ADAPTIVE **RECOGNITION**

VIDAR

User Manual

This manual contains instructions on accessing the web interface, system settings and setup guidelines, and usage and maintenance.

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RELEASE DATE
26.02.2025.

VIDAR

USER MANUAL

Document version: 2025.02.26.

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1. ABOUT THIS MANUAL

The structure of this manual follows the approach of configuring a new camera for its first-time use.

- The camera provides access to all its features through a web interface, its entire configuration control is available using a web browser. No external components need to be installed.
- First, system settings are discussed, so that the device will be operational.
- Next, the user will be guided through the process of setting up the image capturing process, so that the camera will provide good quality images both for internal use and for the video feed streamed with the chosen encoding.
- In the third part, the manual will discuss how to capture events using internal or external triggers, and depending on the model, read, store, and transfer ANPR data corresponding to the event.
- In the last section, the tools of camera maintenance (firmware update, logs, etc.) are described.

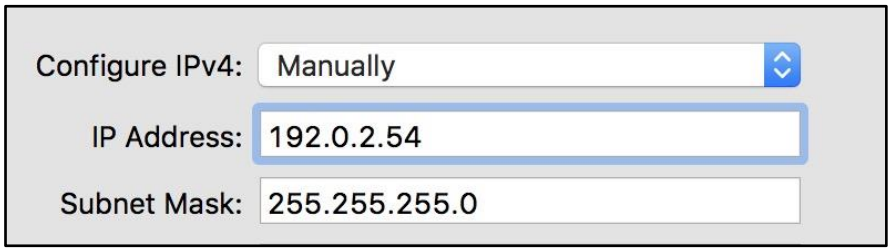
2. ACCESSING THE CAMERA

Note

In order to access the camera, power and network connectors have to be connected appropriately. For more information see the Install Guide. Follow the five steps below:

1. Connect the camera to a computer or a network switch using the Ethernet cable, then power the camera on. Soon both status LEDs (at the camera front) turn on and stay lit while the camera is booting. When the green status LED flashes two times and the red LED turns off the camera is ready for operation.

2. Set your computer's IP address as 192.0.2.x (with x other than 3 or 255, for example 192.0.2.54), with the subnet mask 255.255.255.0



3. Use the ping command to test network connection to the camera
   Windows: c: \ping -t 192.0.2.3
   Linux: [username@mylinux ~]$ ping 192.0.2.3

4. In a couple of second the ping echo package will be received, if not:
   - check the Ethernet link LEDs at the computer or network switch for a physical link
   - check the IP of the computer by pinging its own address (using the example at step #2: ping 192.0.2.54)

5. Start a browser (Firefox, Chrome or Edge) and enter the default IP of the camera: http://192.0.2.3 into the address bar. If the web interface is not accessible, make sure that neither a proxy nor a firewall is blocking access, and that the browser is not in offline mode.

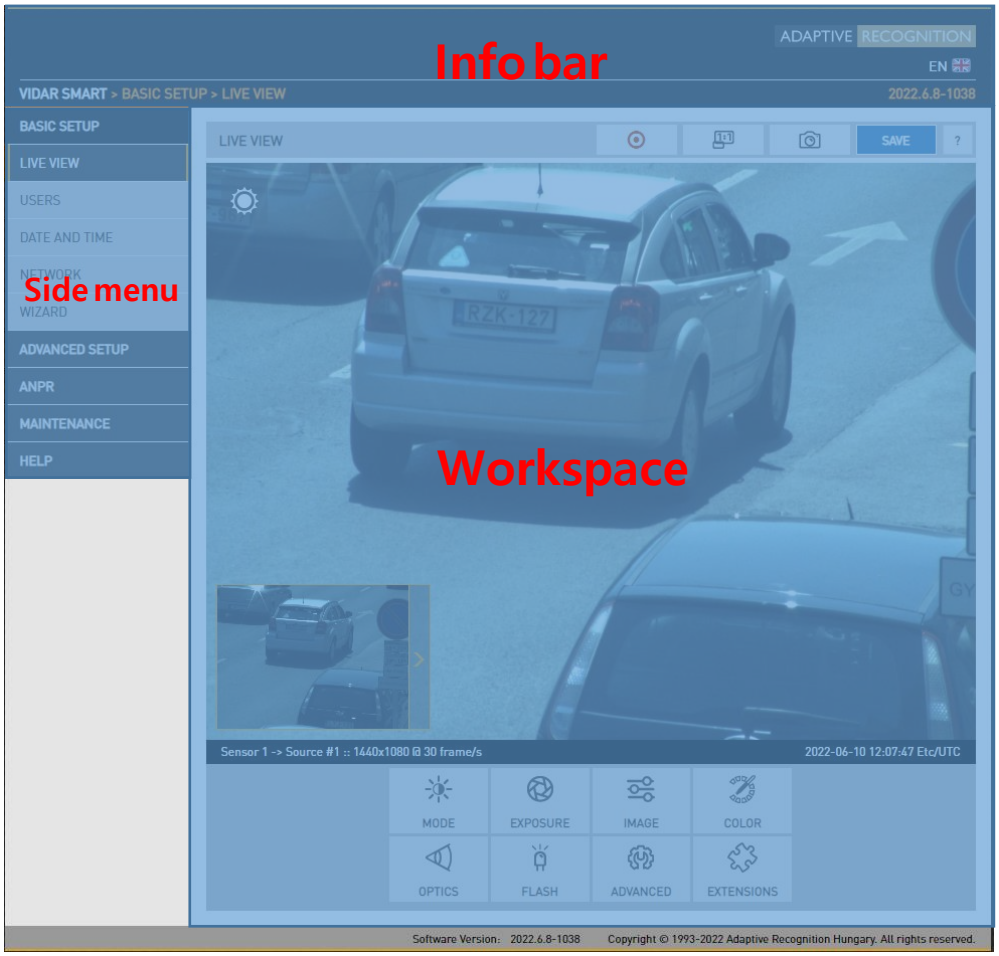
Note

From versions of Firefox (v. 56.0) it might be necessary to disable the feature "Use hardware acceleration when available" to avoid possible browser/machine hangs (Located at: Preferences/Performance/Use Recommended Performance Settings).

3. WEB INTERFACE

Main areas of the camera interface:

Info bar



The information bar displays:

- Adaptive Recognition logo
- Version number
- Language selector
- Camera type, name of the currently active page.

Side menu

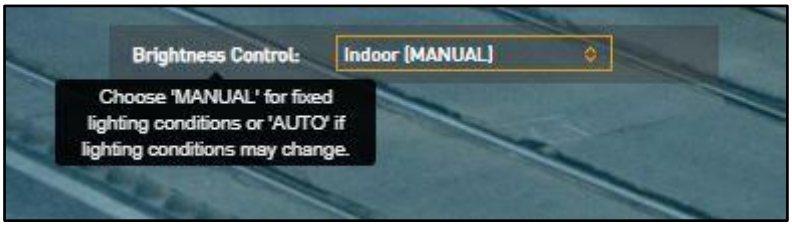
- Basic Setup, Advanced Setup, ANPR, Maintenance, Help menu
- Access camera settings via the navigator. Menu is organized into a tree structure.

Workspace

- Use the workspace for settings. **Save** your changes, otherwise the previous settings remain in effect.

Hint

Some workspace controls have interactive help. Hover the mouse over the label of the setting to see the tooltip.



Important!

Use the **Save** button to save settings. All settings will be lost if you leave the page without saving settings. A popup window will remind you to save settings.

Click the ? icon on the workspace to display **Help** on the page.

Note

Menu subpages can also be addressed via direct links, like http://192.0.2.3/#liveview/, http://192.0.2.3/#eventman, etc.

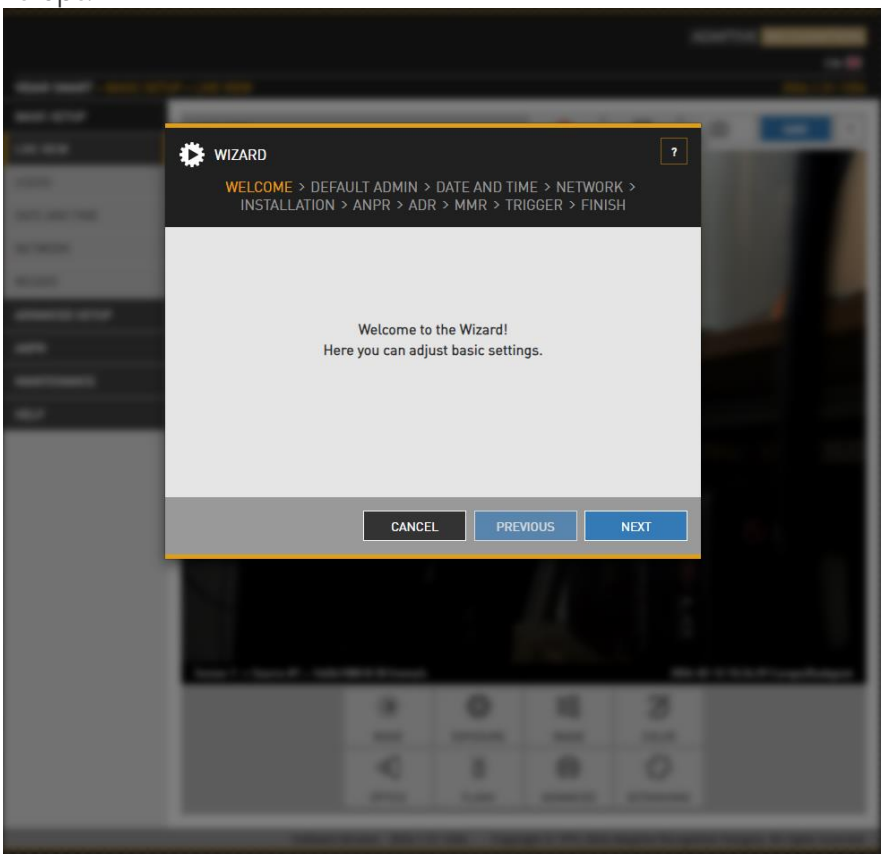
Important!

For best user experience use a recent edition of Google Chrome, Mozilla Firefox or Microsoft Edge.

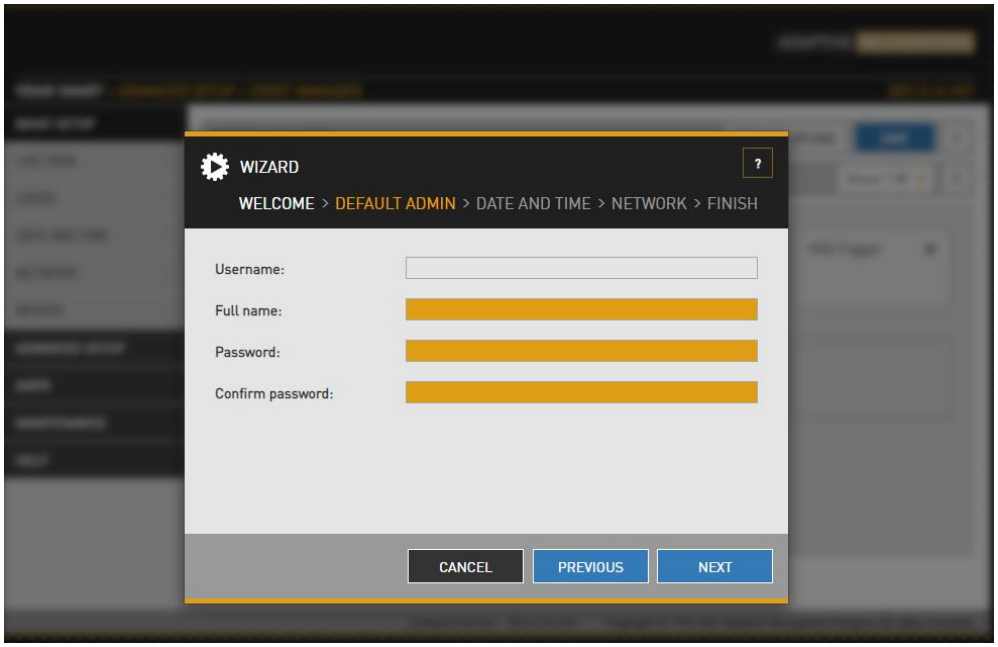
4. FIRST STEPS (WIZARD)

