version 2.8

AutoCode Intellect
Customization Guide

vit
raising technologies™

Contents

1.Introduction

1.1. AutoCode Intellect Overview

AutoCode Intellect is a software module for the Intellect CCTV System. The following features are available within the module:

- License plate recognition.
- Recognition of up to 10 plates in the same frame.
- Recognition fine tuning: license plate template selection, control over quality and parameters of resulting data.
- Ability to set multiple license plate detection zones within one frame.
- Distributed processing and storage of recognition cases within the module's database.
- Adjustment of events and media storage time: control over depository volume.
- External database check for recognized license plates.
- Alerts creation and management within preset algorithms.
- Reading recognition server coordinates from a GPS receiver.

1.2. About this manual

This manual is created for installation and adjustment specialists, system administrators and AutoCode Intellect users with administrator rights. The manual is designed according to various tasks to be completed during different stages of working with AutoCode Intellect:

- The **"Getting Started"** chapter contains the hardware and software key requirements and recommendations.

- The **"Installation"** chapter provides a detailed description of modules installation and license activation processes.

- The **"Setting Up"** chapter focuses on setting up the main module features necessary for recognition process control.

- The **"Administration"** chapter describes operations carried out for module's additional configuration and performance control.

Additionally, the manual contains description of the connection between AutoCode Intellect software module and Intellect CCTV System features.

2. Getting Started with AutoCode Intellect

2.1. Hardware requirements

AutoCode Intellect is a software module for Intellect CCTV System. The instructions for module installation and settings in this manual are written with account for the user having already considered basic hardware requirements for Intellect complex. Additional recommendations for selecting a CPU that will carry most of the workload in the process of license plates recognition are provided in this chapter.

CPU performance is the vital part in AutoCode recognition module's operation measured in total amount of frames processed per second (on all recognition channels). This index is different for two modes of module's operation – slow (used on parking lots) and fast (used on highways). During the slow mode of operation the amount of frames processed per second should be six and during the fast mode it should equal the framerate of the camera used for surveillance.

If processor capacity is too low for high recognition settings, the decimation of recognition queue occurs (some frames are lost). This leads to lower recognition quality.

Provided below are tables 1 and 2 that illustrate frames per second that can be processed by recognition module under specific computer configuration, processor load and image resolution (when the video is processed with the lowest possible compression level, i.e. decompression time is not accounted).

Default configurations with CPU's of various price categories and performance rates (from lowest to highest) were selected for testing.

Table 1 — Comparing the operating rate of AutoCode recognition module under 80-90% CPU workload (fps).

Computer Configuration	Image Resolution				
	720×288	720×576	1360×512	1360×896	2336×1752
Intel Core i5-2500 3.3Ghz 2Gb RAM	240	128	68	38	10
Intel Xeon DP Quad-Core E5620 8Gb RAM	274	180	94	54	15
Intel Core i7-2600 3.4Ghz 8Gb RAM	386	220	102	66	20
Intel Core i7-3930K 3.2Ghz 16Gb RAM	642	370	192	110	32
2* Intel Xeon X5650 2.66Ghz 12Gb RAM	1034	569	299	180	54

Table 2 — Comparing the operating rate of AutoCode recognition module under 60% CPU workload (fps).

Computer Configuration	Image Resolution				
	720×288	720×576	1360×512	1360×896	2336×1752
Intel Core i5-2500 3.3Ghz 2Gb RAM	180	96	51	28	7
Intel Xeon DP Quad-Core E5620 8Gb RAM	205	135	70	40	11
Intel Core i7-2600 3.4Ghz 8Gb RAM	289	165	76	49	15
Intel Core i7-3930K 3.2Ghz 16Gb RAM	481	277	144	82	24
2* Intel Xeon X5650 2.66Ghz 12Gb RAM	775	426	224	135	40

Testing conditions:
1. Processor is loaded with recognition only.
2. Format of compressing the videostream processed by the module is Xvid or MJPEG.

It's vital to keep in mind that video decoding (using software compression chipsets, IP-cameras and IP-coders) takes up most of processor capacity. And the whole stream is decoded with no regard to the mode set in AutoCode module whether it's fast of slow. Which is why, if the module runs recognition on 6 fps, the whole stream (for example, 25 fps) received from the camera will be decoded.

It's possible to assess the losses in processor capacity during decoding by running the CCTV system to be viewed by the operator under required settings (amount of channels, resolution, framerate and codec).

Part of hardware resources may be used by additional tasks, such as video-archive creation, database processing, antivirus protection, etc. This is the reason it's recommended to choose a CPU that will be loaded up to 60% during AutoCode recognition module's active time. The online calculator available on VIT website may be used to select the CPU.

If the selected configuration matches one of those provided in tables 1 and 2, it's possible to determine approximate available thread count by dividing total number of frames taken from the table by framerate of selected recognition mode.

For example, under 1360×512 resolution, Intel Xeon DP Quad-Core E5620 8Gb RAM configuration and 60% CPU workload, AutoCode Intellect will be able to process video from:

- 11 cameras in slow mode (70/6 ≈ 11);
- 2 cameras in fast mode if their framerate is 25 fps (70/25 ≈ 2).

If the amount of recognition channels increases, so should the amount of RAM. One recognition process on one channel takes up to 1 Gb of RAM.

All aforementioned information should be considered when choosing hardware for AutoCode Intellect.

Examples of default hardware configurations:
Example 1.

Configuration: Intel Core i5-2500T (2.3Ghz), 2Gb RAM
Camera: Axis P1344
Codec: h.264
Fps: 20
Resolution: 1280x800
Channels (with decoding): 3

Example 2.

Configuration: 2 x Intel Xeon X5650 (2.66GHz), 12 Gb RAM
Camera: Axis P1344
Codec: h.264
Fps: 25
Resolution: 800x600
Channels (with decoding): 20

2.2. Software requirements

AutoCode Intellect module server application (LPR module) is installed along with pre-installed Intellect server system. AutoCode Intellect Client (VM module) may be installed either along with pre-installed Intellect system client (Remote Monitoring Workstation, RMW) or with server application.

AutoCode Intellect module is connected to Intellect software complex, Version 4.9.4 or later. Internal database is processed by MSSQL: version Microsoft SQL Server 2008 R2 or later is recommended. Additionally, NTFS file system is required for correct module operation.

AutoCode Intellect is compatible with Microsoft Windows:
- Windows Server 2008 (x86)
- Windows Server 2008 R2 (x64)
- Windows Server 2012 (x64)
- Windows Server 2012 R2 (x64)
- Windows 7 Professional (x86, x64)
- Windows 7 Enterprise (x64)
- Windows 7 Ultimate (x86, x64)
- Windows 8.1 Enterprise (x64)
- Windows 8.1 Professional (x86, x64)

Minimum amount of HDD storage space required for AutoCode Intellect is 610 Mb.

AutoCode Intellect Installer includes additional software, such as ffdshow, HASP-keys driver ("_redist" folder). These components are installed automatically. It's not recommended to update them to latest versions – stable performance of the module is guaranteed only with provided versions of components.

It's recommended to update AutoCode Intellect regularly — this provides for faster and more effective troubleshooting by technical support engineers.

3. AutoCode Intellect Installation

Contents

Depending on the tasks set by customers, AutoCode Intellect is provided as following complementary modules:

1. LPR — server application, AutoCode recognition module.
2. VM — client application, interface module.
3. GPS — module for working with GPS receiver to determine the recognition server's coordinates.
4. VITSQLQUERY — external database communication module.

Module installation process consists of the following stages:

1. Install wizard launch, following the install instructions.
2. Computer reboot after the installation is finished.

This chapter contains the description of LPR functional module installation as a server component of AutoCode Intellect. After the LPR module is installed, it's possible to proceed to installing other AutoCode Intellect modules.
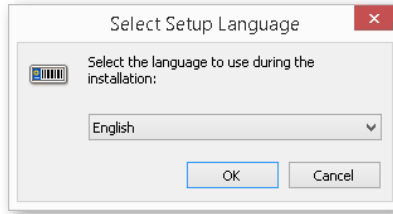
3.1. Installation

Step 1. Launching the Install wizard

Run the program file with .exe extension as administrator. You may receive a security system alert. Click **Run** in the alert window.

Step 2. Selecting the installation language

This step is to select the language (Russian, Ukrainian, English or Spanish) to be used during module installation process (Fig. 1). The language of AutoCode Intellect interface is to be selected further into installation.
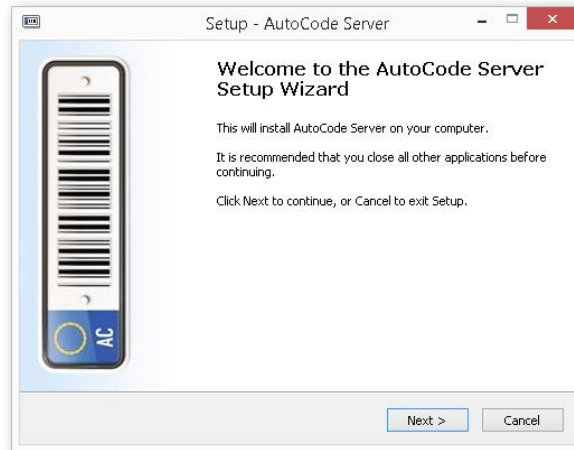
Figure 1 — LPR functional module installation: selecting the installation language

Step 3. Initiating installation

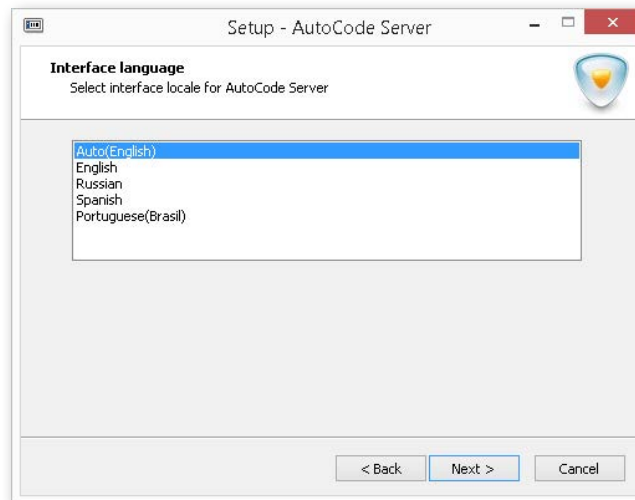Click Next to proceed to installation (Fig. 2).

Figure 2 — LPR functional module installation: welcome screen

Step 4. Selecting AutoCode Intellect interface language

This step is to select the interface (localization) language for the functional module installed (Fig. 3). The first item on the list of available languages is the language of current Intellect system localization (it's marked as **Auto**).
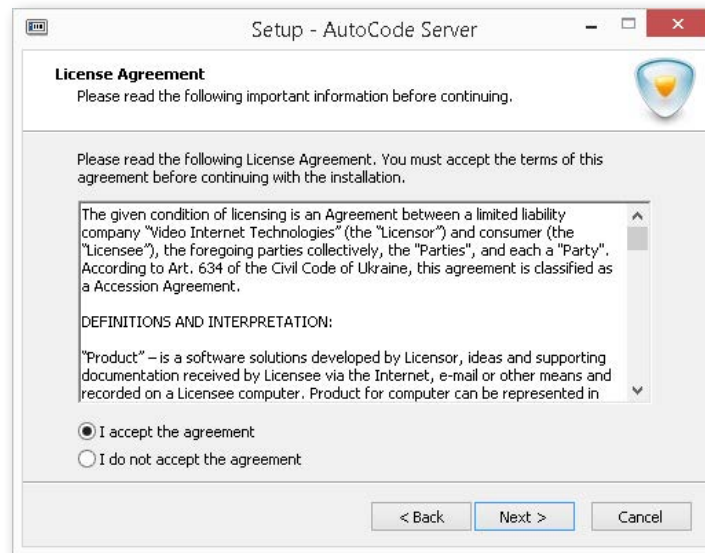
Figure 3 — LPR functional module installation: localization selection

Step 5. Accepting Terms and Conditions

At this stage it's recommended to read the license agreement. It's necessary to accept the terms of the agreement to proceed with installation (Fig. 4).

**Figure 4 — LPR functional module installation: license agreement**

Step 6. Selecting the license type

This step is to select one of licensing options (Fig. 5), according to which one of the following may be installed:

- the version of AutoCode Intellect with active license: the user is supposed to have either a hardware or software protection key (select **I have a dongle**);
- AutoCode Intellect trial for familiarizing with the software module features within 30 days from the day of installation (select **Install demo key for 30 days**).

Note! A trial version will not operate on virtual machines or under active RDP sessions.

Figure 5 — LPR functional module installation: selecting the license type
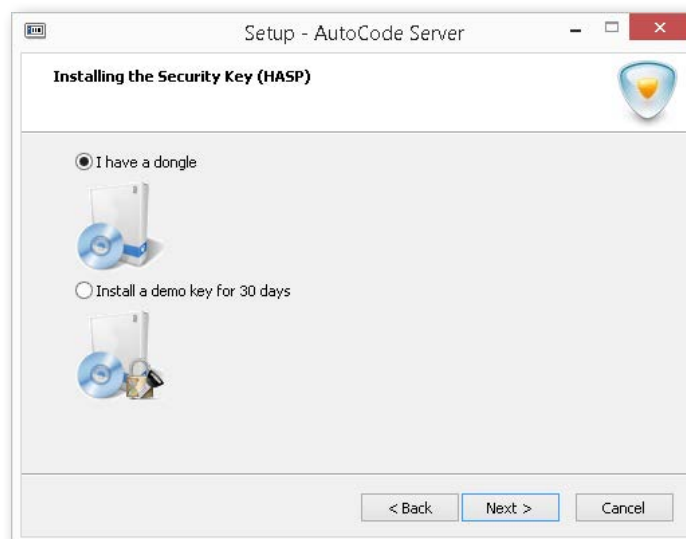
Step 7. Selecting the directory to install main components

At this state a path to the directory to store the main system components is to be set up (Fig. 6). The default path is C:\Program Files (x86)\VIT\AutoCode, but users may select another directory by clicking **Browse**.

