

# Hikvision ITS All-in-one Traffic Camera

Configuration Manual

### **User Manual**

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This Manual is applicable to the intelligent transportation system.

The Manual includes instructions for using and managing the product. Pictures, charts, images and all other information hereinafter are for description and explanation only. The information contained in the Manual is subject to change, without notice, due to firmware updates or other reasons. Please use this user manual under the guidance of professionals.

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# **Chapter 1** Overview

## 1.1 Objective

This manual is designed to provide standard engineering guidelines for the construction and configuration of the All-in-one Traffic Camera. Configuration of rear-end platform is not included.

# 1.2 Target Reader

This manual is written for implementation and maintenance personnel who will install and configure the All-in-one Traffic Camera.

### 1.3 Safety Precautions

- Road in construction should be semi-closed to avoid risk. And the construction area should be surrounded with enough reflective cones as cautions.
- Constructors should wear reflective vests on site.
- Constructors must fasten safety lines when working at high places, and wear hardhats when working on scaffold or portal frame.
- Do not rise or fall the ladder truck sharply during operation.
- Be sure to cut off the power supply before installing devices or connecting wires.

# **Chapter 2** Device Activation

#### Purpose:

For the first use of the camera, you need to activate the device by setting an admin password. No operation is allowed before activation. You can also activate the device via SADP.

#### Steps:

- 1. Install the SADP software in the attached CD or downloaded from the official website.
- 2. Run the software.

SADP will automatically search all online devices in LAN. The results are displayed in sheet, with device type, IP address, security status, device serial No. and many other information, as shown in the figure below.

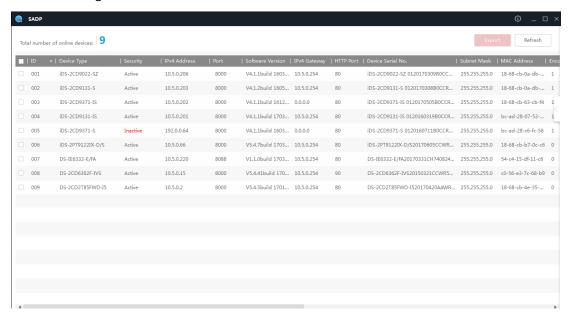


Figure 2-1 SADP Search Interface

- 3. Check the capture camera to be activated to pop up the **Activate the Device** window on the right.
- 4. Set capture camera password in the popup window.
- 5. Click Activate to complete activation.

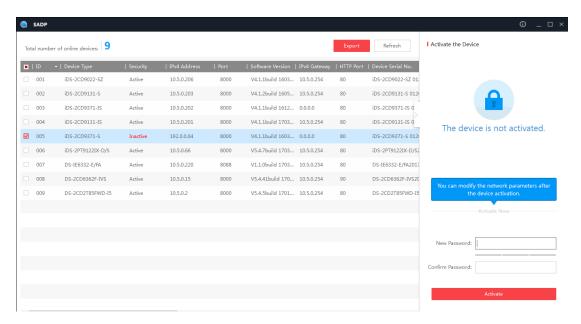


Figure 2-2 Activate the Capture Camera

- 6. Check the activated camera to pop up the **Modify Network Parameters** window on the right.
- 7. Enter camera IP address, subnet mask and admin password.
- 8. Click Modify to finish IP settings.

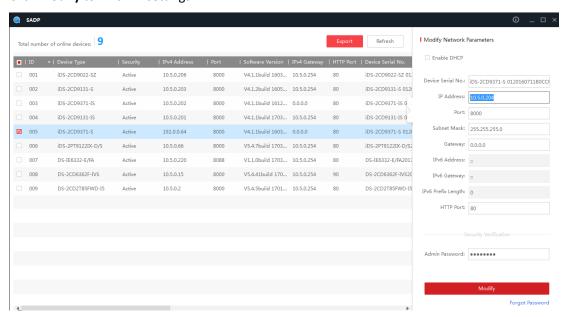


Figure 2-3 Modify Camera IP Address

9. Modify the computer IP address to be in the same network segment as the capture camera.

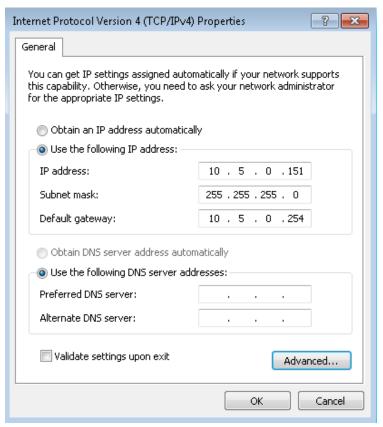


Figure 2-4 Modify Computer IP Address

10. Open IE browser to connect the capture camera and enter password to log in.



Figure 2-5 Log In

# **Chapter 3** Construction Solution

### 3.1 Construction Solution I

The following construction takes example of 5 MP camera in the scene of bidirectional 4 lanes.