WEB INTERFACE > BASIC SETUP > WIZARD

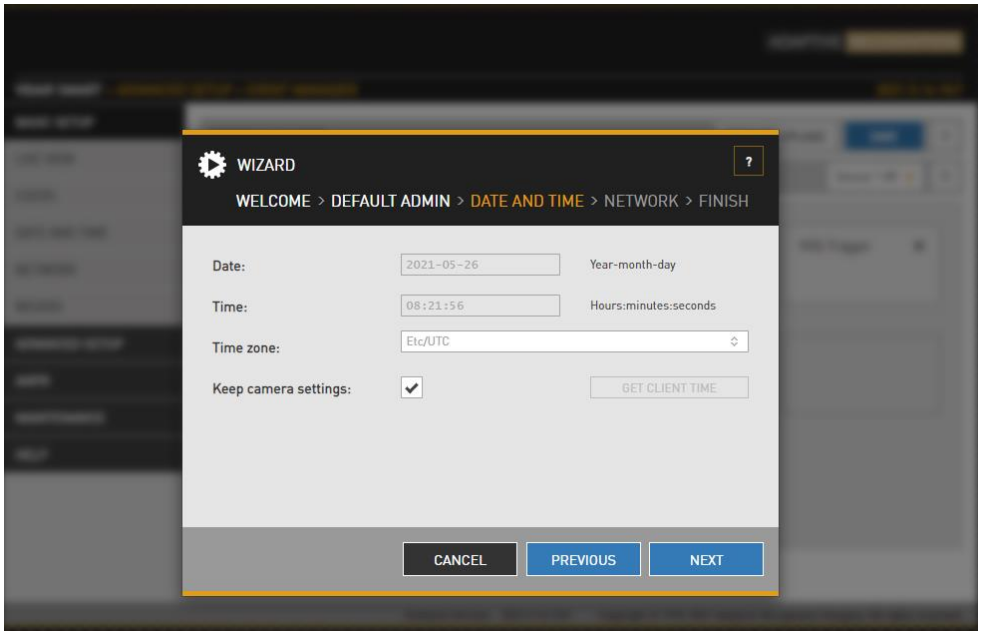
The Wizard will help with the initial configuration of the system settings of the camera. It will guide you through few steps:



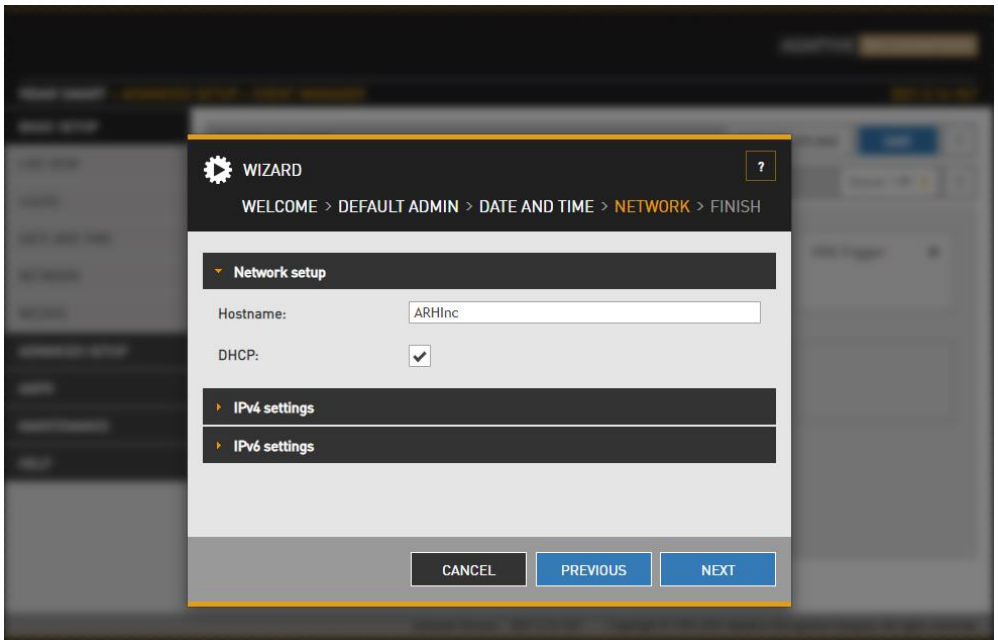
- Setting up an administrator user



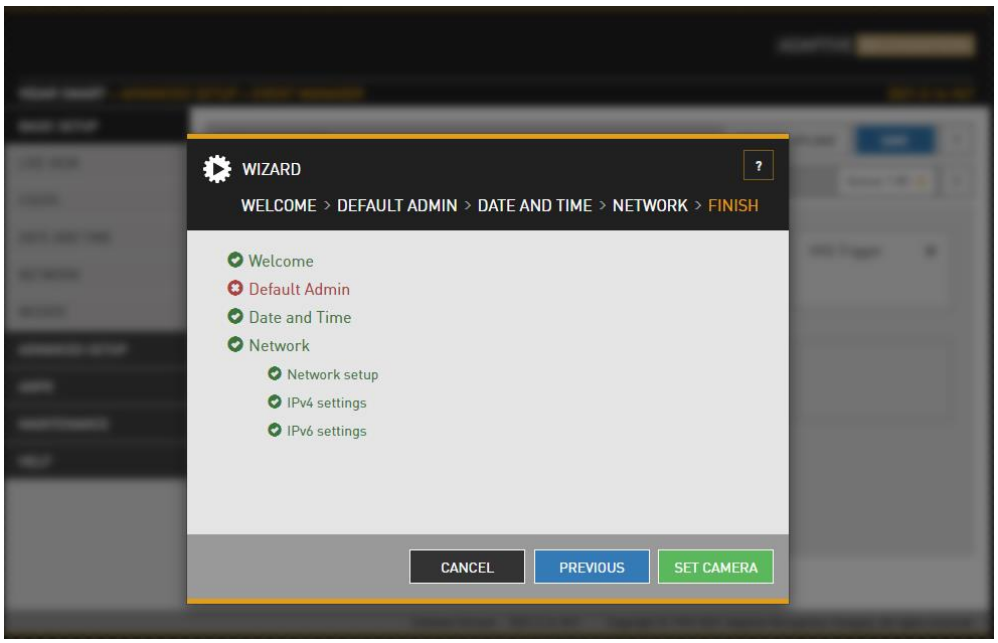
- Set the current date & time:
  - **Keep current settings**: If the date and time is correct, ticking the checkbox will accept the system's data. The other sections will become inactive.
  - **Get Client Time**: Adjust the internal clock of the camera to the PC.



- Set up the network



- Displays a checklist of the settings: a properly configured entry is displayed in green. Entries that need further attention are displayed in red.

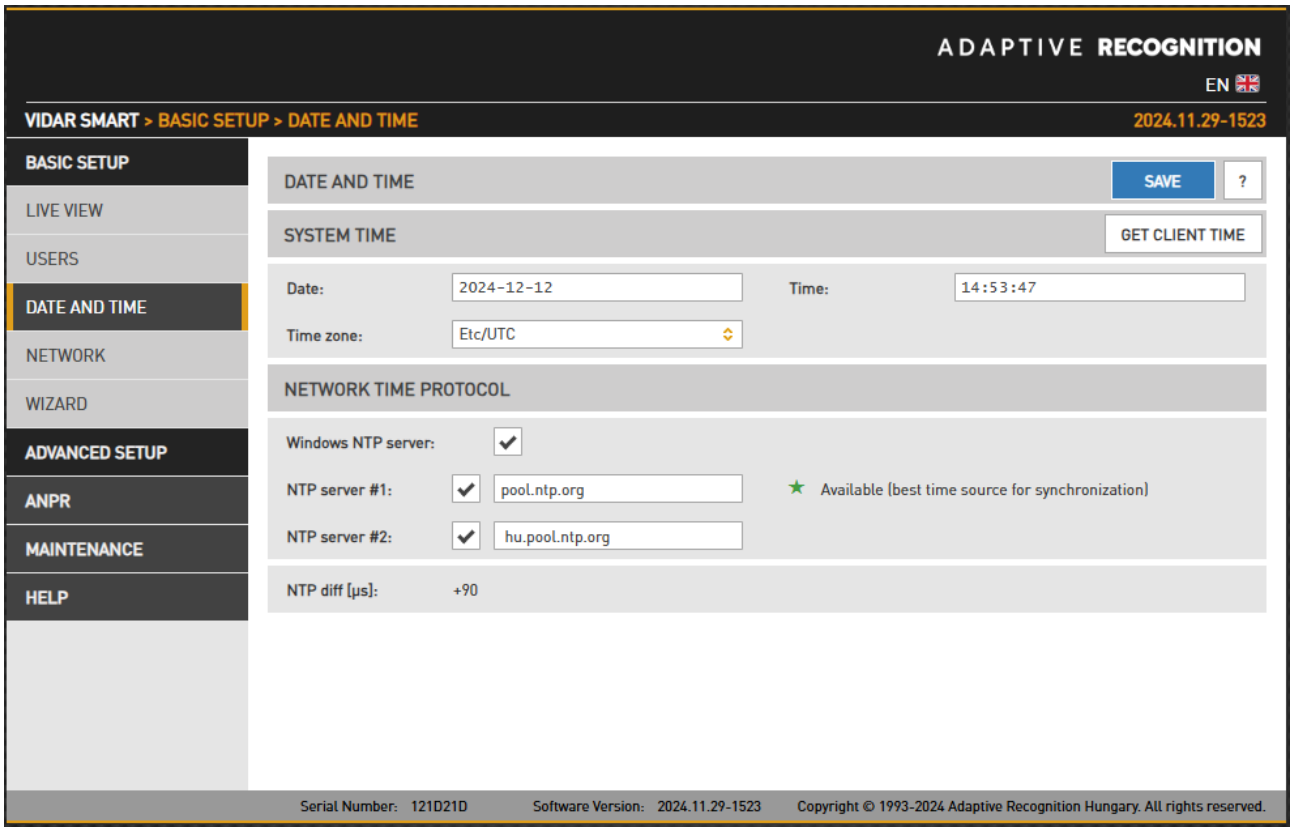


All of these settings are also available as separate configuration pages (see System settings).

5. SYSTEM SETTINGS

5.1. DATE & TIME

WEB INTERFACE > BASIC SETUP > DATE AND TIME



Current date and time and timekeeping settings are managed from this page. Users can set date and time by using a time synchronization protocol (NTP), which will keep time synchronized to a server over network.

Before you set the time, please make sure that your time zone is valid (has the correct continent / Capital City). You can do this by using the Time zone's drop-down list.
Querying the camera's time zone via URL:
http://{camera_ip}/setup/time?section=time&gettzone&wfilter=1
or
The list used for the time zone dropdown menu can be accessed here in .JSON format:
http://{camera_ip}/js/cam/data/timezones.js

The URL command is used to synchronize the camera's internal time with the PC's system time. This command allows precise time configuration:
http://{camera_ip}/setup/time?wfilter=1&section=time&save=&year={year}&month={month}&day={day}&hour={hour}&min={minute}&sec={sec}&tzone={time_zone}

> Note
>
> Settings are applied after clicking **SAVE**.

Continuous synchronization is based on NTP (Network Time Protocol). The following settings are available with **NTP client**:

- **NTP server #1, 2:** Several NTP servers can be set up if more precise time synchronization is the goal (can also be GPS-based). The address of the NTP server. (If the NTP server does not run on the default port (123), specify the port in the following format: [hostname/ip]:[port].

- **NTP diff [µs]:** The current deviation of the camera's system time from the time received from the NTP server(s).

To initiate an immediate synchronization to the NTP server, click the GET CLIENT TIME button.

> Note
>
> The camera has an internal battery feeding its Real Time Clock (RTC) while the camera is powered off. In a power down state the battery is able to provide power to the RTC for approximately 2 weeks. It takes about 12 hours in a power up state for the battery to completely recharge.