Figure 6 — LPR functional module installation: selecting the directory
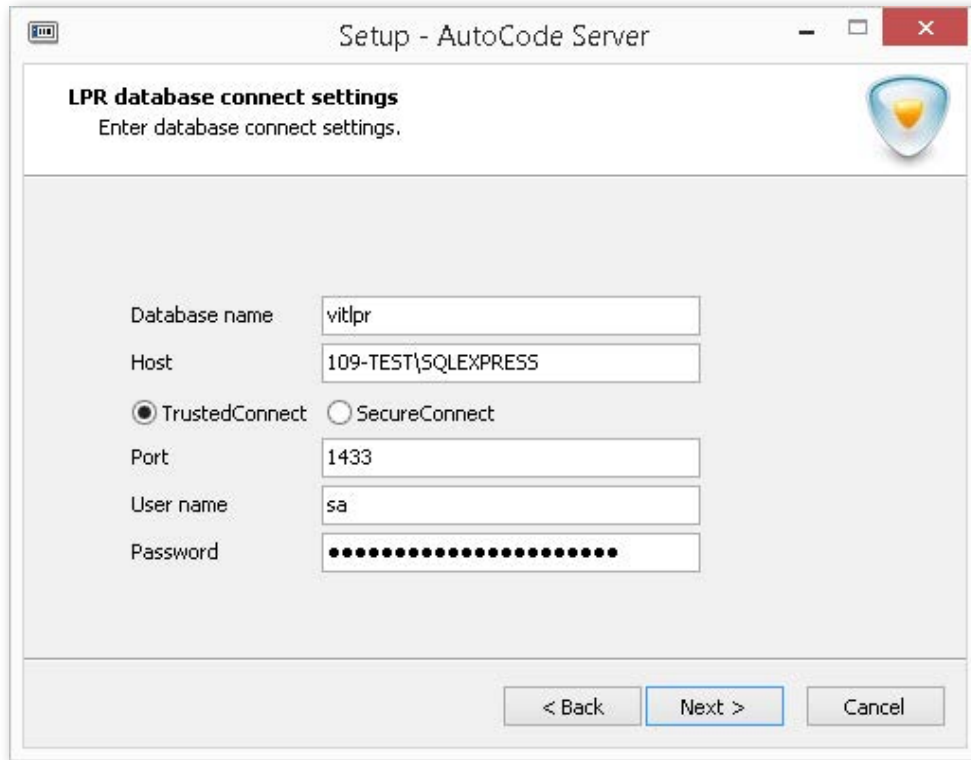
Step 8. Selecting the database connection settings

The fields in the form (Fig. 7) shown at this stage are filled automatically by the Install wizard (Table 3).

**Table 3 — Database connection parameters shown at LPR Module installation stage**

Database name	Recognition database name. The default value is "vitlpr".
Server IP	IP address of MSSQL server hosting the recognition database. A record of one of the following kinds is acceptable: • Computer IP\ MSSQL server name (e.g. "192.168.0.168\ SQLEXPRESS") — preferable; • Computer name\ MSSQL server name (e.g. "BOX78\ SQLEXPRESS").
Port	MSSQL server port. The default value is 1433.
Trusted Connection	Authorization via Windows (current user).
Secure Connection	MSSQL authorization.

Note! During the installation of AutoCode Intellect (at this stage) "sa" user and "Intellect_default_DB_4" password are used by default to create a new MSSQL administrator account (username — "VIT[nine random numbers]"). Created account data will be used to connect to local recognition database.

Should the need for other data occur, the following is to be checked:
1. The value in **Server IP** field corresponds to real computer and MSSQL server names.
2. Specified port is open.
3. MSSQL server settings allow "Trusted Connection" mode operation.
4. Correct MSSQL server username and password are entered when "Secure Connection" mode is selected.
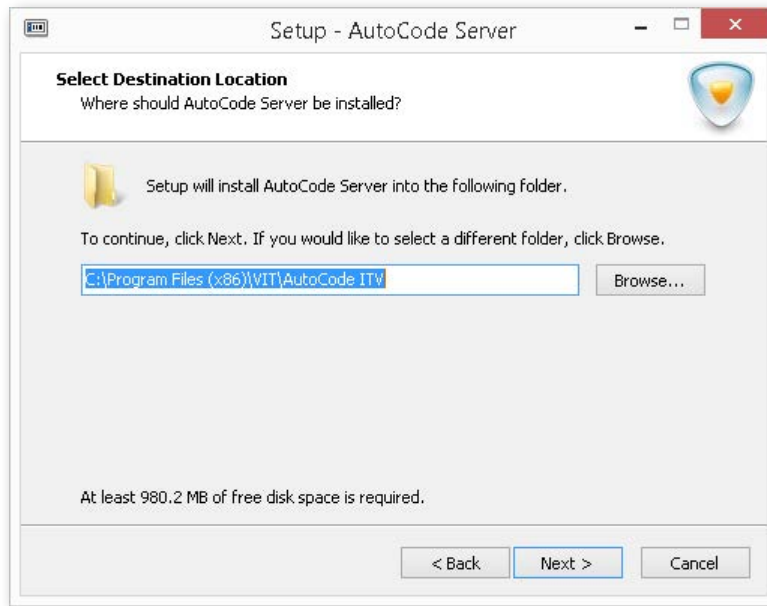
Step 9. Confirming installation settings

At this stage it's recommended to check if the specified parameters are correct and then click **Install**. Click **Back** to return to previous screens and make adjustments (Fig. 8).

Figure 8 — LPR functional module installation: parameters confirmation
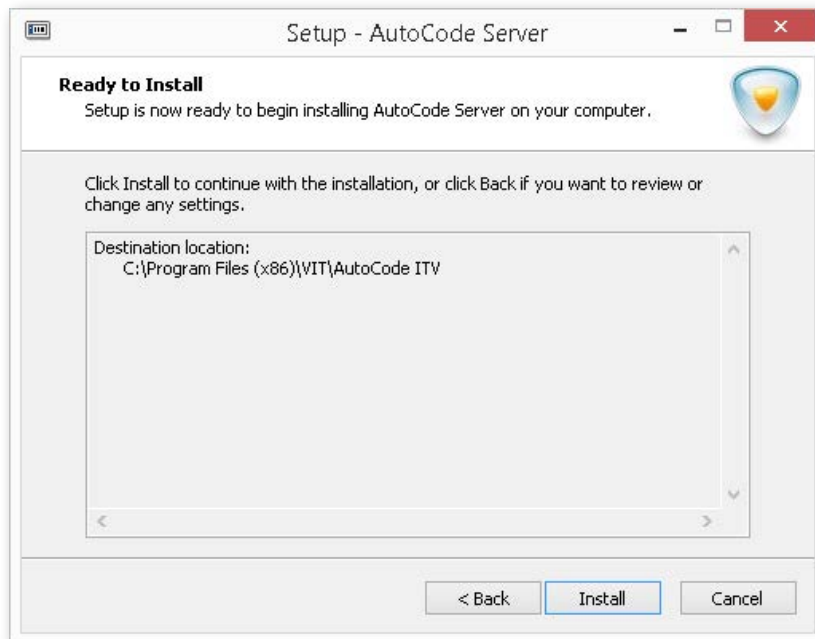
Step 10. Installing the module and additional software

At this stage AutoCode Intellect is installed as well as additional software distributed with it, such as Microsoft .NET Framework 4, Microsoft Visual C++ 2010, ffdshow , Foxit Reader, HASP Key Manager (Sentinel HASP RUS) and HASP keys driver (Fig. 9).

Installation files for additional software are stored in "_redist folder" (within AutoCode Intellect installation package).

Figure 9 — LPR functional module installation: additional software
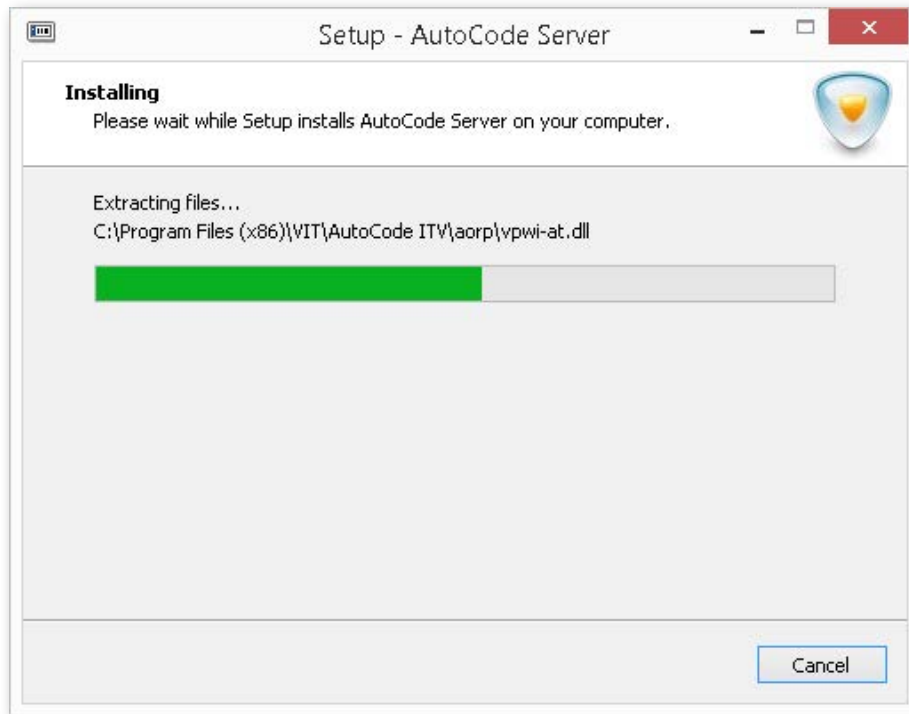
Step 11. Completing the installation

To finish the installation, select **Yes, restart the computer now** option and click **Finish** (Fig. 10).

Figure 10 — LPR functional module installation: completing the installation

3.2. Activating the license

AutoCode Intellect license protection is carried out using Sentinel HASP complex solution. This allows providing the client with one of the license key types (Table 4).

Table 4 — AutoCode Intellect license protection instruments

HASP HL Key (Hardware license)	AutoCode Intellect hardware protection. A USB drive mounted into a recognition server. It may be transferred to another server without losing the license and without updating.
HASP SL Key (Software license)	AutoCode Intellect software protection. It's realized as an application. It attaches to hardware. If the modules are transferred to another server, a new license should be purchased.

The license (license key setup) defines a set of features available in the module that the user is provided with. In cases when the AutoCode Intellect feature-set is to be changed or expanded, the protection key is updated. This option is available for both hardware and software protection packages.

Licensing is required for the following:

- LPR module. Number of recognition streams.

- LPR module. Number of countries whose license plates are to be recognized.

- LPR module. Module operation mode (videostream processing speed):
  ◊ "Slow" ("parking") — up to 6 frames per second. Used to recognize license plates on vehicles moving under 20 kmph, e.g. at parking lots.
  ◊ "Fast" ("freeflow") — defined by framerate of the camera used as well as the processor capacity. Used to recognize license plates on vehicles moving faster than 20 kmph (on highways).

3.2.1. HASP Key Manager

HASP Key Manager is a remote update system installed along with AutoCode Intellect. The activation process consists of the following steps:

Step 1. Launching HASP Key Manager

Launch HASP keys from, for example, the Start menu:
Start —> All programs —> VIT —> AutoCode —> Utilities —>HASP Key Manager

If the hardware protection key is used, make sure it's connected via USB.

Step 2. Generating a c2v file for the manager

At this stage a file that contains the information about current license state with .c2v (customer to vendor) extension is to be generated and sent to the manager. The following steps are to be taken in order to generate the file:

1. Click **Collect Information** in "Sentinel HASP RUS" window (Fig. 11);

Figure 11 — Sentinel HASP RUS: "Collect Information" button
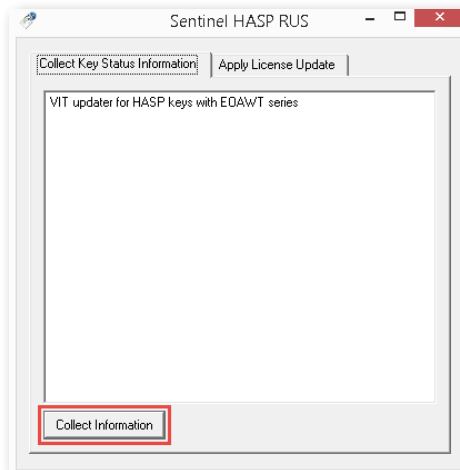
2. Specify the name for the generated c2v file and save the file to a specific directory (Fig. 12).

Figure 12 — Sentinel HASP RUS: saving a c2v file
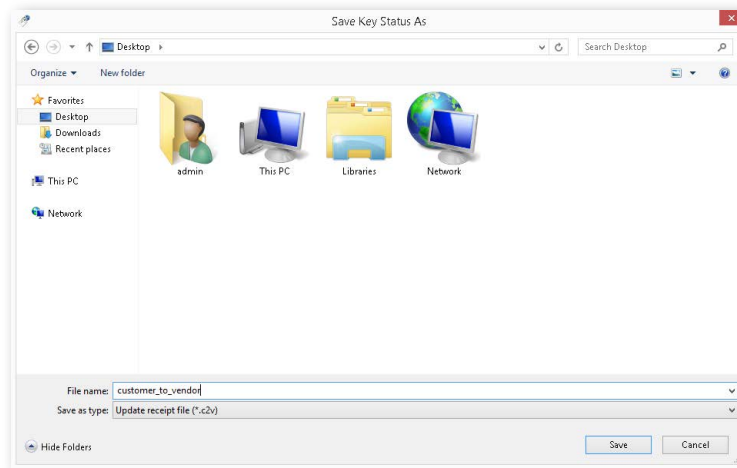
Note! If there are more than one license keys installed on a local computer, a proper key to save the state should be selected when generating a c2v file (Fig. 13). In addition, c2v file must be generated on the same computer where v2c file is to be applied (see Step 3 and Step 4).

Parameters for each key are available on "Sentinel Admin Control Center" (see detailed instruction in "3.2.3. License Parameters" section).

