER_DETECTED" && Event.SourceType=="ULPR" && Event.Sourceld=="1") { var plate = Event.GetParam("plate"); debugger; if(plate == "o270ca99") //if(Event.Action == "RUN" && Event.SourceType=="MACRO" && Event.Sourceld=="1") { DoReactStr("CAM","1","REC_STOP",""); DoReactStr("CAM","1","REC","delay<500>"); var time = Event.GetParam("time"); var date = Event.GetParam("date"); var tArr = time.split(":"); </pre>
---	---	---

		<pre> var dArr = date.split("-"); var shift = new Date("20"+dArr[2],dArr[1],dArr[0],tArr[0],tArr[1]], tArr[2]); shift.setSeconds(shift.getSeconds()+30); var time1 = printDate(shift); var filename = date+"_"+time+".avi"; filename = filename.replace(/:/g, "_"); filename = filename.replace(/-/g, "_"); var oShell = new ActiveXObject("Shell.Application"); var commandtoRun = "C:\\Program Files (x86)\\ Axxon PSIM\\Tools\\Converter.exe"; var arguments = "\"c:\\backup\\ "+filename+"\", \"1\", \" "+date+" "+time+"\", \" "+time1+"\""; DebugLogString(arguments); oShell.ShellExecute(commandtoRun,argumen ts, "", "open", "1"); } } </pre>
5	Raising of turnpike	<pre> if(Event.SourceType == "LPRDB" && Event.Sourceld == "1" && Event.Action == "SEARCH_RESULT") { DoReactStr("GRELE", "1", "ON", ""); Sleep(5000); DoReactStr("GRELE", "1", "OFF", ""); } </pre>

6	<p>Creation of a passing vehicle event. The information is displayed in the Online Monitor and recorded to the database:</p> <ol style="list-style-type: none"> 1. Request without parameters — an empty result containing an undefined LP number is returned. 2. Request with the plate parameter — the result containing the LP number is returned. If the LP number coordinates are not specified (plate_left, plate_top, plate_right, plate_bottom), then whole frame will be displayed. 3. Request with any database parameters that are displayed in the Online Monitor. For example, LP number coordinates (plate_left, plate_top, plate_right, plate_bottom), confidence, direction, hazard_class 	<ol style="list-style-type: none"> 1. DoReactStr("ULPR","1","CREATE_EVENT",""); 2. DoReactStr("ULPR","1","CREATE_EVENT","plate<A777AA777>"); 3. DoReactStr("ULPR","1","CREATE_EVENT","plate<A777AA777>,plate_left<200>,plate_top<200>,plate_right<300>,plate_bottom<300>,confidence<15>,direction<2>,hazard_class<Very dangerous>");
---	--	---

6.3 Appendix 3. Database replication via MS SQL Server

Detailed information about database replication via MS SQL Server is given in reference manual – for example, page <http://msdn.microsoft.com/en-gb/en-es/library/ms151847%28v=SQL.90%29.aspx>

In case of some problems with database replication via MS SQL Server apply to Microsoft technical support service (see <https://support.microsoft.com/en-GB>).

6.3.1 Introduction to database replication

Replication is the process of data copying among databases that are in the same or different servers and connected via LAN, WAN or Internet. The following terms are used in MS SQL Server replication:

Term	Description
Publication	Server (database) that sends data to another server (database)
Distribution	Server that controls data flow via replication system. Contains a specialized distributor database. Distribution and Publication can coincide
Subscription	Server (database) that receives data from the other server (database)
Publication	Sum of articles, sent to Subscription
Article	Main replication module: table or table's subset

Subscription	Data group, received by Subscription
Distribution database	System database that is saved at Distribution and doesn't contain user tables. Is used for saving the task snapshots and all the transactions, waiting for distribution by the Subscription

**Note.**

On default Replication service is not installed together with MS SQL Server Express.

**Note.**

MS SQL Server Express cannot be used as Publication or Distribution.

In the *Auto PSIM* distributed architecture it is reasonable to use replication with topology «Central subscription». In this case several Publication servers (for example servers, installed on traffic control posts) copy the data to the central server – Subscription.

As it is necessary to transmit data among servers of databases, it is recommended to use transactions replication. This replication type is also preferable in case when copied data constantly change, size of copied data is sufficiently great and not necessary to support auto changes of replicated data regarding Publication and Subscription servers. All described terms are executed in the *Auto PSIM* distributed architecture.

The following agents are used while replicating:

1. Shots agent. Creates files of databases shots, saves shots in the Distribution server and saves information about shots synchronization state to the Distribution server's database.
2. Register reading agent. Compiles transactions, selected for replication, from the transactions register (that is on the Publication server) to Distribution server's database.
3. Distribution agent. Compiles processing task shots from Distribution server's database to Subscription servers; compiles all the transactions, waiting for distribution, to Subscription servers.

6.3.2 Replication setup

Replication setup is made in the following sequence:

1. Setup the Publication server, having created a new publication.
2. Setup the Subscription server, having created a subscription to publish the Publication server.

Replication setup features

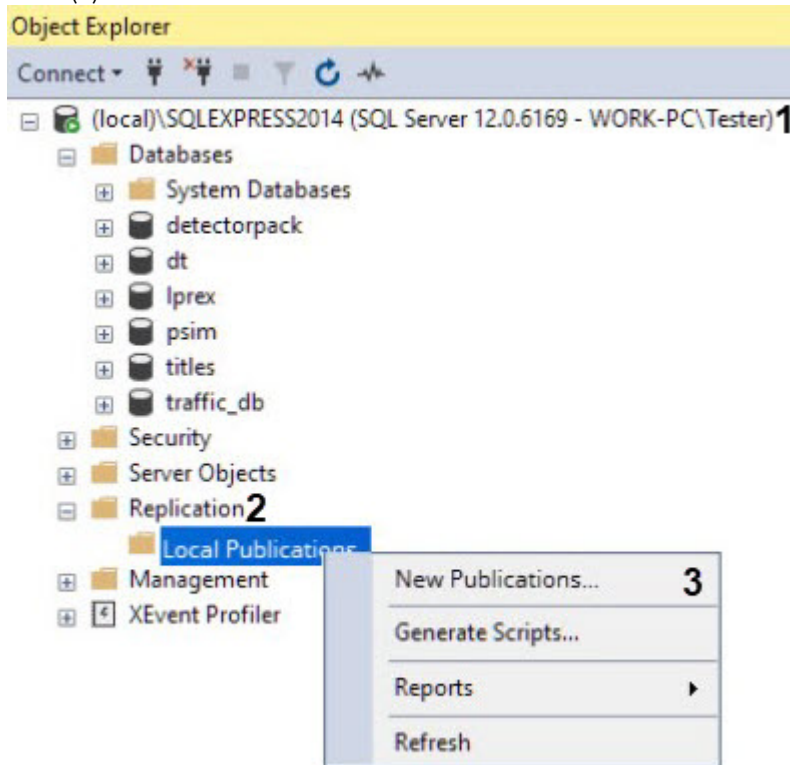
While setting up the publication, the following features should be born in mind:

1. Run the MSSQLServer and SQLServerAgent server with Windows domain's account, as the LocalSystem account is not provided with access to net resources.
2. Replication setup and configuration may be performed only by sysadmin users on MS SQL Server.
3. Service SQLServerAgent and MSSQLServer should be run to replicate the data.
4. Necessary footprint should be entered for Distributor server's database.
5. To replicate tables, containing external keys, all the linked tables should be included into publication.
6. Publication server should be determined on the Subscriber server as a remote server.

Publication setup

To set up Publication server follow the steps:

1. Connect to Publication server in the Microsoft SQL Server Management Studio, and then open the server node (1).



2. Open **Replication** folder and then click with a right mouse button over the **Local Publications** folder (2).
3. Select the point **New Publication** in the opened contextual window (3).
4. **New Publication Wizard** will be displayed in result.
5. Following the instructions of **New Publication Wizard**, enter the following information about publication:
 - a. Distribution server;
 - b. Directory, where databases' instant shots will be located;
 - c. Database that has to be replicated;

Note.

LPREX database should be selected while setting up the replication of plates recognition databases.

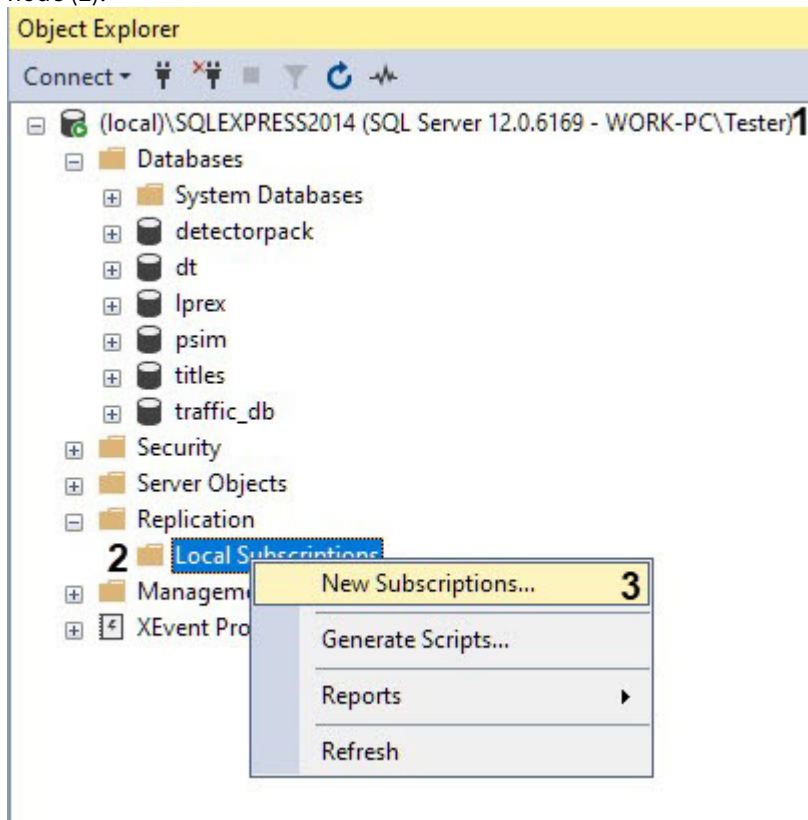
- d. Type of created publication (it is recommended to select transactions' publication or transactions' publication with update subscriptions);
- e. Data and data base objects (articles) to be included into publication;
- f. steady-state filters of lines and columns;
- g. Shots agent schedule;
- h. Accounts that have to run active replication agents (see section [Administrator's Guide. Introduction](#));
- i. Name and publication description.

Publication server is completed.

Subscription setup

To set up Subscription server follow the steps:

1. Connect to Publication server in the Microsoft SQL Server Management Studio, and then open the server node (1).



2. Open **Replication** folder, and then click with a right mouse button over the **Local Subscriptions** folder (2).
3. Select the **New Subscriptions** point in the opened contextual window (3).
4. **New Subscription Wizard** will be displayed in result.
5. Following the instructions of **New Subscription Wizard** enter the following information about subscription:
 - a. Publication name, that is being subscribed;
 - b. Publication server name and subscription database name;
 - c. Whether the Distribution server's agent runs on distribution or subscription;
 - d. Whether the Distribution server's agent operates constantly, according to schedule or on demand;
 - e. If there is necessity for the agent to create shots of original short for subscription and also necessity for distribution agent to use this shot on the subscription server;
 - f. Accounts which the Distribution agent will be run with.

Subscription setup is completed.

6.3.3 Example of setting up the Traffic replication database

Two kinds of servers take part in the replication:

1. Server, publishing the data, i.e. where the data are added and transferred to the central database.
2. Server, storing data from all the publishing servers to a single central database.

Publishing servers should operate under control of the SQL Server 2008 full version.

Note.

SQL Server Express program doesn't permit data publishing.

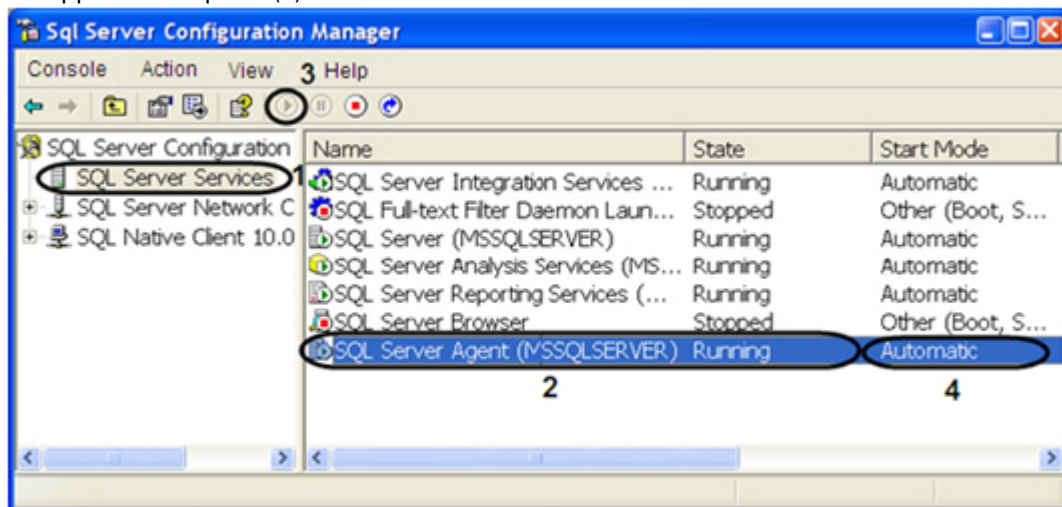
Note.

Setting up the replication for recognition database is done in a similar way.

Setting up the replication on the publishing server

To set up the replication do the following operations on every server, publishing the data:

1. Run the utility **Sql Server Configuration Manager** (for this select on the taskbar: **Start -> Programs->Microsoft SQL Server 2008-> Configuration Tools-> SQL Server Configuration Manager**).
2. The utility window **Sql Server Configuration Manager** will open in result.
3. On the left part of the **Sql Server Configuration Manager** utility select the value **SQL Server Services** (1).
4. SQL Server service will be displayed on the right part of the window in result. It is necessary to check whether the **Sql Server Agent (MSSQLSERVER)** service is run:
 - a. In case when the **Sql Server Agent (MSSQLSERVER)** is run there will be **Running** value in the column **State** (2).
 - b. In case when the **Sql Server Agent (MSSQLSERVER)** is not run, run it by clicking the **Play** button on the upper control panel (3).

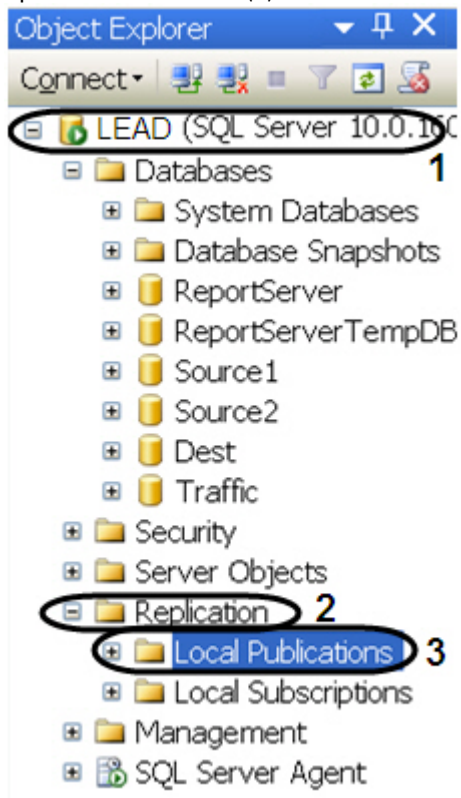


5. **Sql Server Agent (MSSQLSERVER)** service can be configured for auto run of the server or may be run manually. To set the auto run parameters do the following:
 - a. Give a right click upon the **Sql Server Agent (MSSQLSERVER)** service.
 - b. Select the **Features** point in the opened contextual window.
 - c. **Features: Sql Server Agent (MSSQLSERVER)** window will open in result.
 - d. Go to the **Service** tab (1).
 - e. From the dropdown list of the **Start Mode** parameter select the **Automatic** value (2).

- f. Click **Ok** to save the changes (3).

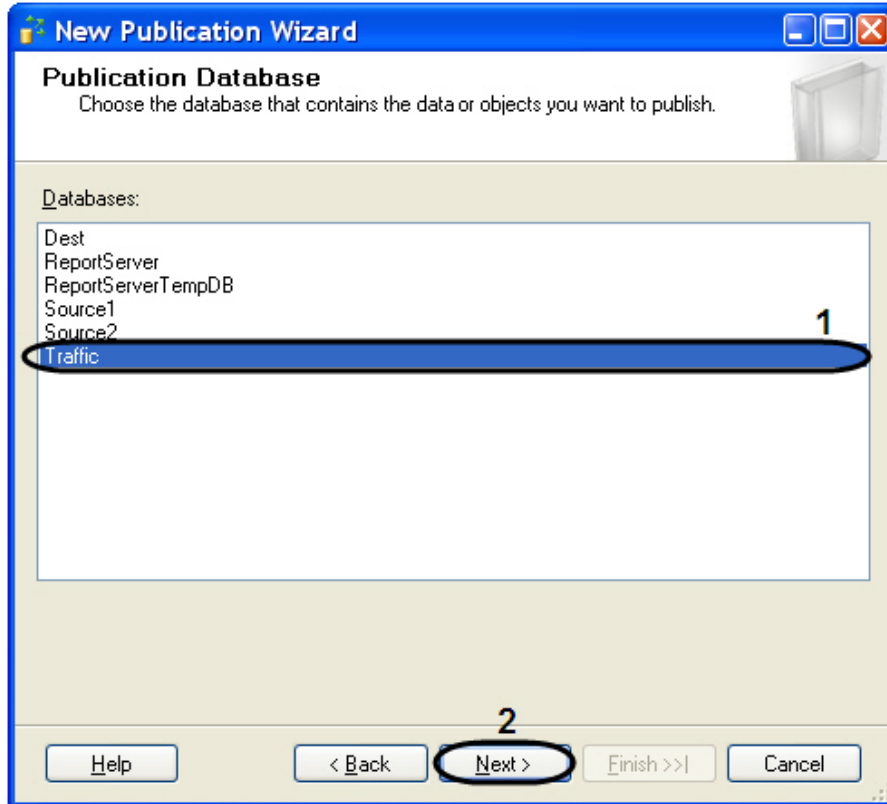


- g. The **Start Mode** parameter was named as **Automatic** in result (4).
6. Run the **Microsoft Sql Server Management Studio** utility and after connecting to the data publishing server open the server node (1).



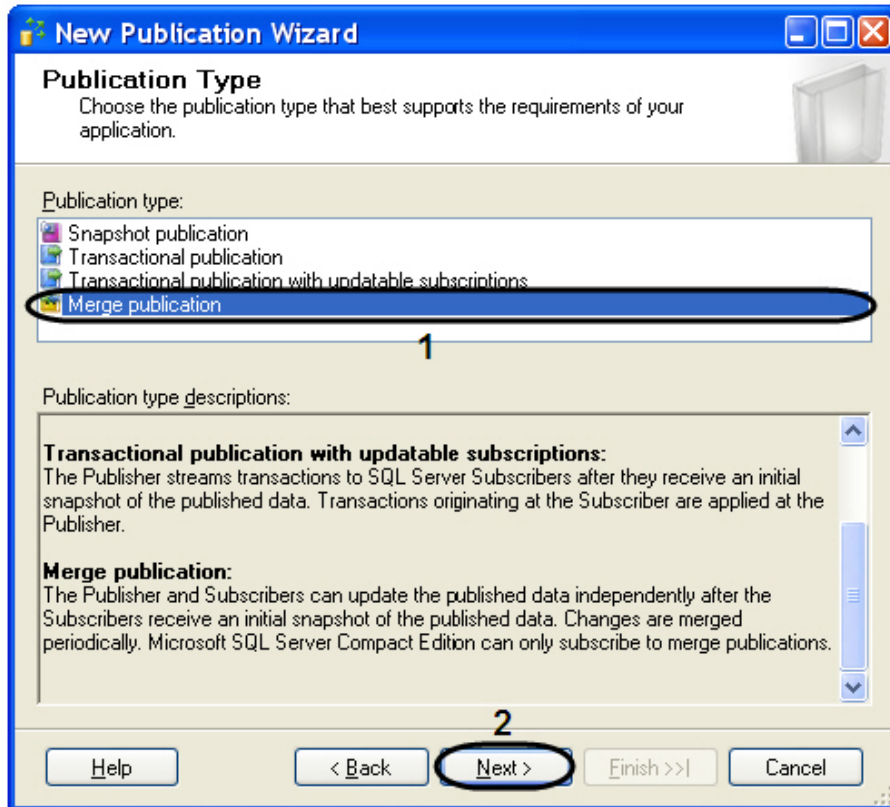
7. Open the **Replication** folder (2), and then make a right click upon the **Local Publication** folder (3).
8. Select the **New Publication** point in the opened contextual menu.
9. **New Publication Wizard** will be displayed in result.

10. Following the wizard's instructions **New Publication Wizard**, enter the following information about the publication:
 - a. Select the distributor database from the **Databases** list (1).
 - b. Click **Next** to continue (2).



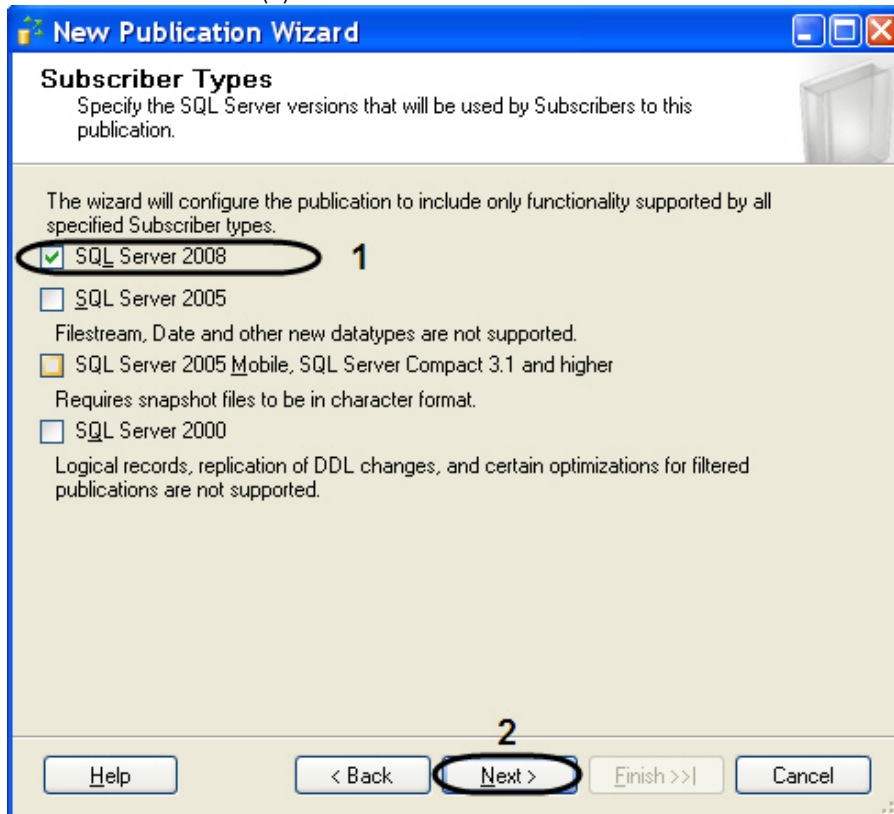
- c. Select the type value of the publication that is being created from the **Publication Type - Merge publication** list (1).

- d. Click **Next** to continue (2).



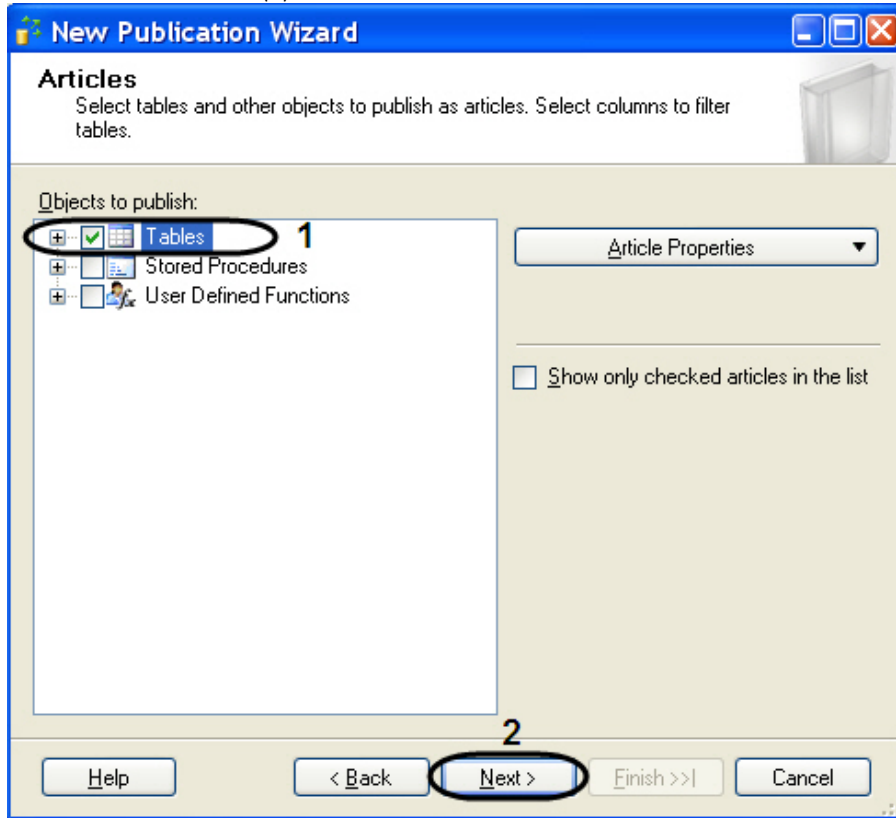
- e. State the subscriber type, setting the **Sql Server 2008** checkbox (1).

- f. Click **Next** to continue (2).



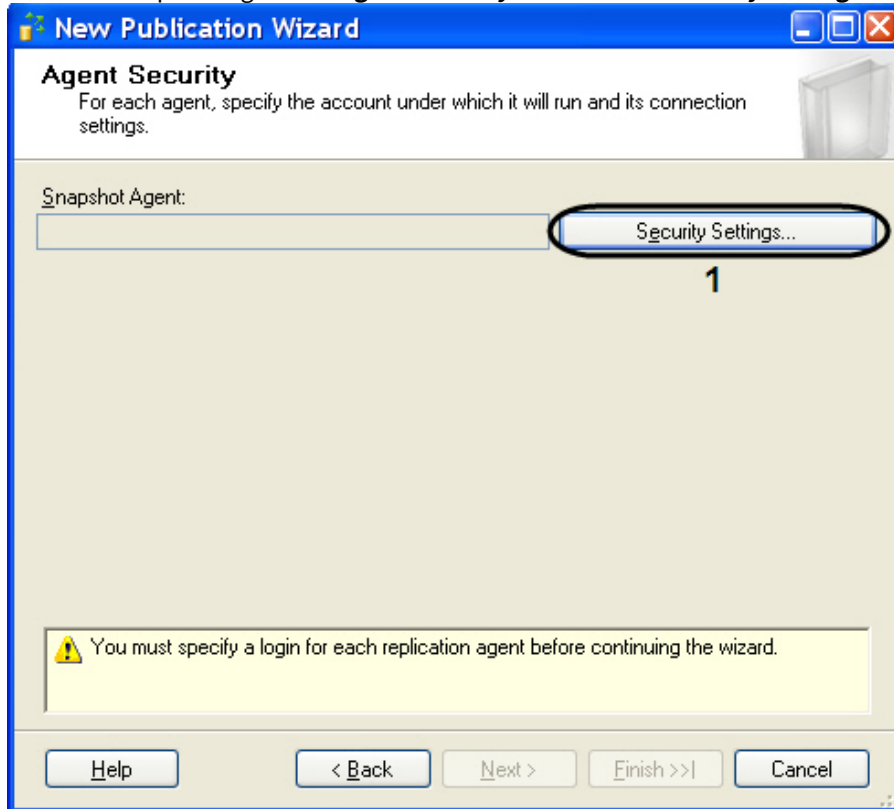
- g. State the database objects to be included into publication, setting the **Tables** checkbox (1).

- h. Click **Next** to continue (2).



- i. Do not change next two tabs.

- j. Go to the Snapshot Agent tab **Agent Security** and click the **Security settings** button (1).



- k. **Snapshot Agent Security** window will open in result.
- l. Set the switch to the position **Run under sql server Agent service account (This is not a recommended security best practice)** (1).

- m. Click **OK** for saving the changes (2).

Snapshot Agent Security

Specify the domain or machine account under which the Snapshot Agent process will run.

Run under the following Windows account:

Process account:

Example: domain\account

Password:

Confirm Password:

Run under the SQL Server Agent service account (This is not a recommended security best practice.) 1

Connect to the Publisher

By impersonating the process account

Using the following SQL Server login:

Login:

Password:

Confirm Password:

2

- n. On the **Complete the wizard** tab enter the publication name in the field **Publication name** (1).
- o. Click **Finish** to create a new publication (2).

New Publication Wizard

Complete the Wizard

Verify the choices made in the wizard and click Finish.

Publication name: 1

Click Finish to perform the following actions:

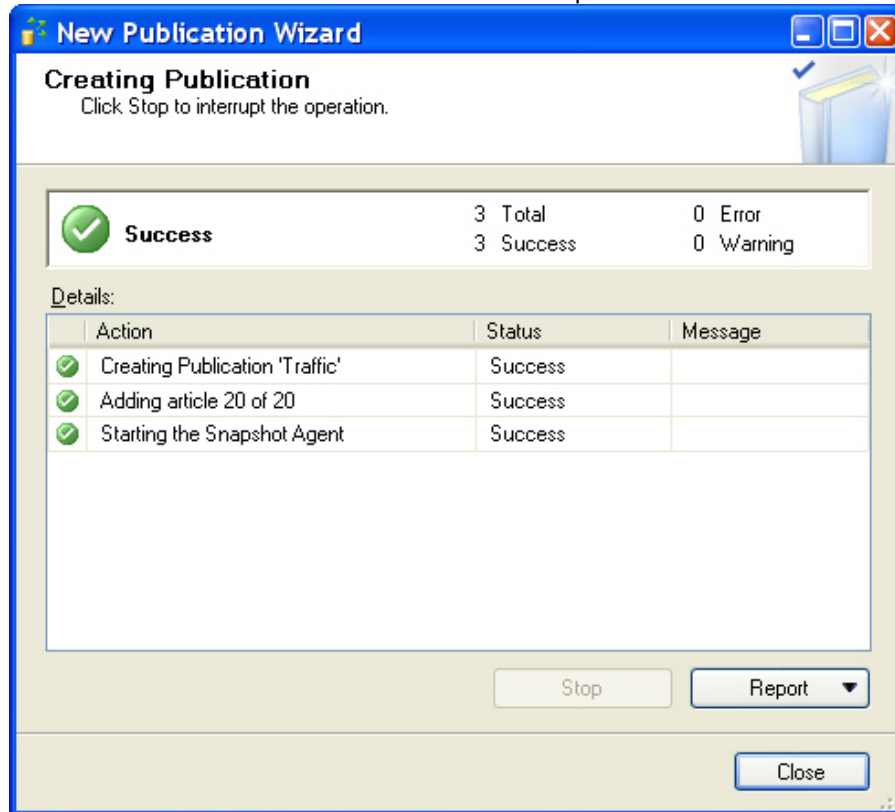
- Create the publication.

A publication will be created with the following options:

- Create a merge publication from database 'Traffic'.
- The Snapshot Agent process will run under the 'SQL Server Agent service' account.
- The publication compatibility level will support Subscribers that are servers running SQL Server 2008 or later.
- Publish the following tables as articles:
 - 'ActualTrafficData'
 - 'Country'
 - 'Device'
 - 'DeviceLanes'
 - 'DeviceObj'
 - 'District'
 - 'Obj'

2

- p. In the **Creating Publication** opened window there will be displayed the process of tasks performance while creating a new publication.
- q. Click **Close** to finish the **New Publication Wizard** operation.



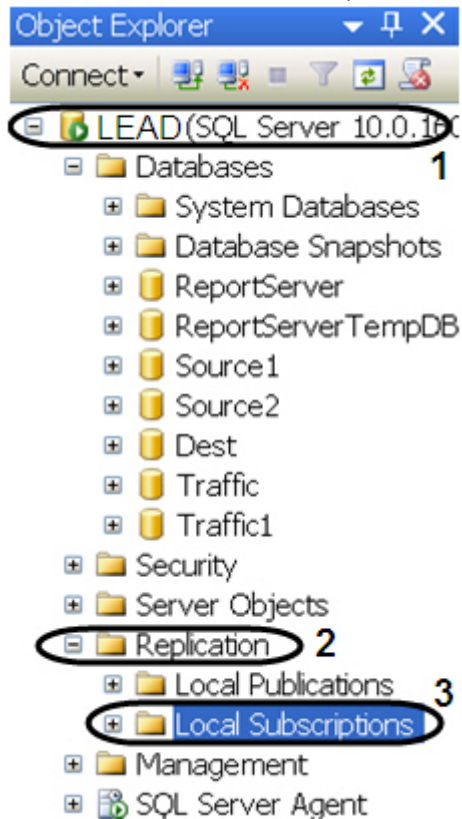
Setting up the replication on the publishing server is completed.