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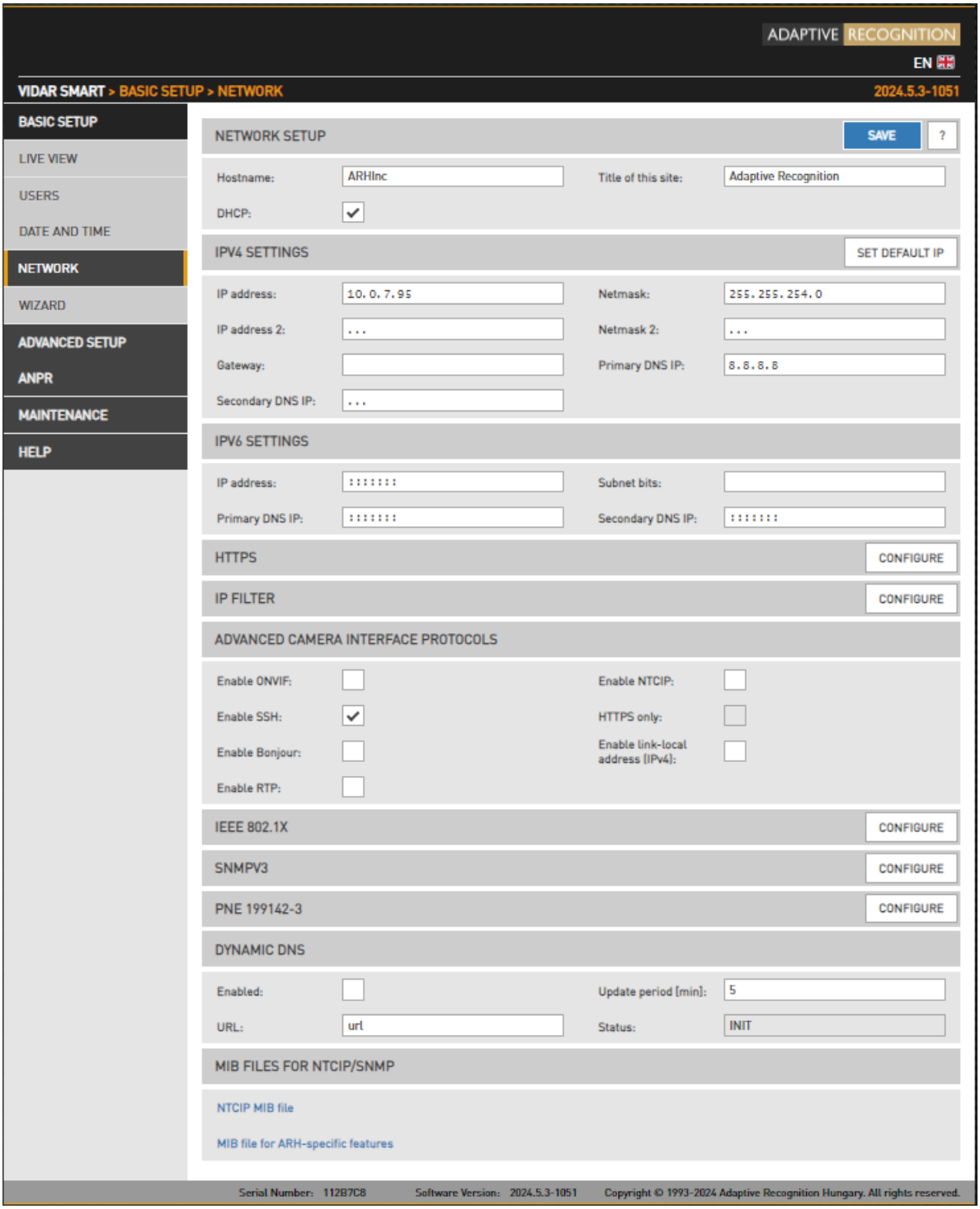
5.2. NETWORK

WEB INTERFACE > BASIC SETUP > NETWORK

This page provides access to the network settings of the camera.



5.2.1. NETWORK SETUP

- **Hostname**: The name of the device in the network.
- **Title of this site:** Textual description of the device, for example Adaptive Recognition, that will appear as the title of the browser tab.
- **DHCP:** Check this checkbox to have the camera to operate in DHCP mode, that is to obtain its.
    - IP address
    - Netmask
    - Gateway
    - Primary and Secondary DNS

  from a DHCP server (DHCP mode).

5.2.2. IP VERSION 4 AND 6

The camera supports IPv4 and IPv6. Both versions can be enabled simultaneously. At most two IPs can be assigned to a device.

- **Set default IP:** This button restores the original IP address of the camera and the corresponding netmask setup.

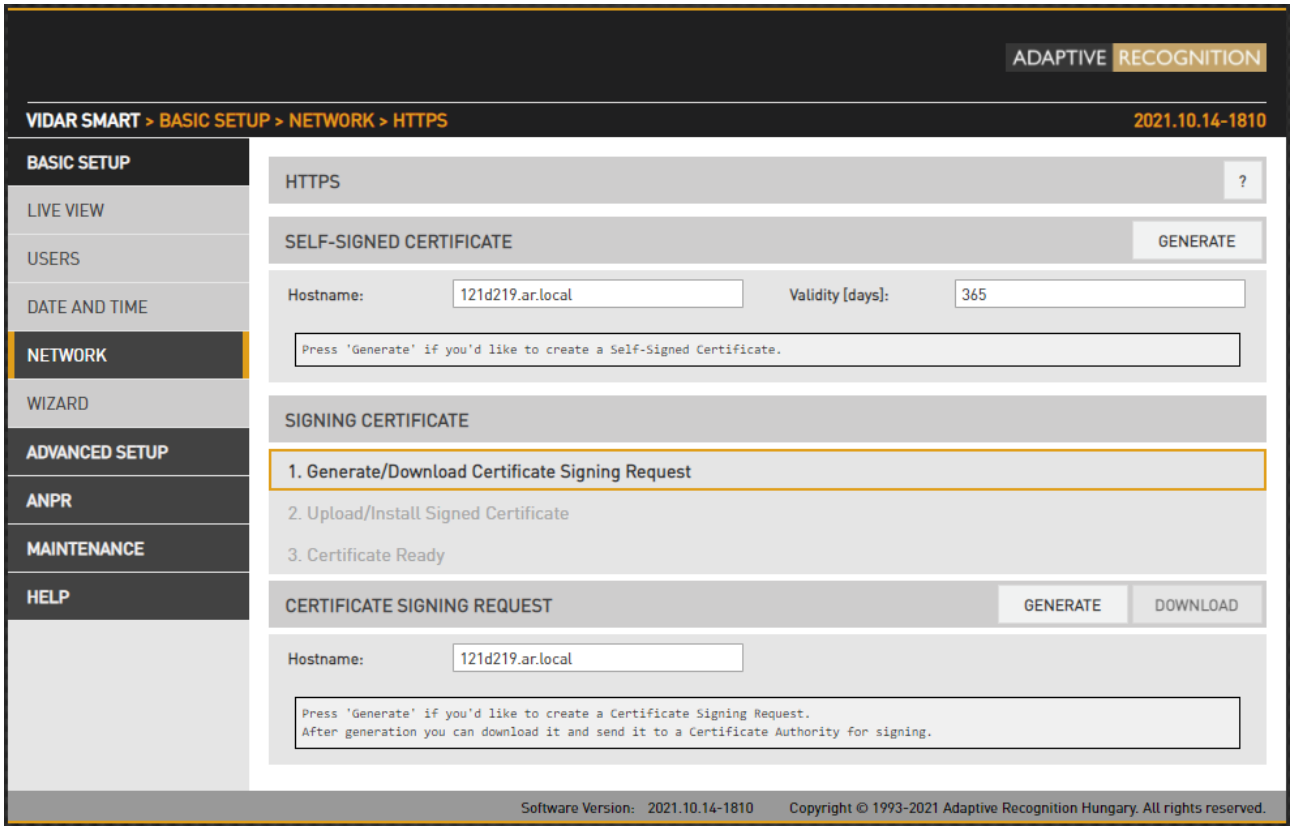
- **IPv4:** The IP address for the camera can be set
    - Automatically via DHCP (see option above), or
    - Manually, by entering a static IP address.
- **IPv6:**
    - Only static IP addresses are supported.
    - The /16 option stands for the length of the subnet mask (16 refers to a 8 characters long mask)

5.2.3. HTTPS

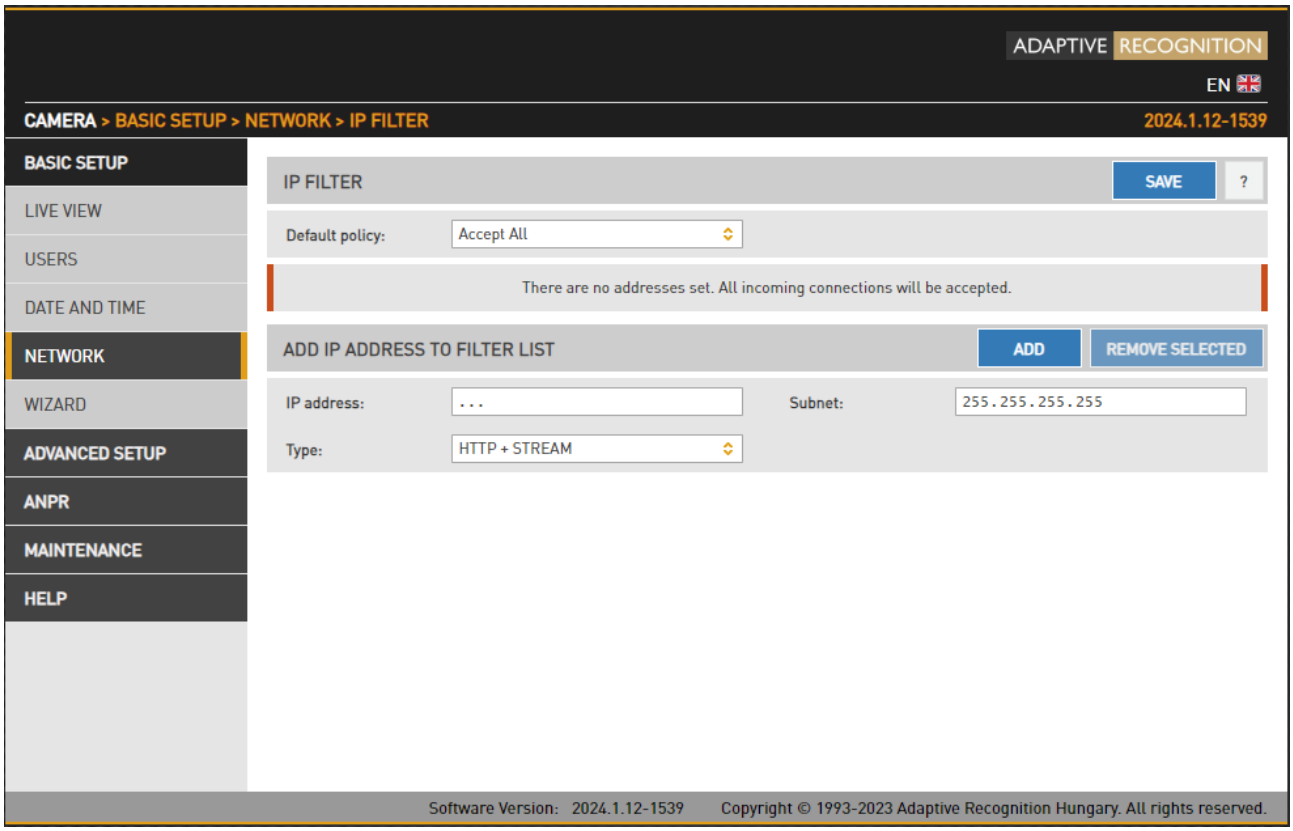
The camera's onboard webserver is capable of running in HTTPS mode, which ensures an encrypted, secure channel between the user and the camera.

How to create and install a Signed certificate:

- Set date and time, otherwise the device will not accept the uploaded certificate.
- Generate and download the "Certificate signing request" (**.csr extension**) file on your device.
- Sign certificate with a Certificate Authority, for instance Symantec, Trustwave… or a self-generated top-level certification, like RootCA.
- After signing, upload it to your device with the public key of the RootCA certificate.
- After installation and restart, your device is available with HTTPS protocol.



5.2.4. IP FILTER



> **Note**
>
> The IP filter module blocks HTTP and stream access only. It does not affect SSH and FTP access.

Default Policy: The policy can be of two types

- Reject All – in this case access is denied to all IPs except those listed
- Accept All – in this case access is granted to all IPs except those listed

The exceptions to the default policy can be added and removed in the **Add IP Address to Filter List** section.

IP address: The system accepts IPv4 and IPv6 addresses as well.

Type: The range of IP filtering

- HTTP+STREAM: the settings are applied to both HTTP and stream requests
- HTTP: the settings are applied to HTTP requests
- STREAM: the settings are applied to stream requests

Subnet: Subnet mask of the IP address being added. This has to be expressed in dot-decimal, just like the address itself. (e.g., 255.255.255.0)

After clicking the Add button, the new exception will appear in the BLOCKED/ACCEPTED ADDRESSES table above the edit fields. The elements of the table can be removed by clicking the check box of the row and then clicking the Remove button. The above settings (default policy, exceptions) will not be applied until clicking the Save button.

Important!

Before clicking the Save button, make sure that all settings are configured correctly, an incorrect setup can block the user from accessing the camera. In this case Recovery Mode may be applied.

5.2.5. ADVANCED CAMERA INTERFACE PROTOCOLS

Enable ONVIF: Checking this checkbox will enable the ONVIF interface of the camera. Please note that with ONVIF enabled the amount of memory available for image buffering will be smaller.

Enable RTP: Select this option to enable RTP streaming.