Figure 13 — Sentinel HASP RUS: selecting HASP key during c2v file generation
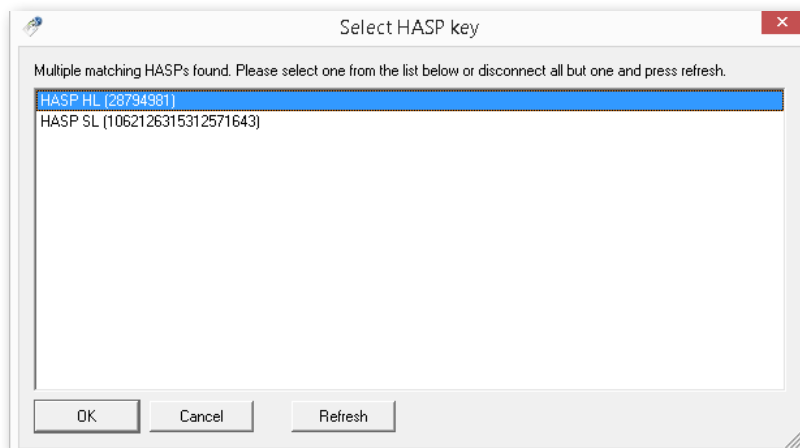
3. Make sure the c2v file is created successfully and send it to manager (Fig. 14).

Figure 14 — Sentinel HASP RUS: finishing c2v file generation
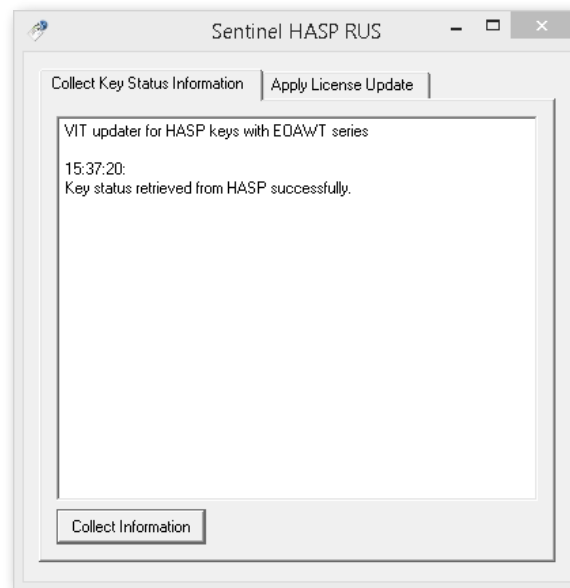
Step 3. Receiving updated license (v2c file) from the manager

The manager should return a .v2c ("vendor-to-customer") file. This file is necessary for license activation/update.

Step 4. Applying received v2c file

Open HASP Key Manager again and go to **Apply License Update** tab (**Fig. 15**) (**1**). Specify the path to a directory (2) that holds the c2v file received from the manager, select the file and click **Apply Update** button (**3**).

Figure 15 — Sentinel HASP RUS: applying the v2c file
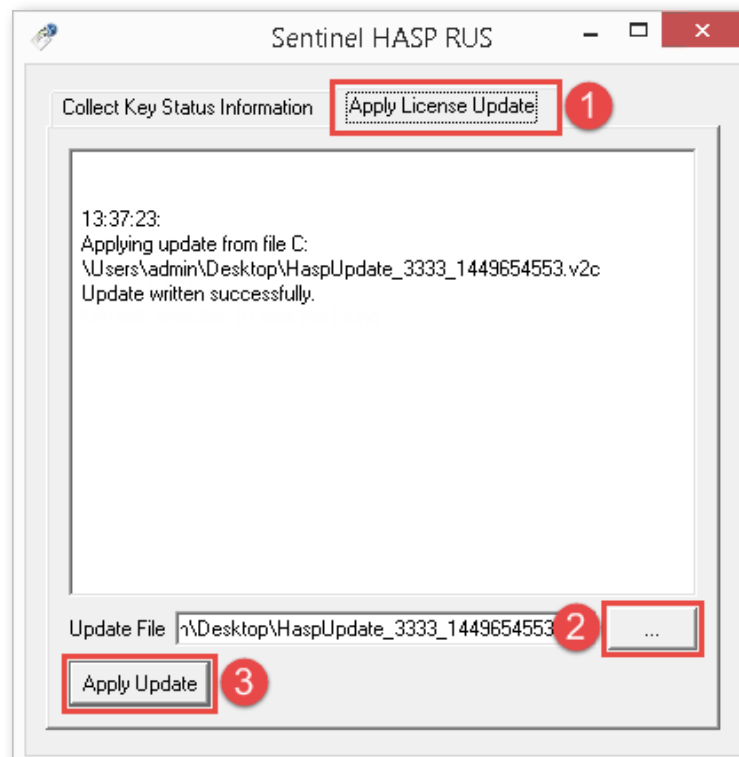
3.2.2. Sentinel Admin Control Center

There is an alternative way to apply the v2c file received from the manager (Fig. 16). It can be done on the "Sentinel Admin Control Center" page available to be viewed in the browser if HASP key drivers are installed (hasplms.exe service is launched in Process Explorer). The following steps are required:

     1. go to http://127.0.0.1:1947/_int_/checkin.html ;

     2. upload the v2c file to **Apply File** section.

     3. click **Apply File** button.

Figure 16 — Sentinel Admin Control Panel: applying the v2c file
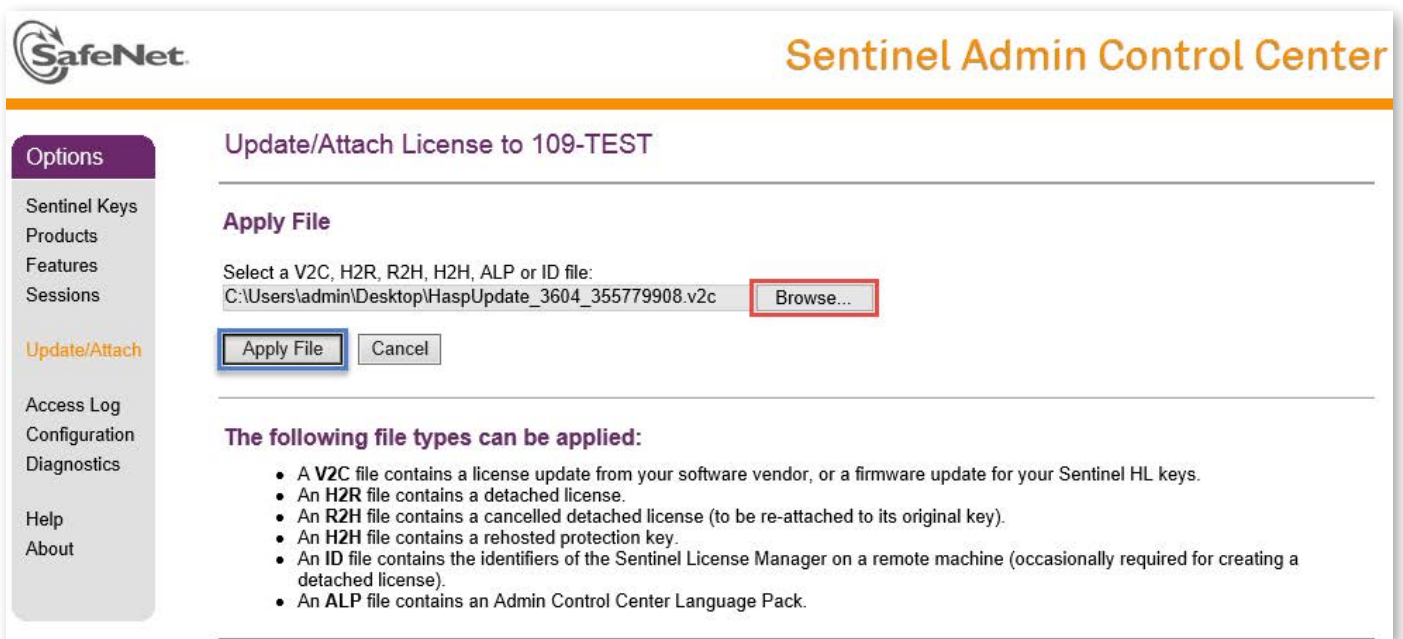
3.2.3. License Parameters

HASP key serial number (VendorID)

This parameter is a unique identifier for the company licensing the user to use the software (via either hardware or software protection key).

Both HASP HL Key and HASP SL Key have their own serial number. A serial number for HASP key is usually stated on its body. If the serial number is unknown, it may be retrieved in the following way (Fig. 17):

1. go to http://127.0.0.1:1947/_int_/devices.html ;

2. in **Vendor** column locate the field that corresponds to a HASP key in question — the value in that field is a serial number.

Figure 17 — Sentinel Admin Control Panel: retrieving the HASP key serial number

#	Location	Vendor	Key ID	Key Type		Configuration	Version	Sessions	Actions
1	Local	107392	1006325816669084894	HASP SL Legacy		-	2.31	-	Products Features Sessions C2V
2	53-testers	107392	660271498945	HASP SL Legacy		-	2.31	-	Browse Net Features
3	53-testers	106763	140363662072	HASP SL Legacy		-	2.31	-	Browse Net Features
4	VIT-HASP	107392	908834003891	HASP SL Legacy		-	2.34	-	Browse Net Features
5	VIT-HASP	Master (106763)	540056173	Sentinel HASP Master		-	3.25	-	Browse Net Features
6	ATESTWIN32-61	107392	762508131554	HASP SL Legacy		-	2.31	-	Browse Net Features
7	ATESTWIN64-81	42510	766823998165389819	HASP SL AdminMode Rehostable			2.33		Browse Net Features
8	HASP-EMS71	Master (106763)	1405351995	Sentinel HASP Master		-	3.25	-	Browse Net Features
9	HASP-EMS71	Master (107392)	307211052	Sentinel HASP Master		-	3.25	-	Browse Net Features
10	VIT-TESTER	107392	655238088251	HASP SL Legacy		-	-	-	Browse Net Features
11	VITACCOUNTING	107392	131970785274	HASP SL Legacy		-	1.50	-	Browse Net Features
12	Local	107392	1449654553	HASP HL Time		-	3.25	-	Products Features Sessions Blink on C2V
13	VIT-HASP	Master (107392)	2100240598	Sentinel LDK Master		HASP	4.27	-	Browse Net Features

HASP Key Settings (Features)

These HASP Key parameters determine the feature set of the product (for example, number of recognition streams, additional modules) available to users.

To find out which settings were programmed into any specific key, the following steps should be taken (**Fig. 18**):

1. go to http://127.0.0.1:1947/_int_/devices.html.

2. select the HASP key you need: if it's installed onto a local computer, select Local in **Location** column.
3. select **Features** option in respective field of **Actions** column. A HASP key page (http://127.0.0.1:1947/_int_/features.html) with all preset features will open.

Figure 18 — Sentinel Admin Control Panel: HASP key settings

#	Product	Feature	Location	Access	Counting	Logins	Limit	Detached	Restrictions	Sessions	Actions
1	-	0	Local	Loc	Station	-	∞	-	Perpetual	-	Sessions
2	579 ITV 1.15 8ch_HI	8	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
3	579 ITV 1.15 8ch_HI	17	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
4	579 ITV 1.15 8ch_HI	460	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
5	579 ITV 1.15 8ch_HI	4000	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
6	579 ITV 1.15 8ch_HI	4001	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
7	579 ITV 1.15 8ch_HI	4002	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
8	579 ITV 1.15 8ch_HI	18	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
9	579 ITV 1.15 8ch_HI	19	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
10	579 ITV 1.15 8ch_HI	4003	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
11	579 ITV 1.15 8ch_HI	4006	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
12	579 ITV 1.15 8ch_HI	4010	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions

License period

To find out how much time is left before the license expires the following steps should be taken (Fig. 19):
1. go to http://127.0.0.1:1947/_int_/devices.html

2. select the HASP key you need: if it's installed onto a local computer, select Local in **Location** column.

3. select **"Features"** option in respective field of **Actions** column. A HASP key page — http://127.0.0.1:1947/_int_/features.html — will open.

Figure 19 — Sentinel Admin Control Panel: tracking the license period

#	Product	Feature		Location	Access	Counting	Logins	Limit	Detached	Restrictions	Sessions	Actions
1	-	0	🔒	Local	Loc	Station	-	∞	-	Perpetual	-	Sessions
2	579 ITV 1.15 8ch_HI	8	🔒	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Start: Tue Jan 20, 2015 14:25 End: Mon Jul 20, 2015 15:25	-	Sessions
3	579 ITV 1.15 8ch_HI	17	🔒	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Start: Tue Jan 20, 2015 14:25 End: Mon Jul 20, 2015 15:25	-	Sessions
4	579 ITV 1.15 8ch_HI	460	🔒	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
5	579 ITV 1.15 8ch_HI	4000	🔒	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Start: Tue Jan 20, 2015 14:25 End: Mon Jul 20, 2015 15:25	-	Sessions
6	579 ITV 1.15 8ch_HI	4001	🔒	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Start: Tue Jan 20, 2015 14:25 End: Mon Jul 20, 2015 15:25	-	Sessions
7	579 ITV 1.15 8ch_HI	4002	🔒	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Start: Tue Jan 20, 2015 14:25 End: Mon Jul 20, 2015 15:25	-	Sessions
8	579 ITV 1.15 8ch_HI	18	🔒	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions
9	579 ITV 1.15 8ch_HI	19	🔒	Local	Loc Display	Station	-	∞	-	Time Period (181 Days) Not started	-	Sessions

In any specific field of the **Restrictions** column both license start (**Start**) and end (**End**) dates are located. If the field contains **Expired** value it means that the license period for this feature has expired.

If the Perpetual license was activated for settings, it would be noted in the respective field of the **Restrictions** column.

In order to update the license, a new c2v file must be generated using HASP Key Manager and sent to a manager. The message should contain the name of the feature that needs to be updated.

3.2.4. Possible errors

Table 5 – "HASP key not found (H0007)" error

Cause	Cause
HASP key is not connected.	Connect the HASP key.
Connected HASP key serial number is different from AutoCode Intellect serial number (a HASP key for the software by another manufacturer is used).	Connect the HASP key with the correct serial number.
Connect the HASP key with the correct serial number.	Check if the HASP key that is being connected is a network key (usually red) and, if not, connect the network protection key.