Setting up replication on the subscriber server

To set up replication do the following on the subscription server, gathering data from all the publishing servers:

1. Run **Sql Server Configuration Manager** (For this select on the taskbar: **Start -> Programs -> Microsoft SQL Server 2008 -> Configuration Tools -> SQL Server Configuration Manager**).
2. Make sure, that **SQL Server Agent** service is run and configured for auto start (see section [Setting up the replication on the publishing server](#), points 3-5).
3. Run the **Microsoft Sql Server Management Studio** utility and after connection to the subscription server open the server's node **(1)**.
4. Open the **Replication** folder **(2)** and then make a right click upon the **Local Subscriptions** folder **(3)**.

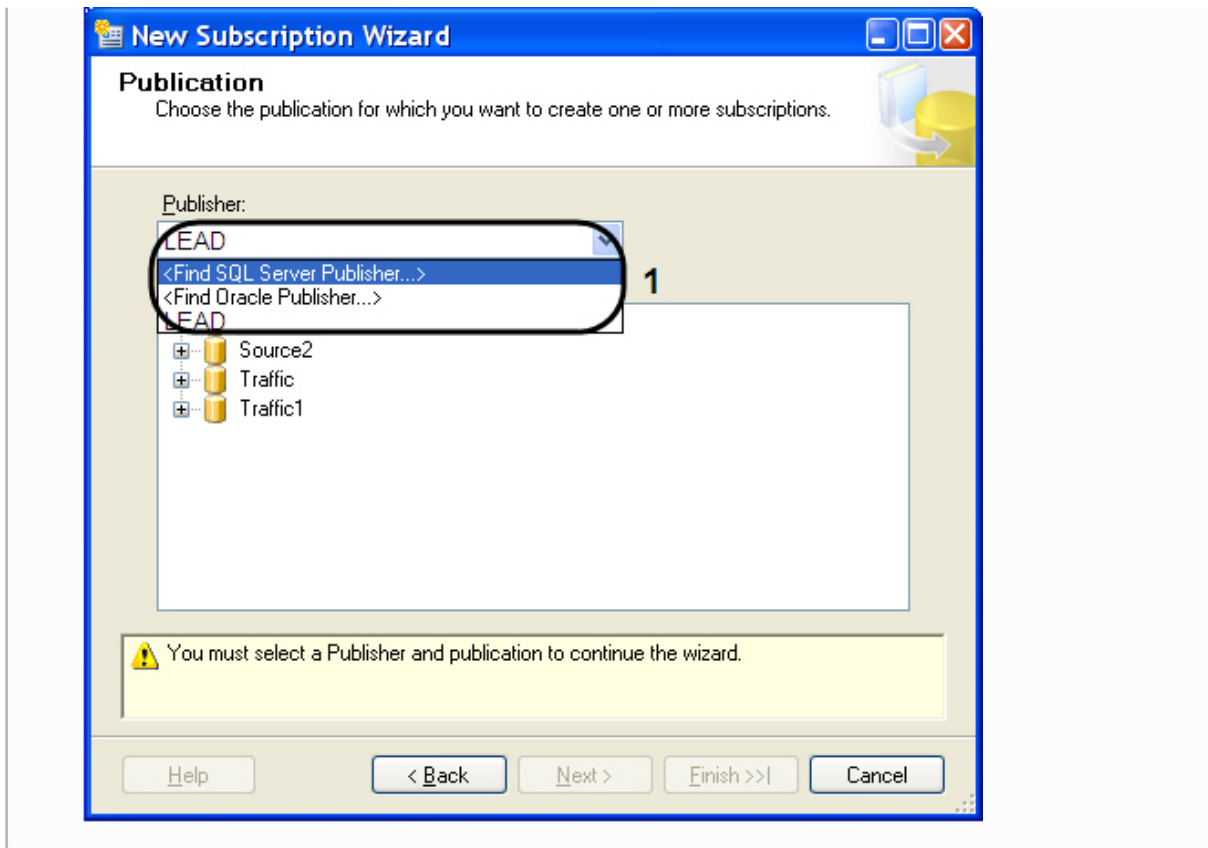
5. Select the **New Subscriptions** point in the opened contextual menu.



6. **New Subscription Wizard** will be displayed in result.
 7. Select the publication server from the **Publisher** dropdown list (1).

Note.

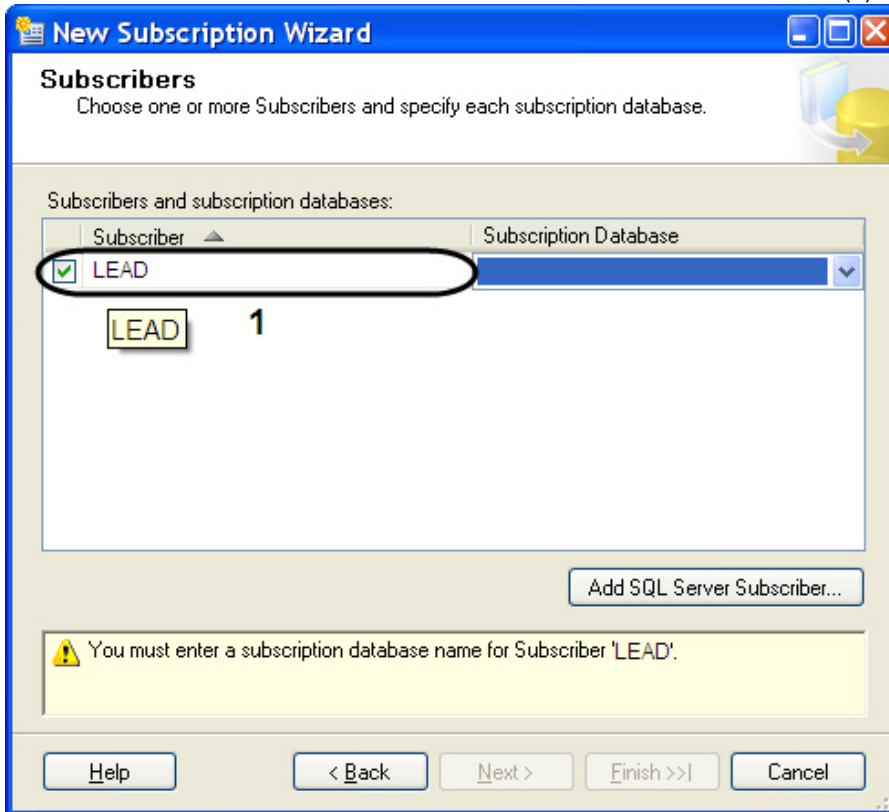
If the publication server is absent in the list one should find it with the help of **Find SQL Server Publisher** function.



8. In the objects tree **Databases and publication** select the publication (1).



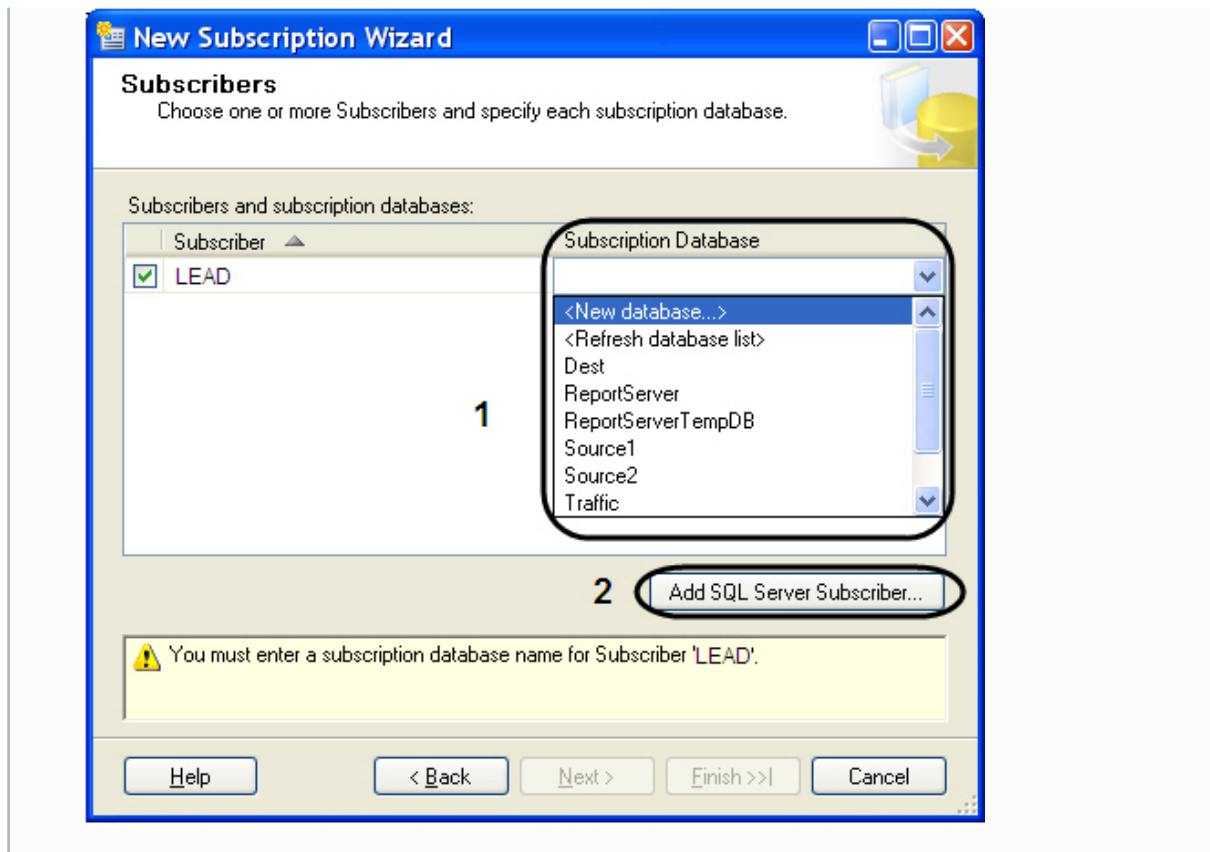
9. Click **Next** to continue (2).
10. Leave the parameter **Merge Agent Location** unchanged.
11. In the **Subscribers** window set the checkbox **Subscriber** next to subscriber (1).



12. Select the subscription database from the **Subscription Database** dropdown list (1).

Note.

In case of connecting the first publishing server one should create a new subscription database, clicking the function **<New database...>**.



13. To add SQL Server subscriber click the button **Add SQL Server Subscriber...** (2).
14. **Merge Agent Security** window will open.
 - a. Set the switch to the **Run under SQL Server Agent service account (This is not recommended security best practice)** position (1).

- b. Click **Ok** to save the changes (2).

Merge Agent Security

Specify the domain or machine account under which the Merge Agent process will run when synchronizing this subscription.

Run under the following Windows account:

Process account:

Example: domain\account

Password:

Confirm Password:

Run under the SQL Server Agent service account (This is not a recommended security best practice.) **1**

Connect to the Publisher and Distributor _____

By impersonating the process account

Using a SQL Server login

The connection to the server on which the agent runs must impersonate the process account. The process account must be a member of the Publication Access List.

Connect to the Subscriber _____

By impersonating the process account

Using the following SQL Server login:

Login:

Password:

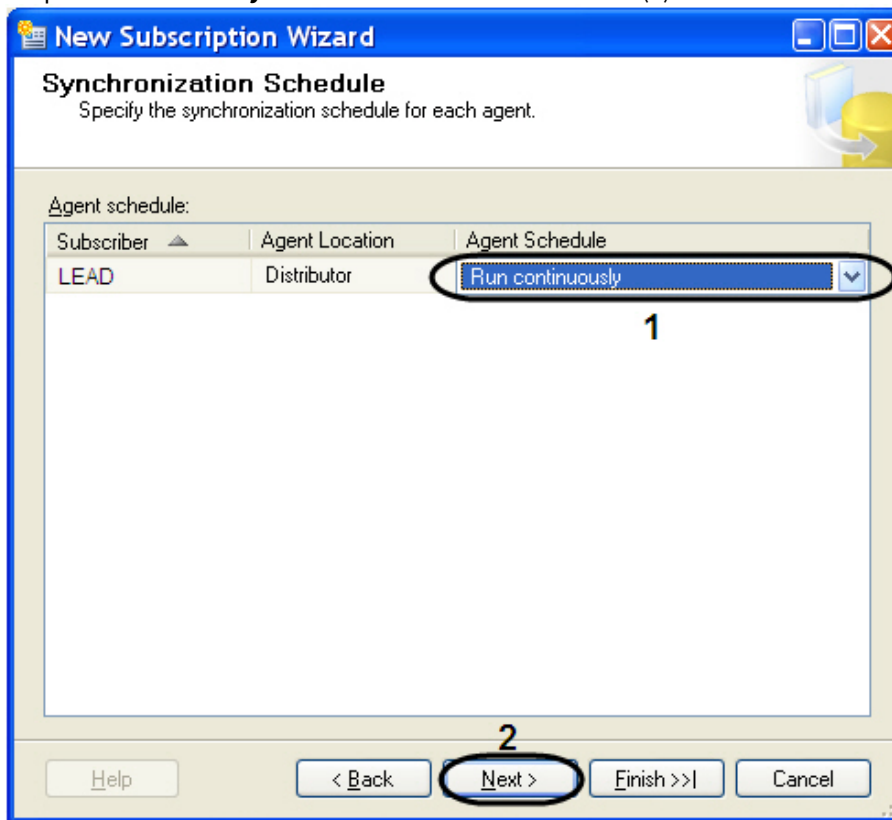
Confirm password:

The login used to connect to the Subscriber must be a database owner of the subscription database.

2

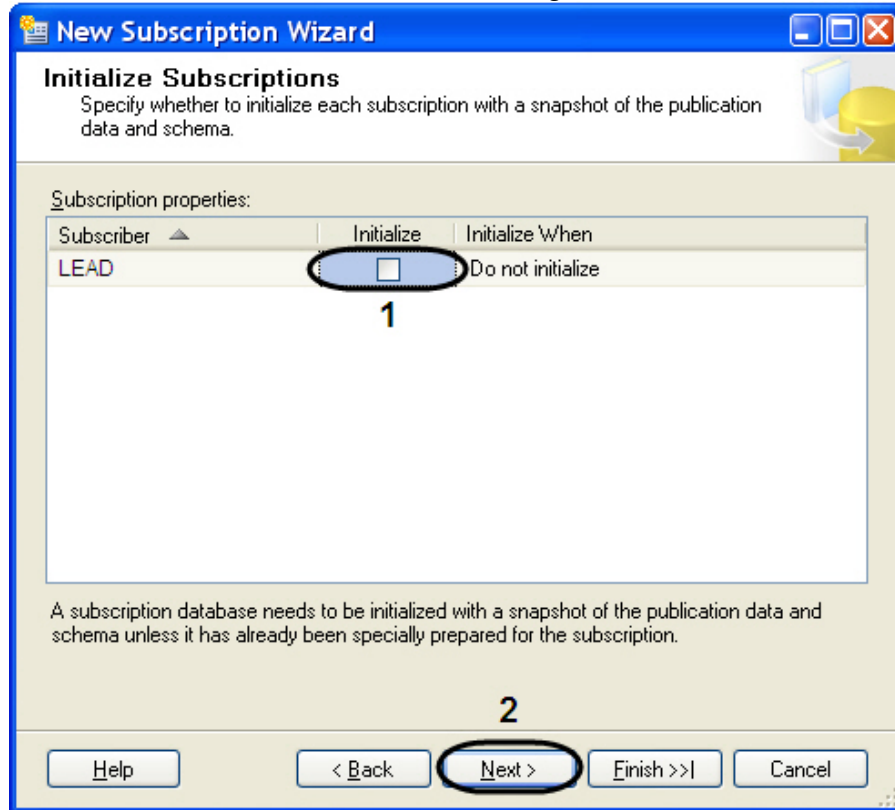
15. Click **Next** to continue.

16. For distributor agent constant operation select the value **Run continuously** from the **Agent Schedule** dropdown list in the **Synchronization Schedule** window (1).



17. Click **Next** to continue (2).
18. In the **Initialize Subscription** window the following should be done:
- Set the **Initialize** checkbox in case of adding the first publishing server (1).

- b. Uncheck the **Initialize** checkbox in case of adding the second and further servers (1).



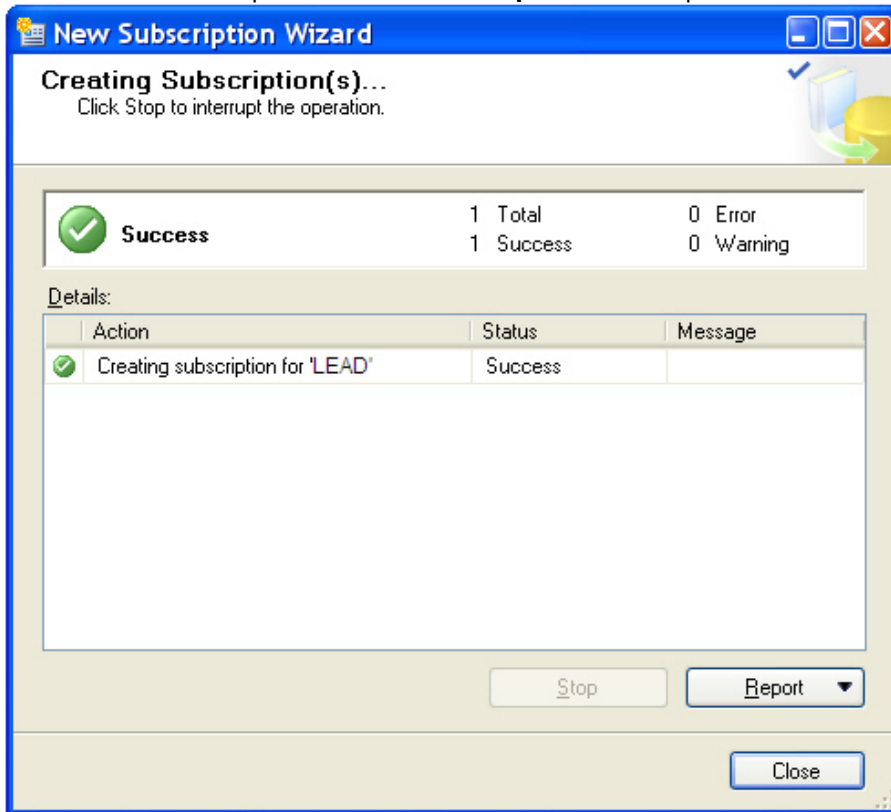
19. Click **Next** to continue (2).

20. Select the **Client** subscription type from the dropdown list **Subscription Type** in the **Subscription Type** window (1).



21. To end the creation of a new subscriber click **Finish** (2).
22. In the **Creating Publication** opened window there will be displayed the process of creating a new subscriber.

23. Click **Close** to end the process of **New Subscription Wizard** operation.



Setting up the replication on subscriber's server, gathering data from all the publishing servers is completed.

6.4 Appendix 4. Procedures for the Auto PSIM database and software for fine imposing interaction

The software for fine imposing is designed for analyzing the stored Traffic enforcement, for checking and correcting the identified plates, imposing the fines.

For the *Auto PSIM* database and this software interaction follow the procedures:

1. The procedure, returning the alarm list of the stated type for a stated period of time for the selected detector or for all the detectors (if NULL).

```
spGetDetectionEvents
```

```
@eventtype int, // alarm's type
```

```
@begindate DATETIME, // time «from»
```

```
@enddate DATETIME, // time «up to»
```

```
@detector uniqueidentifier = NULL //detector's ID
```

```
@speed_over INT=NULL, // speed exceeding (only for Speed exceeding alarms type). Ignored if it is not specified.
```

```
@secondFrameExistINT=1, // display events (only for Red light running alarms type), which have additional frame. Check for additional frame is not performed if 0 or NULL.
```

The following alarm types are singled out:

- 1 – Overspeeding,
- 2 – Found in the external database,
- 3 – Alarm, triggered by the operator,
- 4 – Running a red light,

- 5 – Entered the oncoming lane,
- 6 – Crossing a stop line,
- 7 – Stop a crosswalk,
- 8 – Running a red light traffic.

Fields described in the table will be returned in result of the spGetDetectionEvents procedure performing.

Name	Type	Description
event_time	datetime	Time of alarm
event_time_id	int	Type of alarm
valid_speed	Int	Permitted speed
speed	Int	Speed
speed_over	int	Overspeeding
car_number	nvarchar(50)	Licence plate
address	nvarchar(max)	Address, where the detector is located
direction	bit	Direction
processing_time	datetime	Time of alarm's processing by the operator
comments	ntext	Comments
db_name	nvarchar(50)	External database name
db_info	ntext	Information from the external database (XML format)
operator	uniqueidentifier	Operator's ID
frame	image	Frame
event_id	uniqueidentifier	Unique alarm identifier (GUID)
red_light_on_time	datetime	Time of red light switching on

Name	Type	Description
red_light_on_period	int	Time from begin of red phase to fixing violation on the image. Time is specified in seconds

2. Procedure, returning the list of speed alarms for a stated period for the selected detector or for all the detectors (if NULL).

spGetSpeedEvents

@begindate DATETIME, // time «from»

@enddate DATETIME, // time «up to»

@detector uniqueidentifier = NULL // detector's ID

@speed_over|NT=NULL // speed exceeding. Ignored if it is not specified.

Fields described in the table will be returned in result of the spGetSpeedEvents procedure performing.

3. Procedure, returning synchronous frames connected with event ID or all frames if parameter

@event_id=NULL.

spGetFramesSecondary

@max_items int, // maximal number of output frames

@event_id uniqueidentifier // event ID. Event ID can be got using the spGetDetectionEvents or

spGetSpeedEvents procedures.

Fields described in the table will be returned in result of the spGetSpeedEvents procedure performing.

Name	Type	Description
Id	uniqueidentifier	Secondary frame ID
Frames_id	uniqueidentifier	Primary frame ID
frame	image	Secondary frame
time	datetime	Time of the secondary frame recording on UTC scale

4. Procedure returning all registered license plates for the specified period. Data will be displayed page-by-page with specifying the page number (@pagenumber) and page size (@pagesize).

spGetRegisteredPlates

@begindate datetime, // time "from" (on UTC scale)

@enddate datetime, // time "up to" (on UTC scale)

@pagenumber int, // page number to output

@pagesize int, // page size to output

@totalrows int OUTPUT, // total number of strings complying with query

Fields described in the table will be returned in result of the spGetRegisteredPlates procedure performing.

Name	Type	Description
plate	nvarchar(50)	Vehicle license plate
region	int	Region of license plate

Name	Type	Description
validity	int	Quality of recognized LP, 0-100%
time	datetime	Time of license plate recording on UTC scale

5. Procedure returning all registered license plates for the specified period. Data will be displayed page-by-page with specifying the page number (@pagenumber) and page size (@pagesize).

spGetRegisteredPlatesFull

@begindate datetime, // time "from" (on UTC scale)

@enddate datetime, // time "until" (on UTC scale)

@pagenumber int, // page number to output

@pagesize int, // page size to output

@totalrows int OUTPUT, // total number of strings complying with query

@cameralds nvarchar(max) NULL, // list of cameras ID separated by | symbol in the *Axxon PSIM* software.

Fields described in the table will be returned in result of the spGetRegisteredPlatesFull procedure performing.

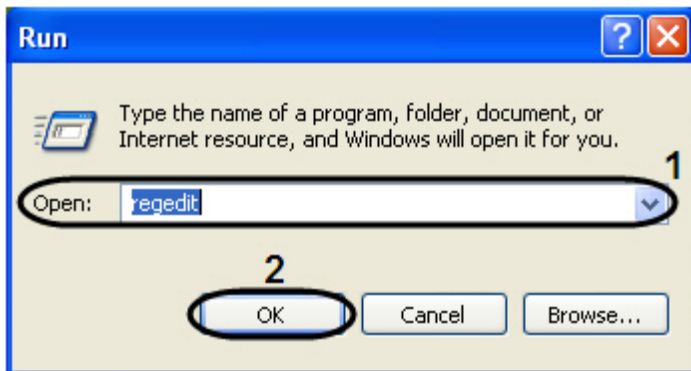
Name	Type	Description
plate	nvarchar(50)	Vehicle license plate
region	int	Region of license plate
validity	int	Quality of recognized LP, 0-100%
plate_left	int	LP coordinates
plate_top	int	LP coordinates
plate_right	int	LP coordinates
plate_bottom	int	LP coordinates
preview_frame	image	Frame for preview
frame	image	Frame
plate_image	image	Image of cut license plate
detector_external_id	nvarchar(max)	Recognizer ID in the <i>Axxon PSIM</i> tree
detector_name	nvarchar(50)	Name of recognizer

Name	Type	Description
detector_address	nvarchar(max)	Address of recognizer
camera_external_id	nvarchar(max)	Camera ID in the <i>Axxon PSIM</i> tree
camera_name	nvarchar(50)	Name of camera
time	datetime	Time of license plate recording on UTC scale

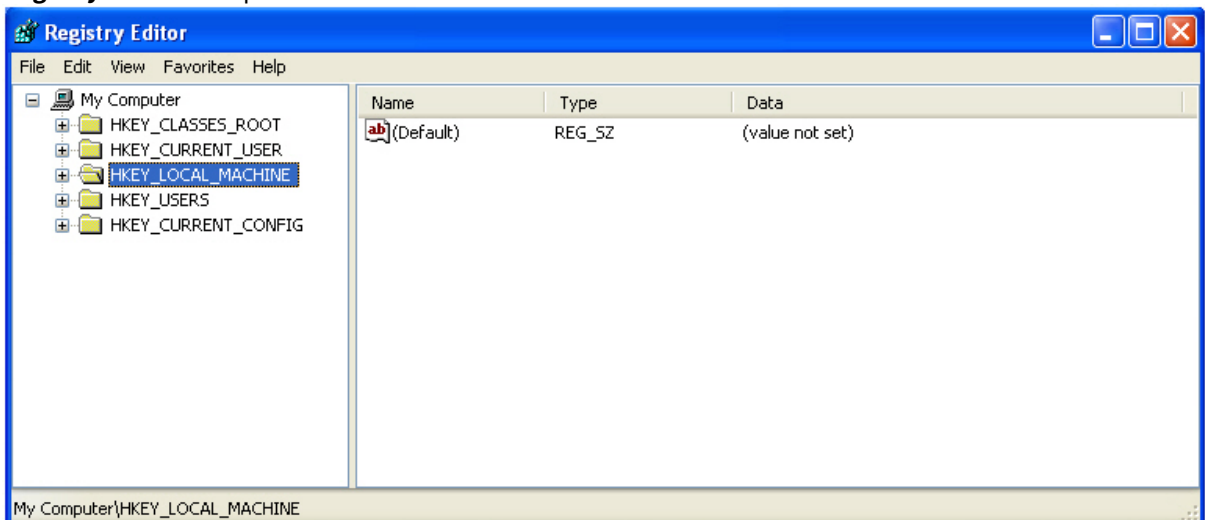
6.5 Appendix 5. Setting up the External plates database in DBF format.

To set up the External plates database in DBF format do the following:

1. Call for a dialog window **Program launch** or go to the **Start** menu and select **Run** or use the key combination **WIN+R**.



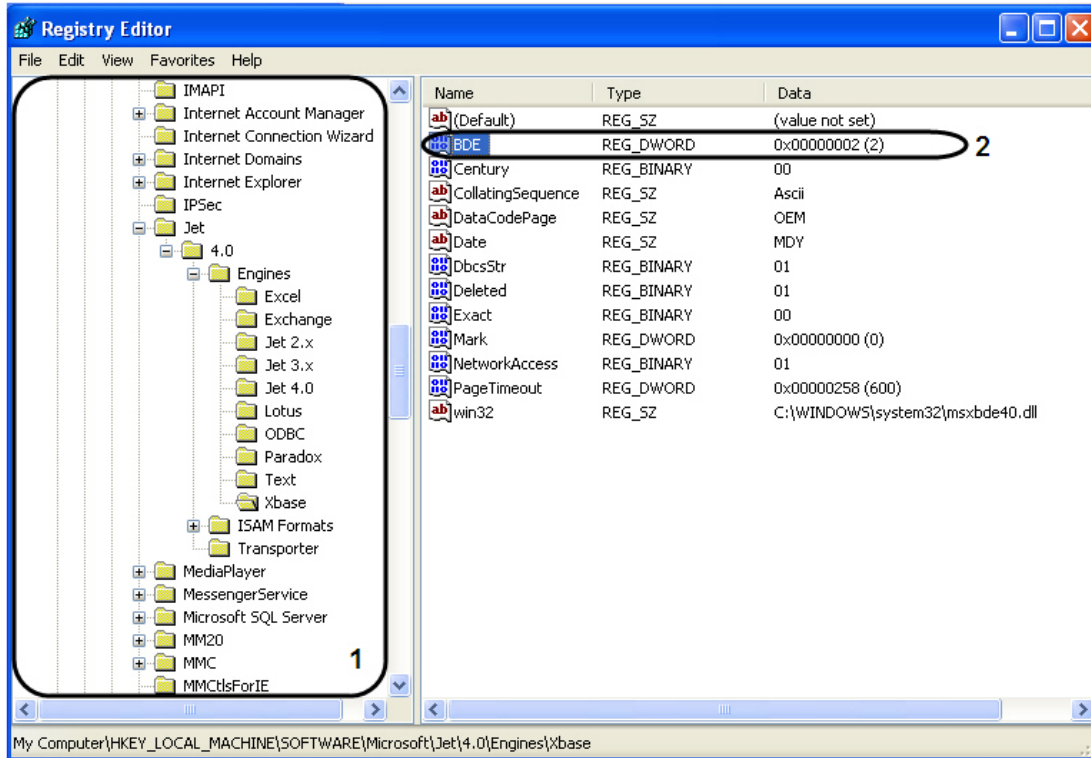
2. Enter **regedit** in the appeared window.
3. Click **OK**.
4. **Registry Editor** will open in result.



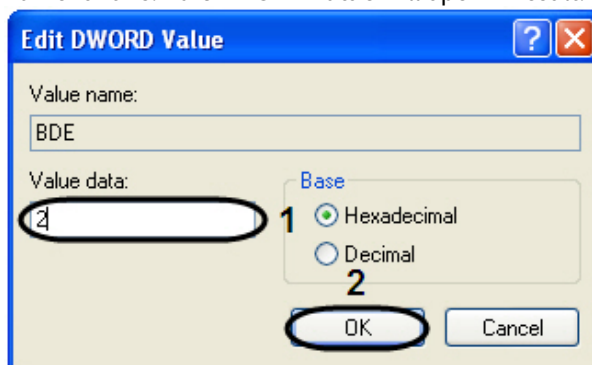
Note.

Detailed information about Registry Editor is given in the section Operation with OS Windows system register of the document [Axxon PSIM software package. Administrator's Guide.](#)

5. In the register tree select **HKEY_LOCAL_MACHINE\Software\Microsoft\Jet\4.0\Engines\Xbase.**



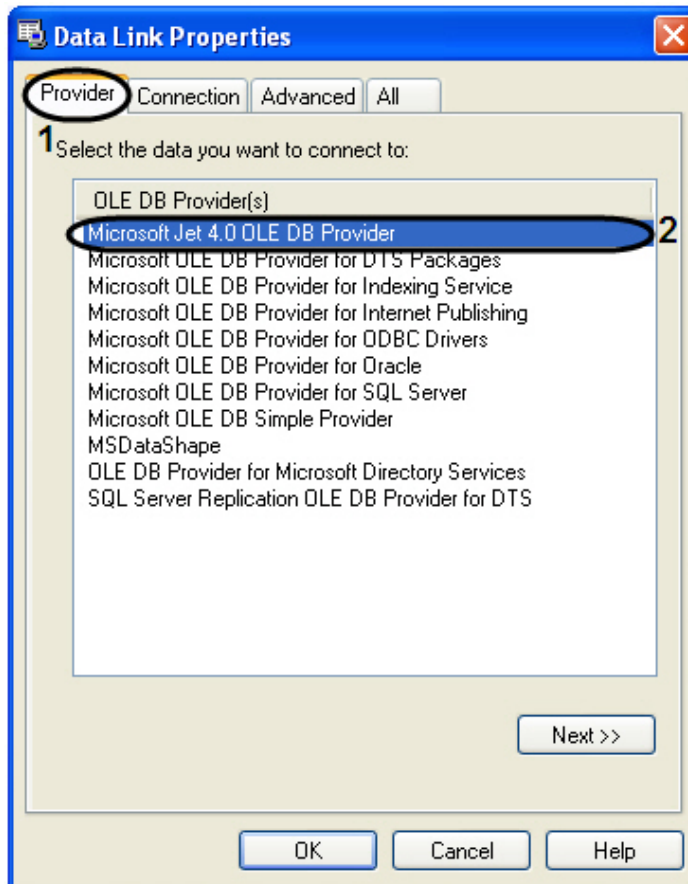
6. Select the menu point Edit -> Create -> DWORD parameter.
7. Assign a name to a new DWORD parameter. For this enter the name in the **BDE** in the activated field, where on default the name **New parameter No1** has already been entered, and then click a mouse in anywhere in the Registry Editor dialog window. The entered name of the new DWORD parameter will be automatically saved.
8. Set the value to the new string parameter. Make a double click with a left mouse key upon the parameter's name for this. **Edit DWORD value** will open in result.



- a. Assign 2 value to the **BDE** parameter (1).
- b. Click **OK** to save the changes (2).
9. DWORD **BDE** parameter will be created in result of operations in the registry (2).