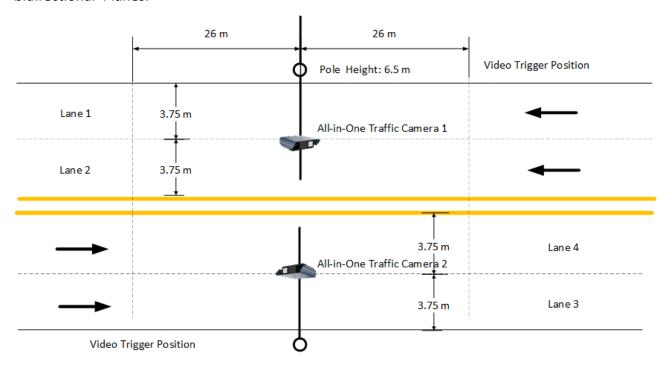


Figure 3-1 Construction Solution for 5 MP Camera (1)

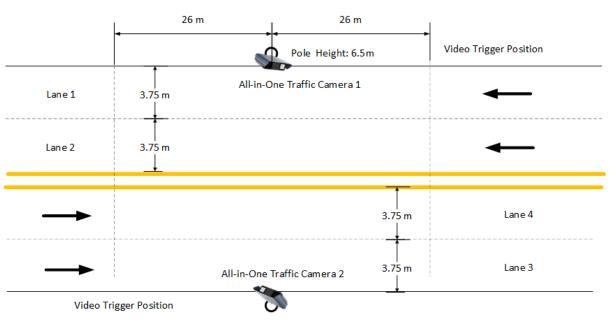


Figure 3-2 Construction Solution for 5 MP Camera (2)

- The pole height is 6.5 m. We recommend that captured position should be 26 m or above horizontal distance from the camera to meet LPR (License Plate Recognition) requirement.
- Flash light is built in the sun shield for light supplement of multiple lanes, improving license plate capture and recognition rate.
- The camera will capture multiple pictures continuously. To guarantee the second picture quality, the picture bottom in captured position should be 18 to 20 m horizontal distance from the pole.

### 3.2 Construction Solution II

The following construction takes example of 9 MP camera in the scene of bidirectional 6 lanes with radar speed detection.

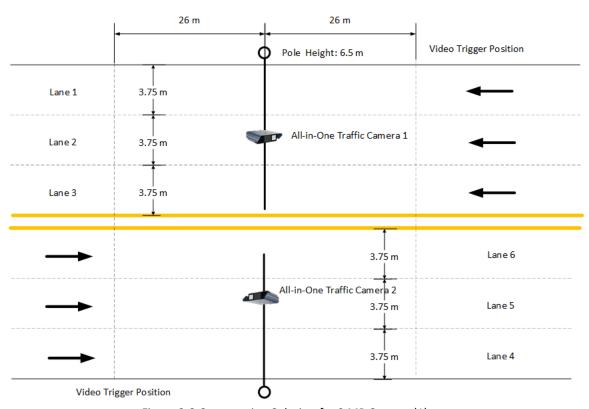


Figure 3-3 Construction Solution for 9 MP Camera (1)

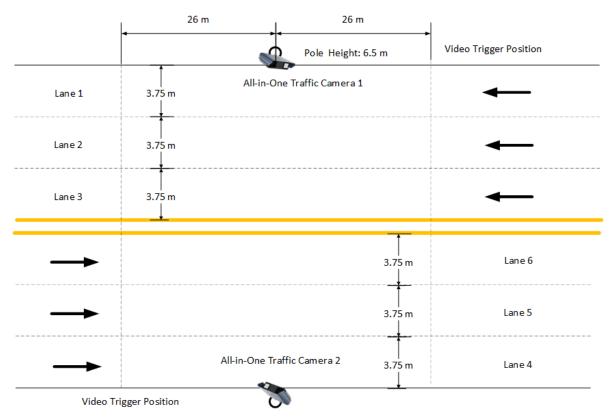


Figure 3-4 Construction Solution for 9 MP Camera (2)

- The pole height is 6.5 m. We recommend that captured position should be 26 m or above horizontal distance from the camera to meet LPR requirement.
- Flash light is built in the sun shield for light supplement of multiple lanes, improving license plate capture and recognition rate.
- The camera will capture multiple pictures continuously. To guarantee the second picture quality, the picture bottom in captured position should be 18 to 20 m horizontal distance from the pole.



Radar is used for speed detection.

# **Chapter 4** Radar Debugging

Radar integrated into All –in-one camera. Radar should debug with a separate tool after installing camera. Radar coverage as shown in Figure 4-1

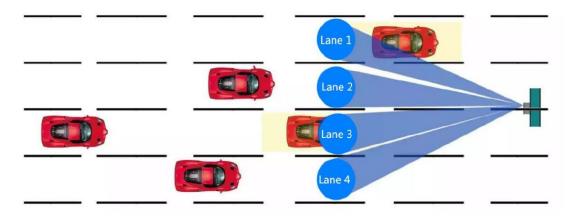


Figure 4-1 Radar coverage

### 4.2 Installation Parameters

Installation height: 6m

Down tilt: 10°

Trigger distance: 28m

## 4.3 Operation via Radar Debugging Software

### 4.3.1 Overview

This software is the debugging software for radar. It is used to configure parameters of the radar for installation, debugging, and troubleshooting. The software installation package is included in the product CD.