Cause	Cause
HASP License Manager Service (hasplms.exe) is not installed.	Install the license manager onto the computer with the HASP key connected and launch it.
Blocked traffic at Port 475 where the HASP key installed or protected module is running (network dataflow may be blocked by Windows brandmauer of, for example, antivirus software).	Disable all software that may block access to HASP key.

<p align="center">**Table 6 – "Feature not found (H0031)" error**</p>

Cause	Solution
No license for the Program Number/Feature ID is added to the HASP key. The key firmware does not match the registered build.	Update the HASP key.
Two HASP keys with the same serial number installed on the computer and the one detected does not have the feature set.	Connect HASP keys one-by-one to see which one works fine with the module.

<p align="center">**Table 7 – "Unable to access HASP SRM RunTime Environment (H0033)" error**</p>

Cause	Solution
C:\WINDOWS\system32\hasplms.exe is blocked by the brandmauer or antivirus.	Add the module to the blocking exceptions list.
Port 1947 is blocked by the brandmauer.	Add the port to the blocking exceptions list.
HASP License Manager Service (hasplms.exe) stopped working.	Relaunch the license manager.

<p align="center">**Table 8 – "Terminal services detected, cannot run without a dongle (H0027)" error**</p>

Cause	Solution
Occurs when terminal services are detected. For example, Microsoft Terminal Server (including Remote Desktop services), Citrix Winframe/ Metaframe etc.	HASP key should not be connected to a computer that has active terminal software installed. The manufacturer may control this option by allowing or prohibiting operation on terminal server. HASP key update is required.

<p align="center">**Table 9 – "Your license has expired (H0041)" error**</p>

Cause	Solution
The license has expired.	Renew the license.
System time on the computer was changed manually.	Update the HASP key.

3.3. Uninstalling

It is possible to uninstall AutoCode Intellect or delete one of its functional modules. The following steps are to be taken to achieve that:

Step 1. Closing the Intellect software complex

Step 2. Launching the uninstall wizard

For a complete uninstall, go to the directory that contains the system components (the default directory is C:\Program Files\Vit\AutoCode) and launch the "unins000.exe" file.

The uninstall file for one of the modules (partial uninstall) may be launched from Start menu (Start —> All Programs —> VIT —> [module folder] —> Uninstall).

Step 3. Deleting "VIT" and "VITCompany" folders

This step is to be carried out during complete uninstall of AutoCode Intellect. The folders are located at C:\Program Files\ by default and contain module components. In some cases either one of the folders or both of them may not be present. In such cases a search should be done and all folders containing "VIT" in their name should be deleted.

Step 4. Deleting VIT configuration folder

This step is to be carried out during complete uninstall of AutoCode Intellect. The folder is located in Application Data and is hidden.

Step 4. Deleting the recognition database (either manually or using MSSQL)

This step is to be carried out during complete uninstall of AutoCode Intellect.

Step 5. Restarting the computer

Note! Partial uninstall (for example, deleting the database or any separate configuration files) may affect the system's performance.

4. Setting Up AutoCode Intellect

Contents

After the AutoCode Intellect software module is installed, the license plate recognition must be set up. Three objects should be created in concession to do that:

      1) AutoCode recognition module;
      2) recognition protocol;
      3) recognition display.

4.1. AutoCode recognition module

4.1.1. Creating

**Step 1. Creating video input device and its child objects**

After the AutoCode recognition module is created it's impossible to proceed with its configuration unless video input device (another important recognition object) is not set up on **Hardware** tab. More details on creating and setting up a **Camera** object may be found in the AutoCode Intellect System Administrator's Guide.

Step 2. Creating AutoCode recognition module

To create a recognition module within the Intellect system, the following steps are to be taken:

1. Open **System Settings** and go to **Hardware** tab (Fig. 20).

Figure 20 — Hardware tab in the Intellect system
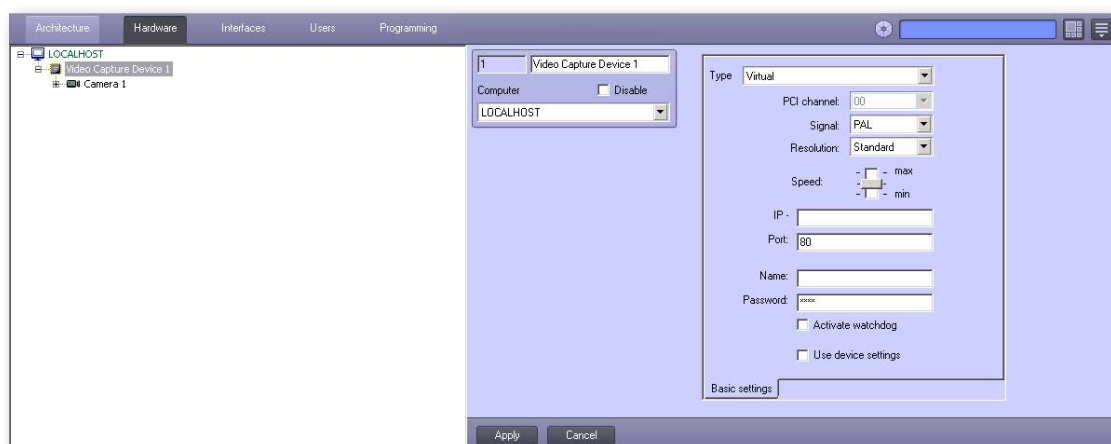
2. Right-click on **Computer** object and select **Create object** from the context menu. Then select **AutoCode recognition module** from the list of available objects (Fig. 21).

Figure 21 — Creating an AutoCode recognition module object
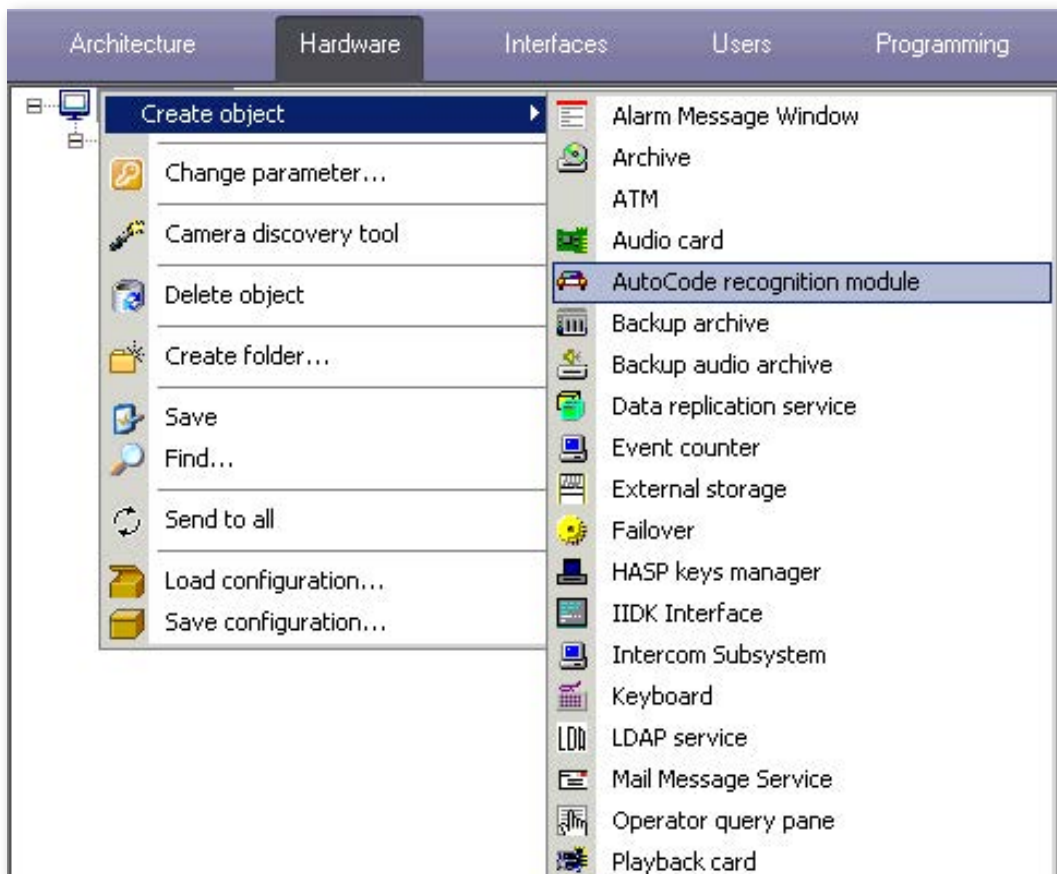
3. Insert following information into a form that appears (Fig. 22) (Table 10).

Table 10 — AutoCode recognition module settings available at creation stage

Field	Description
Number	Recognition module's ID
Name	Name of the recognition module. The default name is "AutoCode Recognition Module [number in order]".
Computer	Computer to which the module will be connected.

**Figure 22 — Basic parameters for AutoCode recognition module**

Click **Apply** to confirm the creation of a new AutoCode recognition module with selected basic parameters.

Note! When the Intellect software complex is launched, an icon for each module is shown in the system tray (Fig. 23). When the cursor is hovered over one of these icons, general information for a respective module is shown:

- ID.
- framerate of the camera that sends the signal to the module to process (**Video fps**).
- amount of frames processed by the module per second (**LPR fps**).
- video resolution (**Frame**).
- database connection status (DB Connected).
- issuer-states code (according to ISO-3166-1) for license plates to be recognized by the module based on selected templates (**Templates**).
- Time of the last module information update (**Update**).

If the recognition module is inactive (either disabled or not configured), only **ID** and **Update** parameters will be displayed.

Figure 23 — AutoCode Recognition Module object information shown in system tray
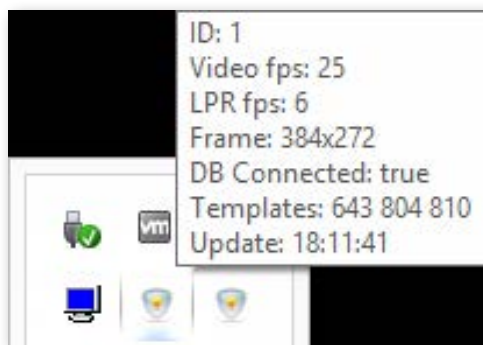
4.1.2. Configuration

To set up a recognition module (or edit settings), go to **Hardware** tab and select the object that needs to be set up. A settings form for this object will appear on the right (Fig. 24) (Table 11).

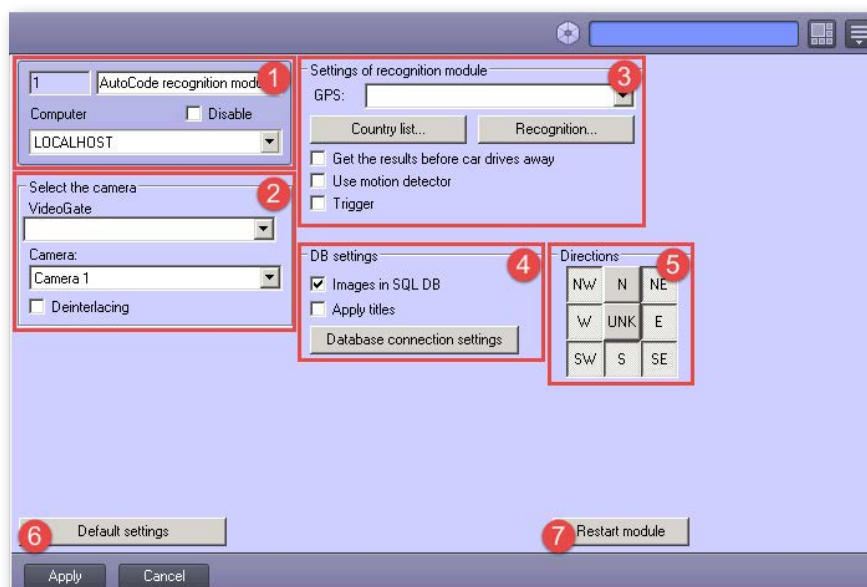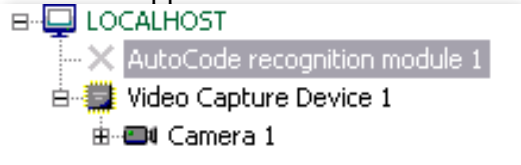**Figure 24 — AutoCode Recognition Module settings form**

Table 11 — AutoCode Recognition Module settings

Settings group	Function
1. AutoCode recognition module basic settings	Module ID is not editable. The name of the recognition module as well as the computer it's connected to may be changed if necessary. • The **Disable** checkbox is to be checked if the module's operation needs to be seized. A grey cross icon shall appear next to the module in the object tree. **Note!** If, after one module was disabled, another module is connected, recognition from the new channel will only begin after the Intellect complex is restarted.
2. **Select the camera** section	Specifies the source of the video to be processed by the recognition module. Check 4.1.2.1. Select the camera subsection for details.
3. **Settings of recognition module** section	Specifies operational parameters for the recognition module. • **Get the results before car drives away** checkbox is to be selected when the license plates are to be documented while still in frame. By default, the license plate recognition result is shown after the vehicle leaves the frame. If this setting is active, the result of recognition will be delivered after the period of time specified in **History storage time**, s setting. It is recommended to use this setting for vehicles that stay in the frame longer (for example, at the parking lot entrance). • **Use motion detector** checkbox is to be checked to activate recognition using motion detector within the Intellect system. Recognition is only triggered when the detector works which helps lower the system's workload and decrease the number of false recognitions when there is no vehicle in the frame. **Use motion sensor** setting can't be used along with active **Trigger** setting. The detailed description of **Use motion sensor** setting may be found in the AutoCode Intellect System Administrator's Guide. • **Trigger** checkbox is to be checked if the recognition process is to be controlled by macros and scripts. **Trigger** setting can't be used along with active **Use motion sensor** setting. The use of macros is described in 5.1. Macros section. • **GPS** setting is activated for reading the recognition server coordinates from the GPS receiver connected to

Settings group	Function
	the system. This setting is available after the GPS function module is installed. GPS receivers that use NMEA connection protocol are compatible with this module. • **Country list** button opens the window to select license plate templates available for the specific channel. Templates are sorted by the issuer state. Details may be found in 4.1.2.2. License plate templates settings sub-section. • Recognition button opens the recognition settings window. Recognition settings are described in 4.1.2.5. Recognition settings sub-section.
4. DB settings section	Contains database connection parameters. See 4.1.2.3. Database settings sub-section for details.
5. Directions section	Specifies the vehicle movement directions in the frame. See 4.1.2.4. Movement direction settings sub-section for details.
6. Default settings button	Restores default settings to selected recognition module.
7. Restart module button	Restarts the recognition process managed by the module without restarting the Intellect system.