Enable NTCIP: Enables the National Transportation Communications for Intelligent Transportation System (ITS) Protocol (NTCIP) which creates a seamless integration into standardized ITS systems. For more information on NTCIP, please check the NTCIP Guide in the HELP menu of the web interface.

HTTPS only: Enables HTTPS protocol which is encrypted using Transport Layer Security (TLS).

Enable SSH: When this box is ticket out, access will be denied through the service port (SSH). When disabled, the Adaptive Recognition Support will have limited tools to recover the camera when inaccessible!

Enable link-local address (IPv4): If the PC is running on a DHCP network, it is possible to revive network communication with improperly configured IP devices to correct the IP address. This can be accomplished using the so-called link-local IPv4 address of the network device.

Enable Bonjour: The program is able to detect Adaptive Recognition (VIDAR) cameras on the Ethernet network using the Bonjour protocol.
The program recognizes all devices connected to the network: it can query their IP address (via the Bonjour protocol), but it will only end up fully communicating with those that are configured on the same subnet as the PC.

Enable RTP: RTP is a fundamental protocol for real-time media transmission over IP networks, providing the necessary tools to deliver synchronized and reliable video streams.
These steps are needed for the setup:

1. In the Browse menu, under the Network submenu, in the Advanced Camera Interface Protocols section, check the **Enable RTP** checkbox to use the function.

Important!

It is very important to save the operation by pressing the **Save** button afterward. At this point, the camera will restart and an RTSP Port will appear.

At this point, the camera will restart and an RTSP Port will appear. The default port number is 554.

2. The other settings can be found on the Advanced Setup -> Stream Settings page. At the bottom of the page, if RTP is enabled, a Multicast Stream block will appear. You can set three main parameters:
   - **RTP Multicast** (format: ip:port, with the IP range: 224.0.0.0 - 239.255.255.255)
   - **Auto Start** checkbox
   - **RTP TTL** (between 1-255, with 64 as the default value). If any format is incorrect, the camera will send an error message.

There are also two buttons on the interface, which are used to **start** and **stop** the **stream**.

3. The interface has been expanded with the option to download an **SDP file**. The link only appears if a valid value is entered in the **RTP Multicast** field. If the field's value changes, the link disappears and will only reappear after saving. Similarly, if you enter the value for the first time, the link will only appear after **saving** it.

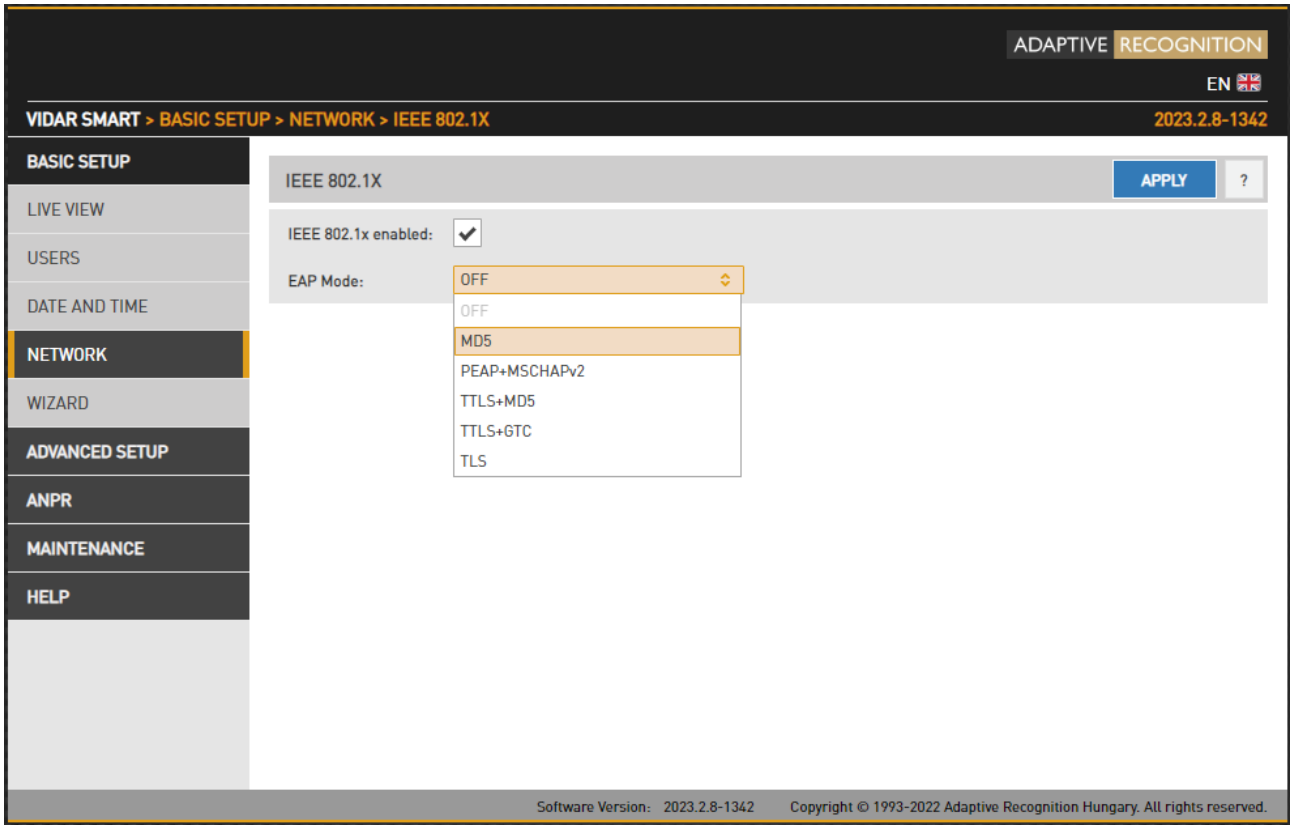
   This **SDP file** can be opened in media player programs, for instance in VLC, and it contains the stream parameters, allowing the camera's image to be displayed in the player.

5.2.6. IEEE 802.1X

The settings on the web interface of the camera is available at BASIC SETUP/NETWORK/IEEE 802.1X. It can be achieved by using the Configure button.

Based on the network created by the network administrator, these are the following options:

EAP Mode = MD5 (Challenge): the user only on the HP V1920 switch configured. Entering a password is mandatory.
EAP Mode= PEAP+MSCHAPv2: the user through a RADIUS server can be entered. Entering a password is mandatory, certificates are optional.
TTLS+MD5: the user can be logged in via a RADIUS server. Entering a password is mandatory, certificates are optional.
TTLS+GTC: the user can be logged in via a RADIUS server. Entering a password is mandatory, certificates are optional.
TLS: the user can be logged in via a RADIUS server. The client uploading the (side) certificate and the private key is mandatory (The private key password must also be entered. If there is no private key password, the previous password can be deleted by entering the minus sign. The camera does not check whether the uploaded private key is encrypted and does not validate the entered password).



Entering a user ID (Identity) is mandatory in all cases. The anonymous identity option is not yet supported, so when logging in a user ID can be interrogated on the network.

The general rule for filling in text fields is that if you leave them blank, the camera takes into consideration a previously specified or default value, although it may not accept it. Some cases, text data can be deleted by entering the minus sign (This can happen if the field is not mandatory, e.g. in case of private key password).

The settings applied only after pressing the Apply button, and if this succeeded, the interface will offer to restart the camera.

5.2.7. SNMPV3

SNMP (Simple Network Management Protocol) is a network protocols to manage and monitor network elements. SNMP retrieves information and data from cameras on the network. It will also be able to communicate with network devices that know the same standard.

Using SNMP, you can:

- identify devices
- monitor network performance
- monitor changes or query the status of network devices in real time.

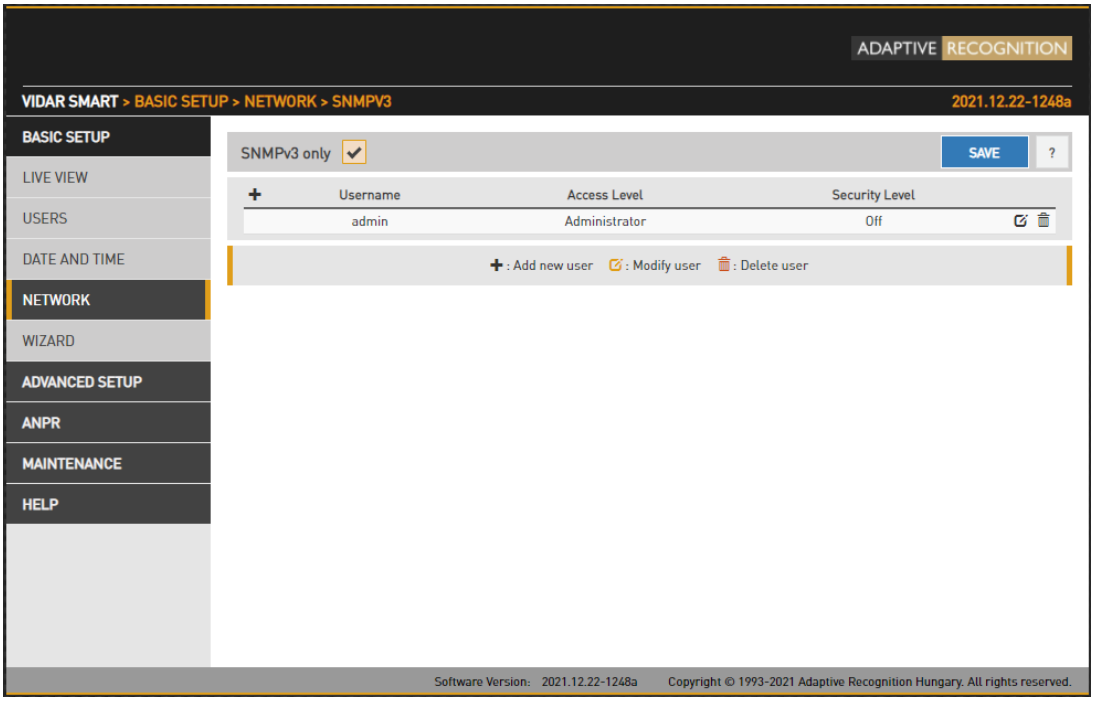
Click on **Configure** button first.

Function can be turned off with the

checkbox.

After that, you can add a new user: clicking on the plus ('+') button, then a form appears requesting the following fields:

- **Username**
- **Access level** (Normal user, Read-only user, Superuser and Administrator)
- **Security level** (Off, MD5, SHA1, MD5+DES, SHA1+DES, MD5+AES, SHA1+AES)



Note

Settings will be applied only after click on **SAVE** button.

5.2.8. DYNAMIC DNS

Dynamic DNS services provide a consistent addressing method for devices that change IP address frequently. The host device needs to periodically (**Update Period**, given in minutes) ask for an update at the dynamic DNS service provider (**URL**, as given by the DDNS provider), which will in turn keep the DNS tables (where the domain/host names are translated to the corresponding IP addresses) of the service provider up to date. The current status of the process is shown in **Status**. Please note that network settings such as IP domains, gateway settings, etc. may affect this feature, in short: the DDNS service provider must be accessible from the device.

5.2.9. MIB FILES FOR NTCIP/SNMP

A management information base (MIB) is a formal description of a set of network objects that can be managed using the Simple Network Management Protocol (SNMP). The format of the MIB is defined as part of the SNMP. You are able to download it and open it with any text editor. The function only works if the Enable NTCIP box is checked in the Advanced camera interface protocols menu.

Note

Settings are applied after clicking **SAVE**.