### 4.3.2 Running Environment

• Software environment: It is applicable to Windows XP\Vista\7\8. Install Microsoft.NET FrameWork4.0 or above version (the kit is included in the installation package) to the computer. It is recommended to use 64-bit version of windows 7.

• Hardware environment: It is required that the computer should be equipped with 2.0GHz CPU, 2GBmemory, and 1GBvideo memory. It is recommended to use a separate graphics card for better display results.

### 4.3.3 Install Software

### Steps:

- 1. Double click the setup.exe file in the installation package. If Microsoft.NET Framework does not exist in the computer, it will be installed automatically.
- 2. Install the debugging software according to the installation wizard, as shown in Figure 4-2.

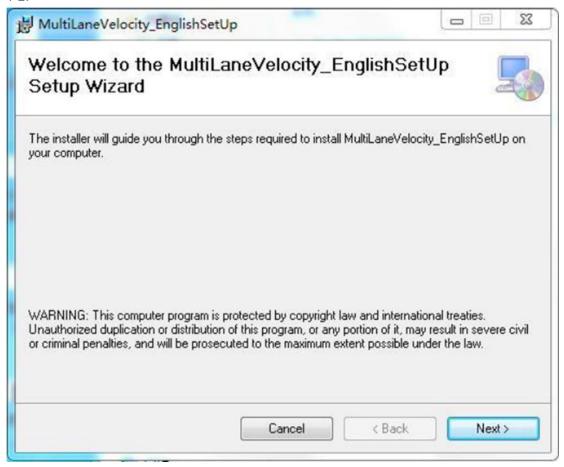


Figure 4-2 Installation Wizard

3. Click **Next** and then select an installation path, as shown in Figure 4-3.

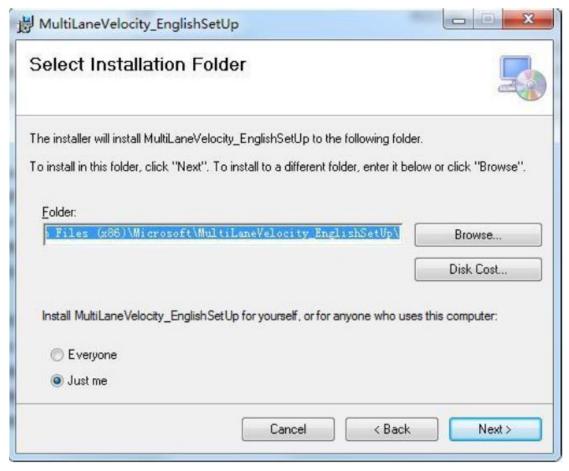


Figure 4-3 Select Installation Path

4. Click **Next** to continue. The setup wizard will complete the software installation automatically, as shown in Figure 4-4.

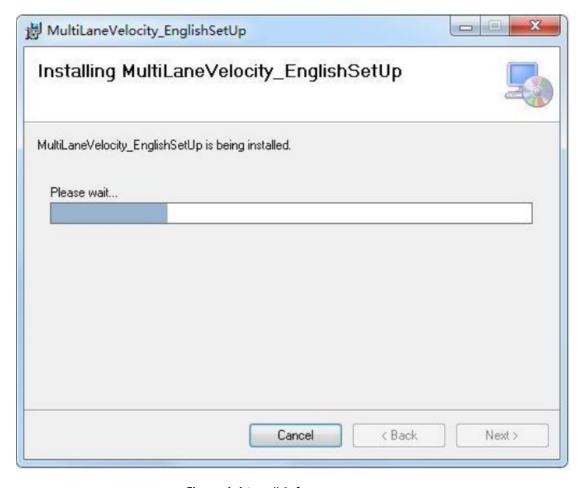


Figure 4-4 Install Software

- 5. Click **OK**, and a shortcut named *MultiLaneVelocity.exe* will be generated on the Windows desktop.
- 6. Double click the shortcut icon to run it.

## 4.4 Operate via Software

### Before you start:

Connect the radar to the computer properly.

There are three working modes of the software: debug mode, test velocity mode, and measure mode. Switch the radar to different working modes via the software. The software enters the interface as shown in Figure 4-5 after running.

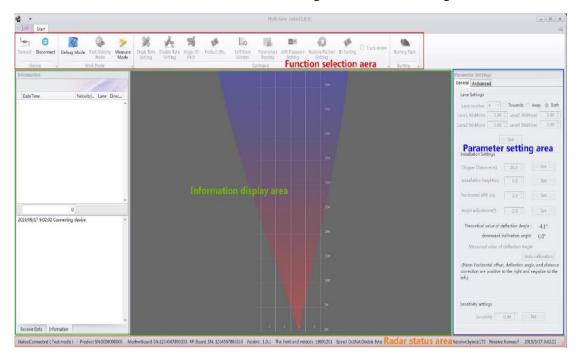


Figure 4-5 Debugging Software Interface

The interface contains Function Selection Area, Information Display Area, Parameter Setting Area, and Radar Status Area.