10. To set up the connection to the external database do the following operation in the **Data Link properties** window:

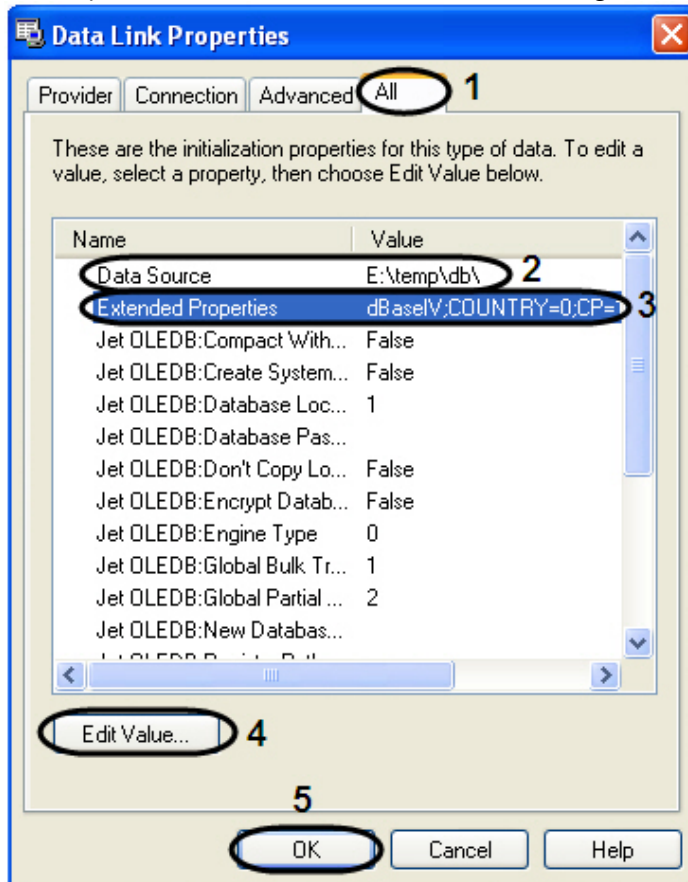
a. Go to the **Provider** tab.



b. From the **Providers OLE DB** list select the **Microsoft Jet 4.0 OLE DB Provider** point.

c. Then go to the **All** tab (1).

- d. Set the path to .dbf files in the **Data Source** value range (2).

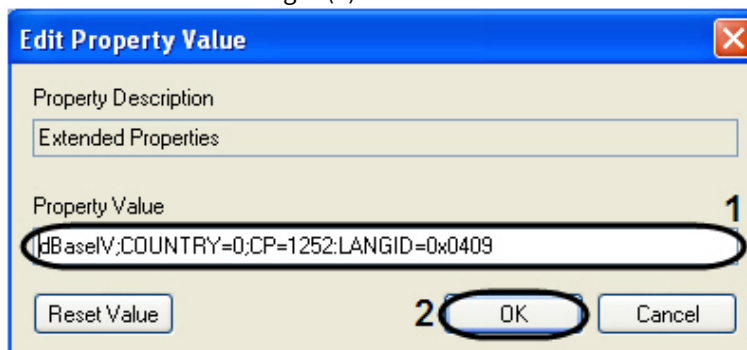


- e. In the value range **Extended Properties** state **dBase IV;COUNTRY=0;CP=1252;LANGID=0x0409** (3).

Note.

The value **COUNTRY=0;CP=1252;LANGID=0x0409** is stated only in case of being stored in DOS-coding.

- f. To change the property value click the **Change value...** button (4).
 g. In the opened **Edit property value** window enter the changes in the **Property value** field (1).
 h. Click **OK** to save the changes (2).



- i. Click **OK** to close the window **Edit property value** (5).

As the result the External Plates Database in DBF format has been setup.

6.6 Appendix 6. The Debug windows


6.6.1 ULPR server debug window

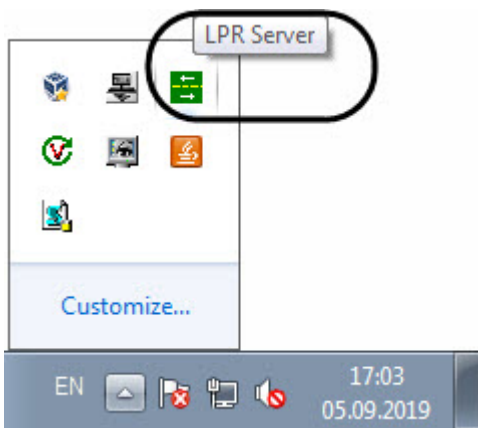
The **ULPR server debug window** is designed for operation control and debugging of the **LPR channel** object registered in the system.

The launch of the ULPR server debug window

Attention!

The launch of the debug window is possible only if the **Debug mode** is enabled (for more details, see [Enable, disable, change the mode of the Debug window](#)).

The launch of the ULPR server debug window is carried out from the notification area on the Windows taskbar. To launch the Debug window, it is necessary to click twice on the sign with the left-mouse  button.

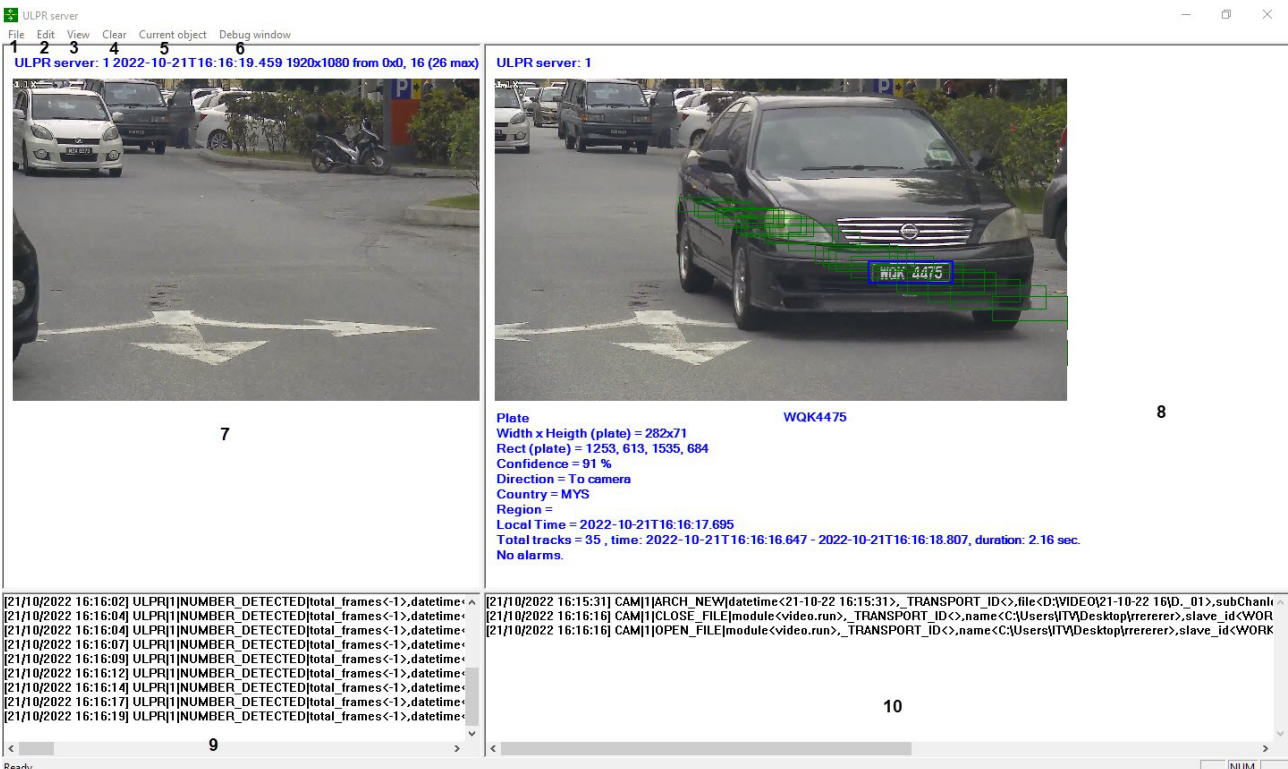


As a result, the **ULPR server** window will open.



The ULPR server debug window interface

The **ULPR server** debug window contains the interface components described in the table below.



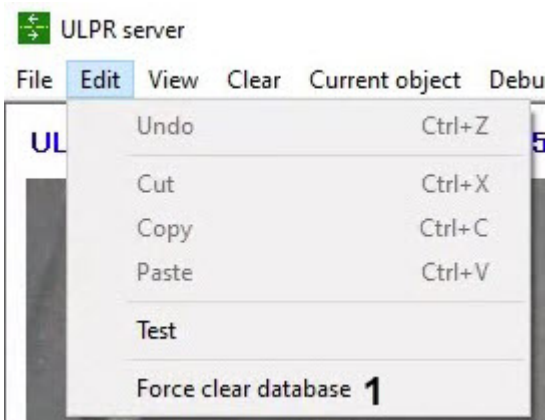
Num ber	Name	Description

1	The File menu	Access to the Edit Nearest Time button (see Editing the Nearest Time for the specified remote recognition module) Access to the Exit button
2	The Edit menu	Access to the operations with text Access to the Force clear database button (see The forced clearing of the license plate numbers database)
3	The View menu	Access to the Status bar button used to display or hide the status bar of the Debug window in the lower part of the window
4	The Clear button	Clearing all areas
5	The Current object menu	Access to the selection of the LPR channel with which the operation will be carried out
6	Debug window	-
7	The preview area of the video image from the camera	The video image from the camera and the data on the video stream are displayed in this area
8	The preview area of the frame with the last detected vehicle	The frame with the information on the last detected vehicle is displayed in this area
9	The preview area of the events from the LP recognition channel	The events of the LPR channels are displayed in this area For the NUMBER_DETECTED event to include the entire frame (the image parameter) and the cropped enlarged part with the number (the image_plate parameter), encoded using Base64, you must set the 1 value in the string parameter of the PicturesInNumberDetectedEvent registry key (see Registry keys reference guide)
10	The preview area of the events from cameras	The events from cameras are displayed in this area

The operations in the ULPR server debug window

The forced clearing of the license plate numbers database

To force the clearing of the license plate numbers database, it is necessary to select the **Force clear database (1)** option in the **Edit** menu in the **ULPR server** Debug window.



As a result of executing this procedure, all the license plates recognized earlier than the archive size allows (see [Configuration of archive size in the database](#)) will be forcibly deleted from the Active Monitor database.

Attention!

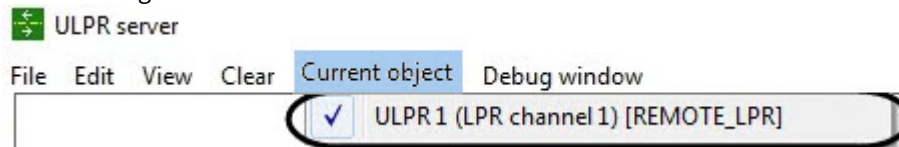
- When the archive size is set to 1 day, all the records recognized earlier than a day before the launch of the forced database clearing will be deleted.
- The use of the **Force clear database** command does not physically reduce the size of the **LPREX** database.

The forced clearing of the license plate numbers database using the Debug window has been completed.

Editing the Nearest Time for the specified remote recognition module

To edit the **Nearest Time** for the specified LP recognition channel on which the remote recognition module is used, it is necessary to do the following:

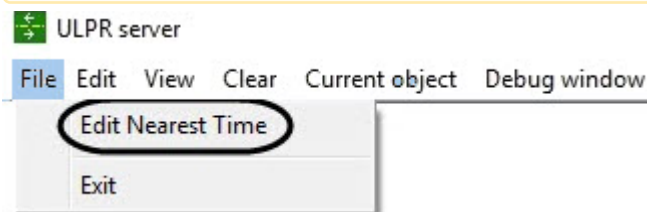
1. Select the **LPR channel** object in the **Current object** menu in the **ULPR server** Debug window on which the remote recognition module is used.



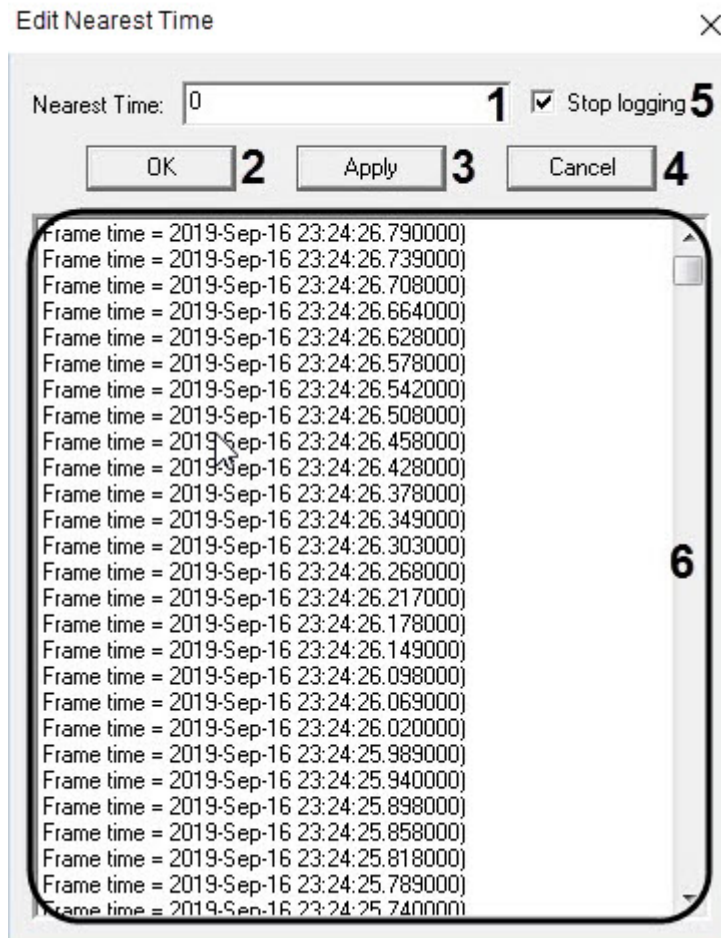
2. In the **File** menu of the **ULPR server** debug window, select the **Edit Nearest Time** option.

Attention!

This option is available only if the remote recognition module is used on the selected **LPR channel** object. Before setting up, it is necessary to synchronize the time of both the Server and the camera executing the LP recognition.



As a result, the **Edit Nearest Time** window will open.



- In the **Nearest Time** (1) field, enter the time difference value between the moments of receiving the frame and event on the LP recognition.

Note

To set up the optimum value, it is necessary to subtract the nearest frame time in the list (6) from the recognition event time and convert the achieved result to milliseconds.

- Click the **OK** button (2) to apply the changes and write the specified value in the Windows registry.

Note

- Click the **Apply** (3) button to apply the changes, but the specified value will not be written in the Windows registry.
- Click the **Cancel** (4) button to cancel the changes. If the specified value differs from the registry one, the dialog box will open. In this dialog box, you need to click **Yes** if it is necessary to apply the changes and write the specified value in the Windows registry. Otherwise, click **No**.

- Set the **Stop logging** (5) check box if it is necessary to stop the time logging of all the received frames from the camera and the recognition time which are displayed in the area (6).

Note

The time difference in milliseconds between the moments of receiving the frame and event on the LP recognition is approximate and varies from event to event with the same **Nearest time** value.

The **Nearest time** editing for the specified remote recognition module has been completed.

6.6.2 UrlServer debug window

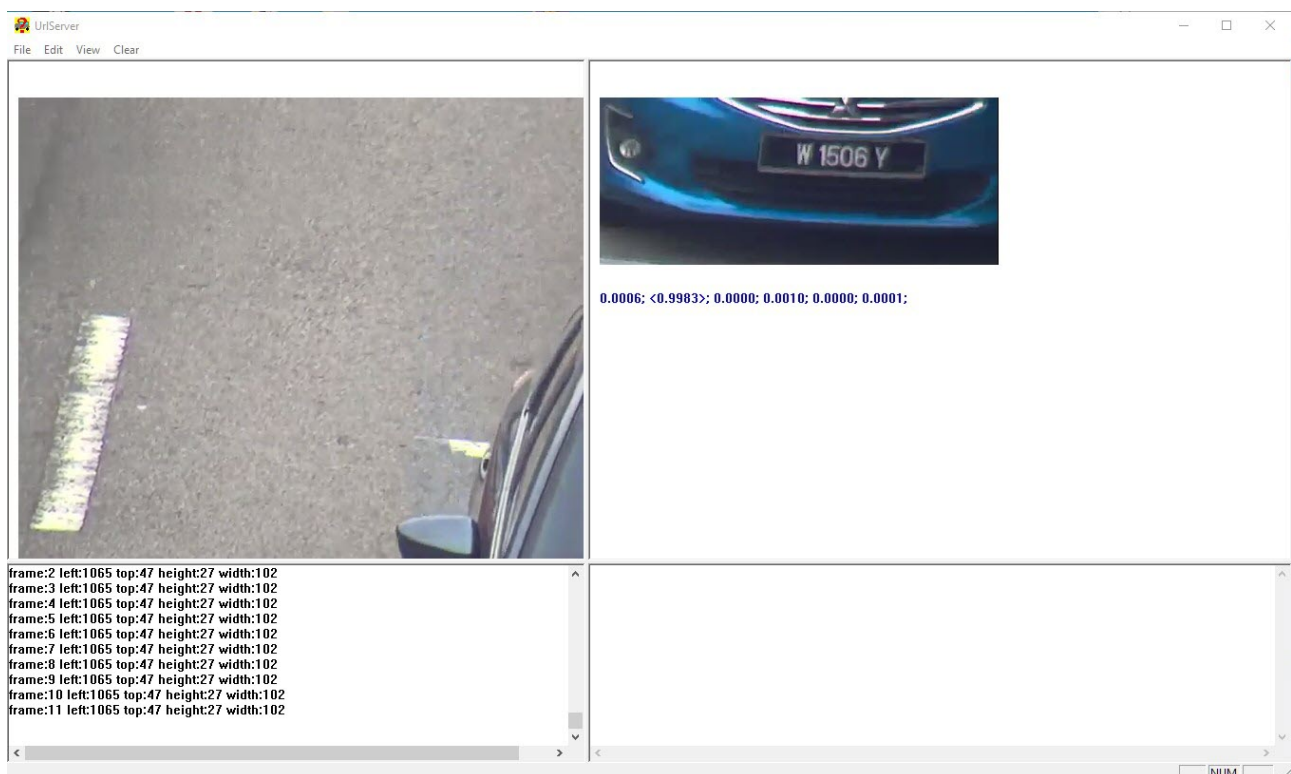
The launch of the UrlServer debug window

Attention!

The launch of the debug window is possible only if the **Debug mode** is enabled (for more details, see [Enable, disable, change the mode of the Debug window](#)) and the **UrlServerFrameBuffer** registry key value is not **0** (for details, see [Registry keys reference guide](#), for more information about working with the registry, see [Working with Windows OS registry](#)).

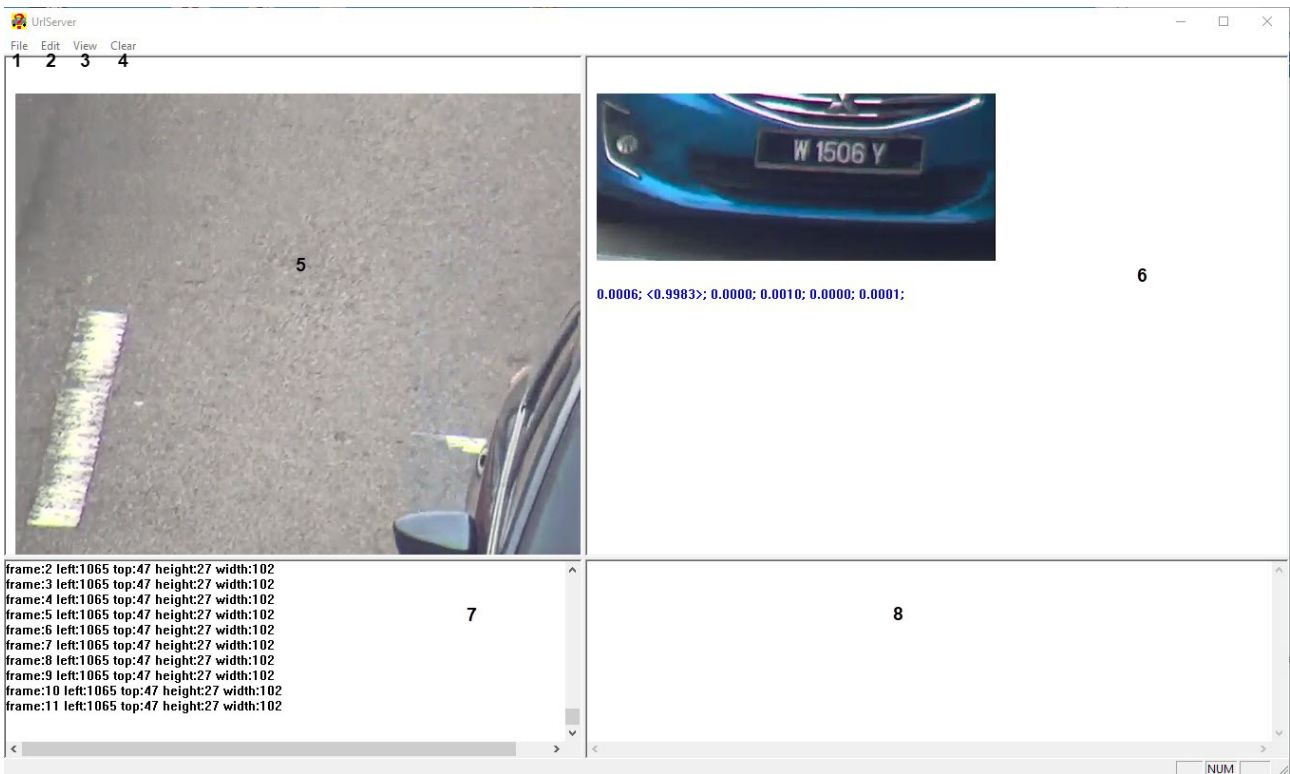
The launch of the **UrlServer** debug window is carried out from the notification area on the Windows taskbar. To launch the Debug window, it is necessary to click twice on the sign with the left-mouse button.

As a result, the **UrlServer** window will open.



The UrlServer debug window interface

The **UrlServer** Debug window contains the interface components described in the table below.



Number	Name	Description
1	File menu	Access to the Exit button
2	Edit menu	Access to the operations with text
3	View menu	Access to the Status Bar button, designed to show or hide the debug window status panel at the bottom of the window
4	The Clear button	Clearing all areas
5	The preview area of a frame from the camera	In this area, the video image from the camera received by the UriServer module is displayed
6	The preview area of a frame prepared for recognition	In this area, the frame prepared for recognition and information on the results of recognition of this frame are displayed
7	The preview area of POST requests from UrmLpr	In this area, all processed POST requests from UrmLpr are displayed

8	The preview area of error events	In this area, all errors that are written to the log file are displayed
---	----------------------------------	---

6.7 Appendix 7. The utilities description to work with Auto PSIM software

6.7.1 The utilities to work with AUTO-Uragan recognition module

KeyInfo.exe utility for reading the Uragan keys

General information about the KeyInfo.exe utility

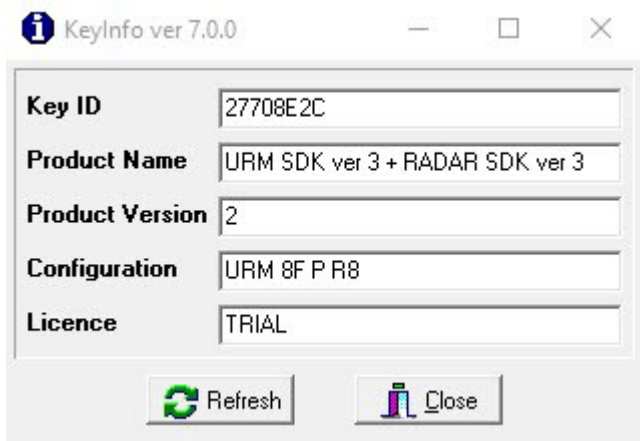
The KeyInfo.exe utility is designed for checking the configuration of the current Guardant hardware protection key.

Starting and closing the utility

To start the KeyInfo.exe utility, do one of the following:

1. Start the utility from the **Start** menu. Click Start -> Programs -> Axxon PSIM -> Tools -> Uragan keys reading.
2. Start the KeyInfo.exe executive file in the <Auto PSIM installation directory>\Modules\UrmLpr\Auto_uragan\KeyInfoBin catalogue.

The **KeyInfo** dialog box will open.

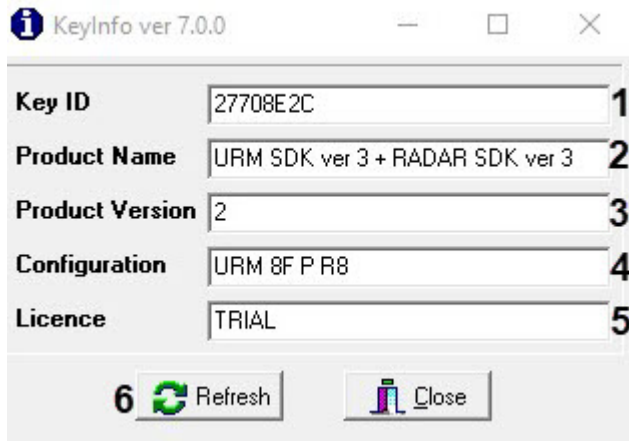


To close the utility click the **Close** button or  button.

Using the KeyInfo.exe utility

The KeyInfo.exe utility allows checking the configuration of the current Guardant hardware protection key. The following information is displayed in the utility window:

1. The unique key identifier in the **Key ID** field (1).



2. The product name in the **Product Name** field (2).
3. The key version in the **Product Version** field (3).
4. The key configuration in the **Configuration** field (4). Decryption of the main values that can be used in the license key:
 - **URM** – module name.
 - **R** – displays the maximum number of radars that can be connected to the *AUTO-Uragan* software module.
 - **F** – displays the maximum number of "fast traffic" lanes (for roads with free passage of vehicles, without checkpoints, barriers, etc.), on which you can configure LP number detection.
 - **S** – displays the maximum number of "slow traffic" lanes (for roads with limited traffic, with checkpoints, barriers, etc.), on which you can configure the LP number detection.
 - License for simultaneous work with different sizes. If there is the **L** symbol, then the key allows simultaneous operation of different sizes. If there is no **L** symbol, then the key allows the operation of only one standard size.
 - **VS** – displays the maximum number of lanes on which speed measurement by video is available.
 - **P** – pattern recognition of all countries. In older versions, there may be **C1** – all countries except the countries of North and South America.
 - **CAC** – support for iris control.
 - **PAD** – support for fixing violations at the pedestrian crossing (not providing benefits to the pedestrian).
 - **TL** – support for fixing violations at the intersection (crossing the intersection on the red traffic light, leaving the stop line on the red traffic light).
 - **VIOL** – support for fixing violations of road marking and signs non-compliance.
 - **AVS** – support for fixing speeding violations on a road section.
 - **WSD** – support for determining the type of vehicle and detecting the windshield of the vehicle.
5. The license type in the **Licence** field (5).
6. To update the information displayed in the utility window, click the **Refresh** (6) button.

PatCgfr.exe utility for active patterns configuration of Auto-URAGAN module

General information about PatCgfr.exe utility

PatCgfr.exe utility is designed for creating, editing and removing configurations. Configuration in this case means the set of templates using at plates recognizing.

The configuration changing is possible after the updating of hardware protection key (see [RTKeyUpdate.exe utility for updating the Uragan keys](#)).

⚠ Attention!

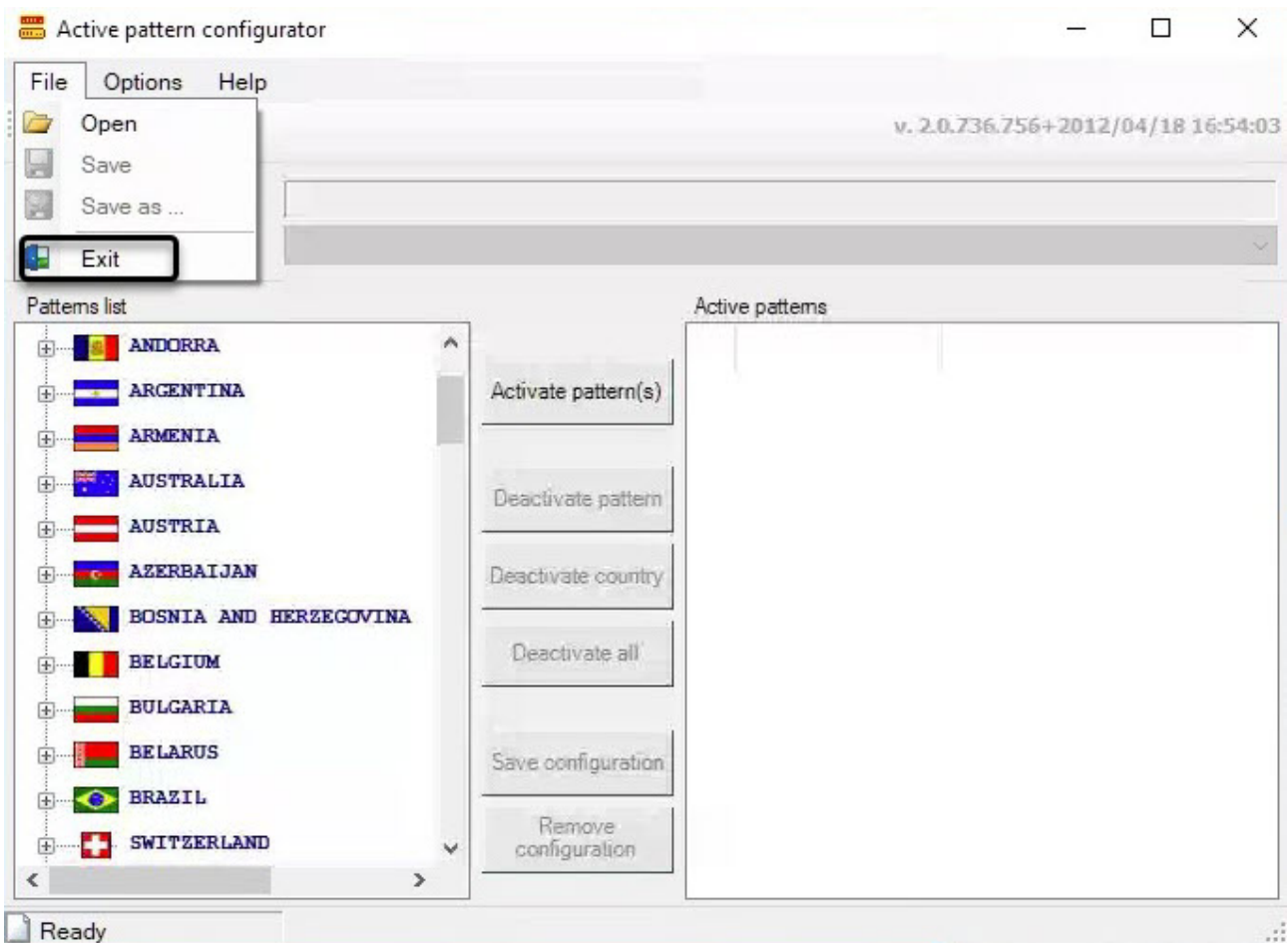
Close the *Auto PSIM* software before the configuration changing.

Starting and closing the PatCfgr.exe utility

You can launch the PatCfgr.exe utility in one of the following ways:

1. From the **Start** menu.
 - To configure the SDK templates for version 3.5, click **Start** menu → **Axxon PSIM** → **Utilities** → **Uragan Pattern Configurator 3.5**.
 - To configure the SDK templates for version 3.7, click **Start** menu → **Axxon PSIM** → **Utilities** → **Uragan Pattern Configurator 3.7**.
 - To configure the SDK templates for version 3.8, click **Start** menu → **Axxon PSIM** → **Utilities** → **Uragan Pattern Configurator 3.8**.
2. From the *Auto PSIM* installation directory.
 - For SDK version 3.5: <Axxon PSIM installation directory>\Modules\UrmLpr\Auto_uragan\Bin
 - For SDK version 3.7: <Axxon PSIM installation directory>\Modules64\UrmLpr\Auto_uragan\UrmSDK3.7\PatCfgr\Bin
 - For SDK version 3.8: <Axxon PSIM installation directory>\Modules64\UrmLpr\Auto_uragan\UrmSDK3.8\PatCfgr\Bin

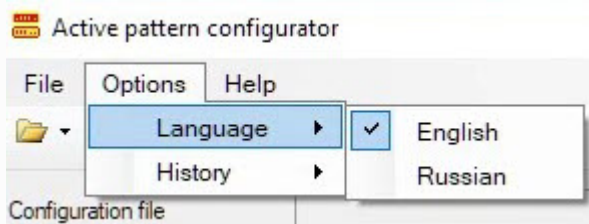
After you start the PatCfgr.exe utility, the **Active pattern configurator** window opens.



Note

To change the interface language of the PatCfgr.exe utility, do the following:

1. Select **Language** from the **Settings** menu.



2. Select the required interface language.

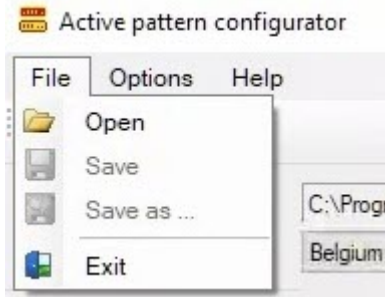
Click the **X** button or select **Exit** from the **File** menu to close the PatCfgr.exe utility.