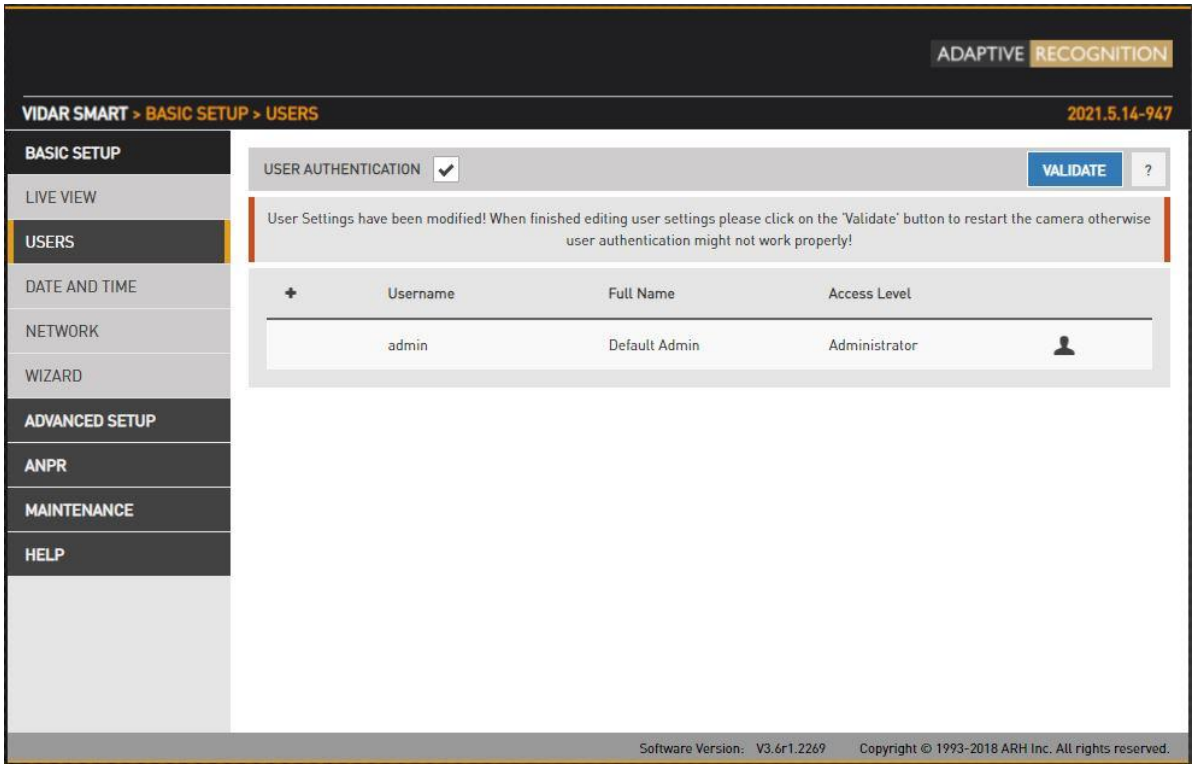
5.3. USERS

WEB INTERFACE > BASIC SETUP > USERS

User management settings are displayed in this page.

If user management is not required, it can be turned off with the USER AUTHENTICATION checkbox. This increases performance. Administrator rights will be granted to all. This is also the factory default state. In order to create new users, a user with 'Administrator' privileges must be created first.

Users can be added , deleted and edited with the corresponding buttons.



Important!

If you enable 'User authentication', all connections to the camera will require username and password.

Adding a new user: On clicking the plus ('+') button a form appears requesting the following fields:

- **Name:** The user's name, this will be used to login.

Important!

User name cannot be 'root'. User name must contain only letters of the English alphabet, numbers or underscore ('_') (with regular expression: /^[0-9A-Za-z_]*$/)

- **Full name:** The full name of the user.

Important!

Full name should contain only letters of the English alphabet, numbers, space or the following characters: '.','/','_','+','-',',' (with regular expression: /^[0-9A-Za-z\.\/_\+\- ,]*$/)

- **Password:** Corresponding password.

Important!

Password should contain only letters of the English alphabet, numbers or underscore ('_') (with regular expression: /^[0-9A-Za-z_]*$/)

- **Confirm password:** Confirm the given password to rule out mistyping.

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- **Access Level:** Check the table below for the extent of each access level.

Access Level	Privileges
Viewer	Login Live View Help
Normal	Login Basic Setup – Live View Advanced Setup – Private Zone, Event Manager ANPR - Browse Maintenance – System Info, Sensors, Camera Log Help
Power	Login Basic Setup – Live View Advanced Setup – All Menu Items ANPR – All Menu items Maintenance – System Info, Sensors, Camera Log, Restart Help
Administrator	Access to every camera feature

- **Edit/Delete:** It is possible to edit user parameters or delete existing users from the system with the exception of the main "admin" user. This user cannot be deleted and its username and access level cannot be modified.

Note

Settings will be applied only after restarting the camera. If you click VALIDATE after modification the camera will automatically restart.

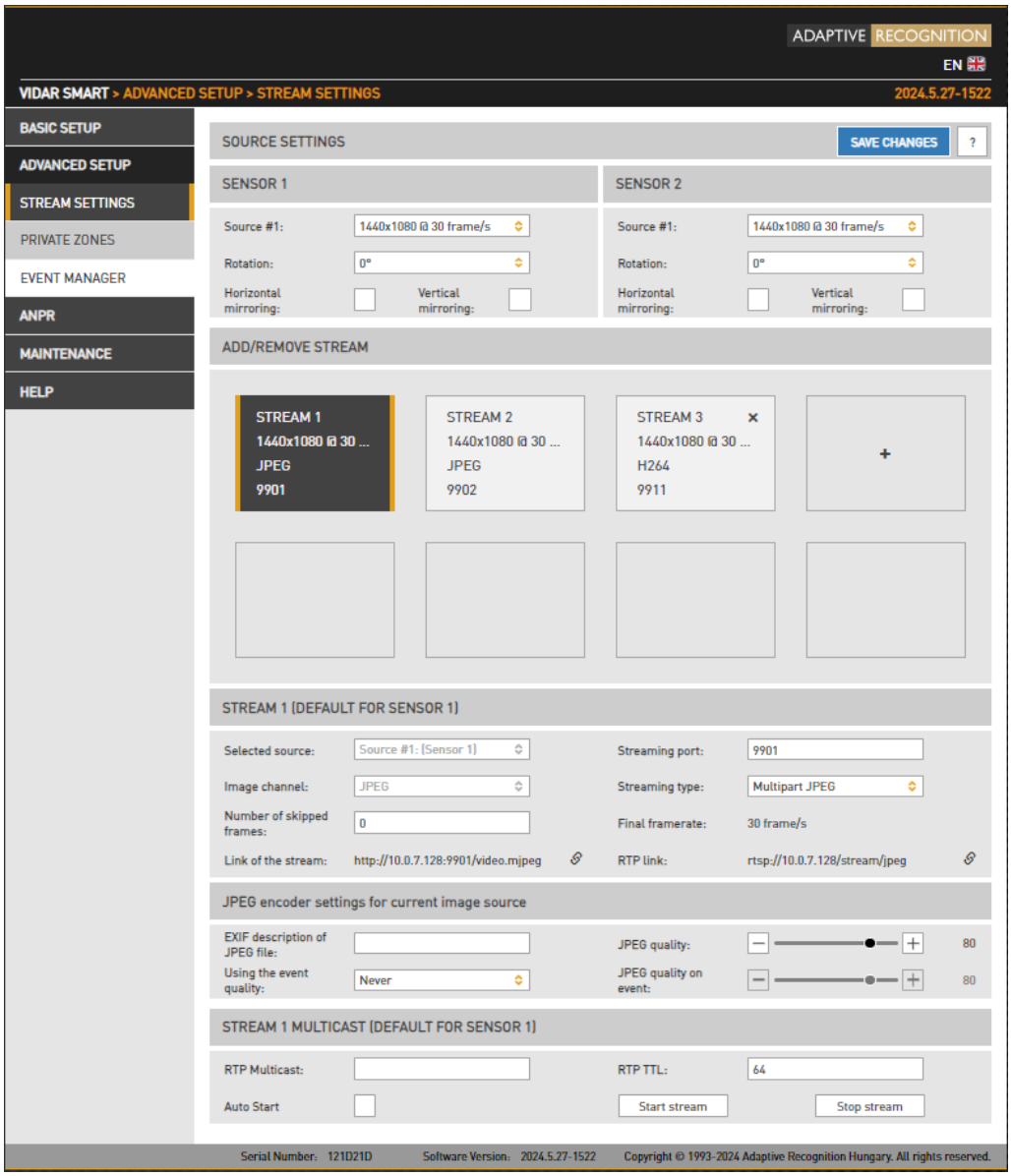
6. IMAGE SETUP

6.1. IMAGING PIPELINE

WEB INTERFACE > ADVANCED SETUP > STREAM SETTINGS

Image capturing process is organized as a pipeline receiving images from the sensor, then processing and buffering the images. There may be more than one pipeline: Source#1 for the primary and Source#2 for the secondary pipeline.

The primary and secondary imaging pipelines are configured in the **Stream Settings** section.



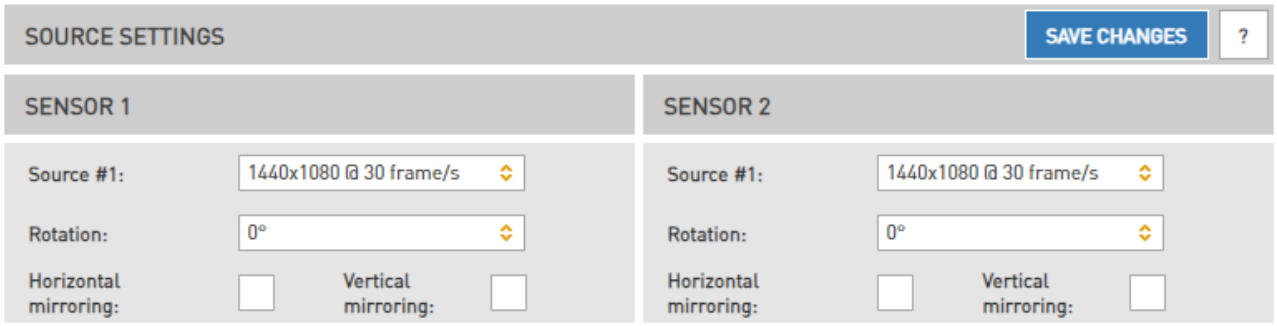
The primary pipeline is always active. The secondary pipeline is activated by enabling secondary sensor. Both pipelines are fed by the same sensor, but the pipelines can be configured independently, with the following limitations:

- The pixel resolution's upper limit is the max resolution of the imaging sensor, and lower resolutions can only be the power of two fractions of the full resolution (½, ¼, ⅛, etc.)
- With sensor 2 enabled even frames are fed into the primary, while odd frames are fed into the secondary pipeline, thus the frame rate of the individual pipelines will be one half of the frame rate of the sensor.
- Sensor settings (such as gain or shutter – adjustable at Live View) and geometric transformations (rotation, mirroring) are shared by the two pipelines.
- Post-processing settings (such as color/grayscale mode, gamma, etc.) are independent for the two pipelines
- Two different intensities of the built-in illumination may be defined for the even/odd frames (Frame Parity Flashing – you can find at Live View as well)
- Pipelines are identified by their source (source#1 for the primary and source#2 for the secondary pipeline)

Both pipelines can feed one or more video stream servers with images. Video servers can stream in various encodings, containers, etc.

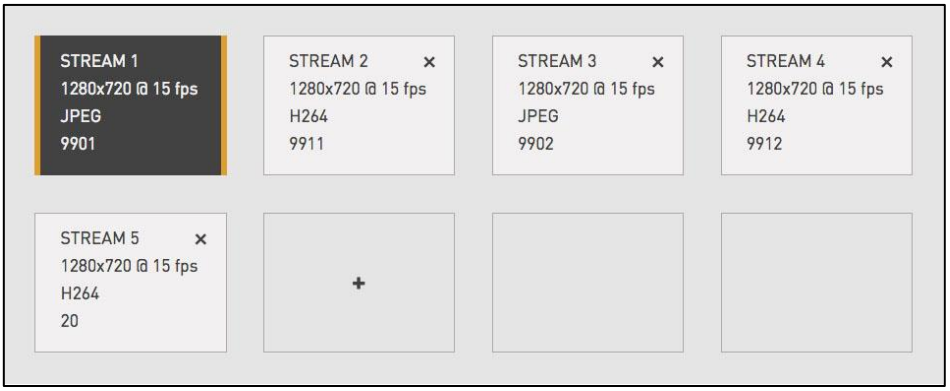
Source settings

- **Source#1:** The resolution and FPS of the primary imaging pipeline
- **Source#2:** The resolution and FPS of the secondary imaging pipeline
- **Rotation, Horizontal and Vertical mirroring:** Geometric transformations (shared by both pipelines)



Stream X Settings: The settings of the selected stream are listed here

Add/Remove Stream: The output of both the primary and secondary pipelines can be directed into a stream, which is a video feed streamed on a HTTP port. You can add a stream by clicking on the "+" icon at an available (empty) slot. You will be offered a number of presets, which can be custom tailored later.