- Function Selection Area includes multiple functions to choose, such as device connection, debug mode, parameters reading and burning flash. Specific definitions are as follows.
- **Device Connection**: Click **Connect** and select a communication mode to enable the communication between software and radar.
- **Device Disconnection**: Click **Disconnect** to disable the communication between software and radar.
- **Debug Mode**: Only in this mode can radar parameters and Wi-Fi password be edited.
- ➤ **Test Velocity Mode**: The normal mode of speed detection. In this mode, parameters setting and reading are not allowed.
- Measure Mode: Measure mode is only required for measuring detection.
- ➤ Single Byte Setting: If the detection speed is lower than 255 km/h, select single byte setting.
- ➤ **Double Byte Setting**: If the detection speed is higher than 255 km/h, select double byte setting.
- Angle of Pitch: Read and view the pitch angle of radar.

- **Product SN.**: Read and view the serial number of radar product.
- **Software Version**: Read and view the current radar version.
- ➤ **Parameters Reading**: Read the current road information and installation parameters.
- ➤ Wi-Fi Password Setting: Edit the current Wi-Fi password connected to the radar.
- Restore Factory Setting: Restore the parameters and road information to default status.
- > **ID setting**: Set different frequency points to avoid mutual interference.
- **Track Shows**: Show the real-time moving track of target when selected.
- **Burning Flash**: When the radar does not connect to the debugging software, click Burning Flash to upgrade the current version of software.
- Information Display Area displays the detection speed, lane information, direction and real-time picture simulation of the current target.
- Parameter Setting Area contains General Settings and Advanced Settings. Lane Setting, Installation Setting and Sensitivity Setting can be configured in this area.

### General Settings

- Lane Setting: No more than 4 lanes is allowed. Three direction modes (Towards, Away and Both) can be selected. The Lane Width should be set in accordance with actual road width.
- **Trigger Distance**: The radar will report the speed information of target which arrives at this position.
- Installation Height: Set in accordance with actual installation height.
- **Horizontal Shift**: Set in accordance with the deviation of the radar to the horizontal center.
- **Angle Adjustment**: Make adjustments based on the target moving track detected by the radar.
- **Sensitivity Setting**: The detection sensitivity of radar. The higher the value is, the lower the sensitivity will be.

### Advanced Settings

The debugging software can be switched to the advanced setting interface only in debug mode. In this interface, the velocity correction value and the trigger distance correction value of each lane can be set, as shown in Figure 4-6.

- **Velocity correction:** The radar velocity speed correction. The radar velocity results need to be compensated, according to different accuracy requests.

**Attention:** The default radar accuracy is -4  $^{\sim}$  0 km/h. According to the Ukrainian national standard, the velocity measurement accuracy should be -3  $^{\sim}$  3 km/h. So the velocity correction for each lane should be set to 2 or 3 km/h. This value can also be set in Camera configuration — Application Mode — Constant Correction.

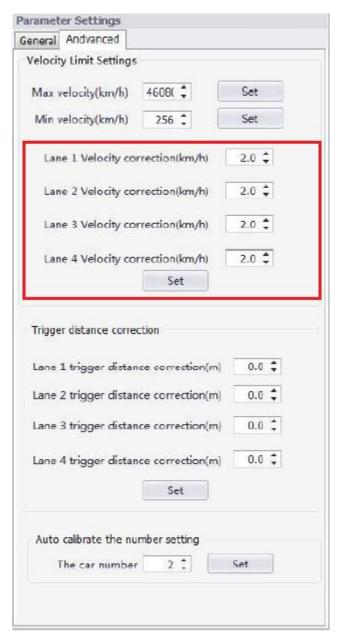


Figure 4-6 Advanced Settings Interface

• Radar Status Area displays the current status of radar, including software version, product serial number and current setting parameters.

### 4.5 Connect Radar

#### Steps:

1. Select **Device Connect**, and the connection setting dialog box will pop up. As shown in Figure 4-7, there are two connection methods: **WI-FI connection** and **Serial connection**.

The initial default connection method is serial connection. All available serial ports of the device will be listed and the user can select the port number to connect device through the drop-down list box.

- 2. Select Baud as 115200, Data as 8, Stop as 1, and Parity as none.
- 3. Click OK.



Figure 4-7 Device Connection Settings

4. (Optional) you can also select the connection method as WIFI connection. The computer must have been connected to the radar via Wi-Fi in advance. Click **OK** and the device will connect automatically.

During the device connection process, the software will automatically read the software version, device number and current setting parameters. These parameters will be displayed in the **Radar Status Area** at the bottom of the interface.

The name of radar is defined as RAD + 11-digitserial No., and the original password is RADAR2019.