Note! Apply button is to be clicked if any module settings changes are made.

4.1.2.1. Select the camera

In AutoCode recognition module settings (**Select the camera** section) a camera that sends videostream for recognition is to be selected. The following steps are necessary in order to do that:

Step 1. Selecting the camera for recognition (Table 12)

Table 12 — Connecting the video channel for recognition

Gateway used	No gateway used
1. Select the gateway from the **VideoGate** dropdown. 2. Select a camera associated with the gateway from a dropdown in **Camera** section.	1. Select the camera from the **Camera** dropdown.

Step 2. Eliminating the alternate-line scanning effect

Deinterlacing checkbox should be checked if an analog camera with no progressive (line) scanning is used.

Detailed description of how to configure video gateway may be found in the AutoCode Intellect System Administrator's Guide.

4.1.2.2. License plate templates settings

A set of templates available for recognition on a specific channel should be selected for AutoCode recognition module (Fig. 25). The following steps are necessary in order to do that:

**Step 1. Opening the license plate templates selection window**

Click the **Country** list button in selected module settings (Fig. 25).

Step 2. Selecting the issuer-states and templates

In the window that opens, the nested lists of license plate templates are sorted by the issuer-state. After the issuer-states and templates are selected, click OK.

Click **Apply** after closing the window to save the settings.

Figure 25 —AutoCode recognition module settings: selecting the license plate templates
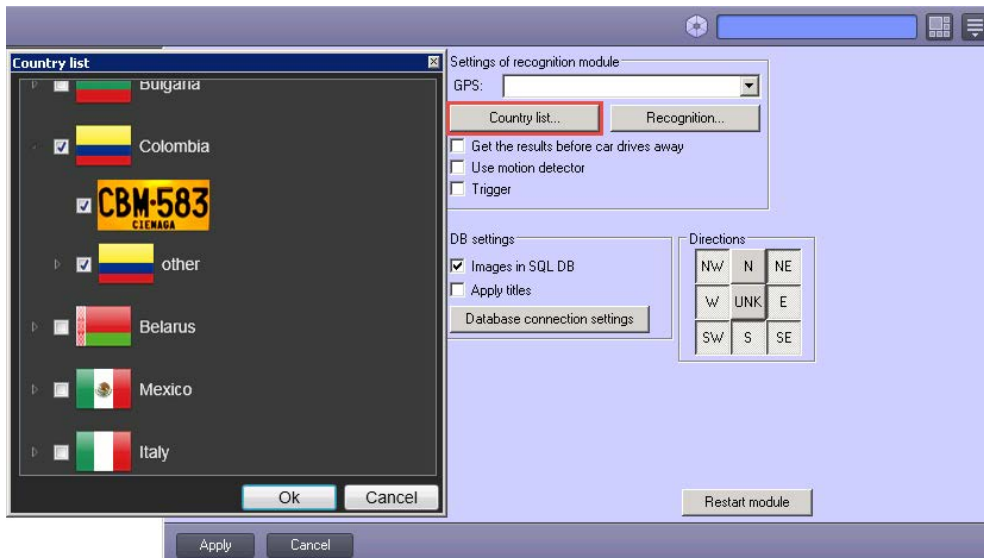
Note! Each recognition module (channel) is to be configured separately from other recognition modules. For each recognition channel, only the license plate templates specified in the protection key are available. Any amount of templates may be selected within each set.

4.1.2.3. Database settings

Database connection settings section (Fig. 26) is created to configure the local database that stores recognition results (Tables 13, 14).

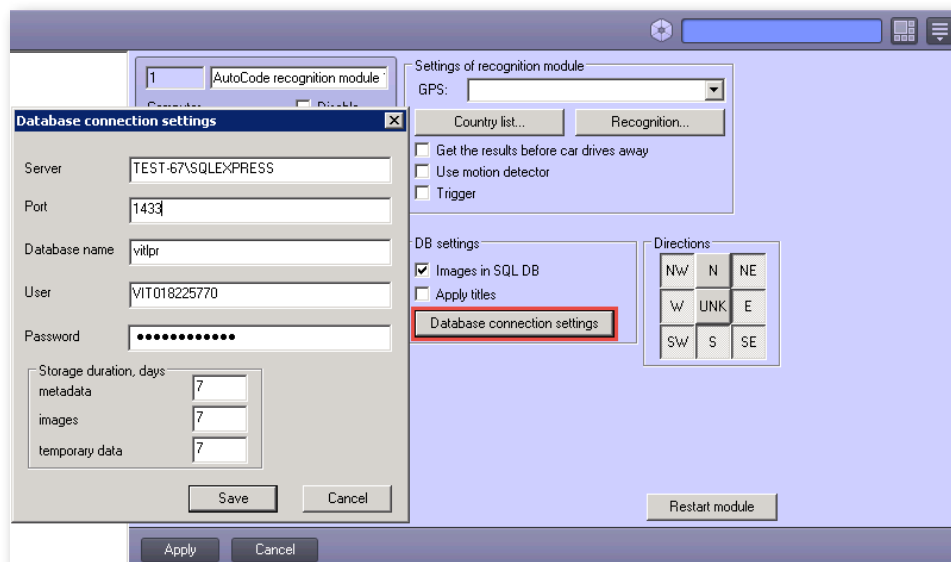**Figure 26 — AutoCode recognition module settings: database connection settings**

Table 13 — AutoCode recognition module settings: Database settings section

Images in SQL DB database checkbox	This checkbox is selected to add media (images) to the database.
Add titles checkbox	This checkbox is selected to add the titles with text information about the license plate to the image transferred to the database. By default the titles contain time of the event, camera name and a license plate number. After the GPS module is installed, GPS coordinates of the recognition module can also be added to the titles.
Database connection settings button	This button brings out a database connection and storage duration settings window.

Table 14 —AutoCode recognition module settings: Database connection settings window

Server	Database address. One of the following formats is acceptable: • Computer IP\ MSSQL server name (for example, "192.168.0.168\SQLEXPRESS"); • Computer name\ MSSQL server name (for example, "BOX78\SQLEXPRESS"). If data from the recognition database is used on other computers, the correct IP address is necessary.
Port	MSSQL server port. The default value is 1433.
Database name	Name of connected database.
User	Username of database user.
Password	Database access password.
Storage duration, days	• **metadata** — storage time of information about each recognition event in database archive table (recognized license plate, camera, recognition time and date, module coordinates if the GPS receiver is connected). All expired records will be overwritten by new data (cycle recording). The default value is 7. • **images** — storage time of images associated with recognition records. All expired images will be overwritten by new ones (cycle recording). The default value is 7. • **temporary data** — storage time for the data displayed live in the recognition protocol. The default value is 7. After the specified time period, the data is no longer considered temporary and is moved to the archive table. Lesser temporary data storage time provides for better performance of the recognition protocol. When the records in recognition protocol are filtered, all the archive table records are checked instead of only those visible in the recognition protocol.

Click **Save** after editing the settings in Database connection settings window.

4.1.2.4. Movement direction settings

Directions setting (Fig. 27) is used when vehicles in the frame are moving in various directions. In such cases, it may be necessary to recognize license plates of vehicles other than those moving in specified direction (for example, at access points with two-way traffic). Only the data from these objects will be transferred to the database.

Any number of directions may be selected in this setting. Each button stands for a direction the vehicle moves in within the frame (from the point of camera's view). Directions are marked using general directions within the program interface:

- **N** (North) — vehicle moves away from the camera.
- **S** (South) — vehicle moves towards the camera.
- **W** (West) — vehicle moves from right to left.
- **E** (East) — vehicle moves from left to right.

Additionally, middle values are available: **NW** (North-West), **NE** (North-East), **SW** (South-West) and **SE** (South-East).

When the direction can't be determined, the "Unknown" value is returned. To save license plates of vehicles that moved in unknown direction to the database, click **UNK**.

Figure 27 — AutoCode recognition module settings: selecting the direction of vehicles in the frame
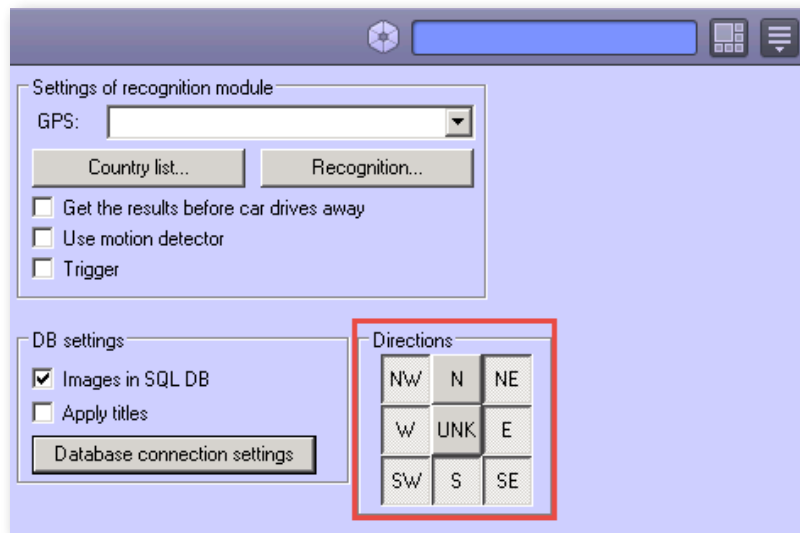
4.1.2.5. Recognition settings

*This sub-section contains descriptions of settings from **Recognition settings** window. The following steps must be taken to open this window:*

1. Go to Hardware tab and select the recognition module.

*2. Click **Recognition settings** button in module settings form that appears.*

It's recommended to pay attention to the number of frames processed per second under current recognition settings. To see this value, hover the cursor over the system tray icon of the recognition module that is being set up.

If the **LPR fps** value is lower than 6 for the "slow" recognition channel or less than 25 for the "fast" channel, it means that processor capacity does not allow achieving the required quality of recognition. It's necessary to keep in mind the actual number of frames processed per second, when looking for the best possible settings for the recognition module, such as number of streams or binarization level.

1) License plate search area settings

License plate search area is one or more areas within the frame where the search for license plates takes place. Each AutoCode recognition module can have up to 20 license plate search areas set up (Table 15). This allows speeding up the recognition by eliminating areas that are sure to not have vehicles or unnecessary for recognition

Table 15 — AutoCode recognition module settings: managing recognition areas

Adding a license plate search area (**Fig. 28**)	Editing a license plate search area (**Fig. 29**)
1. Check the **Edit license plate search** area checkbox in **Recognition settings** window. 2. Click **New.** 3. Place yellow handles in the corners of selected area to include the area where the vehicle is supposed to appear. To add additional corners, click on the edge of selected area and a new handle will appear. 4. Click **Save**.	**Editing:** Right-click the license plate search area to activate it. Once the area is activated, yellow handles shall appear to edit its shape. The last created area is activated by default. **Deleting:** • To delete a license plate search area, activate it and click **Delete**. If **Delete** button is clicked without activating an area, the area created last will be deleted. After an area is deleted, the area that was created first becomes active by default. • Click **Delete All** to delete all license plate search areas. Click **Save** to save the result of editing or deleting license plate search areas.