Using the PatCfgr.exe utility

Open the configuration

To open the configuration, do the following:

1. Select **Open** from the **File** menu to open the configuration file.

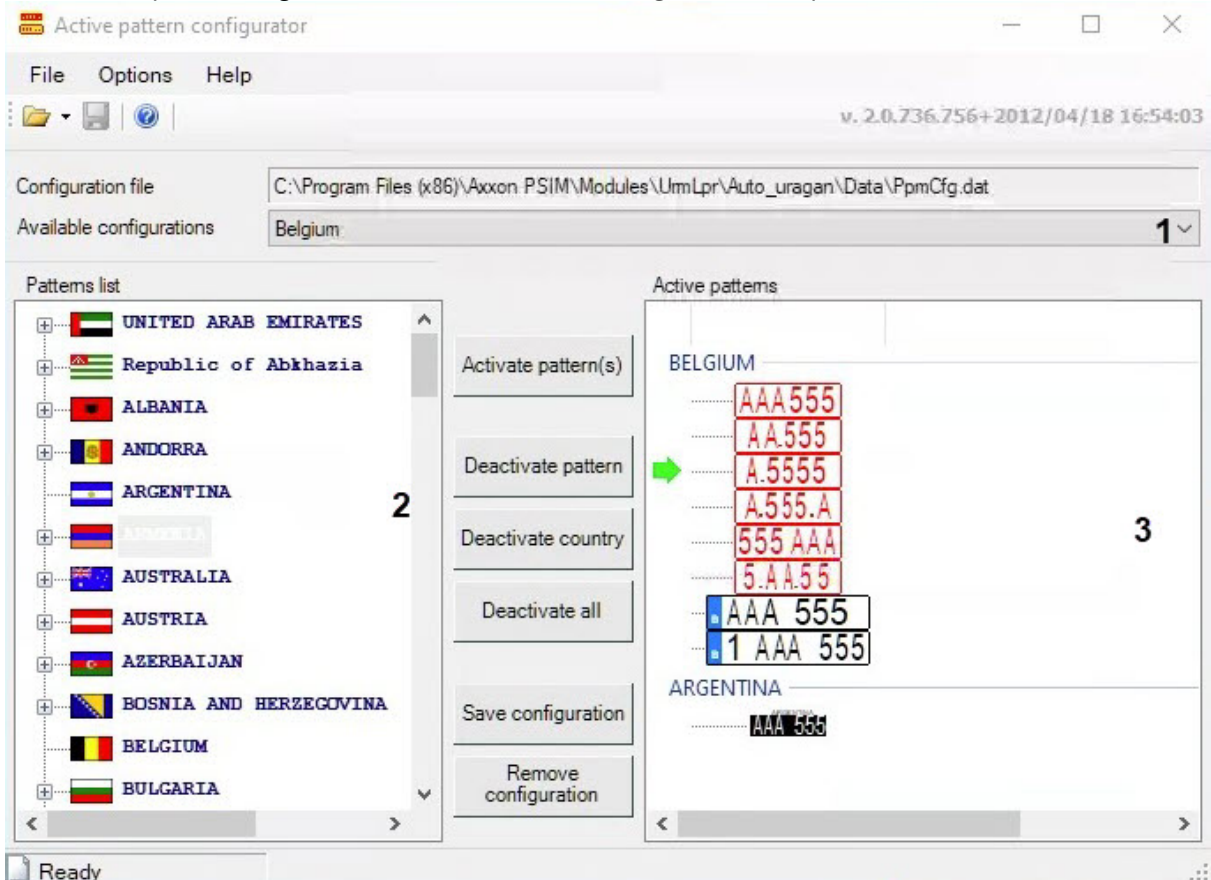


Attention!

The location of the PpmCfg.dat configuration file depends on the current SDK version (see [Setting up the AUTO-Uragan module](#)):

- For SDK version 3.5: <Axxon PSIM installation folder>\Modules\UrmLpr\Auto_uragan\Data\PpmCfg.dat
- For SDK version 3.7: <Axxon PSIM installation folder>\Modules64\UrmLpr\Auto_uragan\UrmSDK3.7\Data\PpmCfg.dat
- For SDK version 3.8: <Axxon PSIM installation folder>\Modules64\UrmLpr\Auto_uragan\UrmSDK3.8\Data\PpmCfg.dat

2. Select the required configuration from the **Available configurations** drop-down list (1).



3. List of available patterns is displayed in the **Patterns list** field (2).
4. Pattern list of the selected configuration is displayed in the **Active patterns** field (3).

Configuration is open.

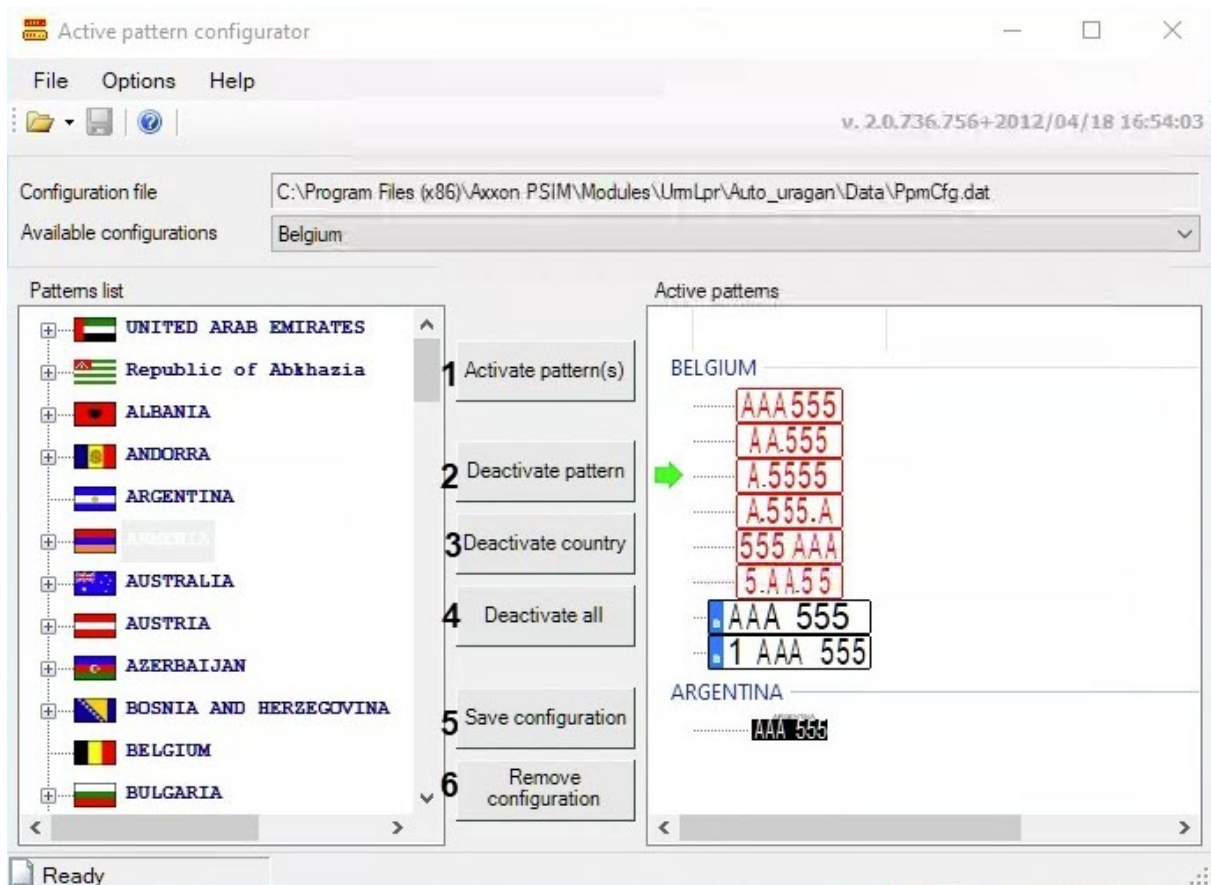
Edit the list of configuration patterns

To edit the list of configuration patterns, do the following:

1. Select the pattern in the pattern list and click **Activate pattern(s)** to add it to configuration (1). If the country is selected in the Patterns list, all patterns of this country will be added to the list of active patterns.

Attention!

Maximum number of countries in configuration is 8.



2. Select the pattern and click **Deactivate pattern** to remove it from the list of active patterns (2).

Note.

Selected pattern is marked by sign  .

3. Select the pattern of some country and click **Deactivate country** to remove all patterns of this country from the list of active patterns (3).
4. Click **Deactivate all** to clear the list of active patterns (4).
5. Click **Save configuration** to save all changes made in configuration (5).
6. Click **Remove configuration** to remove selected configuration from the configuration file (6).

Editing the list of configuration patterns is completed.

RTKeyUpdate.exe utility for updating the Uragan keys

General information about the RTKeyUpdate.exe utility

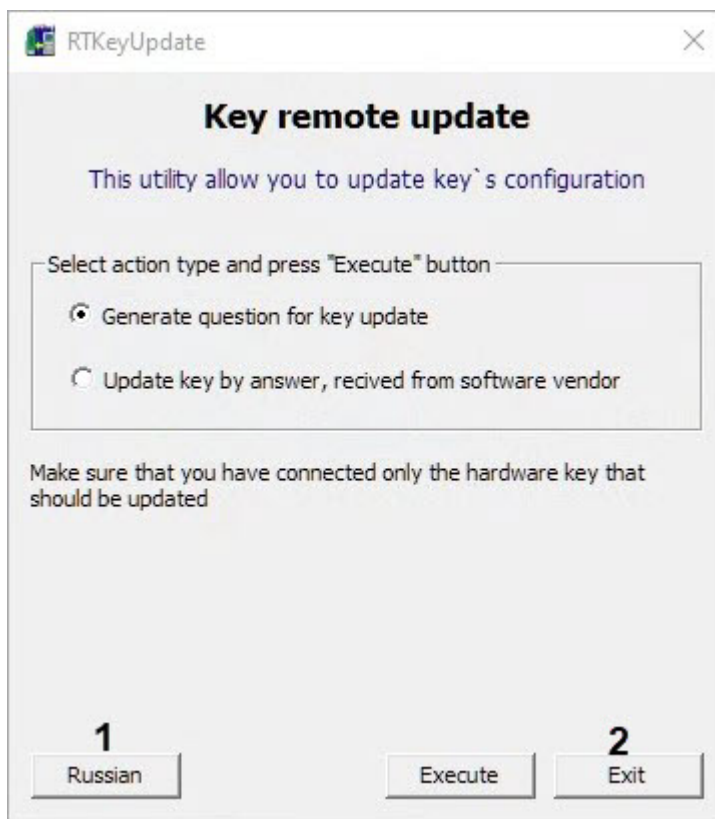
The RTKeyUpdate utility is designed for the Guardant hardware protection key update. New update allows starting the templates configurator and licensing the different plate types and sizes.

Before starting the RTKeyUpdate.exe utility make sure that the key to be updated is connected to the Server.

Starting and closing the RTKeyUpdate.exe utility

Start the RTKeyUpdate.exe utility in the <Auto PSIM installation directory>\Modules\UrmLpr\Auto_uragan\Bin\ folder.

The **RTKeyUpdate** window will open.



Note.

Click **Russian** to switch the utility language to Russian (1).

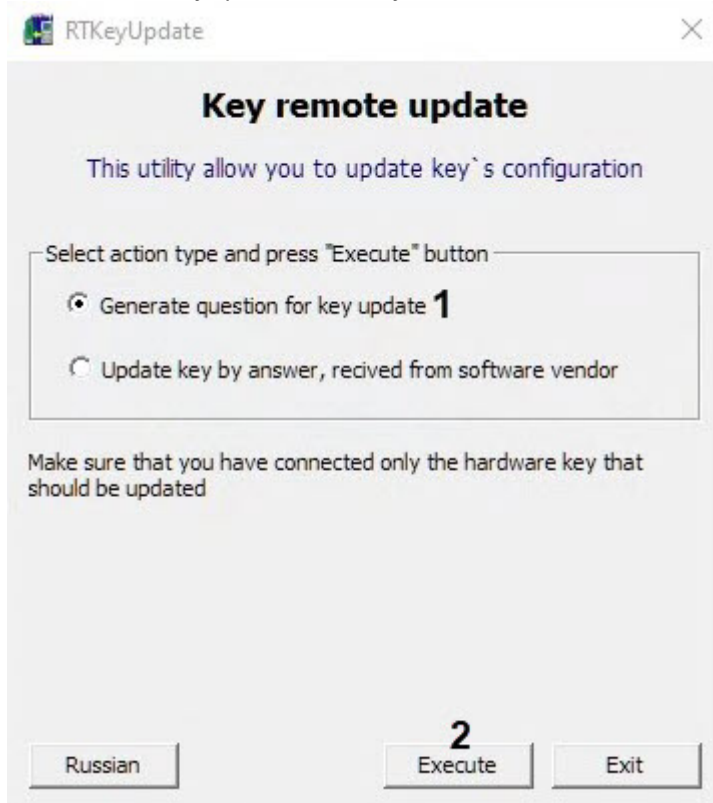
To close the RTKeyUpdate.exe utility click **Exit** (2).

Using the RTKeyUpdate.exe utility

Generation the query file for key updating

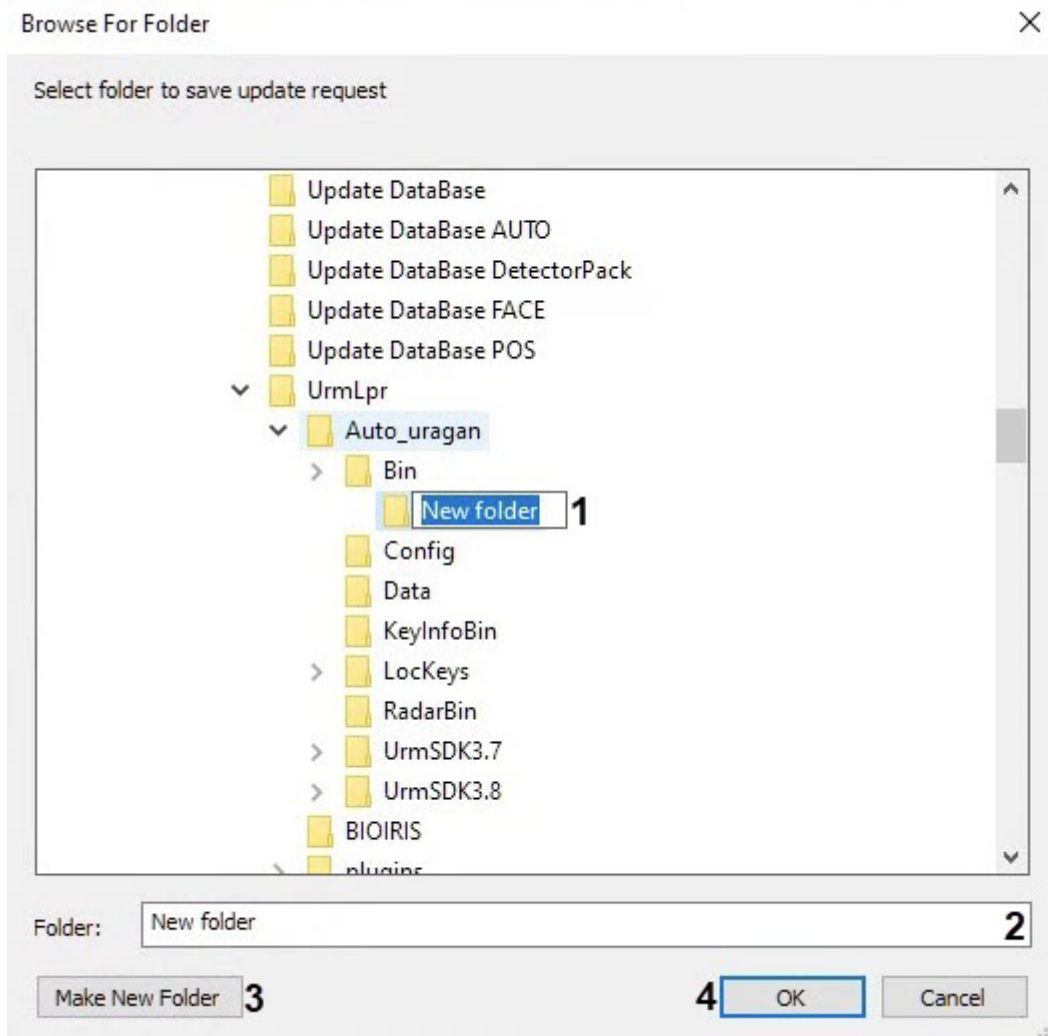
To generate the request file for key update, do the following:

1. Launch the RTKeyUpdate.exe utility.



2. Set the **Generate question for key update** checkbox (**1**).
3. Click **Execute** (**2**).

4. Select the folder for saving the request file in catalogues tree (1).



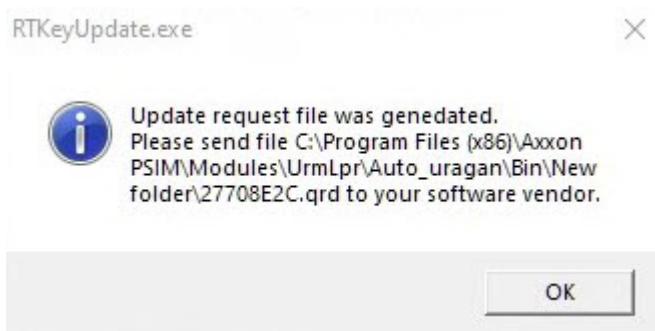
Note.

To create the query file in New folder, do the following:

- a. Enter the folder name in the **Folder** field (2).
- b. Click **Make New Folder** (3).

5. Click **OK** (4).

The message about successful saving the request file will be displayed.



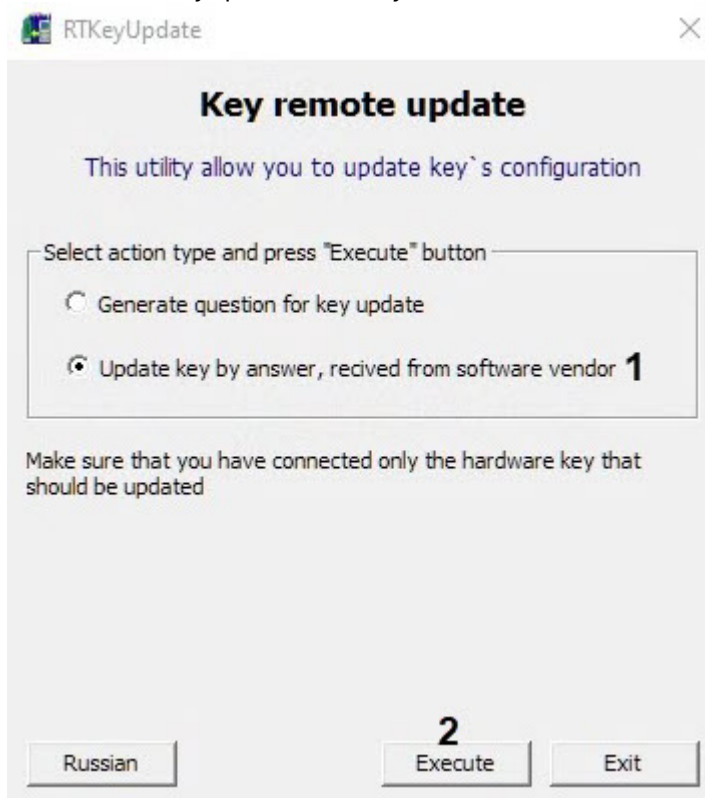
The request file generation is completed.

After the request file is generated send it to the manager of AxxonSoft company with whom the update has been agreed and wait for the dmp-file.

Key update by answer received from software vendor

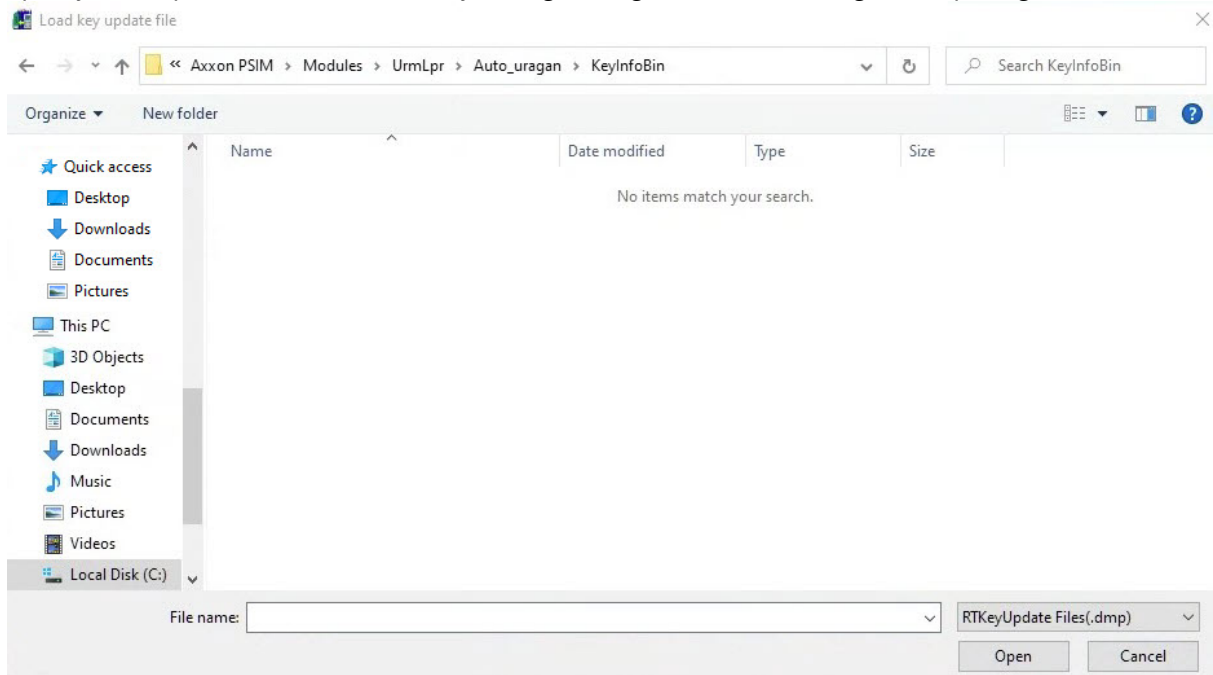
The key is updated after receiving the dmp-file from the manager of AxxonSoft company. To update the key, do the following:

1. Launch the RTKeyUpdate.exe utility.



2. Set the **Update key by answer received from software vendor** checkbox (1).
3. Click **Execute** (2).

4. Specify the dmp-file that has been sent by manager using the standard dialog of file opening.



The update validation can be performed using the KeyInfo.exe utility (see [KeyInfo.exe utility for reading the Uragan keys](#) section).

The key update by answer received by software vendor is completed.

6.7.2 The utilities to work with VT recognition module

LicenceViewer.exe utility for reading the VT keys

General information about the LicenceViewer.exe utility

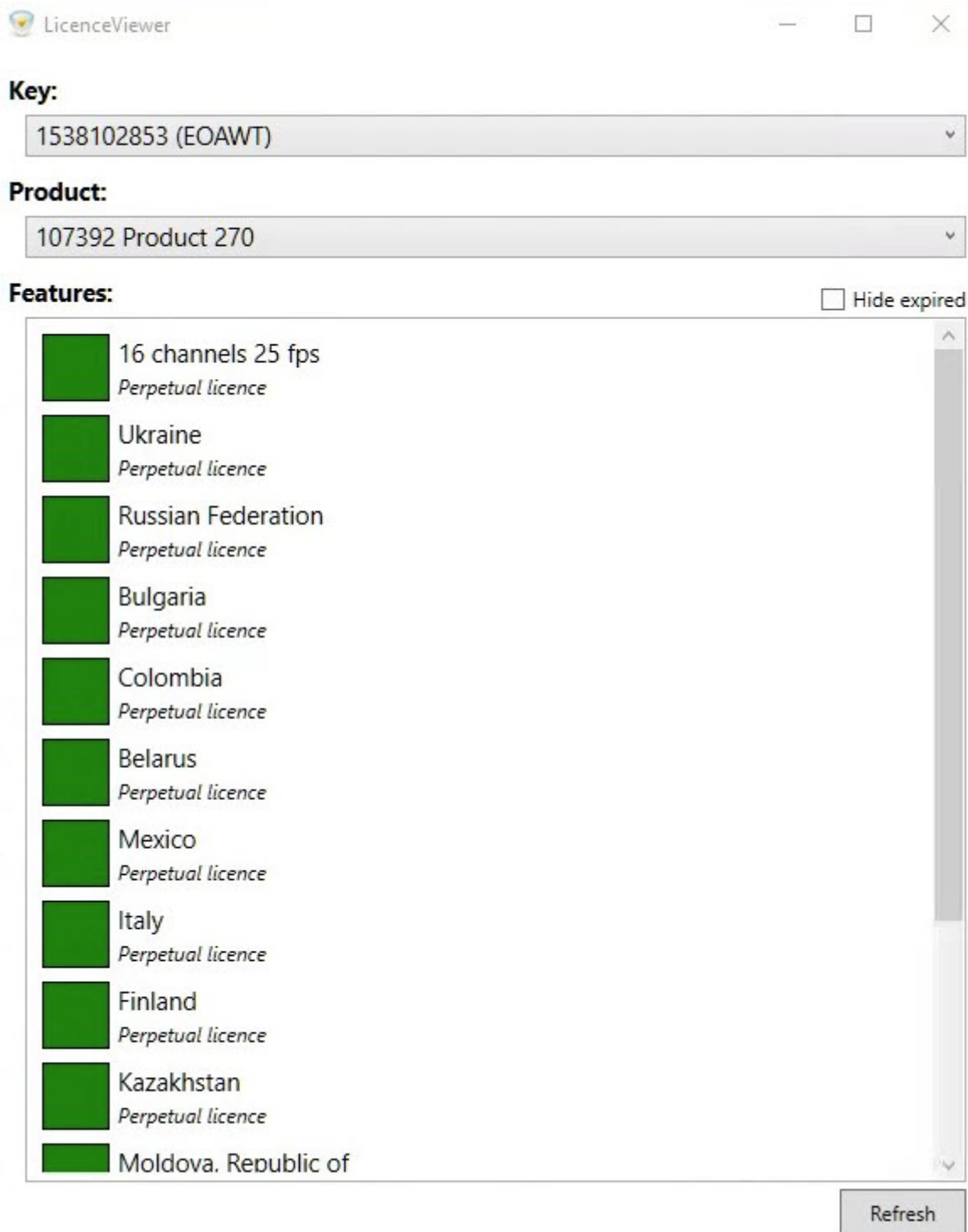
The LicenceViewer.exe utility is designed for checking the configuration of the current Hasp hardware protection key.


Starting and closing the LicenceViewer.exe utility

To start the LicenceViewer.exe utility, do one of the following:

1. Start the utility from the **Start** menu. Click Start -> Programs -> Axxon PSIM -> Tools -> VIT keys reading. Start the KeyInfo.exe executive file from the <Auto PSIM installation directory>\Modules\UrmLpr\VIT_<SDK version>\LicenseViewer catalogue.

The **LicenceViewer** dialog box will open.



To close the utility click  .

Using the LicenceViewer.exe utility

The LicenceViewer.exe utility allows checking the configuration of the current Hasp hardware protection key. The following information is displayed in the utility window:

1. The unique key identifier in the **Key** field (1).

The screenshot shows the LicenceViewer application window. At the top, the title bar reads "LicenceViewer". Below the title bar, there are three main sections:

- Key:** A dropdown menu showing "1538102853 (EOAWT)" with a small "1" and a downward arrow on the right.
- Product:** A dropdown menu showing "107392 Product 270" with a small "2" and a downward arrow on the right.
- Features:** A list of features, each with a green square icon and the text "Perpetual licence". The features listed are:
 - 16 channels 25 fps
 - Ukraine
 - Russian Federation
 - Bulgaria
 - Colombia
 - Belarus
 - Mexico
 - Italy
 - Finland
 - Kazakhstan
 - Moldova, Republic of
 A small "3" is positioned to the right of the "Colombia" feature. To the right of the list is a checkbox labeled "4 Hide expired". At the bottom right of the features list is a "5 Refresh" button.

2. The product name in the **Product** field (2).
3. Functional modules supported by the key in the **Features** (3).

To hide expired functional modules, set the **Hide expired** checkbox (4).

To update the information displayed in the utility window click **Refresh** (5).

PresetEditor.exe utility for active patterns configuration of VT module

General information about PresetEditor.exe utility

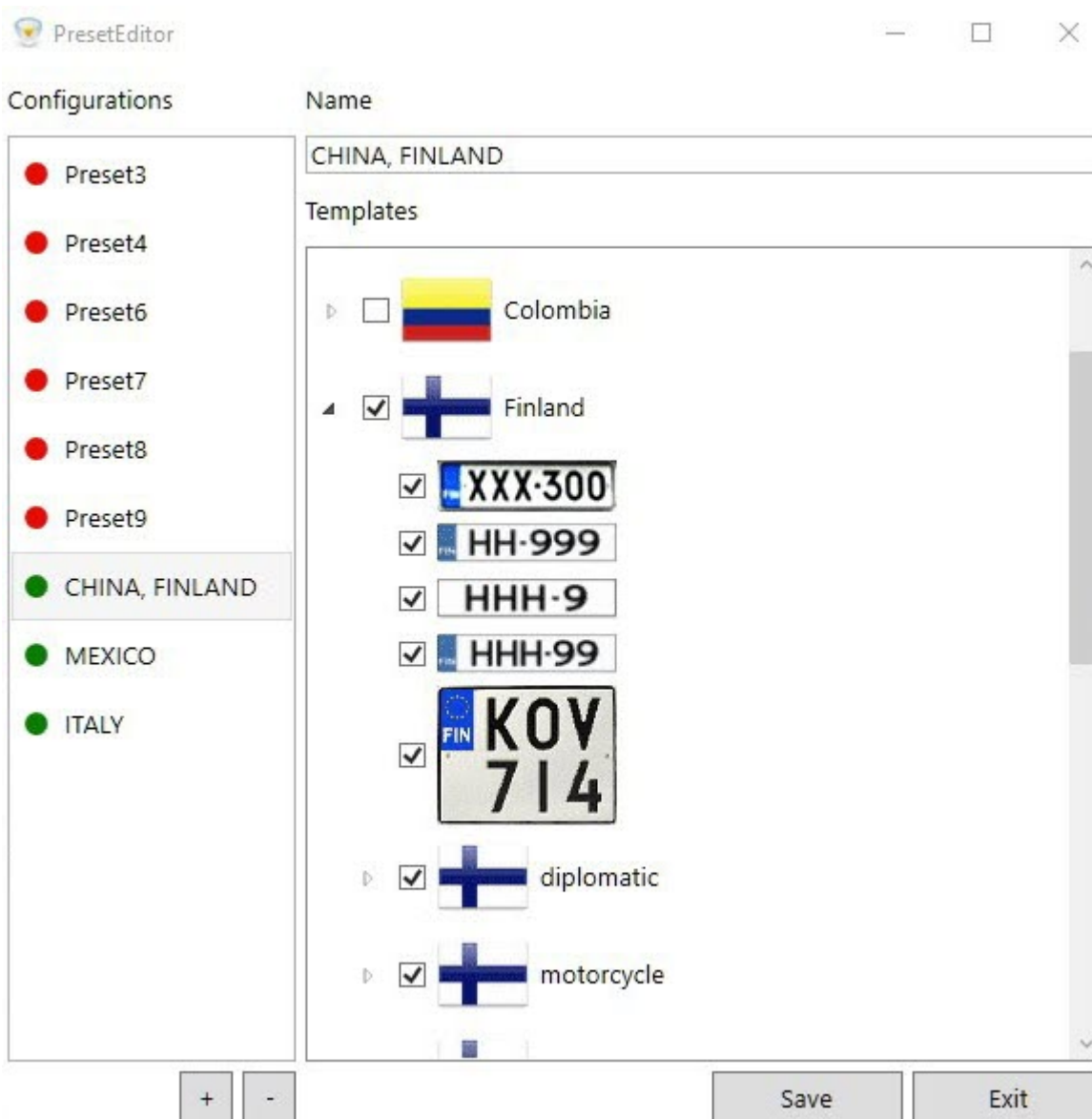
PresetEditor.exe utility is designed for creating, editing and removing template configurations which will be used for LP recognizing using the VT module.


Starting and closing the PresetEditor.exe utility

To start the PresetEditor.exe utility, do the following:

1. Start the utility from the Start menu. Click **Start -> Programs -> Axxon PSIM -> Utilities -> VIT Pattern Configurator**.
2. Start the PatCfgr.exe executive file in the *<Auto PSIM installation directory>\Modules\UrmLpr\VT_<SDK version>\PresetEditor* catalogue.

The following window will open.



Click the **Exit** button or  button to close the PresetEditor.exe utility.