### 4.6 Debug Radar

After load information (number of lanes and lane width) and installation parameters (trigger distance and installation height) are set, view the real-time vehicle status displaying window to check whether the vehicle is in the corresponding lane or not. Set the angle correction and horizontal shift as required to ensure that the target vehicle is in the corresponding lane.

The above parameters should be set according to the actual installation conditions. The horizontal shift value is negative to the left and positive to the right, and the positive center of all lanes are set as the value of 0. If the device is installed at the left lane, set the horizontal shift as a negative value (the deviation value of distance from the center of all lanes). If the device is installed at the right lane, set the horizontal shift as a positive value, as shown in Figure 4-8.

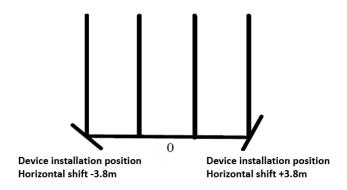


Figure 4-8 Horizontal Shift Settings

Firstly, the moving track should be straight and the initial appearance distance should be greater than the trigger distance. Otherwise, some of the targets will be undetectable.

Secondly, it is necessary to ensure that the detected lane corresponds to the actual lane.

Otherwise the lane number will be inconsistent with the data reported. Adjust the value of pitch offset based on the moving track shift.

After debugging, click Measure Mode and the radar will run normally.

# **Chapter 5** Camera Configuration

### **5.1 Modifying IP Address**

### Steps

- 1. Run SADP.
- 2. Check the camera to pop up the Modify Network Parameters window.
- 3. Enter information in the window.
- 4. Click Modify.

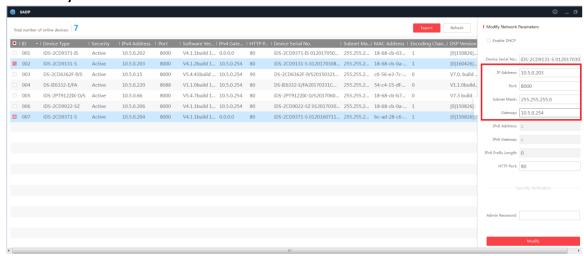


Figure 5-1 Modify Camera IP Address

### 5.2 Checking Firmware Version

- 1. Go to Configuration > System Configuration > Device Information.
- 2. Check the information in Firmware Version.

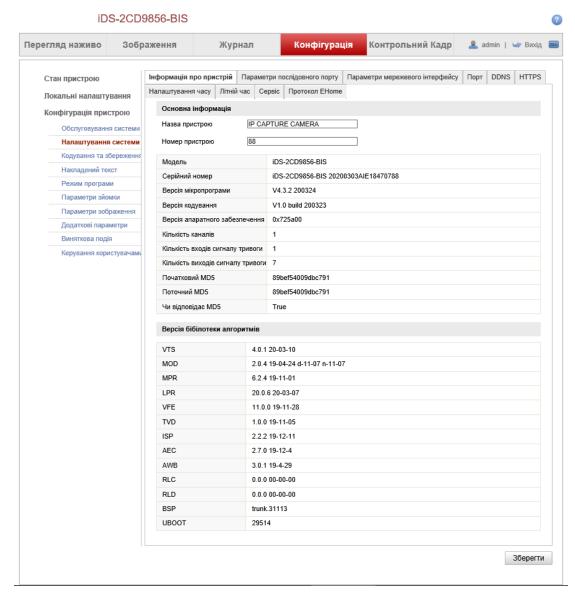


Figure 5-2 Check Firmware Version

## **5.3 Upgrading Program and Restoring Default Settings**

### .Steps:

### Go to Configuration > Maintenance.

- 1. Select ALG file and update, after success, execute step 2;
- 2. Select .dav file and update, after success, execute step 3;
- 3. Restore and reboot camera;