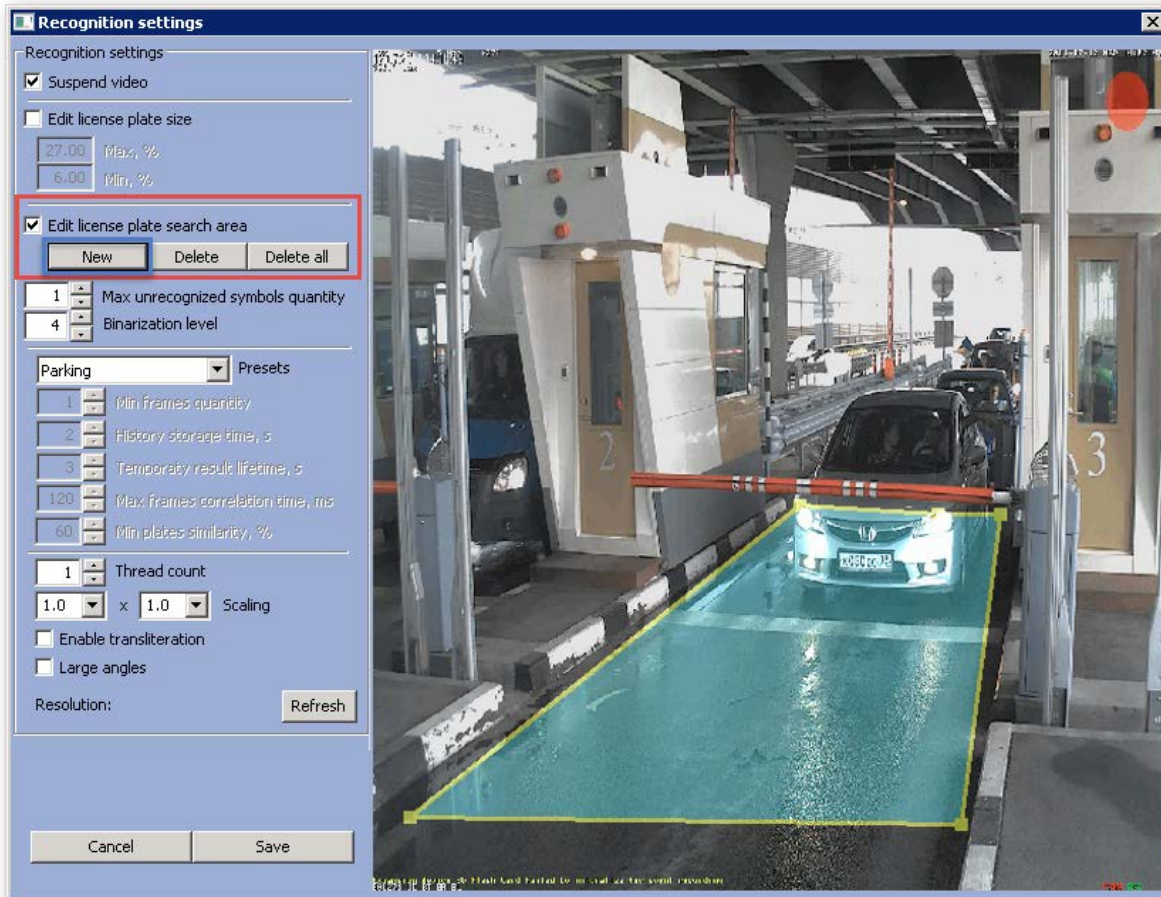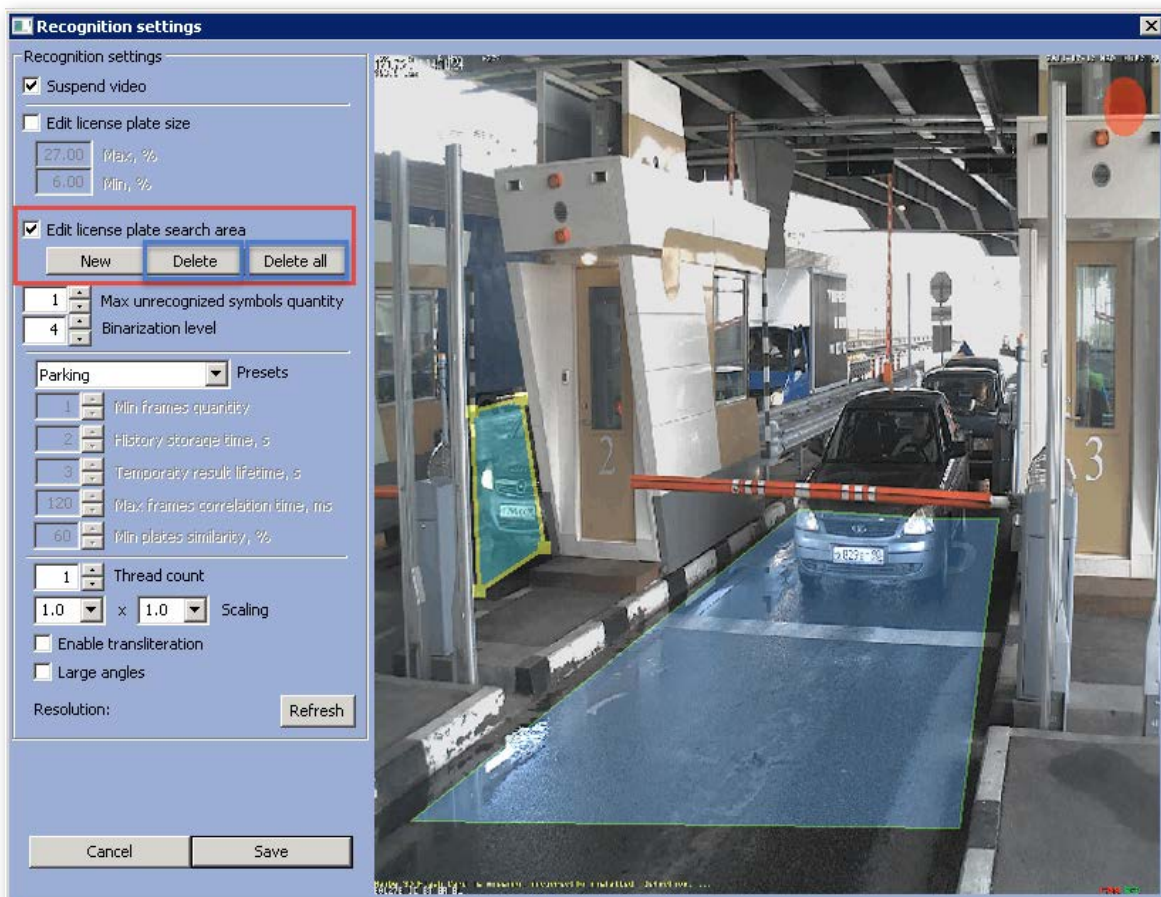**Figure 28 — AutoCode recognition module settings: adding a license plate search area**

Figure 29 — AutoCode recognition module settings: editing or deleting a license plate search area

2) License plate size settings

This setting allows specifying the maximum and minimum size of the license plate in the frame (Fig. 30). This helps to improve recognition quality by excluding objects that are not license plates.

To set the license plate dimensions:

1. Check the **Edit license plate size** checkbox in **Recognition settings** window.

2. Edit the size of rectangles on the screen by dragging or inserting the values into **Max** (the blue area on the screen) and **Min** (an empty area within the maximum size area) fields.

3. Click **Save**.

When editing license plate size, it is recommended to:

1. Set the maximum size to be about 10-15% larger than the actual plate size in the frame.

2. Keep the difference between minimum and maximum size at about 30%.

The default values (presented as % of the frame dimensions) are set as follows:
- Maximum — 27%.
- Minimum — 6%.

Figure 30 — AutoCode recognition module settings: editing the size of a license plate in frame
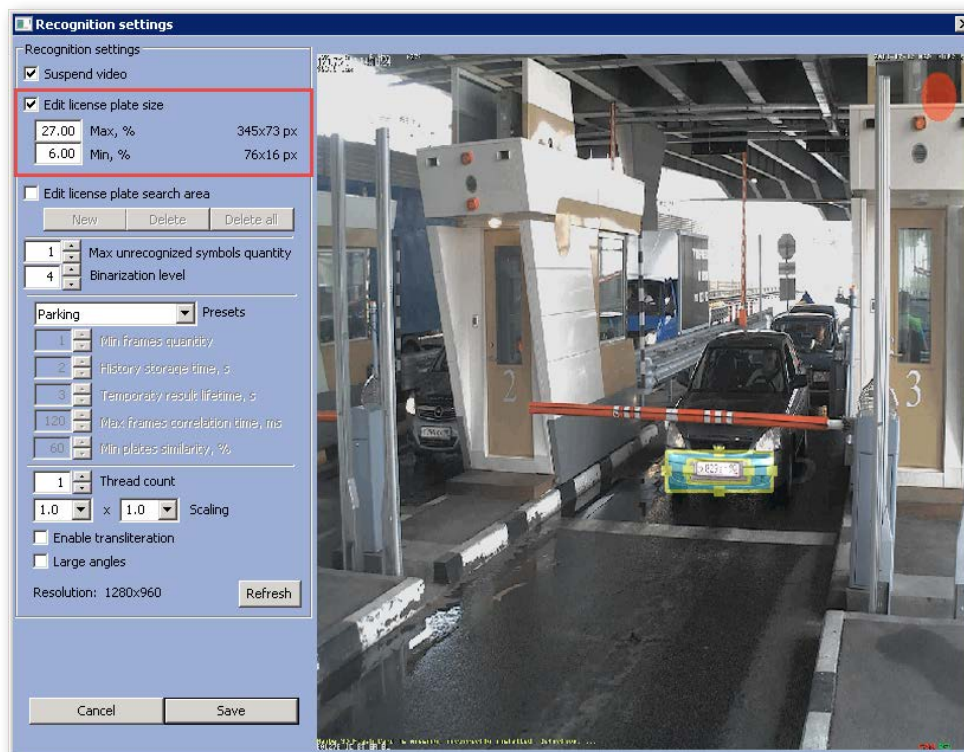
3) Maximum unrecognized symbols quantity setting

This setting allows specifying the maximum amount of unrecognized symbols acceptable to allow a license plate to be saved in the database. Each unrecognized symbol will be replaced by an asterisk (*).

This parameter is set in **Max unrecognized symbols quantity** field.

4) Binarization level setting

The value inserted into the **Binarization level** field represents the number of cycles in license plate detection algorithm. Higher level of binarization leads to better recognition quality, but affects the overall performance of the system.

It's recommended to set a higher binarization level for recognizing slow-paced objects (for example, on parking lots). And, respectively, the lowest possible level should be set when working with license plates on highways.

The default value is 4. Max value is 10.

5) Dynamics settings

Dynamics means processing the license plates on a set of frames and providing the best outcome. Dynamics is set in **Recognition settings** window (Fig. 31) and requires selecting one of two profiles (Table 16).

Table 16 — AutoCode recognition module settings: setting dynamics based on recognition conditions

Profile	Description
Parking	Vehicle speed is **under** 20 kmph. Optimal configuration is selected automatically.
Road	Vehicle speed is **over** 20 kmph. Optimal configuration is selected automatically.
Custom settings	Optimal configuration is selected manually.

Figure 31 — AutoCode recognition module settings: profile selection
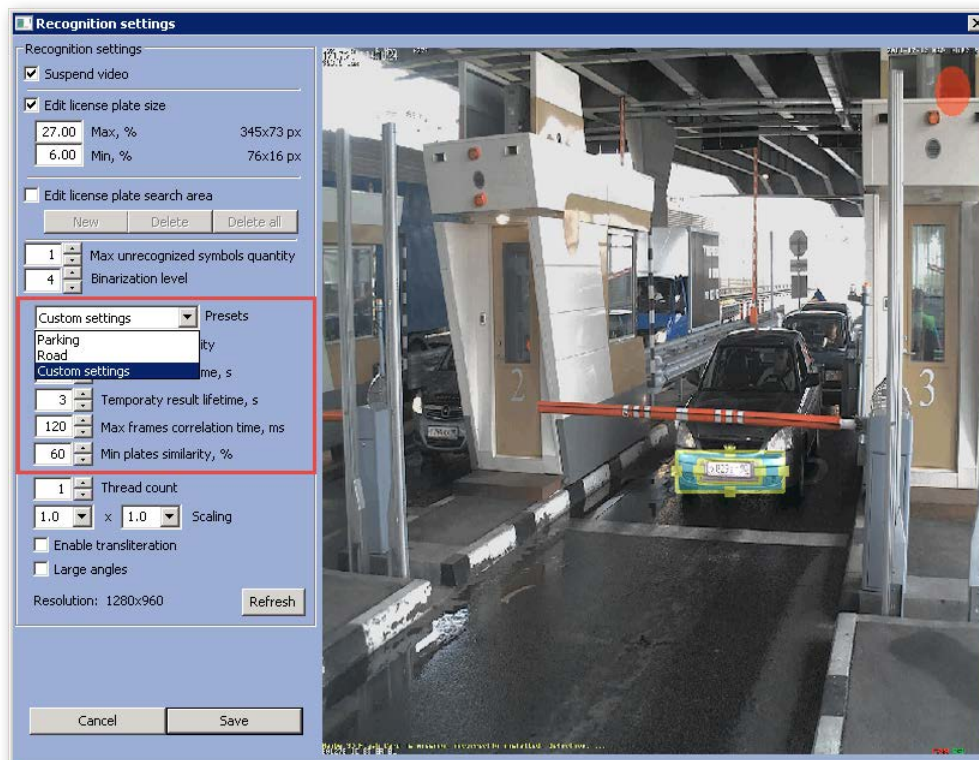
If Custom settings profile is selected, the user should manually set values in the settings described in the table below.

Table 17 — AutoCode recognition module settings: custom dynamics settings

Field	Description
Min frames quantity	Number of frames with the same recognition result sufficient for precise license plate identification and transferring to the database. Recommended value for slow-paced objects is 3-4 (if the conditions provide for this amount of quality images of the license plate).
History storage time, s	Time difference between the time vehicle first appears in the frame and getting the first recognition result. If **Get the results before car drives away** checkbox is selected in recognition module settings form, the result will be received after the time period specified in this field.
Temporary results lifetime, s	Maximum time of the license plate being covered by another object (or beyond the camera range). If the license plate does not reappear in the frame again within the selected period, the object will be considered lost and the recognition of this object will end.
Max frames correlation time, ms	Maximum time period for combining temporary results of recognition into one final result. This setting is connected to **Min plates similarity, %** setting. Maximum possible value is 1000.
Min plates similarity, %	Percentage of similarity between two results of recognition. The results will be combined if the percentage is higher.

6) Thread count

Thread count setting is created for a module to be able to divide the recognition into several streams (parallel processes) and then combine the results from each of them into one. Number of such processes is determined by the value inserted into this field.

If CCTV uses analog cameras or cameras with resolution lower than 1.3 MPix, the acceptable value for a **Thread count** setting is 1. However, this value is not suitable in cases when the recognition takes place on highways and uses cameras with resolution larger than 1.3 MPix. In such cases, processor gets excessive workload and can't process required amount of frames. Cases like this require splitting recognition process into multiple processes using **Thread count** setting.

Note! In cases when the object tree has recognition modules with more videostreams than provided by the licence agreement, only the amount of stream (and, therefore, modules) specified in HASP key will be used.

If the need arises for additional recognition channels, a manager should be contacted and asked to update the protection key and add recognition channels to the feature list. Thread count is licensed separately.

7) Scaling settings

Scaling parameters specify the extent to which the source image will be condensed in width and height before license plate detection. This feature allows enhancing performance of the recognition module.

Video is converted according to the following formula:

W/x, H/y, (1)

W and H stand for width and height.

x and y stand for values provided by the user.

Scaling parameters are either selected from the dropdown or entered manually: min value being 1.0 and max value being 10.0. The dropdown contains proportions that are often used for this setting (1.0, 2.0, 3.0, 4.0). Only whole numbers allowed.
Changes in scaling are not reflected in the Intellect UI.

8) Transliteration

Selecting the Enable transliteration checkbox allows unification of records in recognition database. It's achieved by transliteration of recognized Cyrillic symbols (А, В, Е, К, М, Н, О, Р, С, Т, Х, У) into Latin. This feature also allows avoiding coding problems during the operation of additional modules with AutoCode Intellect.