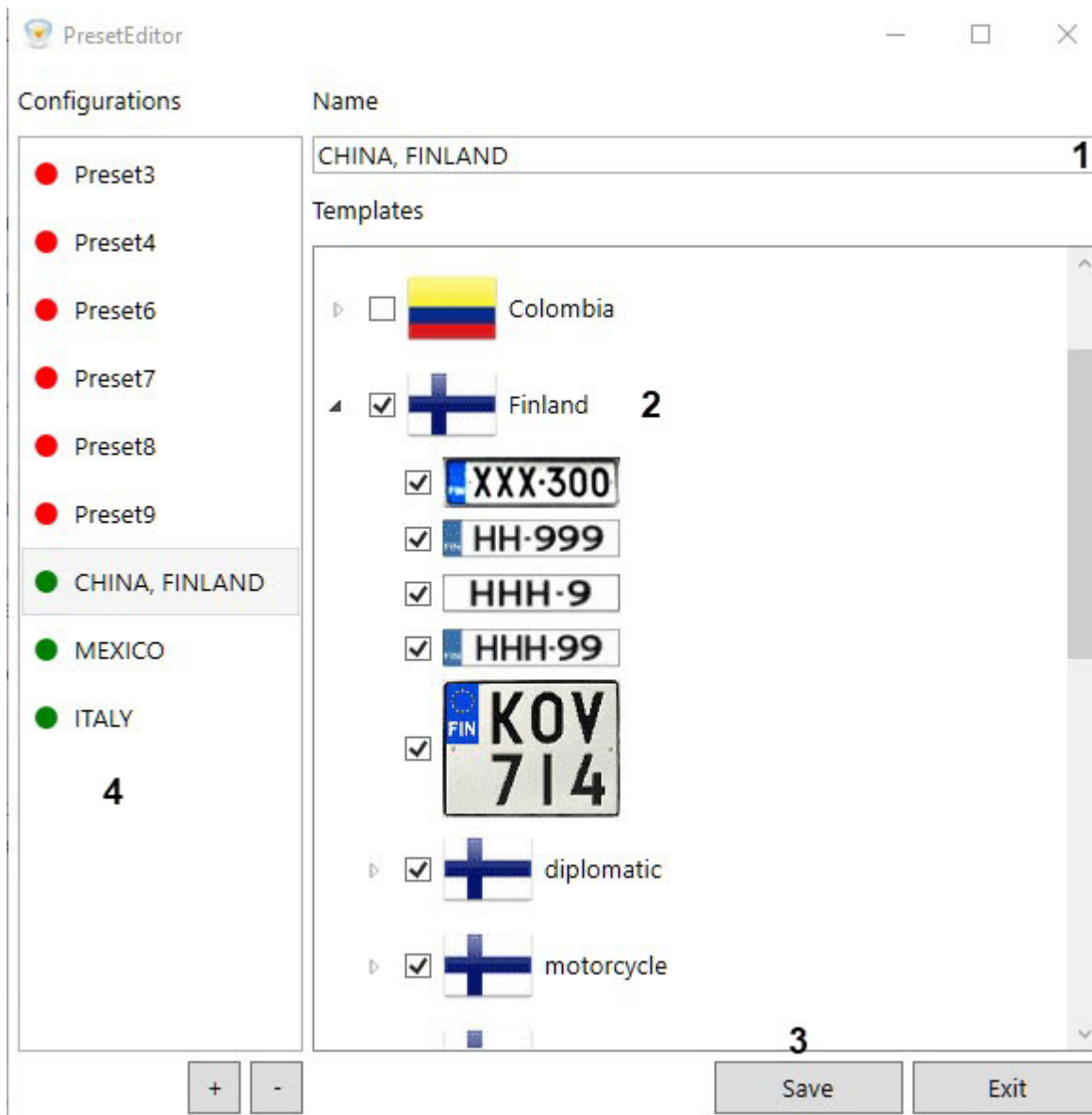
Using the PresetEditor.exe utility

Attention!


To ensure the proper operation of the PresetEditor.exe utility, it is necessary to grant the read/write access for the current Windows user to the following files:


- <Auto PSIM installation directory>\Modules\UrmLpr\VIT_<SDK version>\PresetEditor\features.EOAWT.xml
- C:\ProgramData\VIT\LprPresetDemo\presets.xml

The PresetEditor.exe allows creating and editing of template configurations which are used for LP recognition using the VT recognition module.



To create a template configuration, do the following:

1. Click the  button to create new configuration.
2. Enter a name of configuration in the field (1).
3. To add template to configuration set checkboxes close to corresponding template in the list (2). if the country is selected in the Templates list, all templates of this country will be added.
4. To save configuration click the **Save** button (3).

To remove configuration select the corresponding configuration from the list (4) and click the  button.

To edit existing configuration select it in the list (4) and repeat steps 3-4.

6.7.3 LprFsTool.exe utility for loading images of recognized license plates from database to disk

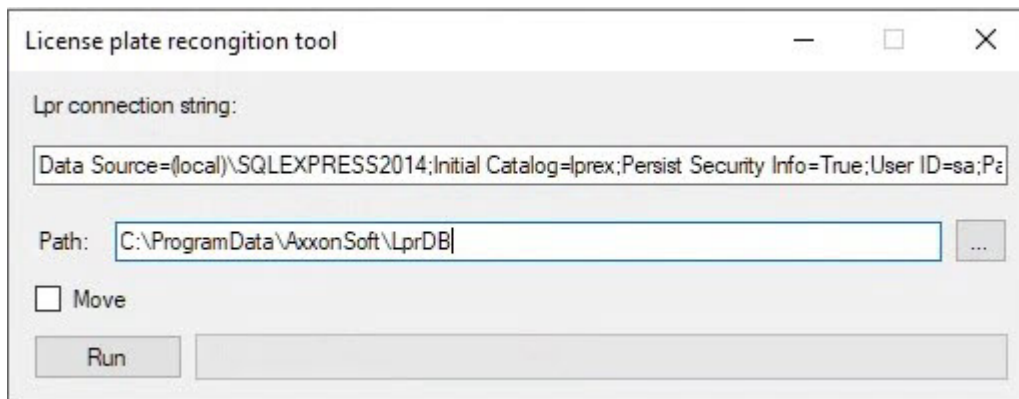
General information about the LprFsTool.exe utility


The LprFsTool.exe utility is designed for loading images of recognized license plates from the database to the disk.

Starting and closing the LprFsTool.exe utility

To start the LprFsTool.exe utility, start the LprFsTool.exe executive file located in the <Axxon PSIM installation folder>\Modules64.

When the utility is started the **License Plate Recognition Tool** window appears.




To close the utility click .

Using the LprFsTool.exe utility

Load images of recognized license plates from the database to the disk as follows:

1. In the **Lpr connection string** field (1) enter the connection string for the license plates database.

2. In the **Path** (2) field specify manually or using the  button (3) the path to the folder where the images will be loaded to.

Info

If "user-defined text" is specified in the **Path** field, then the folder with this name will be created in the same folder where there is the utility.

3. Set the **Move** checkbox (4) checked if the images are to be deleted from the database after they are moved to the disk.

Info

If the **Move** checkbox is set unchecked, then the images are not deleted from the database after they are moved to the disk.

4. Click the **Run** button (5) to load the images to the specified folder. As a result the total images of recognized license plates loaded from the database are displayed.

All ok! Total 32 plate numbers processed.

6.7.4 TestAppTMD.exe utility for setting up the IV vehicle detection

General information about TestAppTMD.exe utility and its licensing

General information about TestAppTMD.exe utility

The TestAppTMD.exe utility is designed for creating a settings file for the *IV vehicle detection* module (see [Setting up the IV vehicle detection parameters](#)).

Licensing of the TestAppTMD.exe utility

To license the TestAppTMD.exe utility, it is necessary to run the GetHardwareID.exe utility on behalf of the administrator at <Auto PSIM installation directory>\Modules64\, then copy and transfer the **HardwareID** to the AxxonSoft managers.

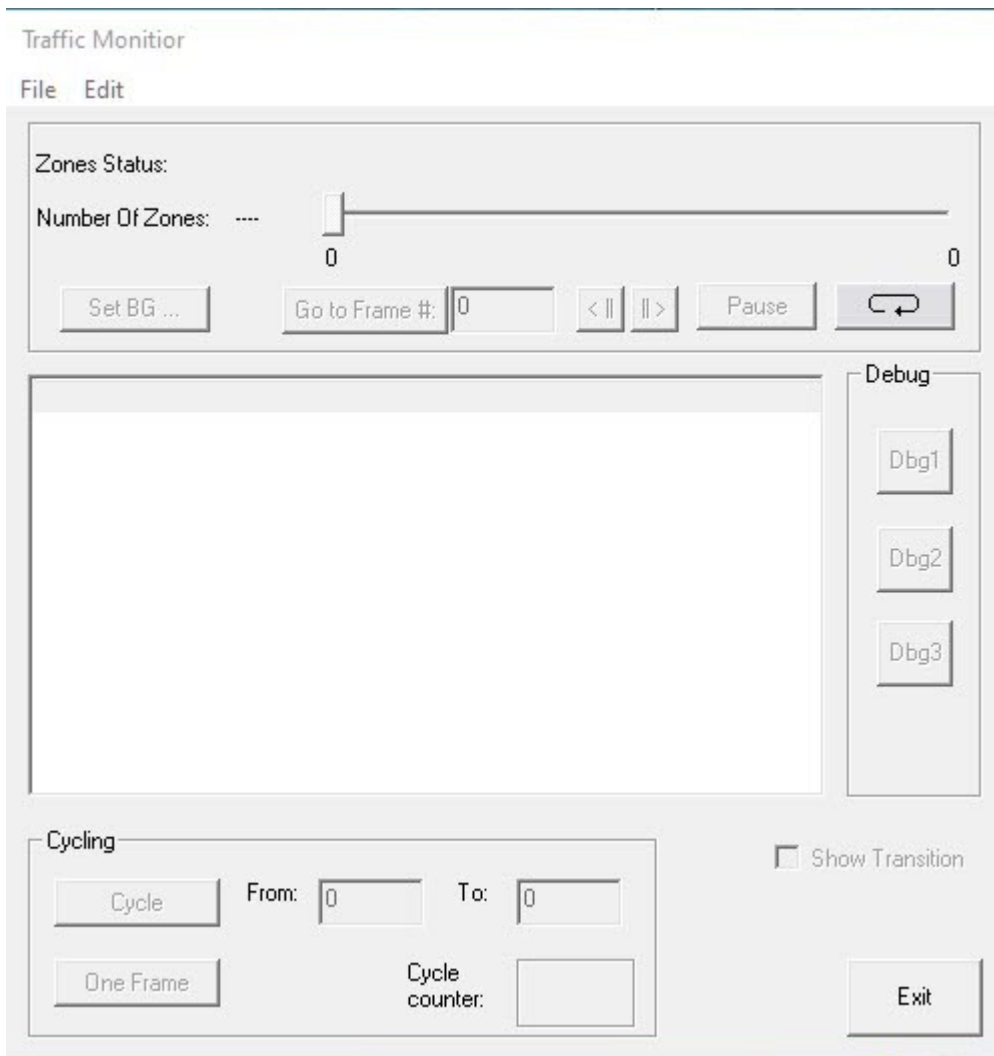


As a response, a regkey.dat file will be received. It is necessary to place it at: <Auto PSIM installation directory>\Modules64\.

Starting and closing the TestAppTMD.exe utility

To start the TestAppTMD.exe utility, it is necessary to start the TestAppTMD.exe executive file located in the <Auto PSIM installation directory>\Modules64\.

When the utility is started the **Traffic Monitor** window appears.





To close the utility, click

Using the TestAppTMD.exe utility

Opening a video file in TestAppTMD.exe utility

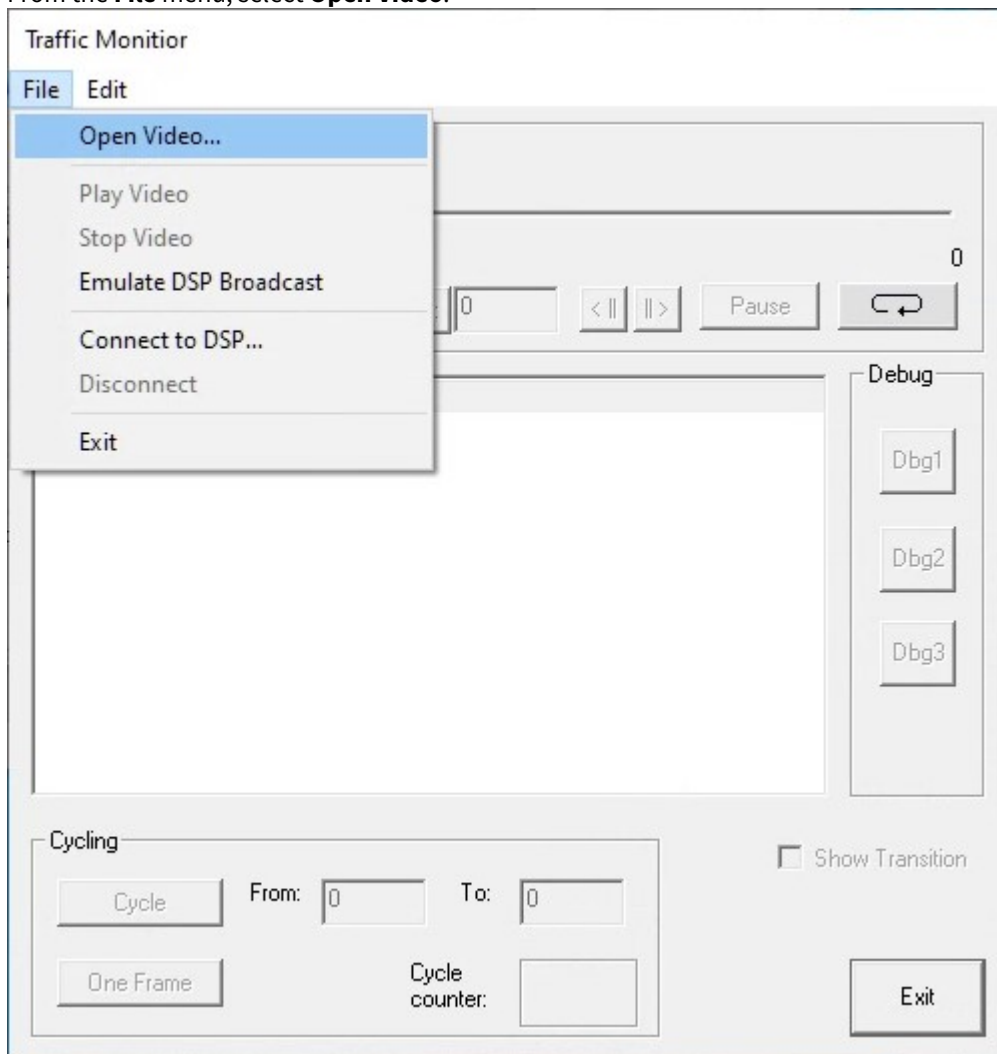
To start working with the TestAppTMD.exe utility, it is necessary to open a video file, on the template of which the *IV vehicle detection* module will be configured.

Note

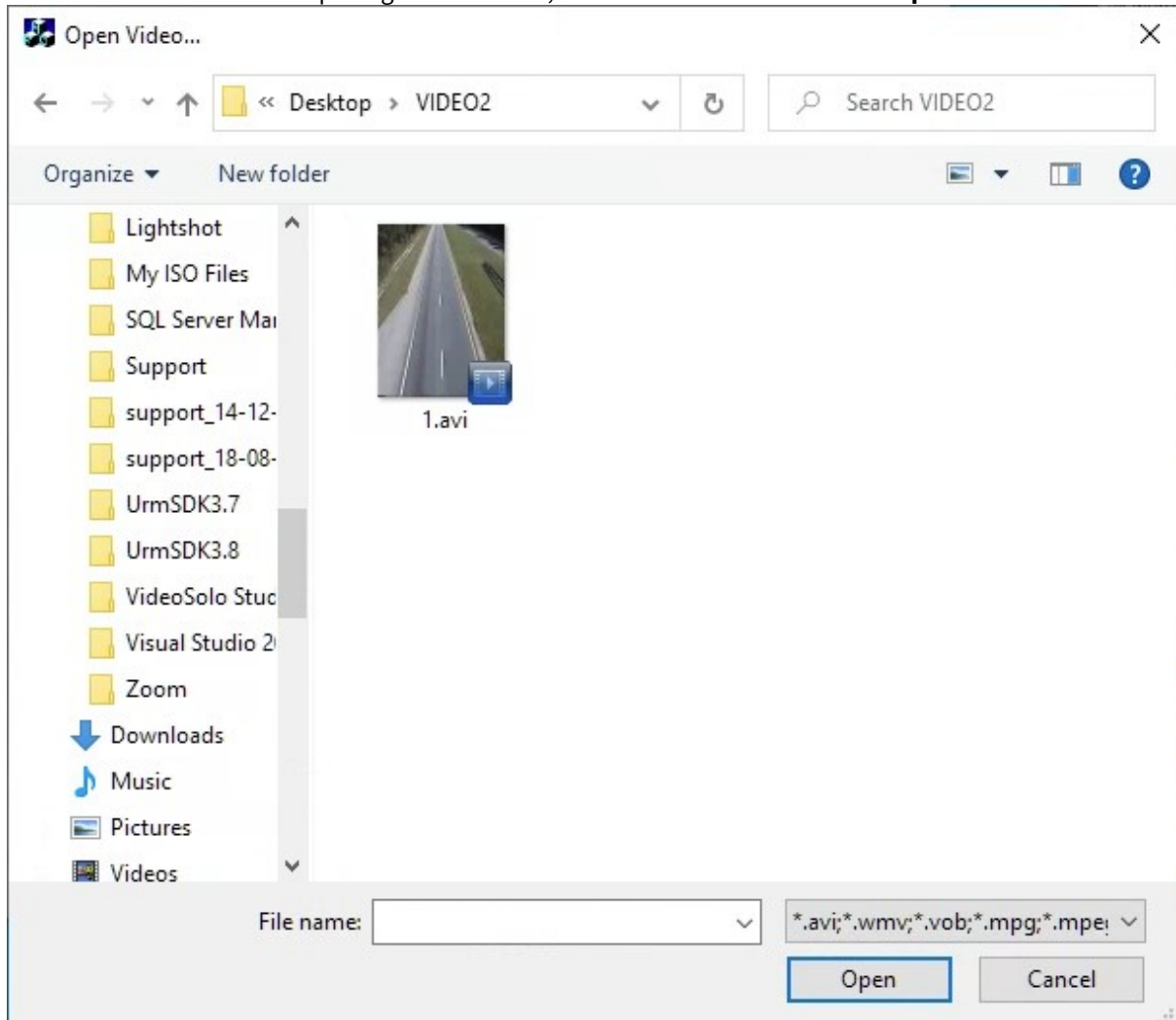
The video file should be obtained from the camera on which the *IV vehicle detection* module will be configured.

To open a video file in the TestAppTMD.exe utility, do the following:

1. From the **File** menu, select **Open Video**.



2. In the standard window for opening Windows files, select a video file and click the **Open** button.



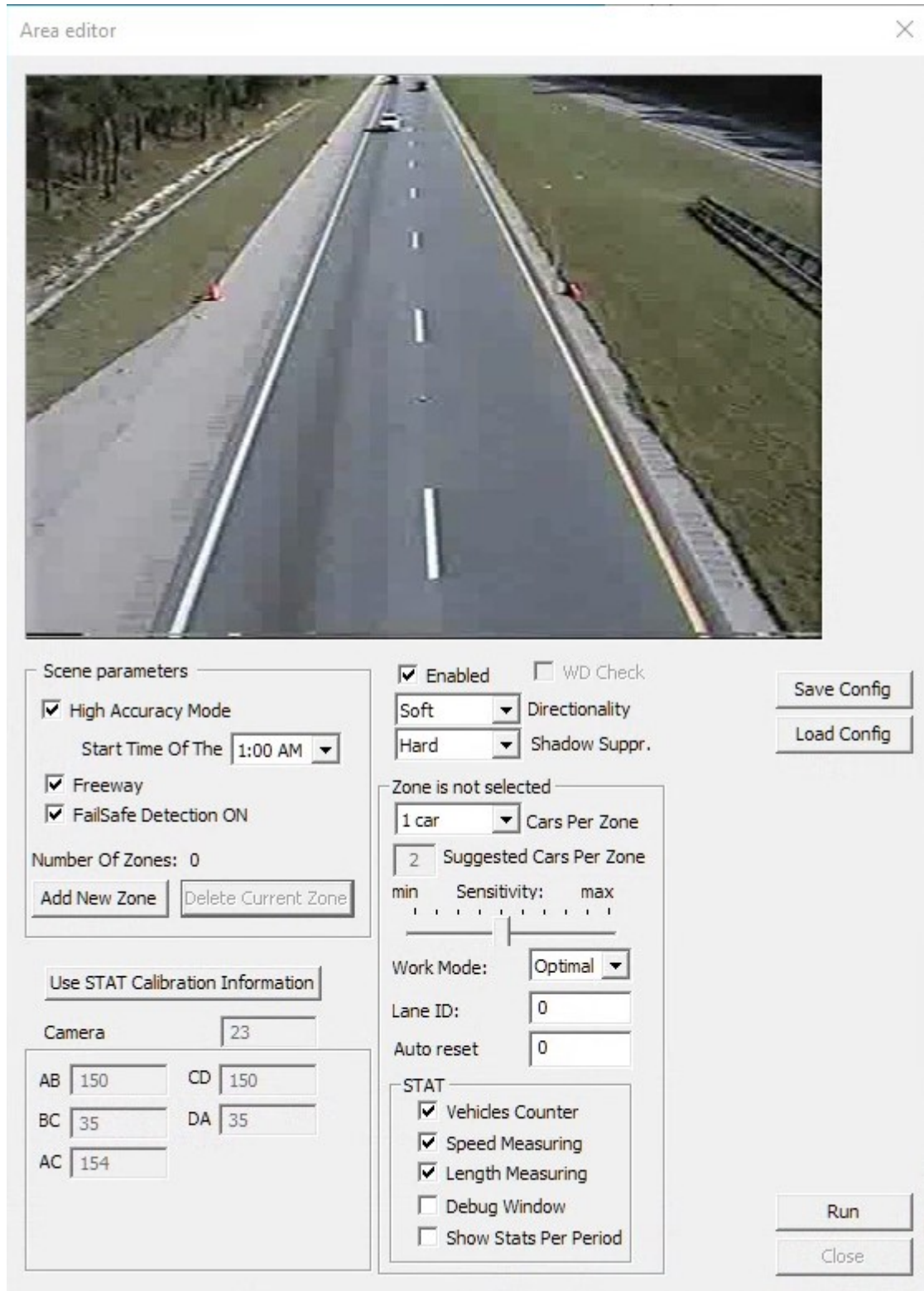
⚠ Attention!

The appropriate codec for the opened video file should be installed in the system. Otherwise, an error occurs when opening the video file.



As a result, the **Area editor** window opens, in which the settings file for the *IV vehicle detection* module is

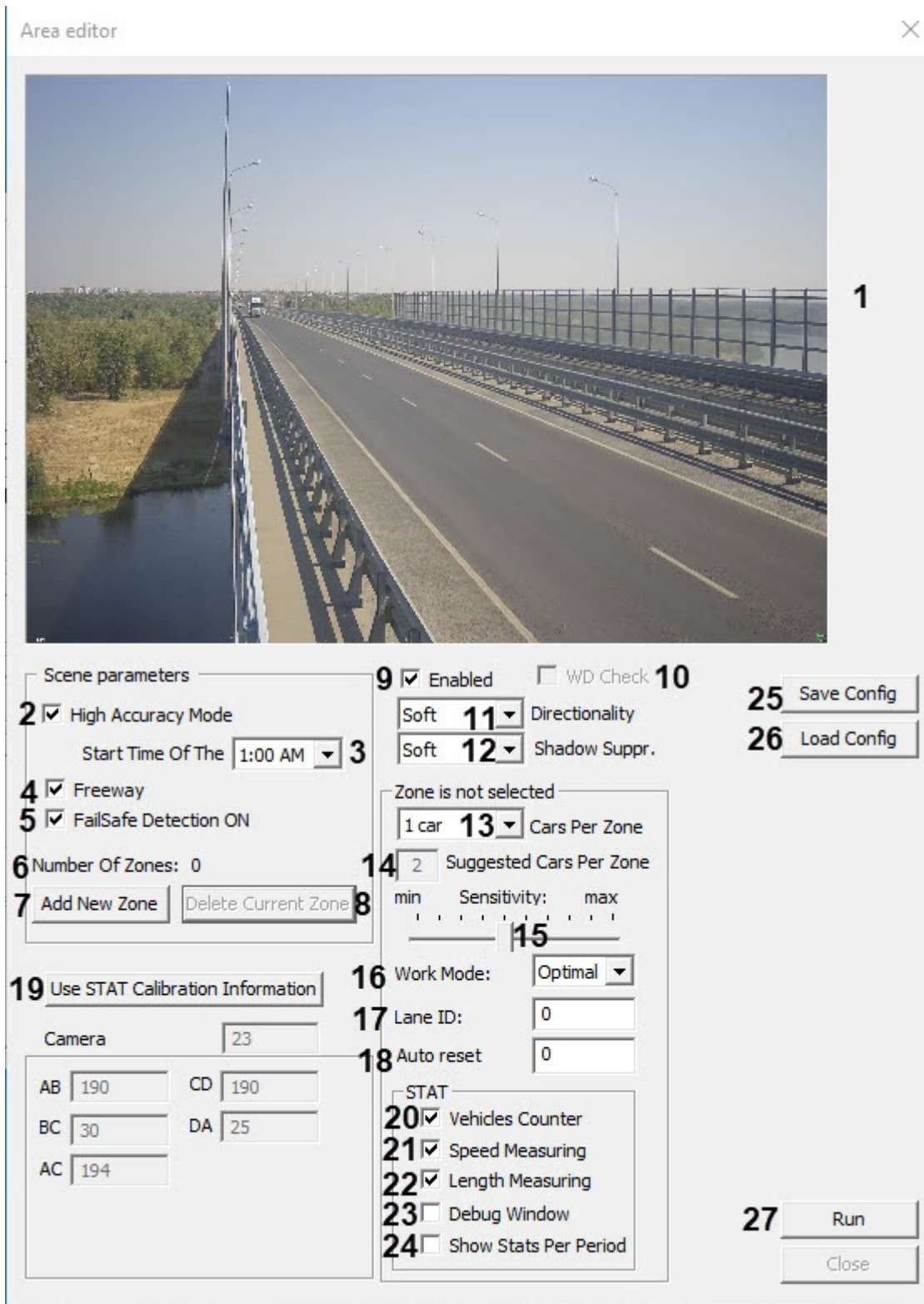
created.



Opening the video file in the *TestAppTMD.exe* utility is completed.

Interface description of the Area editor window

The settings file for the *IV vehicle detection* module is created in the **Area editor** window.



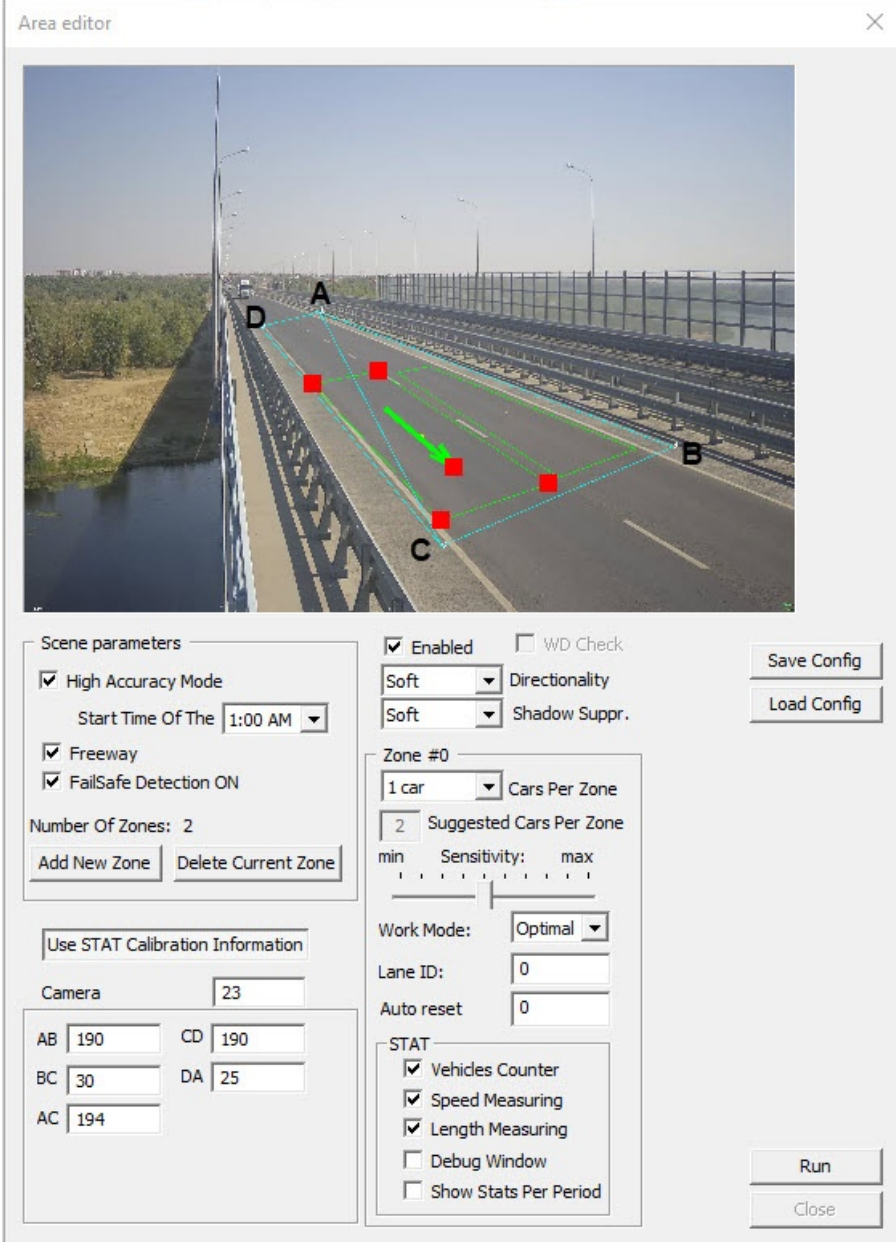
The description of the **Area editor** window interface elements is presented in the table below.

Number	Interface element	Description
1	Workspace	Displays the information about the areas on top of a video image
2	The High Accuracy Mode checkbox	Not used in this version
3	The Start Time Of The field	Not used in this version. <i>Note. It specifies the start time that will be used as the base for sending the timestamps. The frame timestamp is calculated as the $TIME_STAMP = (START_TIME + FRAME_NUMBER * 1 / FPS)$, where FPS means “Frames per second”, and FRAME_NUMBER is the zero frame index</i>
4	The Freeway checkbox	Enables/disables the freeway mode. Must be activated for a freeway where the vehicles are moving fast and non-stop
5	The FailSafe Detection ON checkbox	Enables/disables the check of the the video signal availability
6	Number of Zones	Displays the number of zones in the workspace
7	The Add New Zone button	Adds a new zone to the workspace
8	The Delete Current Zone button	Deletes the current (highlighted in red marks) zone from the workspace
9	The Enabled checkbox	Enables/disables the processing of the selected zone
10	The WD Check checkbox	Checks Wrong Direction. Enables/disables the visualization of cases when the vehicle moves in a direction totally opposite to the originally set direction (orange color)

Number	Interface element	Description
11	The Directionality drop-down list	<p>Enables/disables the check of the vehicle direction:</p> <ul style="list-style-type: none"> • Hard—detection of vehicles will be limited to the cars that move in the right direction, or the cars that stopped in the zone; • Soft—maintains a high level of detection of vehicles that are moving in the wrong direction, but slightly weakens the detection; • Off—vehicle direction check is disabled
12	The Shadow Suppr. drop-down list	<p>Controls the shadow suppression algorithm:</p> <ul style="list-style-type: none"> • Soft—soft shadow suppression; • Hard—hard shadow suppression; • Off—disables the shadow suppression algorithm
13	The Cars Per Zone drop-down list	<p>Allows specifying the number of vehicles that are visually in the zone, if you place them one after another. For detection of stopped cars usually a value of 1 is specified, and the zone of the corresponding size is automatically set, and the entire roadway is filled with these zones. As a result, it becomes possible to create wide, stretched zones that cover the whole or most of the lane compared to when you create several zones of the “single vehicle”.</p> <ul style="list-style-type: none"> • AutoDetect—automatic detection; • 1 car—1 vehicle; • 2 cars—2 vehicles; • 3 cars—3 vehicles; • 4 cars—4 vehicles
14	The Suggested Cars Per Zone field	<p>Specifies the estimated number of vehicles that are visually placed in the zone. It is directly associated with the Cars Per Zone parameter</p>
15	The Sensitivity slider	<p>Indicates the sensitivity level of the vehicle detection in the selected zone</p>
16	The Work Mode drop-down list	<p>Indicates the operation mode of vehicle detection:</p> <ul style="list-style-type: none"> • Optimal (default)—provides the most balanced and accurate vehicle detection; • MinFD—provides a good level of vehicle detection, with less false triggerings; • MaxTD—provides the maximum level of vehicle detection, but sometimes it can produce additional false triggerings
17	The Lane ID field	<p>Indicates the identifier of the lane associated with the selected zone. This information is used by the <i>IV vehicle detection</i> module for better detection accuracy</p>

Number	Interface element	Description
18	The Auto reset field	Indicates the time in minutes used to reset the zone if the zone is in the busy state longer than the specified time (default = 0, which means disabled)

Number	Interface element	Description
19	The Use STAT Calibration Information button	<p>Displays/hides a rectangle which values of the side length are road dimensions used for more accurate calculation of speed and vehicle class. To do this:</p> <ol style="list-style-type: none">1. Click the Use STAT Calibration Information button.2. Specify the ABCD rectangle so that it includes the highlighted green zones.