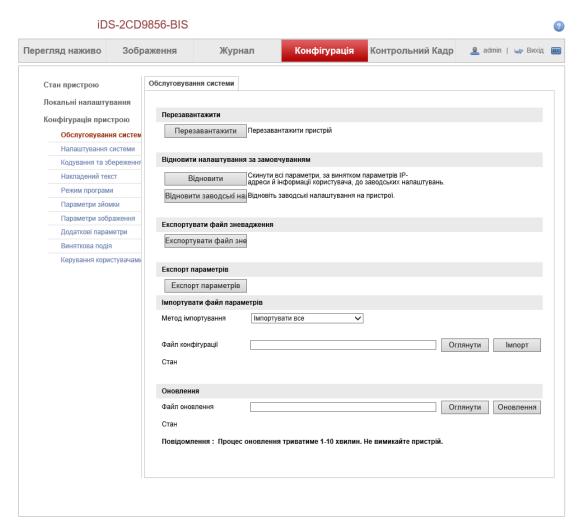


Figure 5-3 Maintenance Interface

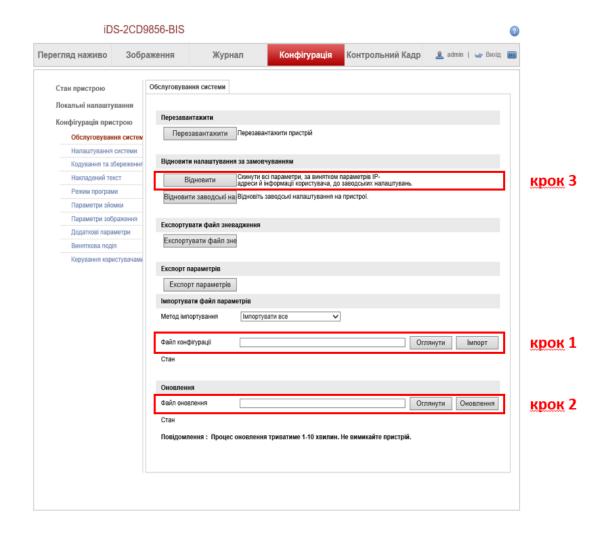


Figure 5-4 Upgrade and Reset

## 5.4 Modifying Time Zone

- 1. Go to Configuration > System Configuration > Time.
- 2. Select **Time Zone**.
- 3. Click Save.

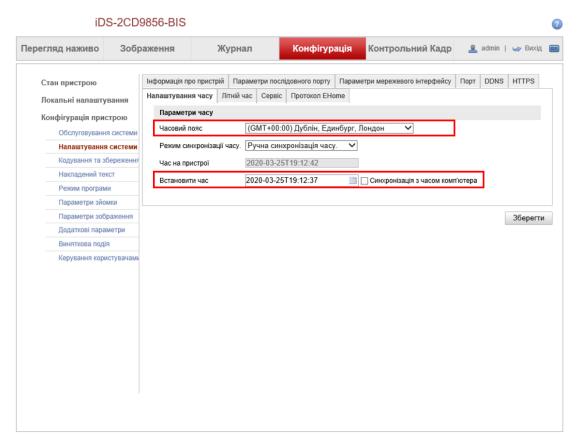


Figure 5-5 Modify Time Zone

### **5.5 Configuring Serial Port Parameters**

- 1. Go to Configuration > System Configuration > Serial Ports.
- 2. Baud rate of RS-485 1 and 2 Parameters should be 19200 and 115200bps.
- Click Save.

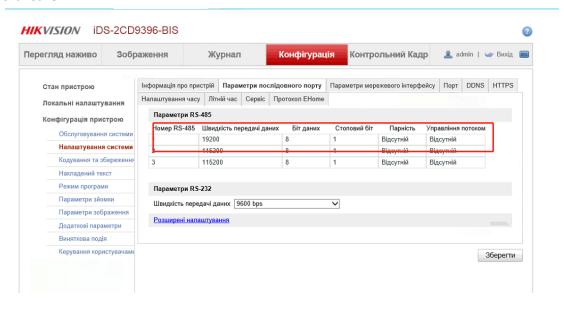


Figure 5-6 Configure Serial Port Parameters

**Attention:** The RS485 controls temperature sensor, and baud rate should be set to 19200. The RS485 2 controls radar, and baud rate should be set to 115200.

### **5.6 Configuring Application Mode Parameter**

#### Steps:

#### 1. Mixed-traffic Lane

- Step 1: Select Mixed-traffic Lane for Application Mode, which means video triggered capture.
- Step 2: Check the "All-in-one Traffic Camera" checkbox and select 1, which means to capture one picture for normal vehicle.
- Step 3: Select Motor Vehicle or All Targets for Capture Type. Select "Burst" or "Strobe" for Capture Mode according to supplement light type. Select "Radar" for Speed Detect Mode.

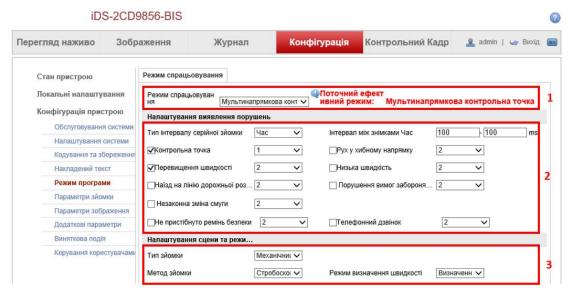


Figure 5-7 Configure Mix-traffic Lane

#### 2. Mix Traffic Lane Settings

- Step 4: Select "3" for Total Lanes.
- Step 5: Choose "From Top to Bottom" or "From Bottom to Top" according to the real vehicle direction.
- Step 6: Set high speed limitation value.
- Step 7: Choose the right control port from F1 to F6 in Linkage Output option according to the wiring of camera.
- Step 8: Select radar type
  - Select Multi-lane radar
- Step 9: Click "Draw Rules".



Figure 5-8 Configure Mix Traffic Lane Settings

3. After clicking Draw Rules, finish all the drawing including LPR area, Lane Line, Lane right limit and Trigger Line, as shown in the picture below.