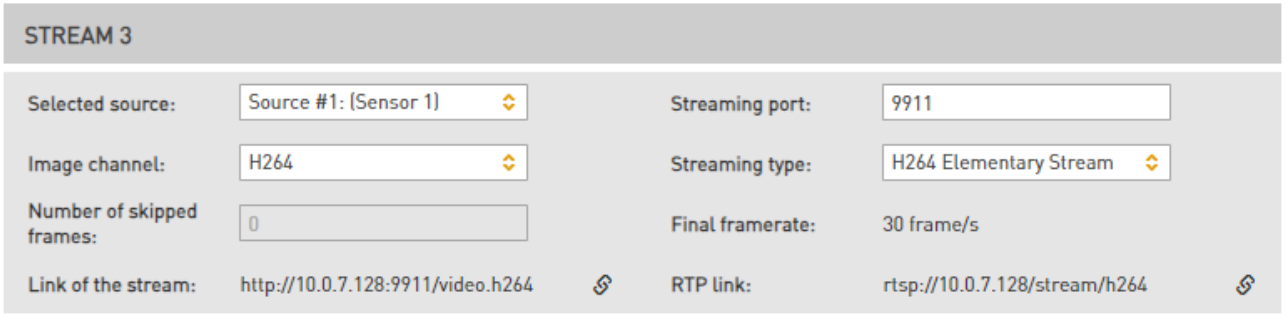


- **Selected source:** The pipeline which will feed this stream
- **Streaming port:** The HTTP port on which the video will be streamed
- **Image channel:** Encoder used on the stream (JPEG or H264). A special type is also available, "Motion Detecting", which is a special H264 core dedicated to motion detection
- **Number of skipped frames**: Can be used to further reduce the framerate of the stream, because resolution@framerate is already given at "Source#X"
- **Final framerate:** Will display the resulting frame rate
- **Link of the stream:** Will display the link of where the stream will be available. When authentication is enabled, the stream is only accessible if the username and password is specified in the link in the following format: http://username:password@HOSTADDR:PORT(e.g.,http://admin:admin@192.0.2.3:9901/...)

You will find the links that you can open, for example, with VLC.

- **RTP link:** Another network protocol to reach the stream and can be opened it with the same way in VLC player as it is written in the 'Link of the stream' section previously. Check the box for **"Enable RTP"** at Network Settings.
- **Streaming type:** The container of the streams, which can be the following (just an example):

Image channel:	JPEG	H264	Motion Detection
Container #1	Multipart JPEG	H264	H264
Container #2	RAW JPEG	MKV (Matroska)	MKV (Matroska)
Container #3	MKV (Matroska)	MP4	–

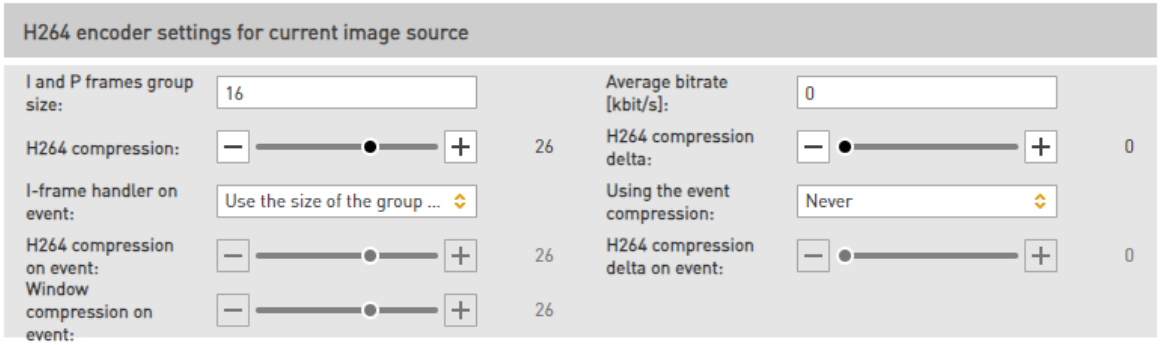


Encoder settings: Depending on whether an H264 or a JPEG encoder is used, one of the following menus will appear:

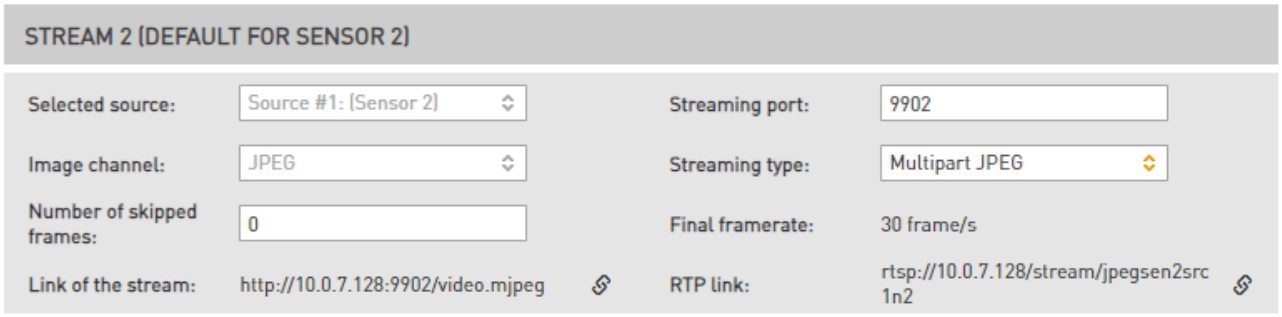
- **H264 encoder settings for the current image source:**
  H264 encoding uses a keyframe (I) followed by a number of predicted frames (P). The frequency of I frames, compression rate and bitrate can be configured flexibly. These settings may also adapt to the image content, for example to provide a higher quality stream in case of an event (motion detected) and lower quality when only the background is visible. It is even possible to limit this higher quality to the part of the image, which depicts the vehicle.
  - **I and P frames group size:** The group size is the number of I frames plus the number of P frames. For example, 1 keyframe + 15 predicted frames, the group size is 16.
  - **H264 compression:** Default H264 compression. The larger this number the lower the quality, but with a higher compression rate and vice versa.
  - **I-frame handler on event:**
  - **Uses...:** Uses I and P frames group size from above
  - **If new...:** The first frame of an event (see below) will be an I frame, all others will be P frames

- **All frames...:** All frames will be I frames across the entire duration of the event
- **H264 compression on event:** During an event this quality will be used instead of H264 compression.
- **Window compression on event:** H264 compression in the event window (image area defined by the event, e.g., where motion was detected).
- **Average bitrate:** Restrict average bitrate to this value.
- **H264 compression delta:** In order to achieve Average bitrate, the quality (H264 compression) may possibly be reduced. This control limits the amount of this reduction.

- **Using the event quality:** Definition of what constitutes as an event for H264 quality on event parameter.
- **H264 compression delta on event**: In order to achieve Average bitrate, the event quality (H264 compression on event) may be reduced. This control limits the amount of this reduction.



- **JPEG encoder settings for the current image source:**
  - **EXIF description of JPEG file:** The description inserted into the header of the file.
  - **Using the event quality:** Definition of what constitutes as an event for JPEG quality on event parameter.
  - **JPEG quality:** Default JPEG quality. The larger this number the better the quality.
  - **JPEG quality on event:** JPEG quality across the duration of an event.

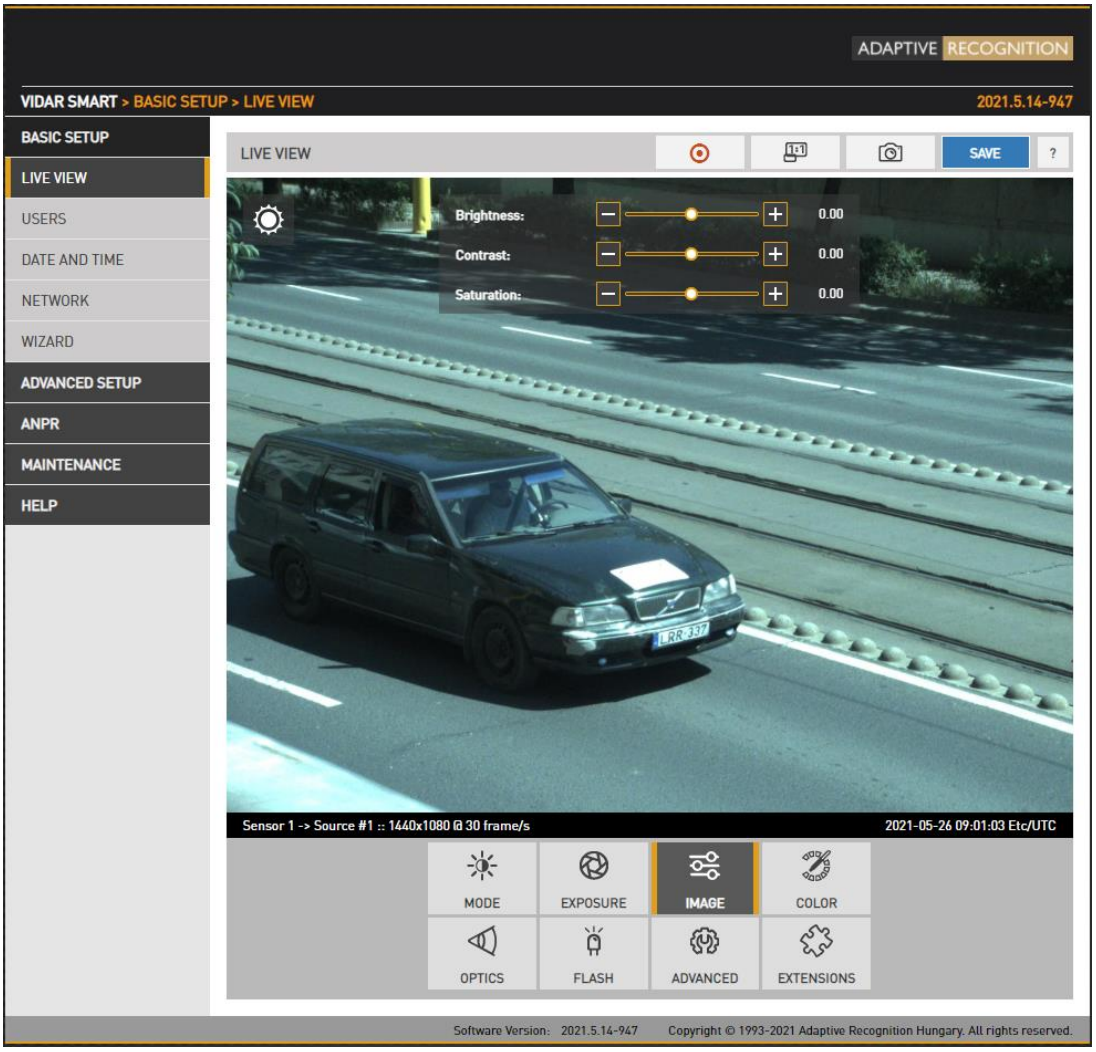


6.2. POST-PROCESSING

From the post-processing stages, the following 3 configuration options are the most important first steps (Image, Color, Advanced). The other 5 Live View menu configurations (Mode, Exposure, Optics, Flash, Extensions) will be detailed further in the User Manual.

6.2.1. IMAGE

WEB INTERFACE > BASIC SETUP > LIVE VIEW > IMAGE

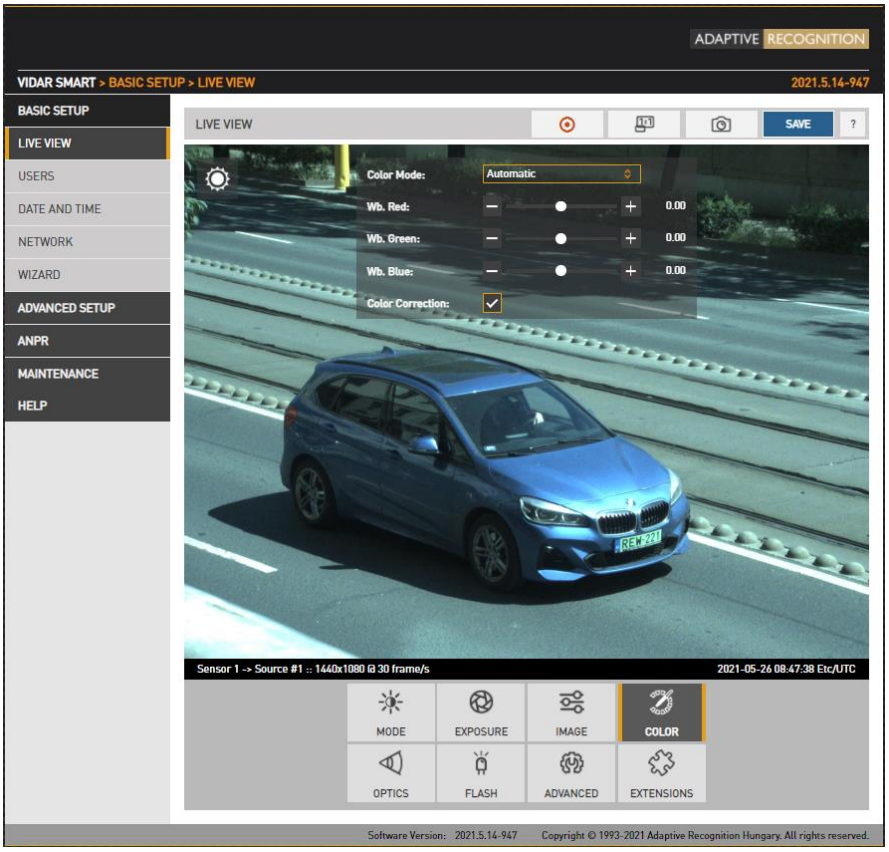


The basic post-processing settings are configured here:

- **Brightness:** Increase/decrease the brightness of the image
- **Contrast**: Increase/decrease the luminance contrast of the image
- **Saturation:** Increase/decrease the chrominance contrast of the image

6.2.2. COLOR

WEB INTERFACE > BASIC SETUP > LIVE VIEW > COLOR



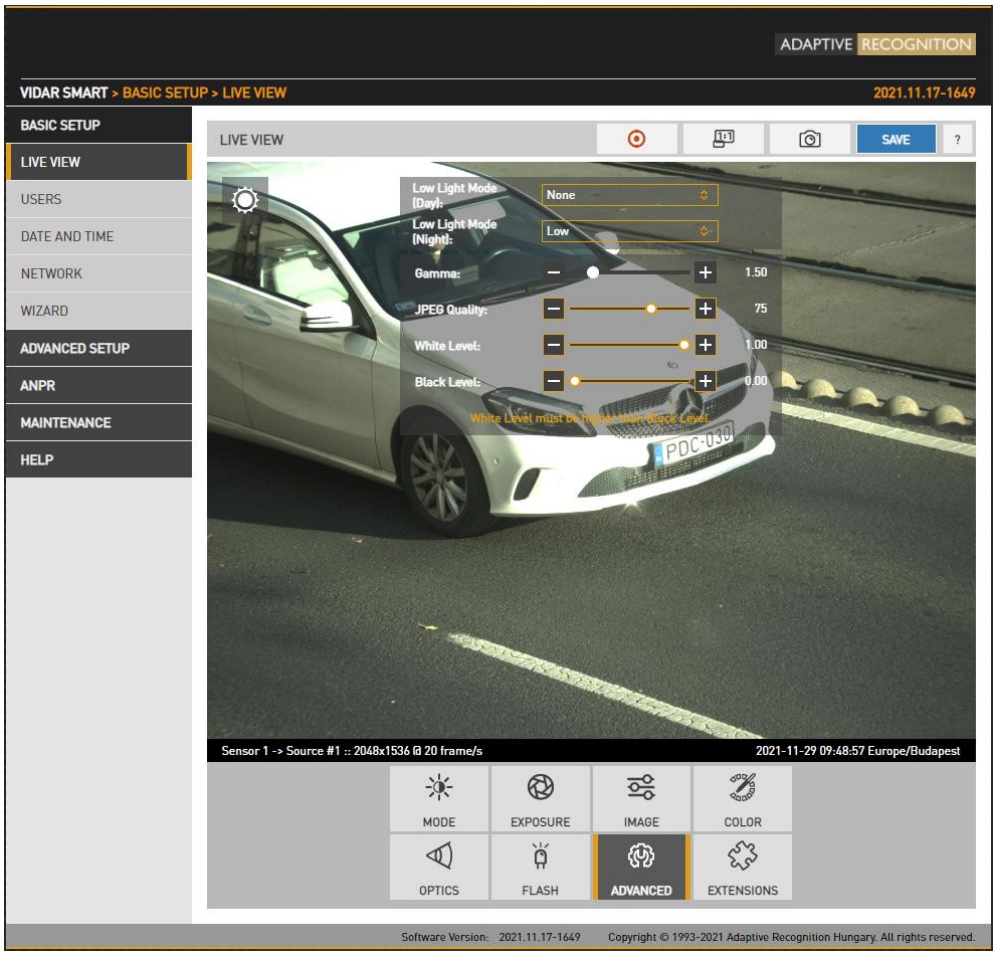
Color settings are configured here:

- **Color Mode:** Automatic/Color/Gray mode
  - **Automatic:** in the case of a color sensor, the switching of the infrared filter determines its status: if the infrared filter is active (filters out infrared), then it is in color mode, if not active (allows infrared), then in gray mode.
  - **Color:** Color mode
  - **Gray mode:** ideal for night time IR mode
- **Wb. Red:** Red channel gain
- **Wb. Green:** Green channel gain
- **Wb. Blue**: Blue channel gain

Color Correction: Automatic compensation for the color of the illumination. If the factory setting is not suitable, there are two options: automatic and manual. The manual option is worth using if the user can set it better than the default or the automatic. The difference between the two is that the automatic continuously adjusts to external changing conditions, while the manual is a fixed setting. The white balance tries to adjust the white balance.

6.2.3. ADVANCED

WEB INTERFACE > BASIC SETUP > LIVE VIEW > ADVANCED

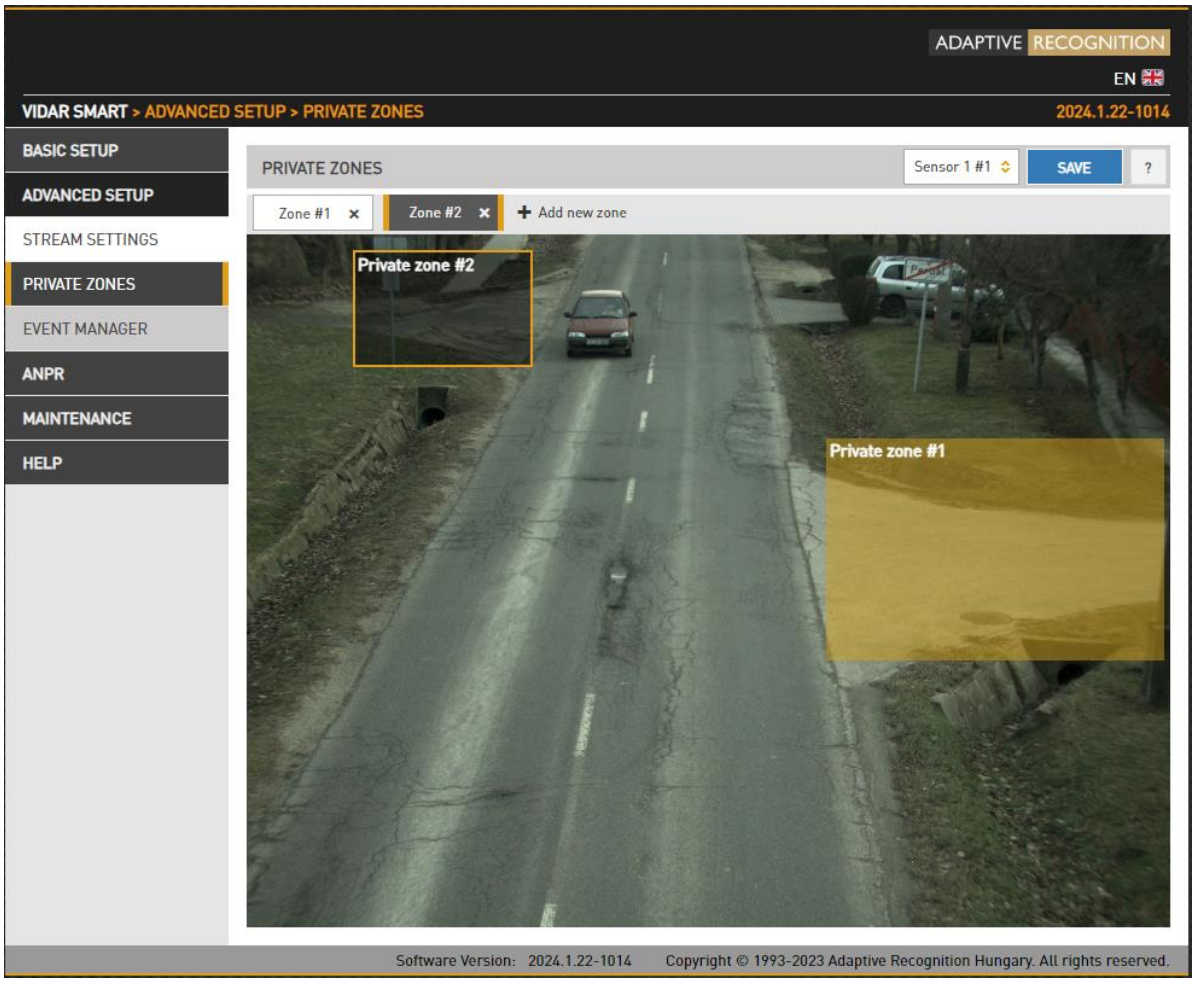


Advanced post-processing settings are configured here:

- **Low light mode**: Under low illumination conditions an algorithm tunes sensor and post processing parameters to still be able to capture an adequate image. The level of these settings may be selected from a drop-down menu, featuring none, low, medium, intermediate, and high. The higher the value, the higher the image noise. Set the appropriate values accordingly.
- **Gamma:** Gamma correction of the image
- **JPEG Quality:** Affects the JPEG compression rate of the image – higher quality setting means lower compression.
- **White Level:** Defines the pixel value above which all pixels will be mapped to white
- **Black level:** Defines the pixel value below which all pixels will be mapped to black

6.2.4. PRIVATE ZONES

WEB INTERFACE > ADVANCED SETUP > PRIVATE ZONES

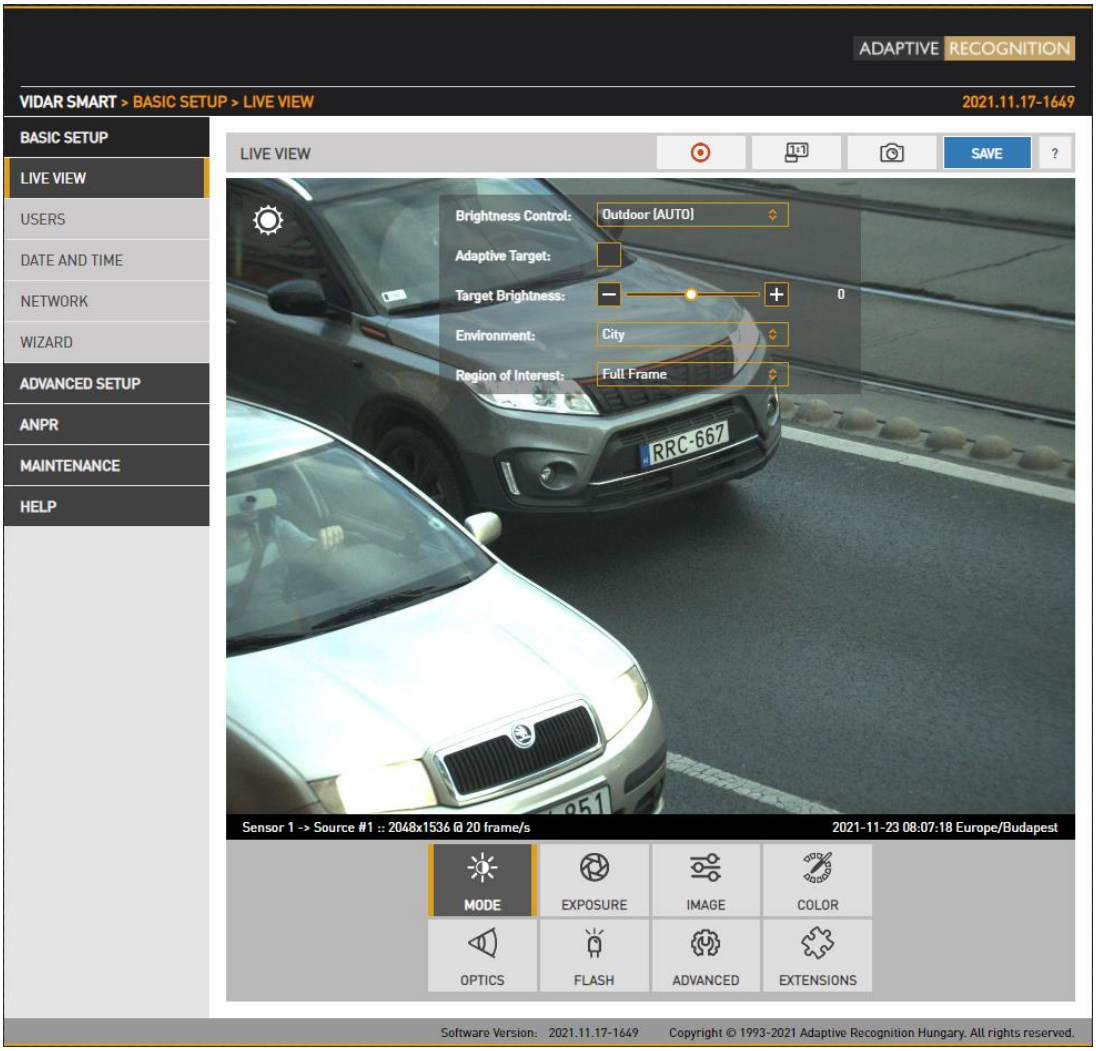


In certain circumstances it may be necessary to cover a part of the image, for instance, a parking place near the monitored lane, where the stationary vehicles should not be in the image, and their license plates should be excluded from processing, or when private property is displayed. These unwanted parts can be covered with a maximum number of 3 rectangular zones using the Private zones tool.