Number	Interface element	Description
		<p>3. Specify the lengths of the sides of the ABCD rectangle in feet: enter the length in the AB and CD fields, enter the width in the BC and DA fields. The diagonal line of the rectangle is calculated and specified automatically in the AC field. The values of these fields are determined empirically and represent the dimensions of the road on which the surveillance camera is installed.</p>  <p>The screenshot shows the 'Area editor' window with a road scene. A red rectangle is overlaid on the road, with vertices labeled A, B, C, and D. A green arrow indicates the direction of traffic flow. Below the image are configuration panels for 'Scene parameters', 'Zone #0', and 'STAT'.</p> <p>Scene parameters</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> High Accuracy Mode Start Time Of The: 1:00 AM <input checked="" type="checkbox"/> Freeway <input checked="" type="checkbox"/> FailSafe Detection ON Number Of Zones: 2 Buttons: Add New Zone, Delete Current Zone Use STAT Calibration Information Camera: 23 <p>Zone #0</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Enabled WD Check: <input type="checkbox"/> Soft: [Dropdown] Directionality: [Dropdown] Soft: [Dropdown] Shadow Suppr.: [Dropdown] 1 car: [Dropdown] Cars Per Zone 2: [Dropdown] Suggested Cars Per Zone min Sensitivity: max Work Mode: [Dropdown] Optimal Lane ID: 0 Auto reset: 0 <p>STAT</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Vehicles Counter <input checked="" type="checkbox"/> Speed Measuring <input checked="" type="checkbox"/> Length Measuring <input type="checkbox"/> Debug Window <input type="checkbox"/> Show Stats Per Period <p>Buttons: Save Config, Load Config, Run, Close</p>

Number	Interface element	Description
		4. In the Camera field, enter the height of the camera installation in feet, the default value is 23 . This value is determined empirically. We recommend installing the camera above the road so that a vehicle going in the outside traffic lane doesn't block the camera's view of both lanes
20	The Vehicles Counter checkbox	Enables/disables the counting of vehicles
21	The Speed Measuring checkbox	Enables/disables the measuring of vehicles speed
22	The Length Measuring checkbox	Enables/disables the measuring of vehicles length
23	The Debug Window checkbox	Enables/disables the debugging mode
24	The Show Stats Per Period checkbox	Enables/disables display of the statistics once in a time period
25	The Save Config button	Saves the current settings to the settings file in .json format, which then must be specified when configuring the IV vehicle detection object (for details, see Setting up the IV vehicle detection parameters)
26	The Load Config button	Loads the settings file in .json format
27	The Run button	It is used to return to the Traffic Monitor window and start monitoring

Guidelines for creating and configuring the zones in Area editor window

General information about creating the zones in Area editor window

To create a new zone, click the **Add New Zone** button (1). A square with red corner dots will be displayed in the workspace.

Area editor X

Scene parameters

- High Accuracy Mode
- Start Time Of The
- Freeway
- FailSafe Detection ON

Number Of Zones: 1

1

Camera

AB	<input type="text" value="150"/>	CD	<input type="text" value="150"/>
BC	<input type="text" value="35"/>	DA	<input type="text" value="35"/>
AC	<input type="text" value="154"/>		

Enabled WD Check

Directionality

Shadow Suppr.

Zone #0

Cars Per Zone

Suggested Cars Per Zone

min Sensitivity: max

Work Mode:

Lane ID:

Auto reset

STAT

- Vehcles Counter
- Speed Measuring
- Length Measuring
- Debug Window
- Show Stats Per Period

To select a zone in the workspace, left-click on the corresponding zone. The currently selected area is highlighted with red corner dots.

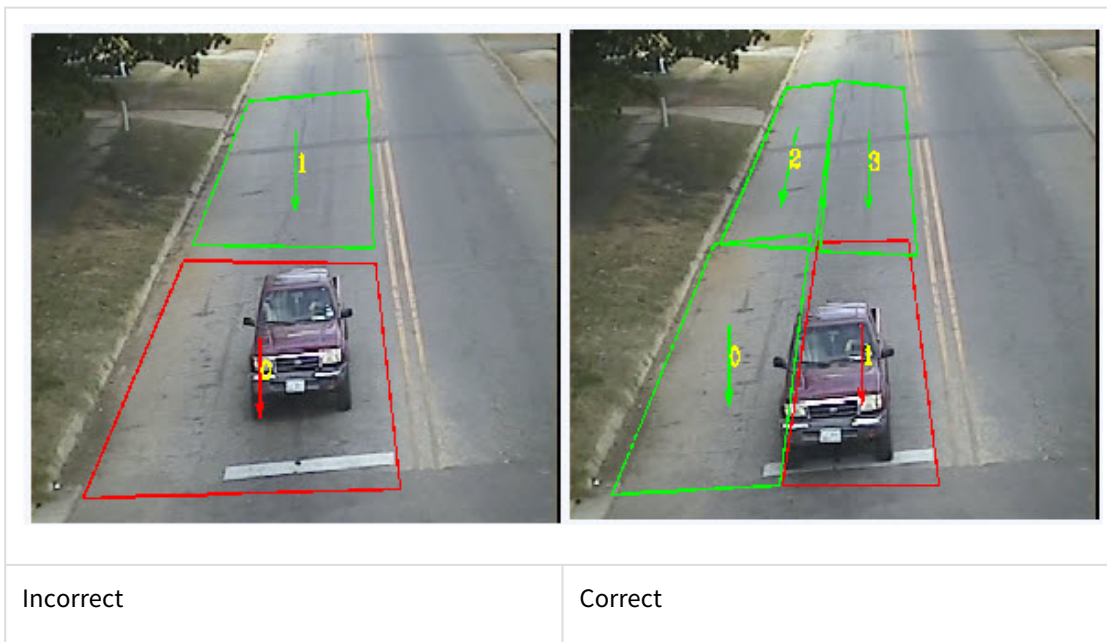
To move a zone, left-click inside the rectangle and without releasing the button, move it to the correct position of the zone on the road.

To change the size of a zone, left-click on the red dot of the rectangle and without releasing the button, indicate the correct position of the zone on the road.

Examples of correct and incorrect zone configuration

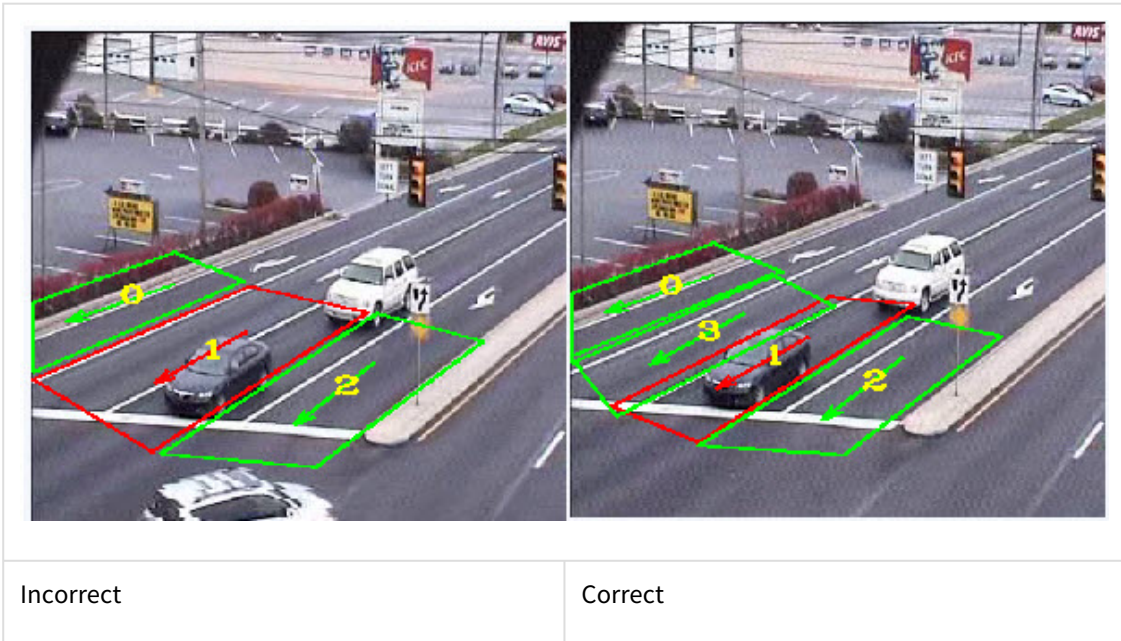
Example №1

If the lane has a width for more than one car horizontally, it is preferable to divide it into several zones so that each zone covers only one potential car.



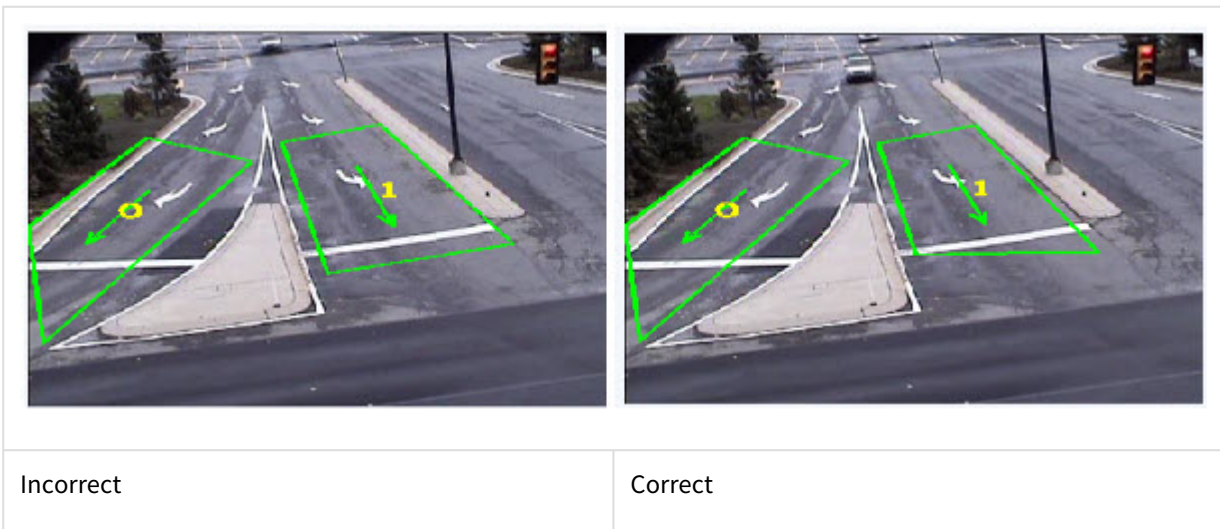
Example №2

If you configure several lanes which are placed at an angle, it is recommended to use several zones for several lanes instead of one zone.



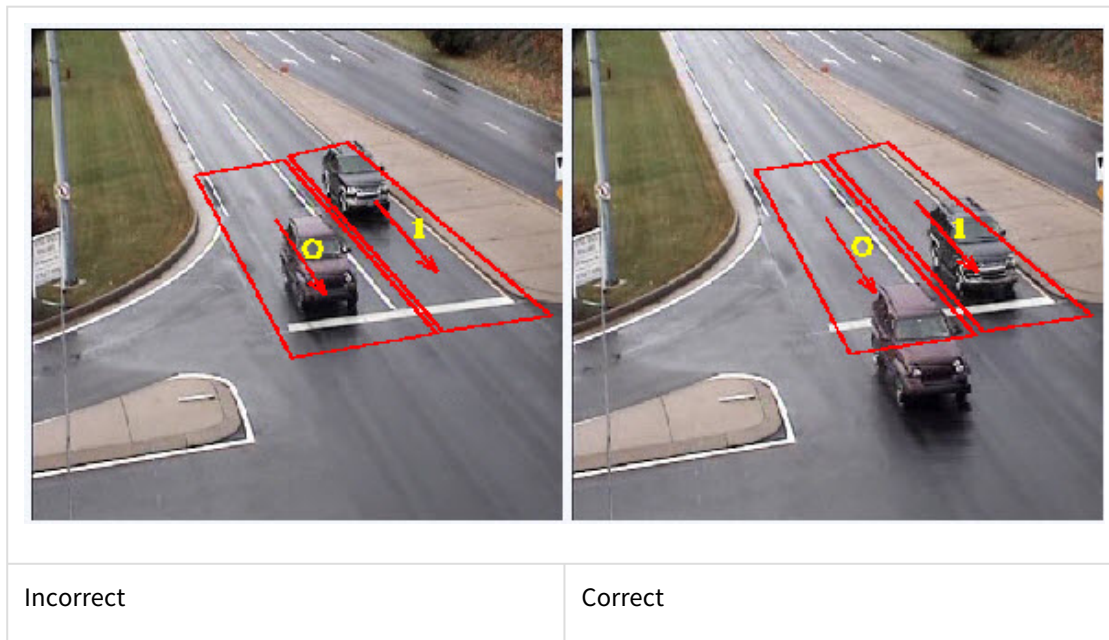
Example №3

The input video for the *IV vehicle detection* module has a resolution of 360x240. An example of such a video is shown in the figure below. The Zone №1 in the left image has a non-identical configuration (the width is approximately equal to the height), so it may not work correctly with the automatic zones division. To increase the reliability of the automatic division approach, it is recommended to use at least one horizontal edge for the zone (vertical or lower), as was done in the configuration image on the right. It is recommended to use this approach for all zones whose width is approximately equal to the height.



Example №4

If one of the zones is too wide, in this case it is zone №0, then its sensitivity is reduced due to the excess area.



Example №5

In case of using the detection of stopped vehicles, the zones from №2 to №6 and from №9 to №13 in the images below proved themselves to be good, these zones provide high detection accuracy, except the existing problems with the zones configuration for the image on the left:

- the first row of zones at the top overlap with the road markings - it is recommended to avoid this, since it can potentially lead to an increase in false triggerings. This problem is resolved in the image on the right;
- the first two rows of zones at the top, which are highlighted in yellow, have an area and size smaller than necessary for the high detection accuracy. All areas highlighted in green are of the correct size.

For high detection accuracy, the zone should meet the following requirements:

- size of the zone (the zone area in pixels) should be $\geq 1\%$ of the frame area. The zones which size is $\geq 1.5\%$ of the input frame area, provide high detection accuracy;

Note

- The zones highlighted in yellow have approximate size of 0.5-0.7% of the frame area, which is below the requirements.
- If in actual practice it is not possible to change the size of the zone, then it is possible to use such small zones, but the detection accuracy will be reduced.

- the width and height of the zone should be $\geq 10\%$ and 8% of the frame size, respectively. The recommended width and height of the zone is 12% and higher.

Note

Overlapping of the zones is allowed. For higher accuracy, in case of the stopped vehicle detection, it is recommended to use the zones configuration in which one zone overlaps another by up to 50% (along the lane).



6.8 Appendix 8. Auto PSIM. REST API

6.8.1 UrlServer

The **UrlServer** corresponds to the *Vehicle Type Recognition Module* software module.

Note

By default, the following http-address is used to interact with **UrlServer**:
<http://127.0.0.1:8091/GetAutoInfo>

To change this http-address, it is necessary to change the value of the `AutoInfo.Url` registry key (for details, see [Registry keys reference guide](#), for more information about working with the registry, see [Working with Windows OS registry](#)).

Initializing UrlServer

General request format:

POST <http://IP-address:port/UpdateServer>

Request parameters:

Parameter	Required	Parameter description
device	Yes	The device on which the neural network is running: CPU or GPU

Parameter	Required	Parameter description
file	Yes	Full path to the trained neural network file
sensitivity	Yes	Recognition sensitivity
key	Yes	An arbitrary unique key. It is necessary to prevent reloading of the neural network file if several LPR channels use the same neural network file and device
lprid	Yes	Identifier of the LPR channel in <i>Auto PSIM</i>

Request example:

POST http://127.0.0.1:8091/UpdateServer

```
{
  "device": "CPU",
  "file": "C:\Videos\dpe_001_openvino.ann",
  "sensitivity": 65,
  "key": "C:\Videos\dpe_001_openvino.annCPU",
  "lprid": "1"
}
```

Removing the UrlServer instance

General request format:

POST http://IP-address:port/DeleteServer

Note

This request lowers the counter of Lpr channels with the same key (neural network file and device). When the counter becomes = 0, the neural network will be unloaded.

Request parameters:

Parameter	Required	Parameter description
key	Yes	An arbitrary unique key. It is necessary to prevent reloading of the neural network file if several LPR channels use the same neural network file and device

Parameter	Required	Parameter description
lprid	Yes	Identifier of the LPR channel in <i>Auto PSIM</i>

Request example:

POST http://127.0.0.1:8091/DeleteServer

```
{
  "key": "C:\Videos\dpe_001_openvino.annCPU",
  "lprid": "1"
}
```

Unloading UrlServer

General request format:

GET http://IP-address:port/Shutdown

Note

This request unloads the UrlServer. If this request is sent during the UrlServer operation, then the UrmLpr.run will restart the UrlServer. The request is designed to shut down the UrlServer process when the *Axxon PSIM* software shuts down.

Request example:

GET http://127.0.0.1:8091/Shutdown

UrlServer frame recognition

General request format:

POST http://IP-address:port/GetAutoInfo

Request parameters:

Parameter	Required	Parameter description
key	Yes	An arbitrary unique key. It is necessary to prevent reloading of the neural network file if several LPR channels use the same neural network file and device
lprid	Yes	Identifier of the LPR channel in <i>Auto PSIM</i>

wDvqon0e2xgFx+NADprkQx78ggehqHTDzj fVIO9zZY4xmq9xpYjJLI7HA6GsBpHtb+CVcgrIM/
TNAHo9lqdtplz080MsbkJFgt+pFTnxzaxZ2aJqTueOY8fyzWNo2oRSeIXuHMQi4UmRdxiu0n8Y6RZMntw5X
usNsZD9BQBhL4p1y4fDb4Sunj68zgfzFXh4q8XKw2+CXZC0Cl2v+FVr34k6SisoLuznnBVU/9CARp/
C2u2+v6QL1bBwg4+dgT+LAGVH4p8TFh5ngu7AxzsuUP+Fcb48lv9SaG8n0W8sWVShMpQhvptJr20uc8baadS8
0Tqqs0kfzqF68UAeJ2txG67PMBYdQatFM9GFZ9rbNa3LxZR/
vOuSu0K0Q0LADfKA6kUnkqer0P0yc1Gd4HQ0A0aNAPv0zyk/
vinDpkj8KMZ6LQABYwOXpNidnFNx9KUA+goAXav9+mFRnrnmMDjkUgoA7raGPWojHzwacc/
SmnIzQA0j1NNxSFxnrTtwI4oAUL70EHvTCz4+Tk0zfIOvJoAsLthUg0FRnIFRbu0aLUjHFADHJ7mm96VyM0go
AU8ULP24X1+liCyoATjHvQGw0gp0LFADTz2FLQcDmj0e1ACiigA4pSFx94GgA/
KLazTKUH3oAXp2rM1+UR6cEz95ua0ya53xPPGRex4oAzrK3TzjIvqD19a6cW8Hkb5MDHcVY0N3c2kEYht4pS
RyHANXk1fxDMGc6FBKv8AssooA2Ildj+5ZgPWrKQH/lqzP7GuefxFrFo3LXGLw1v7bgf5UL4j1KX/
AFGnxTEf3XoA6hRHFwiAVIs0h4LGuW/tvXh/zACx9nFPgt+IO/h5gf8AroKA0q3N2JpdzfwuX/
tzx28PsfYMKX+3fEPfw7J/wB9CgDqgxxSF8GuY/
t3x28PP8A99Gk0v6+P+Zcdv8AgVAHVhZjFG7muVHiTxD/
ANCww+rUp8ReIv8AoV2HuX0KA0oIxTfwrmv+Eh8RkceGG/77FRtr/iUn/
kWn+gcf40AdMzYpokA+8a5r+2vE7HI8PEH3df8AGmtqviUnH9hc/
wC+n+NAHTtJx8qM1Qs5zjaR9awBf+Kcf8glV/4HH/jTPt/iokj7Ii/8Dj/xoA3ZVLwMK4zUL2yHPUGtU/
8ACUv1a3TPqyVn3ses22Gu7ix07usSk/yoA2/
C4tntEkuJFWKRSrEnoRV650XwheSFbm7DLjpuJ5+nFY3hZo5bC6t3uSJlk3JtTt9K020iBzulkvSf9g7f60AU
rjwL4TmtGhs5ZY5m0EYR5/8AZqrW3ha80VAF1Jnt25XemAPyatQaXarkRG4V+zyzbh+RNZF1rd6ly9ssUF0qH
aSIS2PyWgDVj8kD97fw+fcMP/ZqS5vEgs3a04hY4wNpb/Gs+GS6LGVsLTP/
AFxIP6rV9b0W70+aK6kihJHy4AGD+FAFFQ13bwyZDSgdjT9jR8yMsf8AvGubvYJLYiKeZZf+uZJqC2s455l+Y
7ScdFAHThlyc0HHqp4phck9KW1sobeIRrIXa/vVIFJz9+gCAsw601nbHC/jU7eURxIaj/d55c0ARB3NKS/
XbUg8schuakM4I5x+VAFVi56AUzdJ/dFWSUPf9Kb+7/
vUAdeynHLc0pQkfeUj8qkfhQ9ah39RigCN0XPGaYEXPJNT8E9KQKR0x+NAEQTBYGnJz61LRjJ4FADKe0e4BFK
U2jP9aTg9iKAE25I6Uu3BwefpSNj1pAcUAPbjgU3igZPU0LACnn60nFJ36UvGMZ5+lADW6UnFo49cUFcUAKD6
UrEkc0zguUaAexilxR10AKTB9KAHD0cVx2vTLPqWwHpxXWvL5MMkn91a4RnM+oM57nNAGnEAixknAHWteK8S1
tmYnkZxzWDeXLwsSlyXif7tZk+qTXmF8oBv9mgDQaGXVp2d2YLnLhw1pdnb2vEe4n1J61z9o0qIA5J9uwrZtL
mOM/eAPvQB0SMe2RUwDY+8fzrHXWoI+GJY+ijNSf203/LHT55P97A/rQBrAN/eb86dlx/EfzrI+36xLzDpsK/
9dJP/rUGTX2PP2KI/Un+lAG0JG/vH86cJW/vE/jWILfV3+/qqJ/1zBpn9l3LH95rEp/4D/
8AXoA3t0v+1+NRmV8/NLtp4rE/sG3kP72/nc9+AP60v8Awjem45nuD/n60AazTgA/
6Yqf8DFVnupBnZqkX4kVUHh/TAMbpz/wOkGhaZnm0Qn3egCf7ZJ/
HqsWfbFma69dXUfgv+FINJsE4VHx6FqX+yt0/wCeR/76oAjWXc2Trq/
TKf4VKskP8WqW9WmHSt0xjy3/76qFtF0s9Y3/Bv/
rUAWt0Bztu4W+jCszWIY5bBgUs0mDn0HTDn5JPwqncqBZRxnJEZQw6AvmgDL4b6bTrwSp5hAPKoQM/
mK1f8AhNoV/wBZotxI/q15gfkBWPeb0dhxxWczPnkUAdK3jgZyvh+Mf71yx/rVB/FWoLcSS2VvbW/mnJVgzc/
nWOST2pBuB4FAHwaX4s1SeRor4xFT0MEZGPzJrciuv0tEZpiGyKzOK4SznkhLWQAEqc1tpqF30hVbFpF3bhs7
UAaN/aErtDwwf4lFYrQLbyK6yk8/iK05tUvggj8lrcY/
iGarvpU9ynnMqknnIFAGRashRd+5s89KLZFHABH1FZSTtLdwRTSPHLEPugcMK1g3uKAIyhPem+WgB3Z/
A09n0a0ooyc8eLAEKoD0FLs96duHb9aXNAEZSjyx3qTcPekyD70AdbsDHLLuNNYAD7mPpU3A6cVgEc50aAI1NP
phUg08Y6ZoATFAIF0+bHQ0zZjvmgAODQPwpw009BTSM896ADjvio+9LR3oATHPvtv0NAGWysBT8rux0HuaAI
u9JxUjleikH3FR89jQAMCo6j8Dml3Ajpg0ig9WIp7Alex+lAEeCecigH3pRjrTsAD75yexFADd2360u4Ed0aC
uBnI+lM7cdaAM/WpvJ09wOC/
FcrZJumLe9bPiWrZJDCvYEKvm6em0ZNAEGqsTcxxhsfSn6ZapHP5jn001Vrk+bqoHpVyCUI7jPINAf8RLNjgk
qP8AZFXEsrlgmAv7uapRyKfNmle9VPvOBQBsIYIQAKaL+AqUXfHWuFgqRE4WQZ90amWS4kGUhlfPotAGybsf3
h+dN+056GswQakRldPuj9E/+vThb6mP+YXef98D/GgDR+1e9NNyFU1n/ZNVY4GLXp/
4AP8AGnDT9UPXT7p94Af1oAu/ajnqaU3R/vVS/s3UcZ8kL/vuBSfYLwD5p7BP965x/
7LQBd+1H1pPtXvVI2sq/e1DR0/3r0j/wBkqKQBZq+hr9b44/9AoA0TdHsab9pY9TWP9stlpz6zoI+moH/
AON09b2xz82vaCv/AG/k/wDsLAGr9oPrTPtB9aofadL/AIvEuhj6XJP/ALLSfatG6f8ACT6SP+2p/
wAKAL5n96Y8wKnnNUWutI7eKNJ/
7+GoGvNJHTxRpX4EmgDjv0PmuQrEE9hmqrT2cZ8tvyrZe501jllfGmn6QE/+zUgmsu3ixTift7Kc/
wDodAGP9kb+4fyoFow52n8q2w1ueniGx/C1J/8AZ6AEPmficyP0syf/AGegDJS1Y/
wn8q6jSneG0VdzL+0KoKEHJ12zJ/

69CP8A2erMctoB8+sWmPdSv9TQBteeHXEmGho3NTQNCibAigHsBWD9t08cR63pRb0e5Kk/
+Omrttb6jcl5tpHbXqDtZ3PmN+W0UAM1SxEMqXSKCAeaeNrKCM9PbFJeSTSWTI9rOjL1VhyKrWTSyQj9xJ6UA
TBdzGm+W2c9qn2S9BDIPOaa28cGF6AIdqikNSkOekULMKtjmF8+tAEVL+NLtb/nk/
5UfMP+WTfLQB2Laj0I9qAFweT+Ap4ZwOD+Yph3e1AETEDqf0pFBPT8jRJTl01cbQ3saAJF29yAfamkDqDRjPQ
AUh44oASmjIpfwH1ooAaQT92kHDe9PFIVQc7id6YoAAvBzkGmkHPWkzk8GgAnpzQAJLjqfyopSvc/
lTc0AFITg4zyac0c8H6ilVoxy0alvU5oAjGRwakBPoDSFVJyBik257mgBWBAYTgfWm0Ee9MPyKT6DPNAHOag3
nalKTzgyYFQ24CRMfSrc1syzy4JcZqpL+6tpD9aAMq0HmahI55AzTo2AmkPH0pNLB2yyH3otV824jj7ySbf5m
gDaSOK1tVnuUMkrjMcBOFA9Wqq2qamGzbSwdkv923tEBH/
AALANJc3TXdw8jEYz8oHYVVFQAG51qRtzeI9WB9I7p0H5A04yam64bXtZb630n+NI0tTKmaAKhtpn0ZNS1KT/
AH7tz/WL+xRkYdpX/wB+Qn+dXCgPsm7DQBQbS7Fx89rEx/2lBpv9j6Yethbf9+1rQ2mjaaAKH9i6Z/z4W3/
fpf8ACnJpVhGcrZW4PtGKvbGpwjoAhWCBfuwRj6KKf8uMeWv5VJ5dKEFAEP4D8qdx/
dH5CpCgvpLUANzx0H5ULP8ALNAX1FAERxnvSZxUrJ6UgjJPNAEf4Uu5vU1MIqcI/
agCHLY5JNG9jwTuzKMDKZsoAZnNnyDwRUuykMe01AEf+eaYYImkVy7x91w0R+NSlT6UbT6UAbRuP7Q0pzIXN
xAMMxHLL6msjTpCHd0mD0xU1jN5V4sbfdmUoR68ZH61RgJh1Ir36Ee9AG8vldSST6Uw5zLUJHs0BS7nzngH2F
K0jsMFj9BQBWEYHLce1MYj8aGJ3HNJQAmM03H+1Tye01R0AdvjqQAFY1GRxS7y2CCwz7kUrHjBQfUGGcAgZxS
bfalfrUgK7MYAPrk0ARgHNB4p+KacE4oAQqQMnpTTnHF0bbjCg/
nTjtCg+wB+PNAEY6D0c0jDPQHPvUrEOBtj0fdhTGDDqcUARMjr1XFABzxUgJHBY4/
0LMRIyCMUARngc4pnBH3hn8alaE7Qcg+2ajKYPNADVJUHN0A78fnQcA8frSs4HQKf8AgNACEgddg/
maFx3PNIpxkrtpMn2oAUjqainbEDH2qYMcCvWvDi3PvQBksCzRsecgisivU28u1ceta7L/
okMno2D+dYettjKg9e340AR2SeVp0jHrio900LpZAp0xGk49uP61YPyaWfeolHKJc0HAKwFcfUjH8qALFtC3L
LkZ71a+znH3TVmzi226d+KsgdsUAZi253dKtx2xI6Va2LnpTL0GoAq/
ZCDmkNqc9K0xgjpRgeLAGX9mx1FH2f6VffBbAFR4+LAFT7MaPIIq5ij8KAKfkUvkVaowKAKvkCLMAqzxikWA
Kvkc0v2b6VZwKMeLAFb7MKd5AqYjmgDmgCLyRUi2wPNS44pd3GKAK5t1JNM+yj1q1SHg0AV/
s4FMAEvDvN4NI8JHOKAKXkCk+zmrGKUUAZt5E0MQnXrGwb9aqamwj1ISq0HxJ/30M/1rauY/
MtpEx95cVh3zGXT7WXq21o20P7pwP0FAG0hcxqT3HGKk2TMMVBx6k1W06RprN0p4xVkkqBwefrQBF5bYyf60mw
9hVjJV0HIHoDwah00vBoAjK884ppUZ4qQ7jwcAUuY8fdNAHYk7z2P0prAY6/hUoKD09M/
jUTqCcgECgCHbTuAkerIFIYnntimHBxQAvamHAPb8aexUcAZpp65AoATIzyKCyk8Dij0Rz1o4xQA5eD0pJG9T
QDjjJpjZJ65oAI84J3bftin4JGSwZqEUqPmRD6ZGaQoCcsVH4UARtjPzAg1GzH0qU7AeQPypCVA4P4EUARDns
fyo04duKmWRVHUfgKa7qaAIAC1GBv4NSebjjccUeaeQ0LAAFJ6DNVb35YgG45qzvT0x9DVDUHBKDNAFeHmMl
yjHKNknfXL6mTJKrHOXk2gY9BXS2DSFbmFFQqcnLEjtVWEG02dw5KMSBQBmXny6dGD1JqK3EYS7ot98tGn6E1
Lqb5iikUkZz2plsY/sbZGxe5A0f9lf/
AK4oA3LfiAVZRRjNU7cnYRVtSMYPPTQApIzikhJ4qQ+WxBVNV0pygAdKABRt70pzjrSEZFC9MUAMI70nHpUpF
MK0ANpCKeFJ0KGj2jIOaAIqQ040LABilxkpaADFAoooASlHFbPKAHZpKBSCgB1NIPaKAJ0GMVNjIxioRxxg+1
SBsnFAFORc0abirFzHzkdCKq0ASHayEGsSSMnT7iHHEM+7n0YgtcnkYqmyk3N3D2kt8jPqCP6UAQaHJmJk9DW
15ZK5KZFCxpcxvmQ4wwwXR7yRy3PvQA0gEkYpmSAVYAKVmctkp+QpNpc8byf9w0AMLDFMyB3oe0ZW/
1YA9SKPm/6ZigDt2Iz0qI9cZpvmLnLqN6/3qAEIz2pn3G96czrt0DzVY7/
AK0AWWn3D503H2wKbnioUZh0BNP8w9wBQAtJmm+Z/
kUm8Z4DGgB26lwDzUQIPJ49jTtyEcsMfWgCTf2pGJxzUYkUYC9PWld0HRs0AIW56Um4nrTGkUc5/
WmedH0Lj6UAS59qaTweKaZowQwfb9Mn/CmNcBz1H4ZoAU0h0emKN4/
utVa8ufItJZRGeF9aACXULeBijtlv9k9KqzXkFyQVLUY9a4ia5kkLLM5yfekE0g0d5/
OgDtrSaK2md2lUhvSoRNEZpkVs7uQPxrLFu5B1ap4rtlcSKfmHvQBa1HIuEX3qaxPmQW8UUW6WSWQ8eo0Koz3
P2i6D47Vt6Esct5pcY00FHkY90rUAao0rUkhMz2SrEvBbzRn8qZhlwCMV6Bqxj/
s00MeUQDk46muFmQhjppQAKeMGN4PpSQuUBNWvtSE8oxNAFfae6n8qMYNWWusLgRjFV307n+tACE+tNpV+9yK
sYik68H3oAqk4oDdc101suCwaqpG1uvegBjH5qQHPSlcc00cUAlMl470nWlxQAFsig0CgBe2aMg0h9KQIFsGB
4I75oMoHQCK2H0pPloAeJu0i0CVSeRTNh7UuKAJfMwPfyZqtPanoCaALEuGj+lZ50M1cZhjaaov1NAAGGagm
YJqdpJ2LFD+INPH3svV1LP2YSD0Y3DD86AMl82+qoDu4bacjFX73U/
LkAVsY90ap62M3cky9HPmA+x5rEmlI4PwGdpf+EmlCgZX/vkVE/
iSZuBJj6VyxlJ70nm0AdGfEE+75nyPc1pw3PnxLiChdXEmQnjvXS2AnFlHnjigd0ZwMchaj+UcD8s1cftLhUD
tgJ2JYc0iqsY05SV9qAK2xMc9fSoyIgeN34GrskcJXcE2+2c1SZQDQA5V3dHIpTH75pinF030AJ5PN0Ee0jEf
Q0B8mndRQAxo1PXJ/E0n2WJuQV1an0h/CgBnkx44BB+hpGiizkjn00KeJHAWGwPpUZ5NADfJiP/
ACyQj6UCNB91EX8KXHGQx/
Ok5xznFAC4G0KbuI7mna8UhAPWgBpY1UvoDd2ckAbbvHX3q5tU9KaQR2BFAHm2p6JqmnszSwzSRj/lpCNw/
HHSsvzGHB4+or1m4z9jzmz7prjLu2huXikiU57jg0Ac2JTIPYZcuATWtL4di8oyW8zKcfdcz/