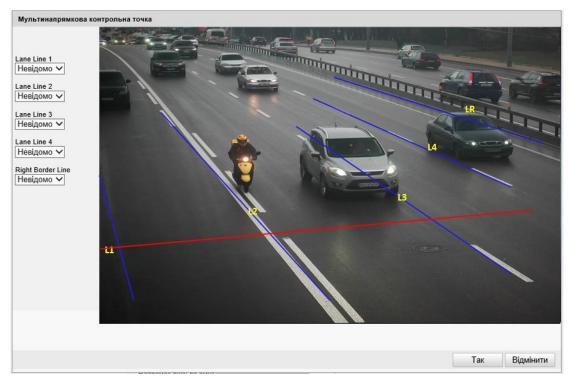


Figure 5-9 Draw Rule

4. Click Save.

# **5.7 Configuring Capture Parameters**

- 1. Go to Configuration > Capture Parameters > License Parameters.
- 2. Select **Front Plate** or **Back Plate** according to real vehicle direction.
- 3. Select Small-Size Plate Recognition as License Plate Type.

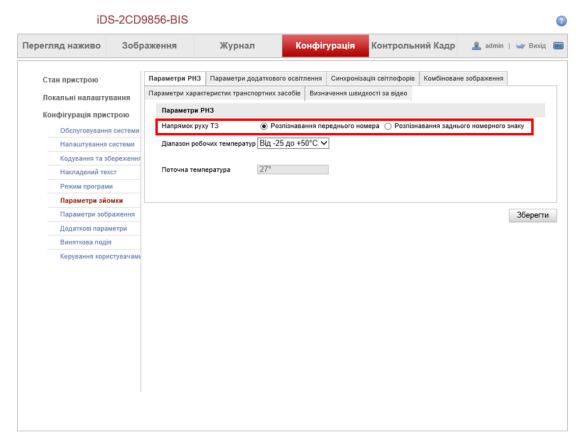


Figure 5-10 License parameters setting

- 4. Go to Configuration > Capture Parameters > Flash Light Parameters. The IO4 controls the light.
- 5. Select Strobe Light Mode.
- 6. Set frequency coefficient as 2 and set duty ratio to a proper value.
- 7. Select time schedule set start time and end time.

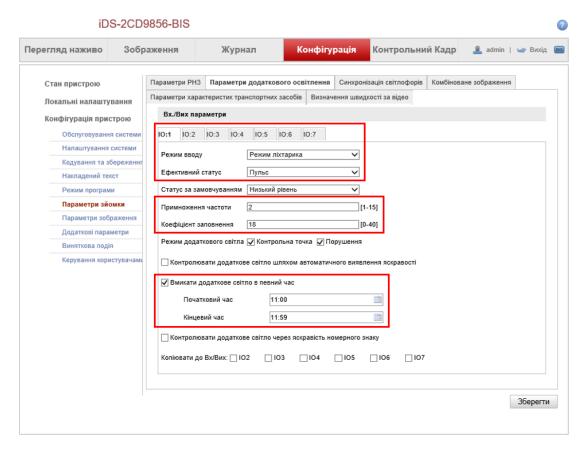
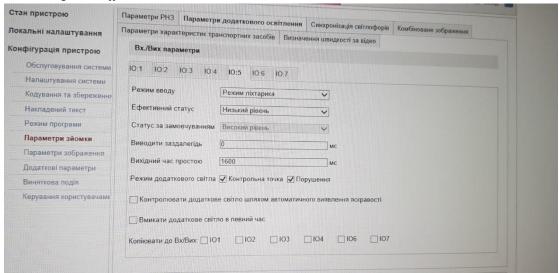


Figure 5-11 Strobe light settings

Attention: IO2 and IO3 are used for the tamper alarm output. They need to be connected in series to the tamper of the communication box. The settings should be by default. IO4 controls supplementary light, using pulse mode, adjust the brightness by duty ratio. IO5 controls the sending and receiving of data between the GPS module and the camera, using level control mode, default is set to high and effective low.



## **5.8 Configuring Image Parameters**

### Steps:

- 1. Go to Configuration > Image Parameters > Video.
- 2. **Shutter Speed** should be in the range of 800~4000. Normally set it as default 4000.
- 3. Change **Gain** value according to the captured picture brightness. The bigger the value is, the brighter the picture will be. The recommended value is between 30 and 70.
- 4. Keep other parameters as default.

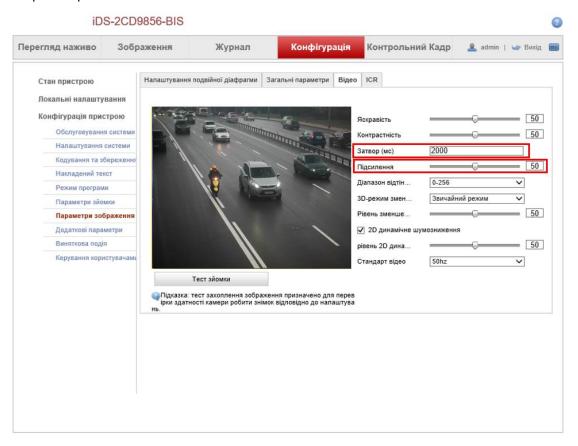


Figure 5-12 Configure Video Parameters

## **5.9 Configuring Text Overlay Parameters**

- 1. Go to Configuration > Text Overlay > Capture overlay configuration.
- 2. Enter information.