The user has to account for whether or not this feature is activated when setting up the parameter to filter (search for) license plates. If transliteration is enabled, filtration value may be either Cyrillic or Latin. On the other hand, if transliteration is disabled and filtration value is Latin, no license plates will be seen in recognition protocol.
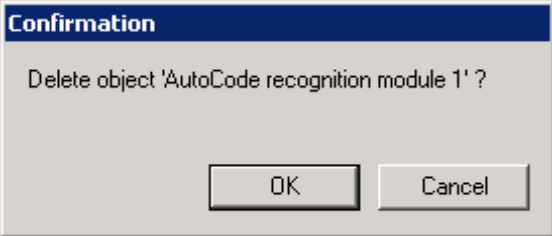
9) Angle compensation

Large angles checkbox is to be checked if the camera is located away from the path of the vehicle (when license plates are placed under more than 5 degrees angle in the frame). This feature compensates the distortion of symbols on the image and provides better recognition quality.

4.1.3. Disabling and deleting

To disable or delete an AutoCode recognition module in Intellect system:

1. Open the **System settings** window and go to **Hardware** tab.

2. Select the module on the object tree.

| Disabling	Deleting
3. Check Disable checkbox in module settings window that appears on the right. 4. Confirm disabling by clicking **Apply.** A grey cross icon shall appear next to the name of the module in the object tree. 	3. Right-click the selected object and select **Delete** object from the context menu. 4. Confirm deleting by clicking **OK** in the dialog that appears.

4.2. Recognition protocol

Recognition protocol is an interface window that displays the information about recognized license plates (events) as a records register. Protocol window also allows managing the events displayed.

4.2.1. Creating

To create a recognition protocol in Intellect system:

1. Open the **System settings** window and go to **Interfaces** tab.

2. Right-click the **Display** object and select **Create object** from the context menu. Then select **Recognition protocol** from the object list (Fig. 32).

Figure 32 — Creating the Recognition protocol object

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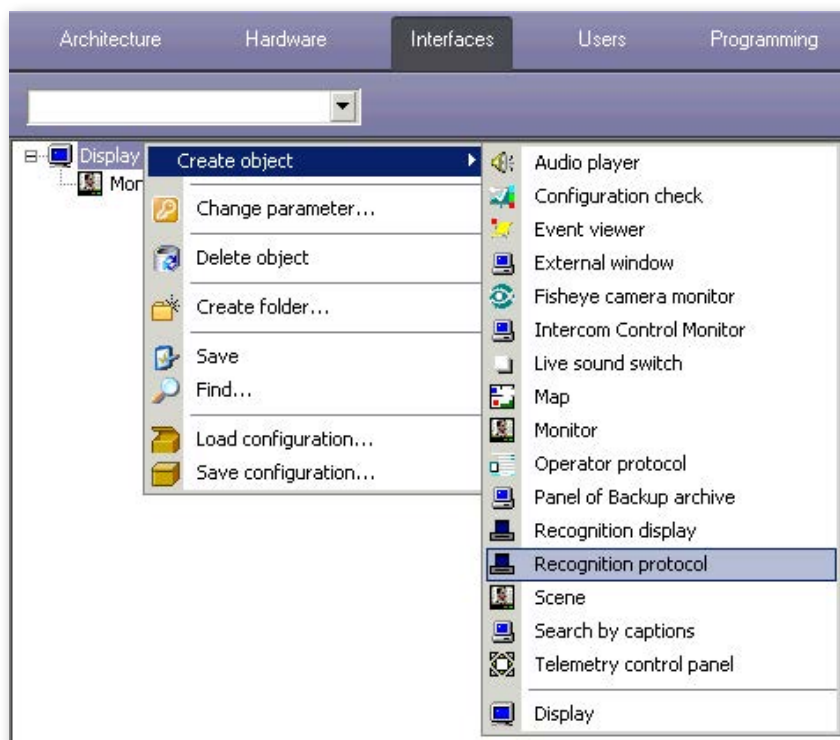
3. Specify the following in the form that appears on the right (Fig. 33) (Table 18).

Table 18 — Recognition protocol settings available at creation stage

Field	Description
Number	Recognition protocol ID
Name	Recognition protocol name. The default value is "Recognition protocol [number]".
Display	A display the recognition protocol will be connected to.

Figure 33 — Basic parameters of Recognition protocol object

Click **Apply** to confirm the new recognition protocol with selected basic parameters.

Note! When creating child objects (such as recognition protocol, recognition display, etc.) on one **Display** object, make sure that a computer is selected to display child objects in Computers section of **Display** settings form. **Display** settings are described in the AutoCode Intellect System Administrator's Guide.

4.2.2. Setting up

To set up a recognition protocol (or edit settings), go to **Interfaces** tab and select the object that needs to be set up. A settings form for this object will appear on the right (Fig. 34) (Table 19).
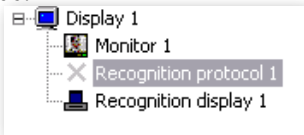
Figure 34 — Recognition protocol settings form

Table 19 — Recognition protocol settings

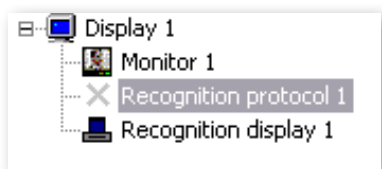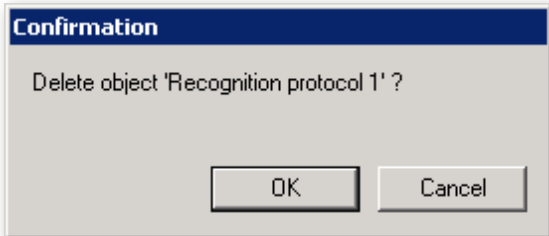| Settings section	Function
1. Basic parameters of Recognition protocol object	The recognition protocol ID cannot be edited. If necessary, the user can change the name of the protocol and the display it's connected to. • **Disable** checkbox is to be checked when the operation of recognition protocol needs to be stopped. A grey cross icon shall appear next to the name of the protocol in the object tree.
2. Monitor for control	Specifies a monitor to view the video archive of recognized license plates. This feature is available upon double-clicking the event in recognition protocol.
3. Screen to display numbers	Specifies a monitor to display the information about the event selected in the protocol. The process of creating and setting up a Recognition monitor object is described in 4.3. Recognition monitor sub-section.
4. Available recognizers and **Selected recognizers** lists	Specifies the events storage servers and AutoCode recognition modules the events from which will be available for display in the recognition protocol. • ">" button adds an object selected in **Available recognizers** list to **Selected recognizers** list. • "<" button returns an object selected in **Selected recognizers** list to **Available recognizers** list. • ">>" button transfers all objects from **Available recognizers** list to **Selected recognizers** list. • "<<" button returns all objects from **Selected recognizers** list to **Available recognizers** list. **Note!** If the Selected recognizers list contains recognition modules connected to different databases, the recognition protocol will only show events provided by one of the databases.
5. Available detectors and **Selected detectors** fields	Specify which external license plate database data will be shown in recognition display window during the recognition. • ">" button adds an object selected in Available detectors list to Selected detectors list. • "<" button returns an object selected in Selected detectors list to Available detectors list. • ">>" button transfers all objects from Available detectors list to Selected detectors list. • "<<" button returns all objects from Selected detectors list to Available detectors list.

Settings section	Function
5. **Available detectors** and **Selected detectors** fields	The process of creating and connecting an External Plates DB object is described in 5.4. External plates database section.
6. Coordinates	Specifies the coordinates for top-left corner of the recognition protocol window: • **X** and **Y** fields specify horizontal and vertical offset from the top-left corner of the screen. The offset is worked by percentage from the dimensions of the screen. Specifies the dimensions of recognition protocol window: • **W** and **H** fields specify the width and height of the window accordingly. The width and height are worked by percentage from the dimensions of the screen. • **Allow movement** checkbox is to be checked to allow the operator to move and scale the recognition protocol window. If this feature is disabled, the recognition protocol window can only be scaled or moved using system settings. The Window title bar checkbox is to be checked to enable the operator to move the recognition protocol window. • Window title bar checkbox is to be checked to have a title of the recognition protocol window displayed. By default this feature is disabled.
7. Allow to edit numbers	This checkbox is to be checked to enable the operator to modify and add numbers manually. When the modified number is selected, the information about modifications will be displayed on recognition display. Disabling this feature makes **Add number** and **Edit number** buttons of the recognition protocol inactive.
8. Enable LIVE mode after, sec	This feature is to specify a time period after which the events in recognition protocol will be refreshed automatically if the operator does not perform any actions with the selected event. The default value is 0 meaning that the system will not go into an automatic refresh mode and the event will remain selected until deselected by the operator.

Click Apply after making all necessary changes in recognition protocol settings window.

4.2.3. Disabling and deleting

To disable or delete a recognition protocol in the Intellect system:

1. Open the **System settings** window and go to **Interfaces** tab.

2. Select the recognition protocol on the object tree.

| Disabling	Deleting
3. Check **Disable** checkbox in recognition protocol settings window that appears on the right.	3. Right-click the selected object and select **Delete object** from the context menu.
4. Confirm disabling by clicking **Apply**.	4. Confirm deleting by clicking **OK** in the dialog that appears.
A grey cross icon shall appear next to the name of the protocol in the object tree.	

4.3. Recognition display

Recognition display is an interface window for viewing additional information about a recognition event (its state, comments from operators, metadata and external database information). A video-archive for selected recognition events is available in recognition display as well.

4.3.1. Creating

To create a recognition display in the Intellect system:

1. Open the System settings window and go to **Interfaces** tab.

2. Right-click the **Display** object and select **Create object** from the context menu. Then select **Recognition display** from the list of objects (Fig. 35).

Figure 35 — Creating a recognition display object
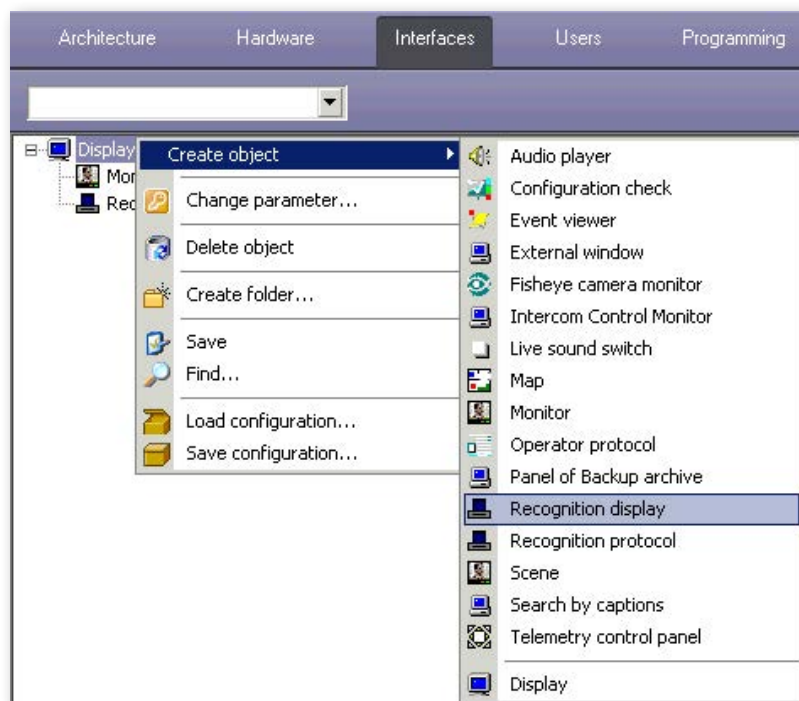
3. Specify the following in the form that appears on the right (Fig. 36) (Table 20).

Table 20 — AutoCode recognition display settings available at creation stage

Field	Description
Number	Recognition display ID
Name	Recognition display name. The default value is "Recognition display [number]".
Display	A display the recognition protocol will be connected to.

Figure 36 — Basic parameters of Recognition display object

Click **Apply** to confirm the new recognition display with selected basic parameters.

4.3.2. Setting up

To set up a recognition display (or edit settings), go to Interfaces tab and select the object that needs to be set up. A settings form for this recognition display will appear on the right (Fig. 37) (Table 21).

Figure 37 — Recognition display settings form
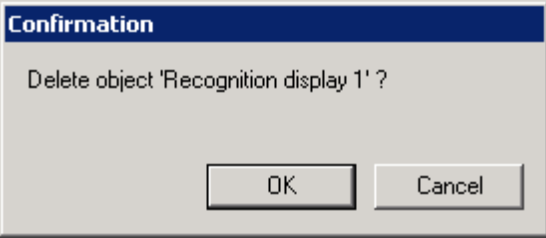
Table 21 — Recognition display settings

Settings section	Function
1. Basic parameters of Recognition display object	The recognition display ID cannot be edited. If necessary, the user can change the name of the display and the display it's connected to. • **Disable** checkbox is to be checked when the operation of recognition display needs to be stopped. A grey cross icon shall appear next to the name of the display in the object tree. •
2. Coordinates	Specifies the coordinates for top-left corner of the recognition display window: • **X** and **Y** fields specify horizontal and vertical offset from the top-left corner of the screen. The offset is worked by percentage from the dimensions of the screen. Specifies the dimensions of recognition display window: • **W** and **H** fields specify the width and height of the window accordingly. The width and height are worked by percentage from the dimensions of the screen. **Allow movement** checkbox is to be checked to allow the operator to move and scale the recognition display window. If this feature is disabled, the recognition display window can only be scaled or moved using system settings.
3. Display window title	This checkbox is to be checked to have a title of the recognition display window displayed. The recognition display cannot be moved if this feature is disabled.
4. Show additional information	This checkbox is to be checked for a recognition display to show the additional information about the recognized license plate based on alerts, reaction to them and external license plate database.
5. Update numbers	This checkbox is to be checked for a recognition display to automatically show the information about each recognized license plate. Should a new event on the license plate appear in the system, the number information and the best shot of it are updated automatically. If this feature is disabled, a recognition display will only show additional information about the license plate if it's selected in the recognition protocol. If no events are selected in the recognition protocol, no data will be shown in the recognition display.