Ws2TS7y1CtJH8p7qcigC3GMse0xx+Vb1uoSKyK7lKwDlSQueee1YVsR0xG0/
 dPWuh0u4gWCXu7oFreP93LtGSpHHP4UAdhoni+1Kw80Xr25b7oLJIP1zUN/
 wCG9Z0xd00IuEH8dud36dR+Vd5ousaPc2GbC6jYKudp7fhXM6j8VfDGkXMgu9RSaZePjtl3E+x5oA5RZBkggg
 jqC0lSoc/4Vi618R5NbumlsNLKxdE3Jzj8KyDqXi08UHL0TYewG39cGgDsJnCfeKKB/
 eYCiCa2fObiED3kArgm0bVZG82S2SL1Mlzn+lMMPk5E+sWc00NgfNAHpZSHH+uhP0lU/wBajKx/89Ix/
 wACFecwnSAcTa88fr5RBz+Yq8g8Ks6k6tIzjoXk/
 wAKA02cFBGHP0NVznPSqVrflxaXENw03ykfrmpZLy6i5m0u72DkyxJvUfU0ASnrTTUueqWFyPkLP0IxVaa28
 WXTH+ztIL2/aVELZH50AaKoxHQ/lTXmhiTMk8S/VxWG/hTxbeP/pVtej/
 t2Jx+TCpoPh9rBIZ31BCOfLtsfzJoAdceJNLh0BM8jDtGhNEfiGzcBgcezZBqK68LtayeXejqwbGcCFOf/
 HaZD4V0y54D6iz+spUf0oAvQ+JfD0Lv/
 al9LajHyMsL0PuVBrTg1fwhdWbyQeJov0GCFdWUH2wwzVXTfBGkQ3kcmp6daXdt3Wwdg36Gu0hsPA9rZSW1v
 pNnCWxADMSM/UmgDm12SDdE4dT0I70GNh1FSSa0qn/
 RJbK2XsYr0D+amqFjJqVm4VLvSbkY5Ww9Ct+i80AWxHkUmw+lZSeLrNH2XaCFxwSrbL/Ota11C2v499vPAW/
 wBqTbQAmwn+HNG1h0U1K7Moz9o05f8AeuwP6VVe7YHH2vRyP+wgB/
 7LQBKYRIMkcpVWSFL5xUq3K44vtJz6C+B/wDZahnuIgw13o4HqdQA/
 wDZAIAh3dKZdxl7aRcdVNS+dEQSmo6MT6fbx/8TVSW7g3FL7V9ItIj1dLsSsfouB/
 OgDNvkaWztj5eCbdec+nFYN1EzIGHaurkntL9tliZXtok2I7Jjd71n2cMX27ypoN4B/
 iU8frQBy0cMkz7EXJ9Rwnb6DI7AzzbF9EHNdytnaxqFW2AGP4Vq0SziJ4jdB/u0AYtpptlb/
 cJy396Q5NX8gcACpfsqZ+YOR/u/wD16d9mA6Iw/CgDu3TdjJI/
 3qgeIj+LA7YNSSFRJ8y8GkkSJRw2PoKAKrD5sZyFwmFcnJqbbzmjYDQBUZSDkdaRmZjzjP8AsrirLCMZ5bP0q
 Fun+NAEeacN3rTQFLat+lT4G3jNAEWSKcDmjYKAAatADWy0lI0vJP4DNP00imZ79qAEJCgHk/Uc07zAy8x/
 kaDJlCCNF9+c/
 zpEjZj8oz7ZxQAGIK9KPKDH5mCfUGnbdmQ6liP7pprvlQTyfT0aAGkKn07PsBTC+7s10ySvAJ+gqPvz8tAEVW
 C1rKCCDtNciSTJgmuykJKugctuG0a42UFLhgFwGc4gJhxntUN3j7Aik50cYNTQfcxV04yWx70AV7WMk8jFTpB
 qljctcaVfG3d+HjZdyP9R3q1bLEFG4Et7VfDrxfwNAGVFda2kokfSfDks3XzTYIp/
 Pbmkkk1eRy7aD4Y3H+M2KE/nsrdQKf4QKChI4oAwlm8QovyweG4x2A0qM/8AstTDVfE0eQJdDQ/
 7GmIP6VpNb038WPpTDYuSCZD+Q/woAz/7Z8Unpf2a/
 wDX0zRakGp+K2GB4ikiHdY4sf1q4bUd4m+oxSizfrt2/U4oAy3Pia4+94u1WP2jlyf+zuI2mvj7/jLXT9Ll/
 wD4qtU2rDqVH0bNCWTZ42gfjQBnLBrB+U+LNfI/6+5B/wCzU+K2vZARJR+uvjqHvZMH/
 wAerS8u4zyy49hQySEYysf90UAZE3h+wLJaeSaRv7zNk/zqnBp80c5iS1vJYPacY/Vq2J/
 IhIMqTDPGcGok1CwQji4yc9FP+FAEH9hWMPbk0e4z73C/
 41KPD+kEyFSSdpQ39anj1SwmeNF+1Bn6bhgfypbi7t7Z2SWKRio3ZB7UARjStLhH7u2EY9BSGysW/
 5ZLj0JzTH1Kx+b9zIcAHlu1SQXEFz00ccQUgZ60AM/s/Tlxmyt3PX7vP8AKk/s7TW0Dplv+X/
 1qG1a2ik2SwzZEnl5u9A1uxYKRauCzFfvc5FAD/7H0vH/INgH/bmf4VCdLs/
 MIXTYUUDCFFXrC5iv498IdRnozcirhtJCP1J/
 FqAMr+zbZlWY147YqtFpcT3gCRoF9AvWtk2k5PG386kS0kzk4XH93NAFZvDloib5dHiIP8AEwXP+NRHSNKHXT
 of++R/hWn9lc9ZZD9Wj/nTWhnj5Dhh70AZ40bSW6adF/3z/wDwPw0PScif2dF/3z/
 9atSEtnnpVnco6HmgDn5PDmj9TpNufqo/wqP+y9MgceVYRR46bRW3KCeahjtvPmxmgCp9pSCPYidvXFZhlG/
 eSd2eua6W80cSx5iKbG05ArnbmykhOHUgCgDctLoyRKd5wPrUklwzNtDcehrL0qR1BjZsDNabx+mSKAIWLg5y
 aZ55HG406RF9c/jUXlr/ALI+poA7N1Y9WqPbnhufep20/
 JLAe2KiKN12n64oAYcClxxSED+9QCAMUANZejd0MVKaaRzQBXEEDT8ECn0cY6UAVyx3c9KeDQ6huLM+cfwUA
 04zz0pp59MU0k55UilWUI2WQPQ0AAUt0I/
 Om4c0BvIx2Wn+YH6Rqv0Apo3YP3h7igBw2k5cEZqE7Qflww9xUq06fwZP8AfI5/OkZLJySM/
 WgCPcB6Z9MUUfCzKbW0HWgHJ559qTL9hgfwGA0wPLY9gznrmpv02ahKP9quv6+v41y0sSY1WZcYwaAJYjxj
 2qB15yafE2UBpWGR0oAngjGM1bjQbc8VUg0QKuo/
 BwpX60ACNhqsBuKg2bvmBp6kjrQBLkZp4KnrUW4U296AJW2FetSY3Kbjixzgm1mjfuxzQAojTNOcgeLM80e1L
 5goAeRTCozS+YMVE06g9R+dAFbUNO+3RIiy+WVYNbms8eH8Nn7Y3DbuIh/
 jWz56eoz9aPNHufokAMLpDqq8bfbJPkcsP19e3WrVzpmV1IrPNIuF2/L3q75h67T+VIZfYj6igDL/
 4R2DcB9qn27NlPtNdhtboTJczsQoUhjwa0R0vQkUM2PmGSPYZoAzbw/
 b3U8sjPKpkYMdpHUVAfDNnuz9ouQd+/
 hg0a11aWT7scn4qRUU0jxf6xCPY0AQWGM06cXMM0rB23bXatMS5PashpSeVJH40qysDy3agDVMvPY0ok9MVke
 Yx6saLS4C8Z/WgDTElDPLSKqCXK5GT9BmnCT/AGW/75NADkkwNvpTjIagVGkuNoJXPqK0orRV+8dxoAhhjaQ/
 NnFXUgSL/

VqBSgBRwKeh55oAG44PSqsLpbSE77eNiEU4c1dbBqPjsaAMSSx+z3HmRKAh7Yq1k+XjIH4VfmTdAwA5xWQGHQ
 Jn3zQA8HaPvCmecF42k/h/9emNn0BxSbW7yYoA65iqjC3AppmjYZj3D6t/
 9apWURjBffn0YjFRd8kHH1oAY3PNNPTN04pDQBGSfWmMzDvmnSKSOKr8g8k0ASiT1NSZGDiqrc8iLV2AoAnzR
 k1FuPtShjQASCoyKefemMeKAF6Lw0aXzCeAqLj20f51GkhVvbaduTcWb94fQnFAAN5PJYPY0hjb0WAXjvQWQ
 n/
 AFagfnTGbaeFJ9s4oAaWHTp70iuwIwRn3pGkdupOPQnNG6gBXdnIyRx6VxmumZr0nXBwa7LIAyc5rLvEOnXMT
 4LxNjRYAbnkUAR25HlkVYUZBqnbk7Rmrv8ADQAlqf3mz3zWnAq5JaIOBzhs4/
 Q1kIxW5B6V0VrdzpaUjnkRSOQpxQApntzCFGnQQt/eiLc/
 mTVfygXznipDnPPVvSouTmgBv2f0Yinrak9XNSqKlFAEK2qA87qUxZbCttHpU2aUAF+PSgCm1vnoaT7MuOSfz
 q2+CfL4pFTJ5oAZHbQnsfzqX7JD/cFSKm2n0ARCGNfuoo/CpAAONq/
 lRRQAYHoKTA9B+VLSfSgA2IeqL+VAVR2xRnmloAKytTTCQQA1D0NYd1MzyEEYwaAKE3HGRSBSTgZJ9qV/
 v8dKv2S+Zhiq0AZxXnByD70zYD0NXbpVEx45qvs46UAX9NaQggrx61pM5RVwhP0rEspvLmx61uBtwG0lAEF2M
 GKZR04NXUbco0e1Quu6F1x2pLcLosd6ALA5qTAXmox0pcnFADiwikQe9NpeaAGvKUbaVYg8ZArL2oJHQsV54
 4rWycYrLvUauASMZoAYUVvL3fieKY0cKnBnQe2KkjU87QCMeuKgY4bGDQB1rllOCB+dMPPf8MVPK+RgZUdwTn
 +lQ/
 U8e9ADwBFIDkdqjkw0hzQjZH40ASnyKrOnpU5PGKbQBVJI7U3easNtwfWoTsPWgBMu0SpX609W3GoDjdG4bu
 oJGKAJm68UhGRSlmkHG5y0vAqIy44IoAa7N0LcD2oXbjnIpgJZuBn2qTLjrGAPegAwpbB5FLIE+HHbpUL888D
 2FN3Z6g0AOK9yCPCimMQDn06kMn0M4FRlhQBITknAAqhRD2Eo2gdKsLs9KpXzf6I4ye2aAMSDg4q+SPLrMif
 LH2q+MmPPH40ARSkhrvQ1t2EgkQVhyHchqzp1wQAM9DigDodh9KeigdRUcEu9Km/
 EUALgULIWAAppbJzQA+lv8HpTAWppPOQaAJeppynb0qNXBHWkBweaAJd9Kp3sFB5NRbhSMY+vNAFLlZCVPUUwN
 g81D5vH3qaZMigCx5opN+eLVt/
 PWjzPegCxpupwd6q+Zz1oMg9aALXmCqtxaxTnP3T7U0y4PWk84UAVpdLkzLJub2NQtP9zjKnGP7rVf8454Nan
 57UAY7Q3QY7opT7lTR+86eW/
 8A3ya2vtHpTTMT3oAyooWaQFlcc+lb8YxyyfxqmLhuYp3nj1oAtbsURkIaqfaFHemNcg8g0AaJkWmGQ54r0
 N1ilW6HqKANATNnpUnmcc1m/acU5LoE4zQBo7xVDUeTEw9cGniZT3qC/
 YfZUYHPzUAQZ2+360FgaYGBXP0frQCR3FAHXF/
 nzj8xmkaZscNg+i8U1xxjb+0ajYrt+8SaAGSbi3zcF8CoR1A0c59qYx70zckAJy2Rn0KZu96b2pDQAJDPQ1AY
 2zyR+dTEjPtePWgBnHvTvMxwM01gBlirGU1SpHbZQApLAHVTC+epNI6k9Kh55zQBYXbw2adLIMYVlqqucYzSE
 kN3PtQA9246iojMQetNfL8E4/CmFAoyMEe4PNAEnnL/FTGdSOKhds8bVH0phJxQA8vg8A/
 hVa7k3Qsv0oZ2x1qtNnYQe9AGWn+vKyrSkBFo0VAz681iStEvDfieBwjBIJovXigBS+cgVFbz+VPj3p9vBJcy
 m0Mcmjmq08bRTjPXPNAHT210vlG5xU4vk6A1yYu2AwGIqMXV1IXEI3fU0AdedRRW5wfrUT6kucgCuY/
 08nkKPwP+NB+3Hj5W/A0AdJ/aAPekN/
 jqa5pl1DuVAHIP8AjTbDSqVypz6UAdQNRA70HUR6isAtENGaXeT3oA3f7RHRQdQz3rB8w5607zD60Abn28e
 tIb70IrE83PGaPM9zQBtfbz60g1D3rG8z3NHme9AGwdR96adQ96yPMHRXQG0tAGv/
 aHuKT7f71k7x60F6ANcX/
 HWkN9z1rK3j+9RvH94UAav240v249jWVz0NJ5nvQBqG90euaa16S0DWcGJHwjn1oAvfbD3o+2npis7d6mlyP
 71AGkt2D3pGvV9RS6Foa63qP2VzLzjBjODXa33wfsre3a4g1C8JVCshK/4UAcMb5T3/
 WgX2DwabcabpEDmN2vGI/2h/
 hVX7BpDn5ZLpfqQf6UAAsV0WxyKlnmL2u3PQ5rmZ7SJJ9nmkG0jZ5qxDcytFsySfU0Ab8fzA7GGRyRUv1Fat
 n9nbw9C+1RN0Y45rNbhioKA0ocqp4dX+gqqzZJq2VSQkqEQehIFV5F64oArSyj0Bj8agBINWHjB+tQFSDjFAE
 3nCjzM9Kr04cDIoAkLU3e05xTCCnmkODQA/cPWk+lR/
 xUtADi3GKjbfKRzTWU460AJkd1x7DNNfKcgsD60wg7+9LJlV+ZHB+mKAIy24jeC3rTWF5cHOB2ApRtIjL7T2B
 pHYuAS+4+wAoAjZLI+UfnULH1B/
 lTskHqfzqQ05P3jn3NAELn1qrcSYU1PJmqtuUIoA56+k+c1oaVPviAz7Vm3q/
 OataN6UAbFnP9mvd5IAzjmq+qXILuHK7cZ4xT2UbyD9ao3AG7GKAI+SVN0ikKsR0psWN4J6VZaGxf7zybj6MB
 QA9JzjrS+djPNQm2gU4Vzj/aanC3t8Ymhp+61ACibg8np61VJ3En0qc2sGePMI92NL5cAGAX/
 75NAEHmyf3gvvijfKekoP/AakKxDje3/fBoHLY+8x+iGgBmZj1nx7bBSrvz80x/BB/jS+ZDn7zn/
 gJoMkPcuKAHLrj/j6k/79D/Go28ztOT/wH/69L5tv6SH6CniS1xjE2fcf/WoAg/fD/
 lr+lGZf+e36VnvgzjEn5U7MX92Q0AQZk/56E/hS750zksZtsc+bn2jJ/pRutfSY/8AACp6UAV98veR/
 wA6MuePMkH/AAKRGYD91JPxpPkH8DGgCDYe8kn/AH1QE/6aS/8AfVWBsP8Ayyk/OnBR2hY/jQBW8v1eT/
 vqnCIer/8AfVT4Y9LdvxNKFz/AMe1AE01F7t/31ShV/2j/wACqU+Y0tr+tg58/
 wDHoPzoAavlgfcp4tUsl5GI1qaKKV+lOn4vj+tbFho1/ckeVZW00+
 +7Uf+zUAM0XV4dB1Nbu4tp5EGCpjXNd1qPw0i50yWK2ivEuJEx88WACfxrmpdGvLaPasFsM8lvVgR+rGq50y

Qn95aBR3K3Ib+tAH0z3PnuX3Ek+tVTnPFdethZAFfLJb3kFU7jTFHkRkemCKA0c20ccVYRI41D7Dn61oNbyRj
 BRM9v8AIqtIMDDDB78UAAfHf0bdYQo2ls1bKkn0BWLbMAq4J+96Vqbc0AdV94/
 epH+UdaSSRuBxx6KBUW47uRmgA60hTI6Ux92crkfjS+YxHIoAY0IJzmo2XFSmXjoajL57UARHmkpzEA4yPzpP
 MXsMUAAPSDSBly01BZRnBFABSgmeZz1pS/HA0aAGYDPjIH1pJQM/eBpu5g3TH1pGL54K/lQAw4PrS/
 KB90sfrjFRmGQnPmfpmkMb55k5+lAEb53c1EUWjAXmpDGxzl6j2f7VAFeTOahdQw4q0yZPNVnTB64FAGPqFsP
 LLYqrpnyzEe9bF1ErW7/ADVk2gAn0B0NAGpKf3v4VQuMlsirz/eBz2qrIBQA22Tc+0K00EcS7nChr1JqnbAB/
 eu38AeH01/W2uLyMPZWZBVGHdv/
 AFoAm8PeDr7W4EuFQW9u30+aLlh7c81t3Pw0vFX9xe28rejQ7f6mvS1VUG0AADgADpS0AFPOsaZc6TdNBdQOj
 9spgH3HNY7SNk7Q0PavofxHolvrnky28qAuATG20VavCH08xS3ET/
 fiyD9c4oAxpZ5s42dPQVB9oL7R5NWJ1iWQ58zPfaKrN9m5y0/0A/
 8Ar0AJ510eLu1J5ty0sDCoWnmDw92D7KaaZbUDiW7/ACoAm+03Q6Q0aBdXQ/
 5YkVCJIG6TXZ9mGaxFhg4ef8eKAJhNct/
 yyajzrkdYTUarEeS8x+hoMlq0GNYf+A5oAkEt0ekLU9ZbZp5BH1NV/Ns+63h/
 4DU8UcbfNGHI9GPNADz9rPSPn3ppF7/zx/
 WpGhUKS6SA+3NQ7YicCK4oAeBe4+4B9TS7b3ttH41H5cfe3lP1FSCGI/dsXb6A0AIWv0m5B+NA+0g/
 NMn51IsJAWNNk/76NKILH/MHP1LGgBq7+9wgNPKsMf6TEPxpFJA0V09F9qeIm6CyI+pYUAKmc/
 8AH5Hmp4o0kkCmZD6AmkiGctxbWwPuymtK1jLrxm01H+6VzQBoWGLK5ULGSx6DnmvUfD/
 AIQtrKFJrtFkmIztxwtc/
 wCF4YZdet4hghI95Hqa9KHvQBA9lavHse3iK9MBrXP6z4Nsb2FntFW3nA+XA+VvqK6ekoA8G1XT57Cd4pVKyK
 cMPSsWU8Yr1r4haev2eK9QYP3H9/SvJZhh2FACWwArEM/
 NW0gXYMnFYtvwF46NmtXAwM4oA3iSKiZzVouP7ufxqM7W42rQBWMjMalUMFzk/
 hS7UhbFG8A8GgBMDHFMYPDSn0+f4vzphLIHDY+lADGVTxtH1ppiUUHLc4J/
 CjvhcgdyAG7BR5QOTSlwKb5zKMKSafSgA2r2FJJHQGo2lPUGkm744cg0A0cD8ajY0m7PPOayWzQA4tikiCvX
 n6UxmGKjMg9APwoAVuD1q0hnHemllxwTQAxSYPNRHBz3A6053HY1DvKg4NAETkgMoPUViRgrK/
 1rbdhuzmsLnr3jgEbc0ATluAKryNg1KzBfwqP+5uKALlu3zivYfhTOP7MurfABD7s9zmvFoH+au98Da+mk6k
 DI37t+HHoPWgD3CioLS8t763We2mWVG7rzU2cDqKAFJGDyK8G8SSLD4kv1UjaxPT65r1DxDt4otdPspYIJg05G
 DtP3RXhmoXzXF00hJ04+tAFA4mbeQs20em0f1FVmuJ0n2kA+pUVIxt8sUbfXFRyNko4t4D9cUAQNcyBuNRiz
 /ALgo+0TLCEv0z6iNf8KXzps4+x2X1IGaQsxB/wBhtwfoAi+0SqcG8Qn02gf0qQTuw5nU/8AARUTmcn5YLC/
 UilXz/4reED/AGWFADxPI0kw/wC+RSi6m7XK/wDfI/woHm7WxDB+LCK/f/8APvbfIwoAX7RMf+XwD/
 gIq1aMectu561U3S/8+1tn6ipIJ3ifDwIV/wBl8UAX7pL2H5ynH3hVASR5x9t/8dqWS5yfkIqf7z5/
 pUfnS44FqB9M0ASB4e96x/ClMtunBu5x9FNMV3bjfbULTjI69J7cH/
 aWgBftNoRgX8xPvxTfMtm0PtFy3+6acJZsF8AH9Av0WnLK4bnUVP+7mgBUityM/6Uf+B//WqUR2ijm05P/A//
 AK1N884/4/WP0JppuVB5vJh+JoAtoLYcrbzk+7f/AFqt27oGyIpePqxrNSWMrzd3Dfh0/WpEkj8z5ZJW/
 wB6gDvFCf+IPEdtK5A3LsPNeyjGBivnC2uTDIkqE7k0Rz0r1LQfH9u9miXquSox5ifN+Y60Ad7R9awm8YaMAC
 l0X9lU5/XFZepe07eCFjbQSFuzS/KB/
 U0AM+I0qW0ekNZ7gZiwbHpvHJJN0prS1rVpNQumkZiQe5PNY30c5oAuW/
 +uUfjWkAu0cVlWmPtIzWwtG0tAHQs46ACm+Zt5AzQVyetIVoAY75GKiJqRl5xTdpHbNAEZPPWk7J7UpU0zaexo
 AQuycKxH0NjN0TTvn6cfjTWVu0B+FAcFW64NM9qUhuU00qTQAxjtPQGkVsZIAqUI3BF0KPK300GgCqW0eLBJx
 yB+dTGI5IyvHvUBrnpkUAQdRSJGXYkg7Q0eakMbDIzTnPLAMTigBkgT+Ak/
 WomARc8fgc1P5Y37VP4VE0RzigCtI4bA2ge9QkehZVp4uahKle3NAFWfPkvzG4rDsWPmPk966CRDIhX1rGtLc
 /aJUzgg0A0cnk1WLD8avvaR4IErD/g0f61AunSMDsLVvYjBoArLIvYVpW9zggq21vUHFVINLVLq58i0MD/
 ac4ArYj8F6r1WeA59DQBoaf4iuLCFkiEybjktazlGJ9cE7c/hV0+LZ5IijS6xI3b7ReKFH/fsisb/
 AIQ3XR9xom/Gkbwpr6dIYm/7aH/Cgaur2W6YtJIOvQGs58FuoqW40LW4c7rGVg0pj0f8KznWSJisodG/
 2xQBjIqknMW+q7Qn/n1fHmpoUaQ8PgVJJazY+WUt7ZoAo+Qp/5dT/
 30f8aDEu3AtT9M11XhvwTPrkM67uZ7eAcnycbiPqa6uf4XeF/lEd3q4fuxnTn8NtAHk/kr3tT9M0eSueLV/
 wDvqvULz4PJ5Ql0vxDdKD0jmiEn54IrAuvhp4ltyfJubK4H+0TGF60AcmsS4x9jP5n/ABpnlKucWR/
 76P8AjXQN4I8WRHnT4ZB/0znz/wCy0w+EFE+edJL/BgaAMlyE/wcFm/8AFr/xqSOMo2Rbsv1NBH/
 CKeJ8caLcN9MGk/4RXxQSB/Y8o+poAyXVSfMTA31ajy4e1lHn/eb/ABrVPhLxPnnSWH1f/wCtT/8AhEPFJ/
 5haD6y/wD1qAMtdqnxj/76b/GnvtbpaQZ9yf8a0f+EP8AFH/QPh/7/wD/ANjTh408TZ5s7RT73J/
 +JoAydj5/497dfxNL5cvVFtLPqTW4ngXxA4zILGL388t/Spk+HmpN/rNTso/pEW/rQBhI1yG/
 1lv+FO3X0P8AWW/4qK3/APhW160V1e2Y+1sf/i6jPgDWY2/dzWsw+pU/1oAx9I/5+IR7BF/
 wpRJJ78wb6AD+QrZHgrV1b57S3/3vOP+FWI/h/qk3/L5awZ9VL/1FAGPHdxjgtmrEd6kUm+GaSKX+9G20/pW/
 B8LbokNP4gtwP8AYtuf/Qq1ofhnpnz/AEjxFPn/AGEC/wCNAHIDWb/dk6jIx9TDGT+e3NMm1KaFbmuJpT/

```

t5xXdL80fCyD974ivCfQyKP6Up8EeCYP9Zq13N7CUf/E0AecSSg85psT5bAbNd/c+G/
BlrC8ls8vmgZBds5rnZLzTFb92NrD/AGP/
AK9AGdAwW6VsefpWupG3k4qtNrNoVAdAcDgXg0v2mIjIdeaA0p3D1prSdgajPwkOB3oActJrzSFx2qIk+tJQB
JuU00lQaYTSdqAHBlppPNMJpu40A03KAQ2fwpAwHQfjUeaazEHAoAsnYMFpj1xTDIoyFZiPeoQ3FNoAeXAPFB
JI45qPqcZxTdxPyhvyoAcxb8ah0S3PFKwA4DGLZLIUICKMdeaAG5dfusR9DUbn7kn3pWIBzkfSmvJF5QAVt/
rkUAMZvWoJHPalZhUTNnigBN+GHesMNX87CtAnDZqhHEy3E7EcEUAIZ/
mpouGQ5Q4PtVSWXa2MZpv2hMcofzoA2ba4kkf5pGPHrV5LmSBdwkYfjX0W95GsnJKitMXEcsY2SZFAGnHr14p
x5zAVdg8S3kf3J/zFc8do6UKwHegDr4fGF0CA6wSD1ZcH86tN4l0m7XZfWEbg9SCD/
wChVx04c81Ex3eLAHVyWPg2509L+WY9lAIH4UCz8LQ0jDVZbnb28rbXGuFBpmcdQDB6aPGmnWUQt7Kym2gYJ
BUZ/WoR43gZLZayUCOp+Zf8a868w44Y0zec8k/nQB7Bp3jmxUERWUimf+ekg/qatP4xhLJDMmf8DU/
1ryjTWAXMmCueNxqdtSt0bH2eTGcb1TIH44oA9I/4SGyk5IJ/3WFJ/
btkeN34ZBrza+WfaZorsxKei7etKi3JtFc30xwMk7Qc0AehtrtqjZ5P1ZR/
WkPi0ywcipPvKv8AjXmqXVYLeWR5d/OASopiTFJsPKkwiYcKOKAPRW8S2Y+75R+ky/403/hI7P2z/
vqf5VxPnW+2JhAh3nHQXv7vax8q0Dqp+Y5AxQB3J8S2gGMJn3BP8hUb+KbRV3Fov7fcb/
CuN064ijjbywazwX8tI1YHBJ+Y0AdxN4ytoeDJFk9MAjP6VWl8Zz7P3UDdMhsLj+dcpLJHJbLvEYf0P9Ke0jm
3I8sqqRQBqP431PdwpH4mo28Yaow+8R+Nc4Z0eaXzVFAHRf8ACX6xjHmgfUA1E3ijWGGDOPw7VhidfWl+0Jjr
QBqnWtTc83Lfmai/tG/JJ+0kH8TWd9oHY0huA0c0AaP2u7f70+f+A00yzkcyk/hWeLodmFH2r/aoAuq02eZG/
0o9pLHJJquLrB60guchrQBZRA0yjHetxIvkhB/
0sG1k3XC10Sk7RQB0Weax5qQ4J4prYxigCM0l0xRiMqBhs0AMJFC4ZfenFRTB8tAEZ60bQXSUexpUdaZQA
zig0/FMYCgB0x5FMyet070Pg/dFAEZkY8EL+HFihwx3AGnFowMLuz70xiAMjrQAvmRrnain/
AHlj8ajJ3nnI/
3RTsjbjvTPrQBA6nPQ1G4I710etNKBjy2PwoAqEHNrkHsKsuB90EH36VCylTyQfoaAIGUg81XlkCo3PUVZc8Y
FubgcGgDJmPzetQNK9DU033jU0e1ADDxViC6aMbBUbP4egC6b2UVG2pSZ6c1HkDrUZ2Z6UATjUpuxxR/
aEp96gIXFMwBxQBZN/
JnnFOS6J5NVNtKbgYFAGkJoZxuNKXGPvVndTyaeGI6GgDotNljMJRwG9MiomhkZtqpJy2e0lygkZt8rEfQ1KL
24T/lS/8A30aA0iuXuWXYntxLHjgrjINSL9qitEUQeZ/eUsMgVzF9o3A6Sv8A99Gmm9nb/lq//
fRoA60ziMUciyoEDHhSRxUS2pBkcJGhIIABrn/PlPWRj/wI0eY5/
jb86ANv7IU8pi2CDlvm6UxneIugmiKmeSW0f5Vjh2/vE/jSbj3oA6CG6ihj2eap/
0mebbkfnIHgc1hbyPSjct1oA22mt8DbMgI9ajmvkELIJAxIxxWNgeLLQA55utQeax43GpcDvShB6UAQh29TS/
0ematKiDqKLUq0gFAFJY5WPBNTNaIItxY5q4pUcjGaJ2BhNAGQWlNPQk+tI3XpTkHegB4zT16CmipF6UAXrD/
j4SumU/KOa5rT/wDj4WukjA2DLY/
CgDoST2oXJ680c89aaSSOTQArAjsRTQKdxs4zn3ptABmk0McEUh0KQKXb5ULfSgABXB3HFRgAnG7Hvin0pU8q
R9ajIFAA4QcK5P4VEc1LkY60wgdjQAzkHtQeLkV96Ta2MkGgBhAApmM8VJwaTAHegBhHbiom46EVI/
eof1oAcrAAGgHPRSSZXqMUMjjqpH1qLkHFAEBYzUDsTurH5qiPNAE02q9x901dBXBGKz7ttiketAGPL981CRT
3JzSdqAI6TpTu1RseKAHbvU0m5ai5pR1oAkzRTaTJoAfS00cU6gA7UUUUALTwuRzTaXmgBCKUd6XFFABTqbTh
QAUZpKWgA70UlhNAB0pc0lFAC5pc0ylzzQBjuNKHxUeaM0ATrLTmkyhFVS2KQt6GgBG60q03NPHSgB4p46daj
pRzQBraUuZq6IHArC0d0Wat3HvQB0ThjpuJNTP0qHvQA3/PWLJ9DTW60v8ADQA5o3CglDtPem/dPyuQfal/
5Zmo/
T60APC+bn5mL+nXNRshHB4+tKn+tpvc0AR4560jFwn016AEHBppJ6BiAe2aUU00AM6HFkv+brQfvUv8dAERBy
aiYYP3gPwzUzfeNQP96gAJJP3i1RlWNTdqZ2NAFZk56UwpVioX980AVXBHQVRvL3Jkda13+4azbr7poAwH4Jz
Ue72qaf75qv3oACaa1KaaetADcGnq00tFKKAFx700Kc5p9LQAmKMUo60p60AMpaUdaU9aAACncikFLQAUUtJQ
AuKKKKAeOopRQAUUtFACYoxS0UANxRilpRQA3BopxptADTSFeM0ppKAepwbimnrQKAJQafGCWwKjFWLX/
WUAdDpcRWIDvmtPPqKpad0FaDdaAP/Z"
}
]
}

```

Response example:

Single-frame:

```
{
```

```

"results": {
  "color": {
    "error_code": 200,
    "tags": [
      {
        "id": 0,
        "color": "",
        "probability": 1
      }
    ]
  },
  "mmt": {
    "error_code": 200,
    "tags": [
      {
        "id": 0,
        "make": "",
        "model": "",
        "type": "car",
        "probability": 1
      }
    ]
  }
}
}

```

Response parameters:

Parameter	Parameter description
type	Vehicle type: noise, bus, car, motorcycle, small bus, truck
Other parameters	Used to maintain API compatibility

6.8.2 ULPR Server

The **ULPR Server** corresponds to the **LPR channel** system object.