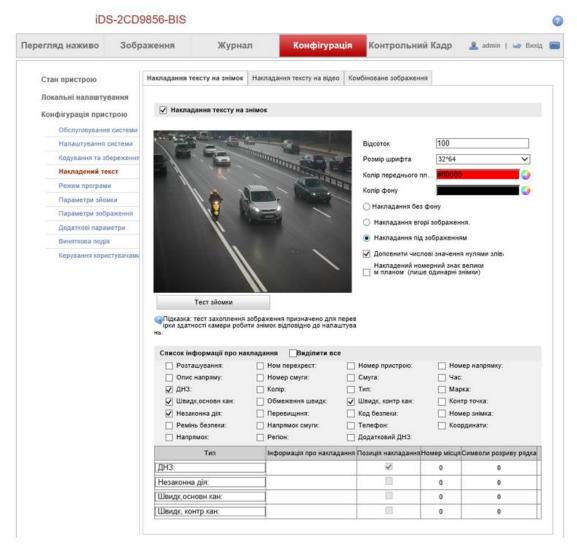


Figure 5-13 Configure Single Picture Overlay

- 3. Click Save.
- 4. Go to Configuration > Text Overlay > Composite Picture Overlay Configuration
- 5. Enter information.

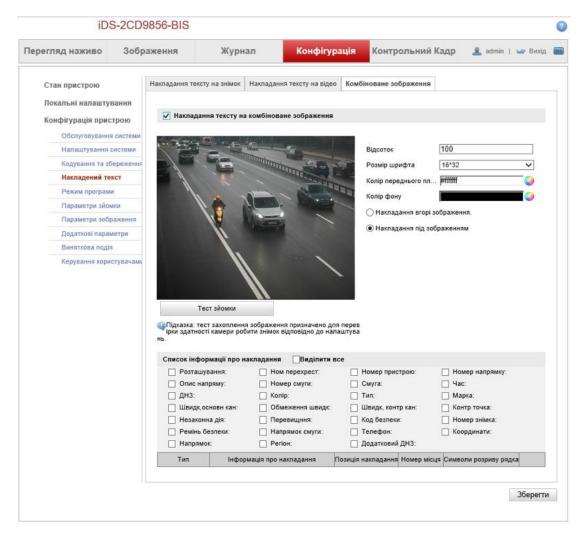


Figure 5-14 Configure Composed Picture Overlay

6. Click Save.

## 5.10 Testing

- 1. Click **Live View** to enter the live view interface.
- 2. Click Real-Time Status and Traffic Flow Statistics

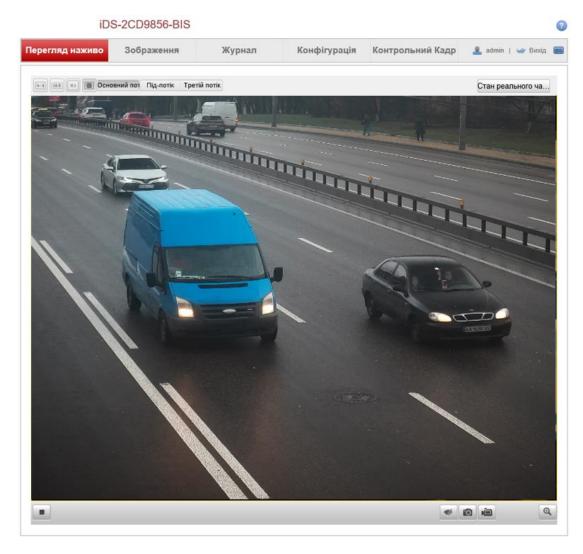


Figure 5-15 Select Live Status and Traffic Statistics

- 3. Select Armed as Level 2 Armed.
- 4. Check if there is uploading of license plates in **Picture List**. If yes, the camera is capturing normally.

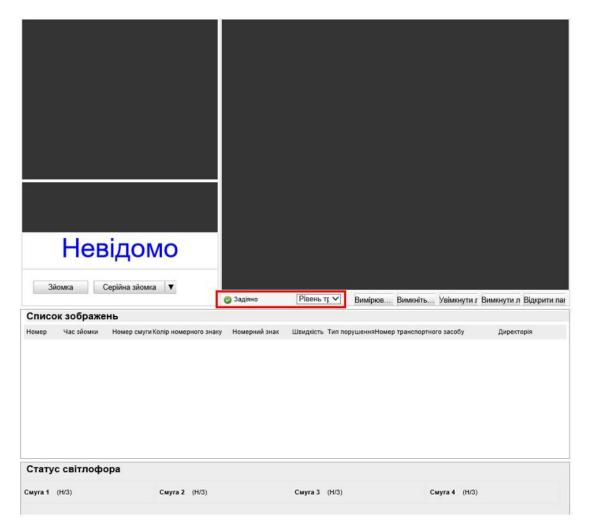


Figure 5-16 Check License Plate Information