Click **Apply** after making all necessary changes in recognition display settings window.

4.3.3. Disabling and deleting

To disable or delete a recognition display in the Intellect system:

1. Open the **System settings** window and go to **Interfaces** tab.

2. Select the display on the object tree.

Disabling	Deleting
3. Check **Disable** checkbox in recognition display settings window that appears on the right.	3. Right-click the selected object and select **Delete object** from the context menu.
4. Confirm disabling by clicking **Apply**. A grey cross icon shall appear next to the name of the display in the object tree. 	4. Confirm deleting by clicking **OK** in the dialog that appears.

5. AutoCode Intellect Administration

Contents

5.1. Macros

Macro system object is intended for creating simple events processing scenarios. Its settings contain the conditions and appropriate objective reactions.

Intellect Administrator's Guide contains detailed descriptions for creating and implementing macros.

Table 22 — The list of events for an AutoCode recognition module object [VITLPR]

Macro name (to be used in scripts)	Event
NUMBER_DETECTED	**A number is detected** The best result of license plate recognition is achieved. If **Get the results before car drives away** feature is enabled, the NUMBER_DETECTED event is activated after the vehicle has left the frame (along with CAR_LOST event). If **Get the results before car drives away** feature is disabled, the NUMBER_DETECTED event is activated after the vehicle appears in the frame (along with CAR DETECTED event).
CAR_DETECTED	**A vehicle appeared in the frame** First recognition result is received by which the AutoCode recognition module detects a vehicle in the frame (depends on **Show results after**, s setting).
CAR_LOST	**A vehicle has left the frame** The vehicle is no longer in the view of detector (license plate processing history storage time is over).

Table 23 — The list of events for a Recognition protocol object [VITLPRVIEW]

Command name (to be used in scripts)	Event
PLATE_SELECT	**A license plate is selected** A license plate in recognition protocol events list is selected.
PLATE_UNSELECT	**A license plate is deselected** A license plate in recognition protocol events list is deselected.
SETPOS	**Window coordinates have been changed**

Table 24 — The list of events for a Recognition display object [VITLPRVMON]

Command name (to be used in scripts)	Event
SETPOS	**Window coordinates have been changed**

Table 25 — The list of reactions for an AutoCode recognition module object [VITLPR]

Command name (to be used in scripts)	Event
START_RECOGNIZER	**Recognition start** Recognition process is initiated. Number of frames to be used during license plate search and recognition can be specified (**Number of frames** parameter).
STOP_RECOGNIZER	**Finish the recognition**
SET_GPS_POSITION	**Set GPS coordinates** A location of the computer using AutoCode recognition module is detected.

Table 26 — The list of reactions for a Recognition protocol object [VITLPRVIEW]

Command name (to be used in scripts)	Event
ACTIVATE	**Show** A recognition protocol is shown if the Display object is hidden.
DEACTIVATE	**Hide** A recognition protocol is hidden.

Table 27 — The list of reactions for a Recognition display object [VITLPRVMON]

Command name (to be used in scripts)	Event
ACTIVATE	**Show** A recognition display is shown if the Display object is hidden.

Command name (to be used in scripts)	Event
DEACTIVATE	**Hide** A recognition display is hidden.

Note! When the events from AutoCode recognition module are being processed (NUMBER_DETECTED, CAR_DETECTED, CAR_LOST) in macros or scripts, a delay between the information arriving to the Intellect system core and information being added to the database should be accounted for. Therefore, if a database search for the event is made immediately after the event itself, the results may return empty (requested information is not yet added to the database).

5.2. HASP Key manager

If the HASP key on local computer was replaced, all AutoCode modules may require a reboot. If the Intellect complex is running, the reboot is carried out by clicking the **Key has been changed** button in **HASP Key Manager** settings form. This object is created on the **Hardware** tab of **System settings** window.

If the HASP Key Manager is active, all security errors are displayed in events sub-system of The Intellect system. If this object is not yet created or active, all error messages will be displayed on screen to receive a feedback from the user.

5.3. System restart service

The Intellect software complex has a feature to control performance of system modules. The following components may be restarted using the System restart service object if the module does not respond within a specified period of time:

1. computer (an additional device is required since in this case the performance is controlled by hardware).
2. module (no need to restart the Intellect complex itself).
3. the Intellect system core.

5.3.1. Creating

To create a System Restart Service object in the Intellect system:

1. Open the **System Settings** window and go to **Hardware** tab.

2. Right-click the **Computer** object and select **Create object** from the context menu. Select **System restart service** from the list of available objects (Fig. 38).
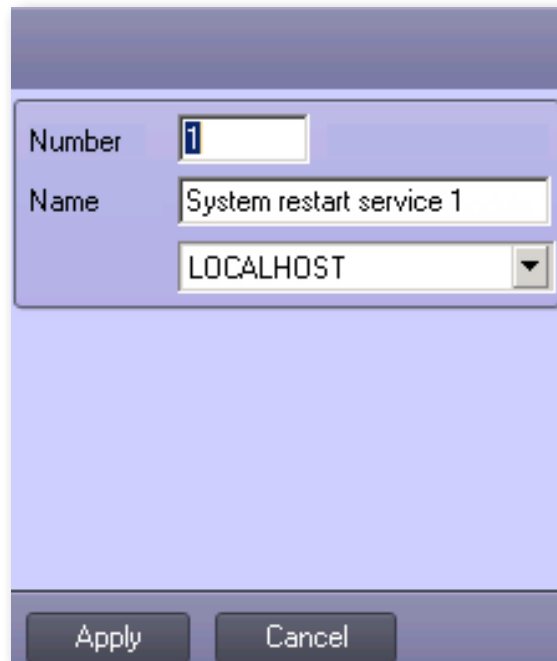
Figure 38 — Creating a System Restart Service object

3. Specify the following in the form that appears on the right (Fig. 39) (Table 28).

Table 28 — System restart service settings available at creation stage

Field	Description
Number	System Restart Service ID.
Name	System Restart Service name. The default value is "System restart service [number]".
Computer	A computer where the system restart service is created.

Figure 39 — Basic parameters of System Restart Service object

Click **Apply** to confirm the new system restart service with selected basic parameters.

5.3.2. Setting up

To set up a system restart service (or edit settings), go to **Hardware** tab and select the object that needs to be set up. A settings form for this recognition display will appear on the right (Fig. 40) (Table 29).
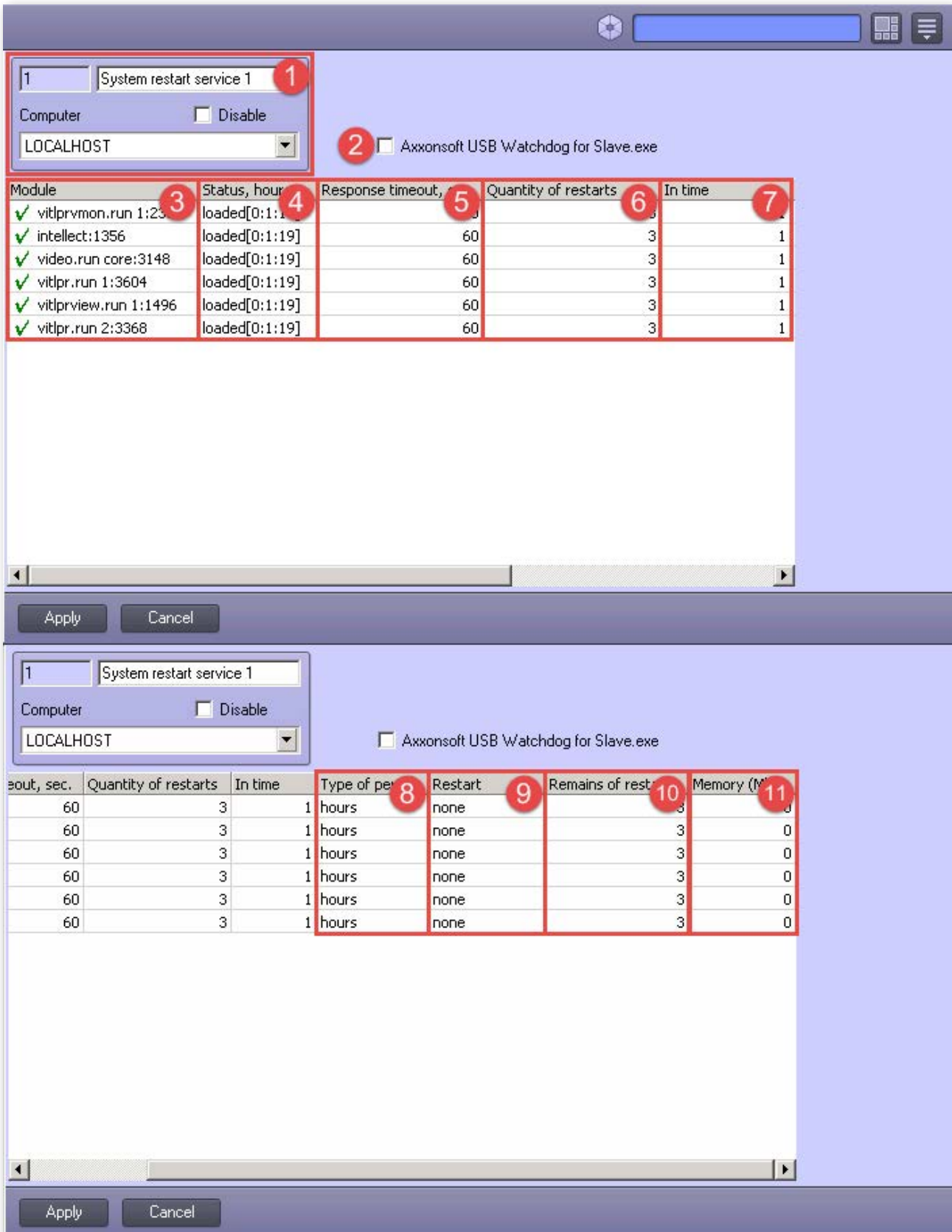
Figure 40 — System restart service settings form

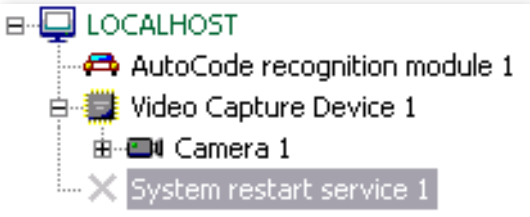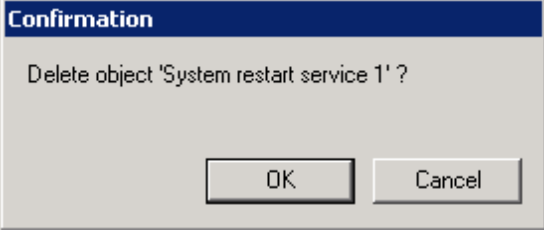Table 29 — System restart service settings

Settings section	Function
1. Basic parameters of	The System restart service ID cannot be edited. If necessary, the user can change the name of the service and the computer it's connected to.

Settings section	Function
System Restart Service object	• **Disable** checkbox is to be checked when the operation of system restart service needs to be stopped. A grey cross icon shall appear next to the name of the service in the object tree •
2. Axxonsoft USB Watch Dog for Slave.exe	This checkbox is to be checked to enable hardware control over the performance of the system. An Axxonsoft USB WatchDog device is used. A detailed description of this feature may be found in the Intellect software complex Administrator's Guide.
3. Module	Displays active modules connected to the system restart service. ✓ — displayed for modules with "Loaded" status. ! — displayed for modules with either "Unloaded (red field)" or "Unloaded" status.
4. Status, hours	1Displays the current state of each module as well as operational time since the last restart in [HH:MM:SS] format.
5. Response timeout, sec	Specifies the response timeout for each module. If no response received within a specific period, the system may be restarted.
6. Quantity of restarts	Specifies the maximum number of restarts for either the module or the Intellect system core that may be executed within a specific time period (**In time and Type of period** columns).
7. In time	Specifies a period of time within which a maximum amount of restarts can be executed.
8. Type of period	Specifies the measurement units for a time period within which a maximum amount of restarts can be executed. Available units are "days" and "hours".
9. Restart	Specifies whether the module of The Intellect system core are to be restarted if no response is received from the module. If no reboot in such cases is needed, the "none" value is to be selected.
10. Remains of restarts	Specifies the number of restarts available within current time period. The module is automatically set as "Unloaded" if the number of restarts exceeds the limit. Remains of restarts counter is refreshed when the maximum restarts time period is over.
11. Memory (Mb)	Specifies the RAM limit for the module. The module if restarted if the RAM limit is exceeded.

5.3.3. Disabling and deleting

To disable or delete a system restart service in the Intellect system:

1. Open the **System settings** window and go to **Hardware** tab.

2. Select the service on the object tree.

Disabling	Deleting
3. Check Disable checkbox in the settings window that appears on the right.	3. Right-click the selected object and select **Delete object** from the context menu.
4. Confirm disabling by clicking **Apply**.	4. Confirm deleting by clicking **OK** in the dialog that appears.
A grey cross icon shall appear next to the name of the service in the object tree.	

5.4. External plates database

The following database types are available with the installation of Auto-Intellect additional module: SQL Server, Oracle, Access, FoxPro. An external database is a source of license plates to compare recognized plates to. The search if license plates to compare in the external database is completely automatic.

The **External plates database** object is created after the Auto-Intellect module is installed. Then the **Vehicle tracer** object is set up to provide the results of searching for recognized license plates in the external database. An additional feature allows viewing the external database information about the license plate to de displayed during recognition. This feature is described in 4.3. Recognition protocol section.

The following steps are to be taken to set up working with external license plate database:

Step 1. Connecting to an external license plate database.

Step 2. Naming the columns that contain license plates information.

Step 3. Selecting the search method for an external license plate database.

Step 4. Specifying the quantity of numbers to be received from the search in external database.

Step 5. Creating an SQL request for an external database search.

Step 6. Setting up additional parameters for an external database.

Each of the aforementioned steps as well as **Vehicle tracer** object setup are described in the Intellect system Administrator's Guide.

Note! The license plates recognized by AutoCode Intellect using external database are compared by the **Plate** field.