Searching for a license plate by image

You can use a POST request to search for a vehicle license plate by image.

General request format:

POST http://IP address:port/lprserver/FindNumbersByImage

Request body:

```
{
  "id": {id},
  "image": {image}
}
```

Parameters in the request body:

Parameter	Required	Description
id	Yes	Server ID
image	Yes	Vehicle JPEG image in base64 format

Request example:

POST http://127.0.0.1:10001/lprserver/FindNumbersByImage

```
{
  "id": "1",
  "image": "/9j/4AAQSkZJRg..."
}
```

Response example:

```
{
  "Plate": "a574MX | 97",
  "Status": "OK"
}
```

 **Note**

Successful response depends on the settings of the detector, as not all detectors can recognize a license plate by a single image.

Receiving an image by ID

If images are stored on a disk in a folder (see [Set up storage of images of recognized license plates and vehicles on disk](#)), you can use HTTP GET requests to receive images.

General request format:

GET http://IP address:port/lprserver/GetImage/{type}/{id}

Parameter	Required	Parameter description
id	Yes	Image ID (image file name without the additional _Frames or _Plate_numbers)
type	Yes	Frames—get an image with a vehicle, Plate_numbers—get an image with a license plate cut out

Request example:

GET http://127.0.0.1:10001/lprserver/GetImage/Frames/66FB34A2-1B38-E811-A92F-001A7DDA710E

GET http://127.0.0.1:10001/lprserver/GetImage/Plate_numbers/66FB34A2-1B38-E811-A92F-001A7DDA710E

Response example:

JPEG image

Receiving search results by a license plate

You can use a POST request to search by a vehicle license plate.

General request format:

POST http://IP address:port/lprserver/GetProtocolNumbers

Request body:

```
{
  "id": {id},
  "time_from": {time_from},
  "numbers_text": {numbers_text},
  "numbers_operation": "OR"
}
```

Parameters in the request body:

Parameter	Required	Description
id	Yes	Server ID. If you want to get search result by several servers, specify the required ids separated by a comma
time_from	No	Beginning of the time range of storing information on license plates from a database. Format YYYY-MM-DDThh:mm:ss.sss

Parameter	Required	Description
time_to	No	End of the time range of storing information on license plates from a database. Format YYYY-MM-DDThh:mm:ss.sss
numbers_text	No	License plate. If you want to get search result by several license plates, specify the required license plates separated by a space. You can also search by a license plate template using %
numbers_operation	No	You must specify this parameter to get search result by several numbers in one request. The parameter value is OR
cam_id	No	Camera ID. If you want to get search result by several cameras, specify the required ids separated by a space
countries	No	Country. You must specify the country according to <i>Axxon PSIM</i> localization. Specify several countries separated by a comma
plate_direction	No	Direction of vehicle movement. Values: 0—not defined; 1—from camera; 2—towards camera; 3—to the right; 4— to the left
comment	No	Comment. Specify several comments separated by a space
comment_operation	No	You must specify this parameter to get search result by several comments in one request. The parameter value is OR
speed_from	No	Lower value of the speed limit range
speed_to	No	Upper value of the speed limit range
validaty_from	No	Lower value of the validity limit range

Parameter	Required	Description
validaty_to	No	Upper value of the validity limit range
numbers_region	No	Region number. If you want to get search result by several regions, specify the required numbers separated by a comma
plates_color	No	License plate color. IS NULL—not defined

Request example:

POST http://127.0.0.1:10001/lprserver/GetProtocolNumbers

```
{
  "id": "1,2",
  "time_from": "2021-05-28T16:10:35.000",
  "numbers_text": "K673YK163 P127P062",
  "numbers_operation": "OR"
}
```

Response example:

Click to expand...

```
{
  "Protocols": [
    "frame": "",
    "license_plate": "",
    "regional_code": "",
    "number": "K673YK163",
    "detectors_name": "LPR channel 1",
    "speed": "",
    "country": "",
    "date": "12.06.2021 13:09:21",
    "recognizer_address": "",
    "valid_speed": "",
    "speeding": "",
    "direction": "2",
    "validity": "97",
    "alarm time": "",
    "alarm_initiated_by": "",
    "alarm_accepted_by": "",
    "comment_from_external_db": "",
    "alarm_accepted_at": "",
    "alarm_handling_delay": "",
    "comment": "",
    "alarm_type": "",
    "alarm_processed": "",
    "external_db": ""
  ]
}
```

```

"red_light_phase_start_time": "",
"time_passed_since_the_red_light_phase_start": "",
"category": "",
"camera": "Camera 1",
"type": "",
"vendor": "",
"model": "",
"frame_from_synchronous_camera": "",
"dangerous_goods_class": "",
"dangerous_goods_composition": ""
},
"frame": "",
"license_plate": "",
"regional_code": "",
"number": "P127PO62",
"detectors_name": "LPR channel 1",
"speed": "",
"country": "",
"date": "12.06.2021 13:09:38",
"recognizer_address": "",
"valid_speed": "",
"speeding": "",
"direction": "1",
"validity": "69",
"alarm_time": "",
"alarm_initiated_by": "",
"alarm_accepted_by": "",
"comment_from_external_db": "",
"alarm_accepted_at": "",
"alarm_handling_delay": "",
"comment": "",
"alarm_type": "",
"alarm_processed": "",
"external_db": "",
"red_light_phase_start_time": "",
"time_passed_since_the_red_light_phase_start": "",
"category": "",
"camera": "Camera 1",
"type": "",
"vendor": "",
"model": "",
"frame_from_synchronous_camera": "",
"dangerous_goods_class": "",
"dangerous_goods_composition": "",

"plate_numbers.id": "{6696D008-30B9-EB11-9644-1831BF4C3BFA}"
}
],
"Status": "OK"
}

```

where **plate_numbers.id**—ID of a vehicle license plate image and (if any) frame from the synchronous camera.

Search for a license plate by image for the VT recognition module

You can use a POST request to search for a vehicle license plate by image when using the VT recognition module.

General request format:

POST http://IP address:port/lprserver/FindNumbersByImage

Request body:

```
{
  "id": {id},
  "zone_x": {max_plate_length},
  "zone_y": {max_plate_width},
  "zone_min_x": {min_plate_length},
  "zone_min_y": {min_plate_width},
  "image": {image}
}
```

Parameters in the request body:

Parameter	Required	Parameter description
id	Yes	Server ID
zone_x	Yes	Maximum length of a license plate, % of image size
zone_y	Yes	Maximum width of a license plate, % of image size
zone_min_x	Yes	Minimum length of a license plate, % of image size
zone_min_y	Yes	Minimum width of a license plate, % of image size
image	Yes	Vehicle JPEG image in base64 format

Example of a request:

POST http://127.0.0.1:10001/lprserver/FindNumbersByImage

```
{
  "id": "1",
  "zone_x": 27,
  "zone_y": 10,
  "zone_min_x": 16,
  "zone_min_y": 5,
  "image": "/9j/4AAQSkZJRg..."
}
```

Example of a response:

```
{
  "Plate": "X126AP550",
  "Status": "OK"
}
```

6.8.3 General information about HTTP API in Auto PSIM

The software implementation of the *Auto PSIM* HTTP API is similar to [Axxon PSIM HTTP API](#).

General agreements, limitations and features are described on the [General information on HTTP API](#) page; additional settings required for the *Auto PSIM* API operation are described on the [Calling API of vertical solutions via Axxon PSIM HTTP API](#) page.

In the *Auto PSIM* API, **lprserver** corresponds to the **LPR channel** system object, and the default port is 10001.

6.9 Appendix 9. LPR channel integration via TCP/IP

For remote systems, it is possible to receive events from the LPR channel. The Server with the running *Auto PSIM* software acts as a TCP Server.

When a new LP number is added to the *Auto PSIM* database, the Server transfers the data via the **TCP port 35555** and **TCP port 55555** in the following formats:

6.9.1 TCP port 35555

```
<?xml version="1.0" encoding="UTF-8"?><CAR_PLATE version="1.0" direction = "in" cam-
id = "4" time = "2020-07-21T18:37:44.695" plate = "x000xx000" plate_mask = ""
confidence = "99" plateImage = "imagebase64" >..imagebase64..</CAR_PLATE>
```

The transmitted data structure is described in the table below.

Name	Description
direction	Vehicle moving direction. The following values are possible: <ul style="list-style-type: none"> in – To the camera (defined by Vehicle license plates) out – From the camera (defined by Vehicle license plates) left – On the left (defined by carriage, container numbers). right – On the right (defined by carriage, container numbers). none – Not defined
cam-id	ID of the camera that captured the vehicle
time	Time of LP number recognition

Name	Description
plate	If the LP number was recognized, the field contains the text of the recognized number, otherwise - "Not defined"
plate_mask	Country the recognized LP number belongs to
confidence	Accuracy of LP number recognition in percent
plateImage	License plate image in "base64" format
> ..imagebase64.. <	Vehicle image in "base64" format

6.9.2

TCP port 55555

```
0x02YYYYMMDDHHMMSSCCNNNNNNNNN0x03
```

The transmitted data structure is described in the table below.

Name	Description
0x02	Start byte
YYYY	Year (four numbers 0000-9999)
MM	Month (two numbers 01-12)
DD	Day of the month (two numbers 01-31)
HH	Hour (two numbers 00-23)
MM	Minutes (two numbers 00-59)
SS	Seconds (two numbers 00-59)
CC	Camera number (two numbers 00-99)
NNNNNNNNN	Text of the recognized number (arbitrary number of symbols), or "Not defined" if the number was not recognized

Name	Description
0x03	End byte

 **Note**

The beginning and end of the message are transferred by the start byte and the end byte respectively. The message between these bytes is transferred in text format.

6.10 Appendix 10. Selea CPS (Car Plate Server) configuration guide

6.10.1 Brief description of Selea CPS

Selea CPS (Car Plate Server) is a software server to which *Selea* cameras with license plate recognition are connected. This software server redirects license plate recognition events from *Selea* cameras to the *Auto PSIM* server.

6.10.2 Configuring the Selea CPS server

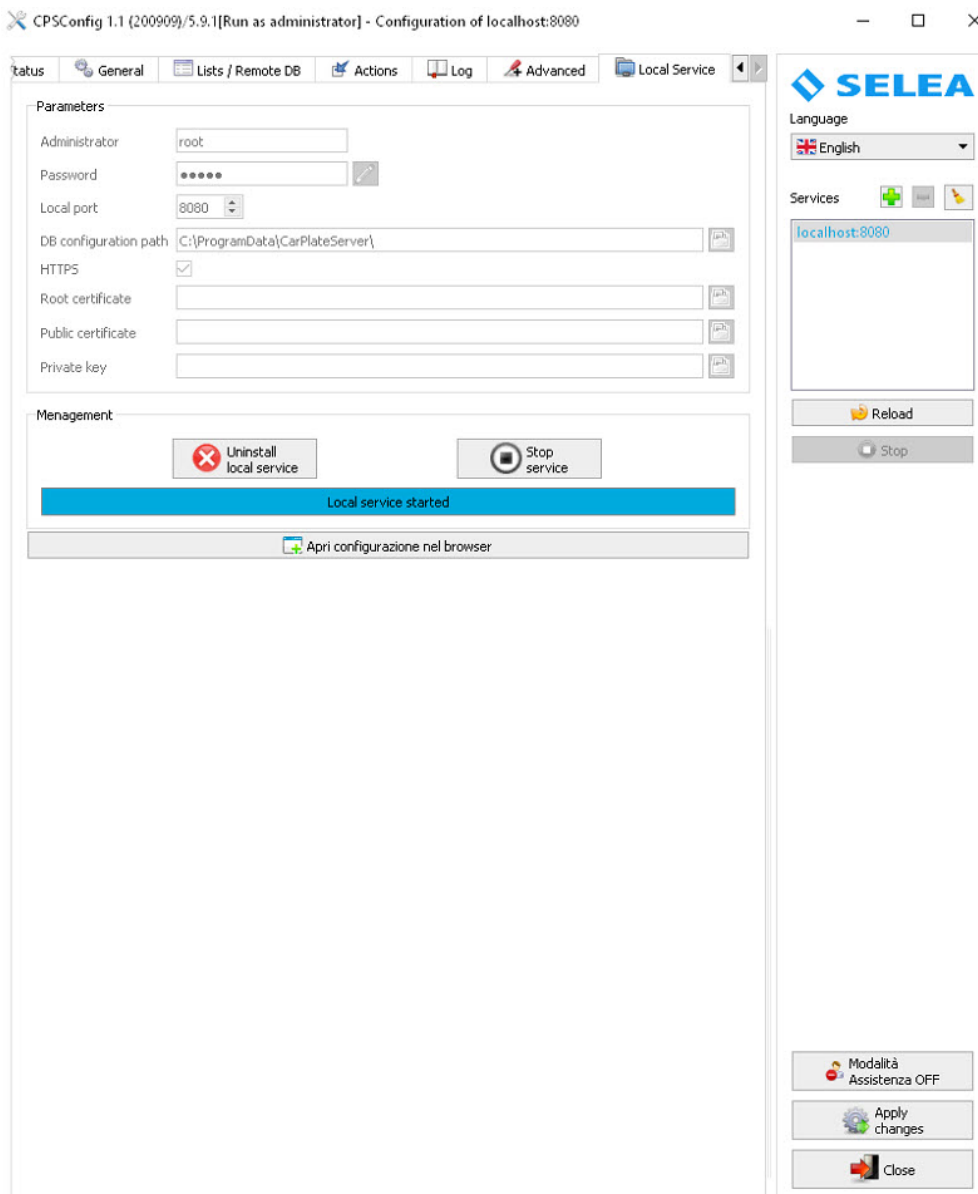
For the *Selea CPS* server to work, it is necessary to install the **CPS sever**, **CPS discovery** and **Seleatool** utilities on one computer. Also, the cameras and *Selea CPS* server should be in the same local network.

 **Note**

Outdated modifications of *Selea* cameras can work in the same local network directly from the *Auto PSIM* without the *Selea CPS*.

The server is configured using the server web interface or the manufacturer's utility *CPSConfig*. Below is an example of configuring a server using the manufacturer's utility *CPSConfig*.

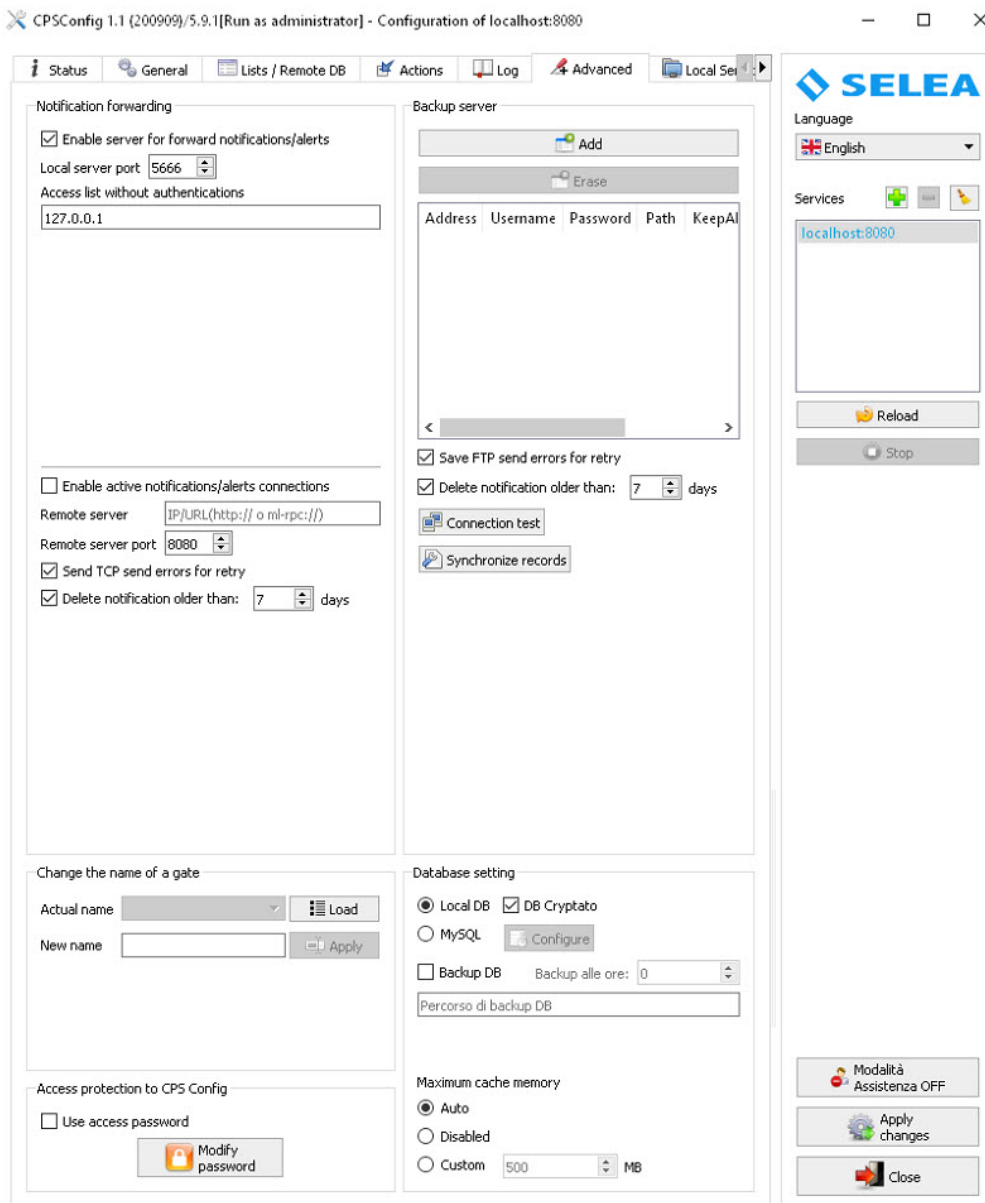
To start the *Selea CPS* server service, go to the **Local Service** tab, specify the server login and password, camera port for events, and other parameters, and then click the **Start service** button. When the server is started, the utility will ask for the server login and password.



The server can forward events from cameras either by itself by opening a connection (ftp, http, or tcp), or to an open client via tcp connection. The latter mode is preferable because it allows you to control the connection without problems with port forwarding on the AN server side.

In order for the server to receive the incoming connections from *Auto PSIM*, it is necessary to enable **Notification forwarding** on the **Advanced** tab, set the used port (5666 by default) and add the *Auto PSIM* server address to the **Access list without authentications** field.

Below is a configuration option when the *Auto PSIM* server is installed on the same computer as the *Selea CPS* server.



Also, in the `C:\ProgramData\CarPlateServer\passive_gateway_carplate_template.xml.utf8` file, it is necessary to set the format of the transmitted events as follows:

```

Begin{
COUNTER=$COUNTER$
CAMERAIP=$CAMERAIP$
CARPLATE=$CARPLATE$
TIMESTAMP=$TIMESTAMP_MS$
IMAGE=$FILE_B64$
IMAGE2=$CONTEXT_B64$
}End

```

Here for the **IMAGE** parameter specify the value `$FILE_B64$` (to get a black and white image). For the **IMAGE2** parameter specify the value `$CONTEXT_B64$` (to get a color image).

6.10.3 Configuring the Selea cameras

In order for the *Selea* cameras to transmit the license plate recognition events to the *Selea CPS* server, go to **SETUP** → **NOTIFICATION SERVICES** → **FTP** in the camera web interface and specify the *Selea CPS* server data.

VIA CAVOUR OUT x +

Not secure | 192.168.101.33/settings.html

Selea CarPlateServer

FTP NOTIFICATIONS SETTING

Server A Server B

Enable

IP address

Port typ.: FTP 21, WebSoket 8080

Username

Password

TEST

Sending options

Notification type

Keep alive commands connection

File name format

Path

i.e. /VIA_CAVOUR_OUT/2022-05-03/14/REAR/WH_AB000CD_54454_2022-05-03_14-55-13-787.jpg

powered by Selea s.r.l.

Since the cameras do not have embedded GPS, in order to transmit the geographical coordinates of the *Selea* camera, go to **SETUP** → **SYSTEM** → **GPS COORDINATES** in the camera web interface and specify the corresponding camera coordinates.

SELEA

System

- System info
- Clock
- GPS coordinates

Network

Car plates reading

Image control

Compression parameters

Security

Notification services

Status

GPS LOCALIZATION

GPS coordinates

Latitude es. 44.9403428

Longitude es. 10.4814643

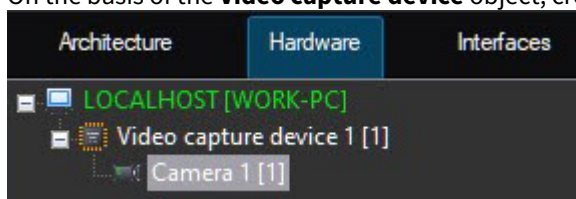
Save parameters

6.10.4 Configuring Axxon PSIM to work with the Selea CPS

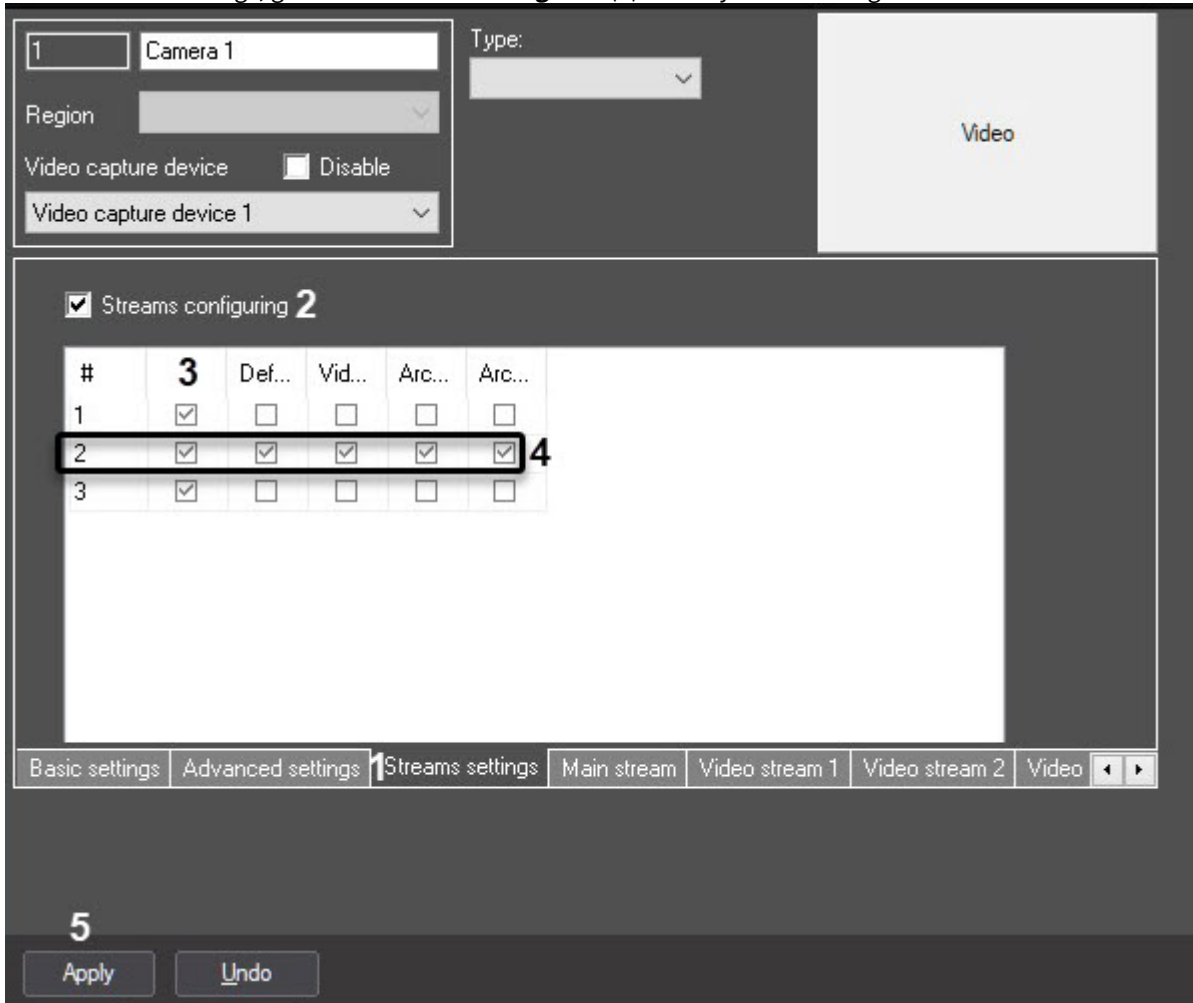
In order to get a response from the *Selea* camera with the help of *Selea CPS*, do the following:

1. Create a **Video capture device** object.
2. In the **Video capture device** settings:

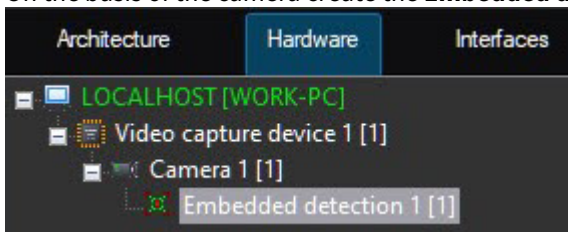
- a. From the **Type** drop-down list select **Selea (1)**;
 - b. From the **Model** drop-down list select **ANPR camera on CPS (2)**;
 - c. From the **Firmware** drop-down list select **auto (3)**;
 - d. In the **IP address** field specify the IP address in the format [ip_camera_address]@[ip_CPS_server_address].
If *Selea CPS* is installed on the same computer as *Axxon PSIM*, then the **IP address** field value will be 127.0.0.1;
 - e. In the **Port** field specify **5666 (5)**;
 - f. In the **Name (6)** and **Password (7)** fields specify login and password of the *Selea CPS* server (see [Configuring the Selea CPS server](#) section);
 - g. Click the **Apply** button **(8)**.
3. On the basis of the **Video capture device** object, create a **Camera** object.



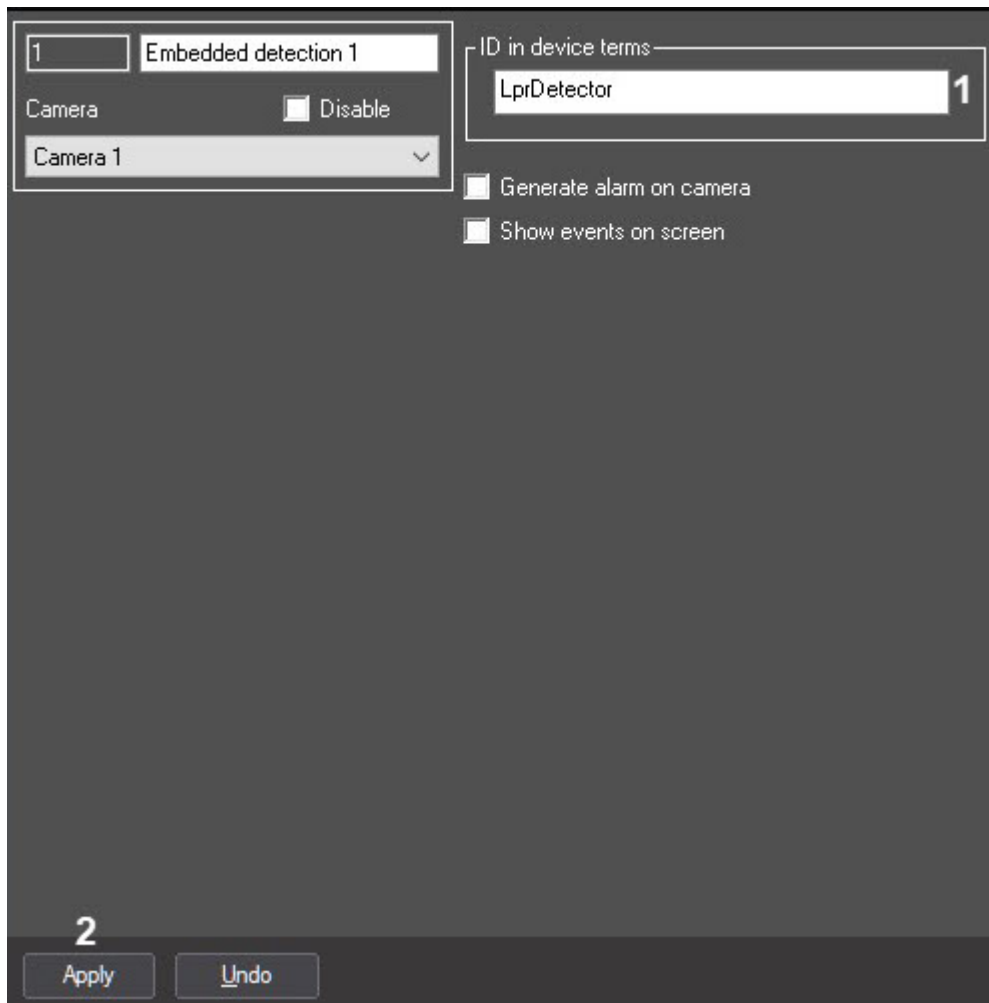
4. In the **Camera** settings, go to the **Stream settings** tab (1) where you can configure camera video streams:



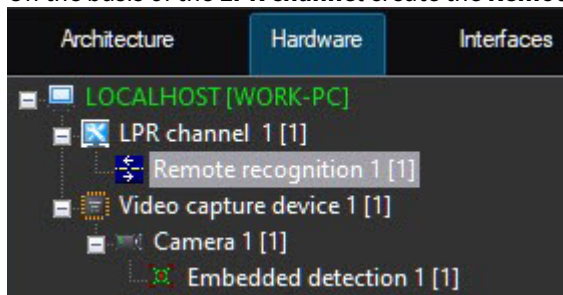
- select the **Streams configuring** checkbox (2);
 - activate all three streams by selecting all boxes in the first column (3);
 - select the remaining checkboxes for the stream 2 (4).
The first stream is the video from the camera. The second stream is color images from the camera in the moment of license plate recognition. The third stream is black and white images in the moment of license plate recognition. You can see them in the **Online Monitor** window.
5. On the basis of the camera create the **Embedded detection** object.



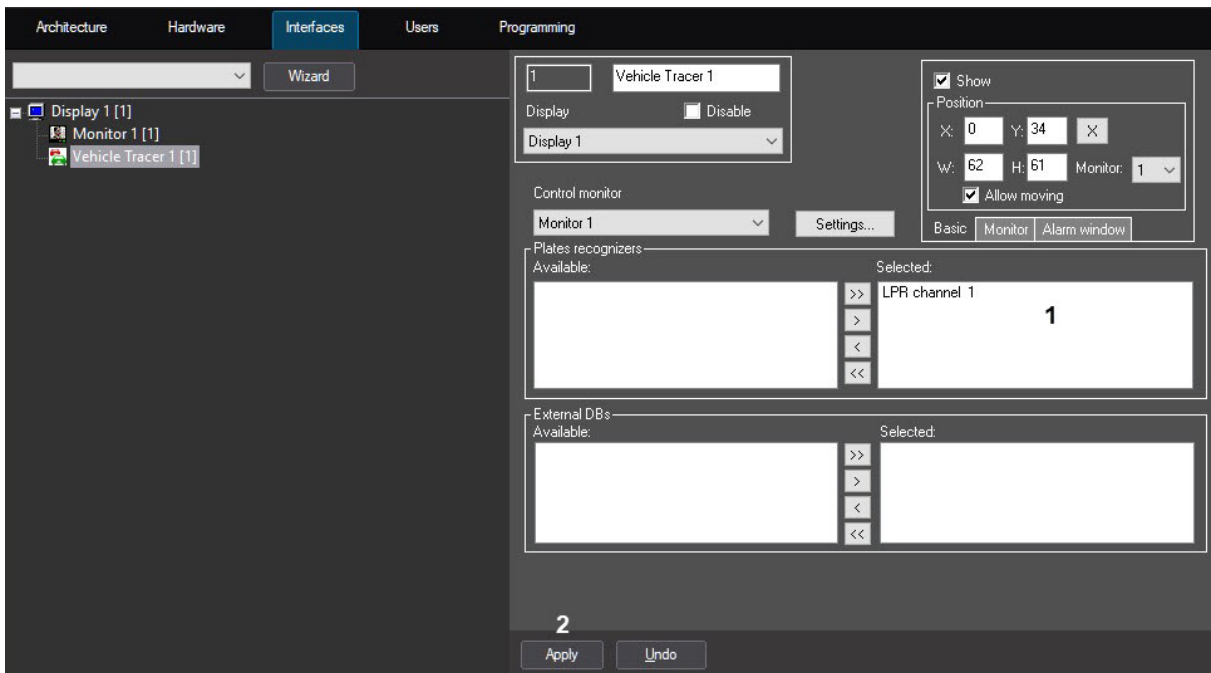
6. In the **Embedded detection** settings in the **ID in device terms** field (1) specify the value of **IprDetector** and click the **Apply** button (2).



7. Create the **LPR channel**.
8. On the basis of the **LPR channel** create the **Remote recognition** object.



9. In the settings of the **Vehicle Tracer** Interface object choose the created **LPR channel (1)** and click the **Apply** button (2).



Axxon PSIM configuration for working with the Selea CPS is complete.

6.11 Appendix 11. Examples of correct and incorrect video images for the IV software module

Video images that meet the video camera mounting and setup requirements for the IV software module (see [Video camera mounting and setup requirements for the IV software module](#)).





Video images that do not meet the video camera mounting and setup requirements for the IV software module.