Each time an area is added, a rectangular box (with yellow edges) shows up in the left upper corner. This rectangle is resizable and can be positioned on the image field in the required position. After clicking on the **SAVE** button, the defined area will be filled with black color, which you can be seen on the live view and on the streams as well.

6.3. BRIGHTNESS CONTROL

WEB INTERFACE > BASIC SETUP > LIVE VIEW > MODE



Brightness control will automatically monitor and control the exposure of the image, with license plate reading as a priority.

Brightness control principally adjusts exposure time (shutter) and gain. As ambient light level decreases, both shutter open time and gain may be increased, but only up to a level (Shutter Max. and Gain Max. - It can be set under the Exposure menu) because a too long shutter value will result in motion blur, too much gain will result in excessive noise. Brightness control will also switch to night mode (engaging built in LEDs) if illumination levels fall to a level, where capturing a color image is not possible.

The icon top left shows the current state:

– Manual mode

– Day mode

– Night mode

Hovering the mouse over the controls provides more information.

- **Brightness Control:** In different illumination situations different strategies are required to maintain a balanced exposure level. The camera offers one manual and one automatic strategies:
  - **indoor (manual)** – For indoor use. In Manual mode **Shutter** and **Gain**, and in models equipped with motorized lenses **Iris** are freely adjusted.
  - **outdoor (auto)** – For outdoor use.

- **Adaptive Target (ATT):** The ATT module is disabled by default; it can be activated in the brightness control interface on the GUI.
  The ATT adjusts the brightness control target value. If the license plate is too dark, it increases it, if it is light, it decreases it.

> Note
>
> If Adaptive Target is enabled, it sets the Target brightness and this field cannot be adjusted.

- **Target Brightness:** This control allows the user to correct the exposure of the image. Larger numbers will result in a brighter image (Please note that limits apply because of Condition).

- **Environment**: Four conditions are available, each corresponding to a range of the traffic's speed and the type of traffic configuration. Please note that these conditions determine the maximal exposure time, limiting the illumination of the scene, under which night mode will be engaged.

Outdoor	Max. speed [km/h]	Default Max. Shutter [µs]
Parking	10	5000
City	50	3000
Highway	255	250

- **Region of Interest:**
  - **Full frame** – Current image illumination is measured in the complete image.
  - **Manual frame** – Current image illumination is measured in the selected region. You can resize and move the rectangle representing the region of interest.

Note

Please note that in mobile mode, Vidar corresponds eventually to a lower speed, as on Freeway the velocity of the camera and the target vehicle is in the same direction, as opposed to Highway use, monitoring oncoming traffic.

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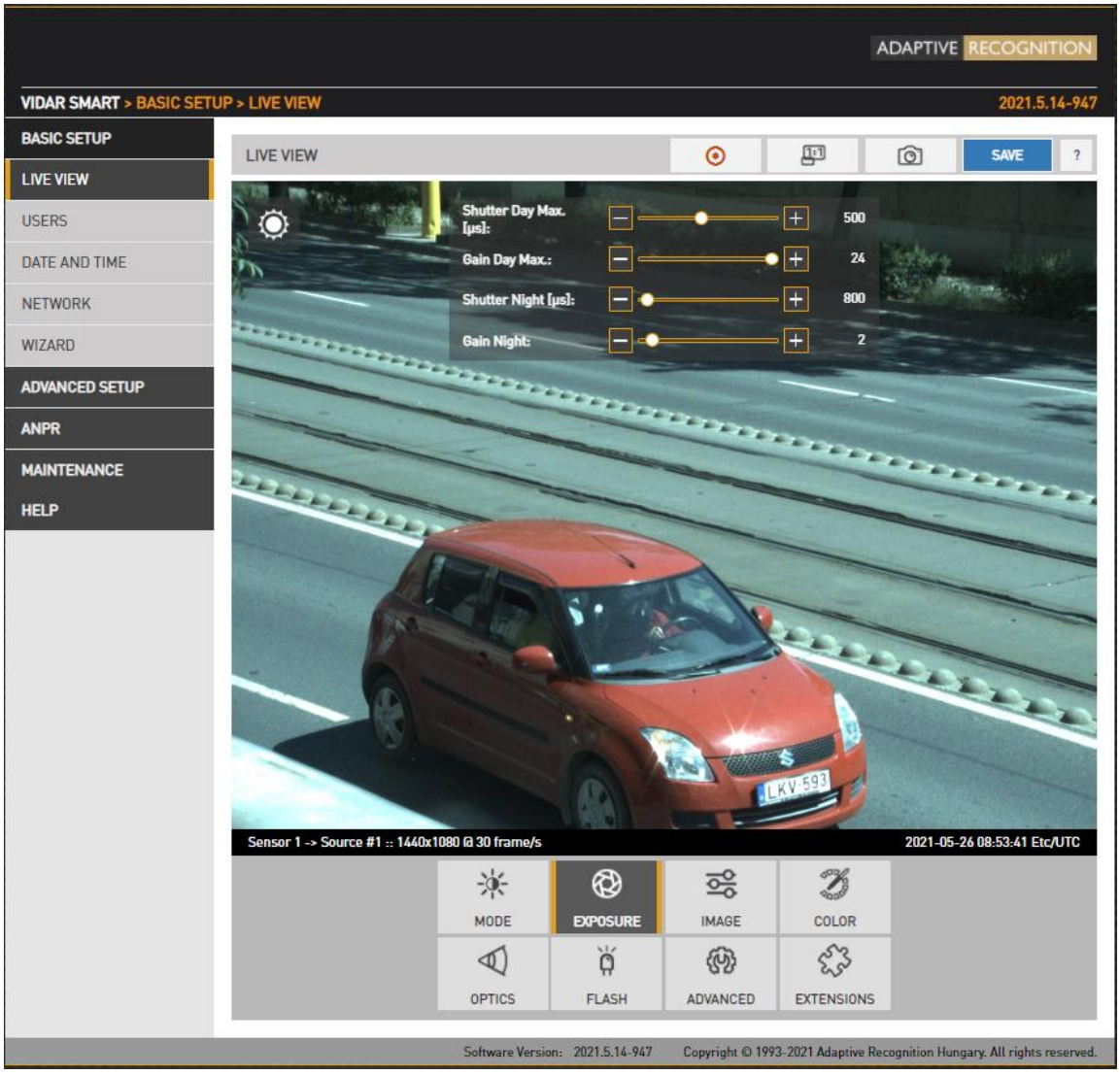
6.4. EXPOSURE CONTROL

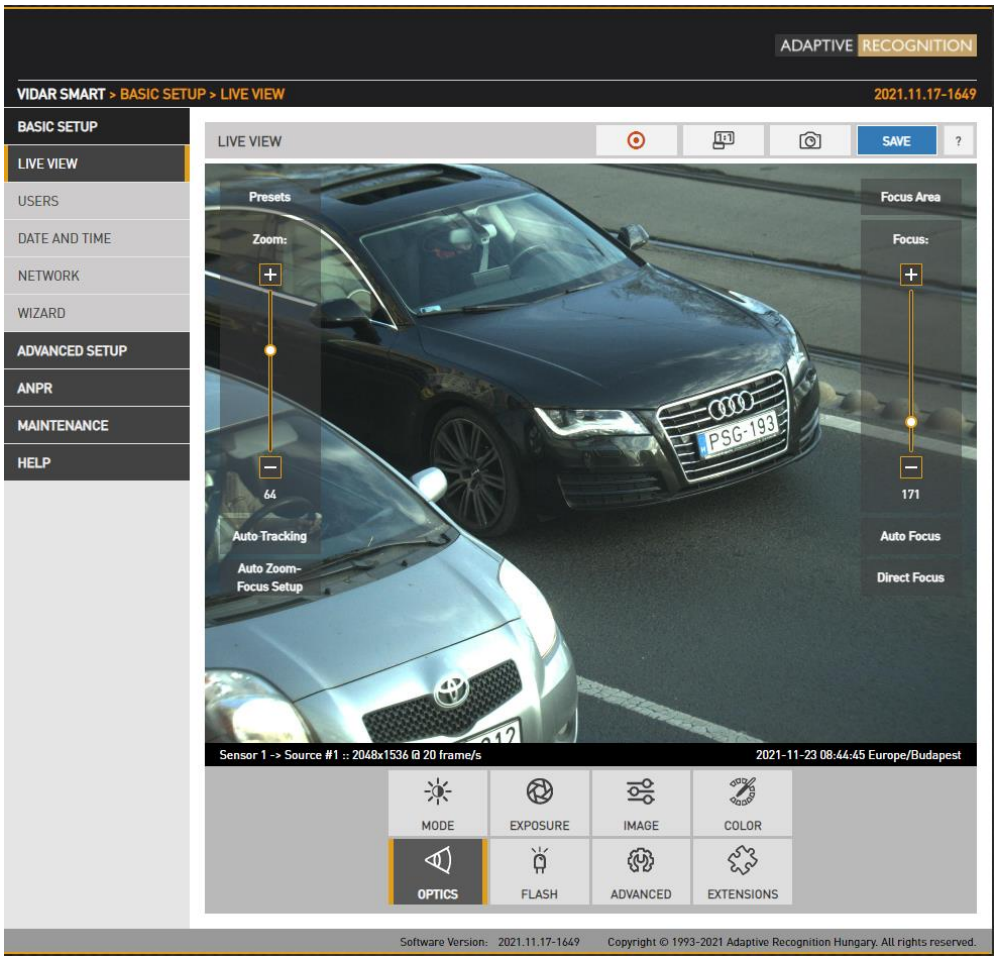
WEB INTERFACE > BASIC SETUP > LIVE VIEW > EXPOSURE



- In **Manual** mode **Shutter** and **Gain** are freely adjusted.
- In **Outdoor** mode both Shutter and Gain are adjusted by the controller. However, their maximum: **Shutter Max**. is adjustable and Gain Max. is available in day/night mode, where a user defined value may be entered. Selecting **Environment** on the **Mode** tab affects these values.

6.5. OPTICS

WEB INTERFACE > BASIC SETUP > LIVE VIEW > OPTICS



Models equipped with motorized lenses will show this menu item. Both lenses can be adjusted individually by switching between the two sensors in the Live view menu. Use the left slider (Zoom) to change the field of view from wide angle (0) to telephoto (100). Use the right slider (Focus) to manually adjust focus from near to far.

Clicking the **Auto Focus** button will execute one time autofocus performance. It is possible to change between short range and full range options. By clicking the **Focus Area** button, moving and resizing the yellow rectangle, the area of interest can be defined, and then this part of the image will be sharp after autofocusing.

Auto tracking is enabled by clicking the **Auto Tracking** button. The essence of this function is to set the zoom to a specific position and then sharpen the image with one of the image sharpening functions. after adjustment, the focus will be adjusted automatically after. It follows from the

operation described that if the **Auto Tracking** function is activated when the image is not in the sharp position, the focus retraction after zooming will also result in a blurred image.

To use auto tracking, an anchor point must be defined, that is the image that needs to be sharp when enabling this function. It is best to set this anchor point (enable auto tracking) with the following conditions met:

- Zoom is at telephoto end
- Iris fully open
- Image is sharp

A number of zoom/focus pairs may be set and recalled as presets using the Presets menu.

> Note
>
> Due to the nature of the optics, enabling Auto Tracking at zoom positions close to the wide-angle position may result in inaccurate image refocus at zoom positions close to telephoto.

There are two new buttons on the Live view optics interface: **Auto Zoom-Focus Setup** and **Direct Focus**.

Auto Zoom-Focus Setup button:

Its function is to automatically adjust the zoom (appropriate viewing angle) and focus (focusing on a specific subject). Its current operation is trying to determine the distance from the camera to the object in the optical center of the camera, and then adjusting the optics to the appropriate zoom position based on the resulting distance and the desired angle of view. It will then automatically refocus the image according to the specified distance. (Currently, the viewing angle can be specified in Plain config (URL: http://CAM_IP/#plainconfig) in the setup / geometry module with the parameters 'lane_width' and 'lane_count'. Their default values are 3 and 1.)

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Direct Focus button:

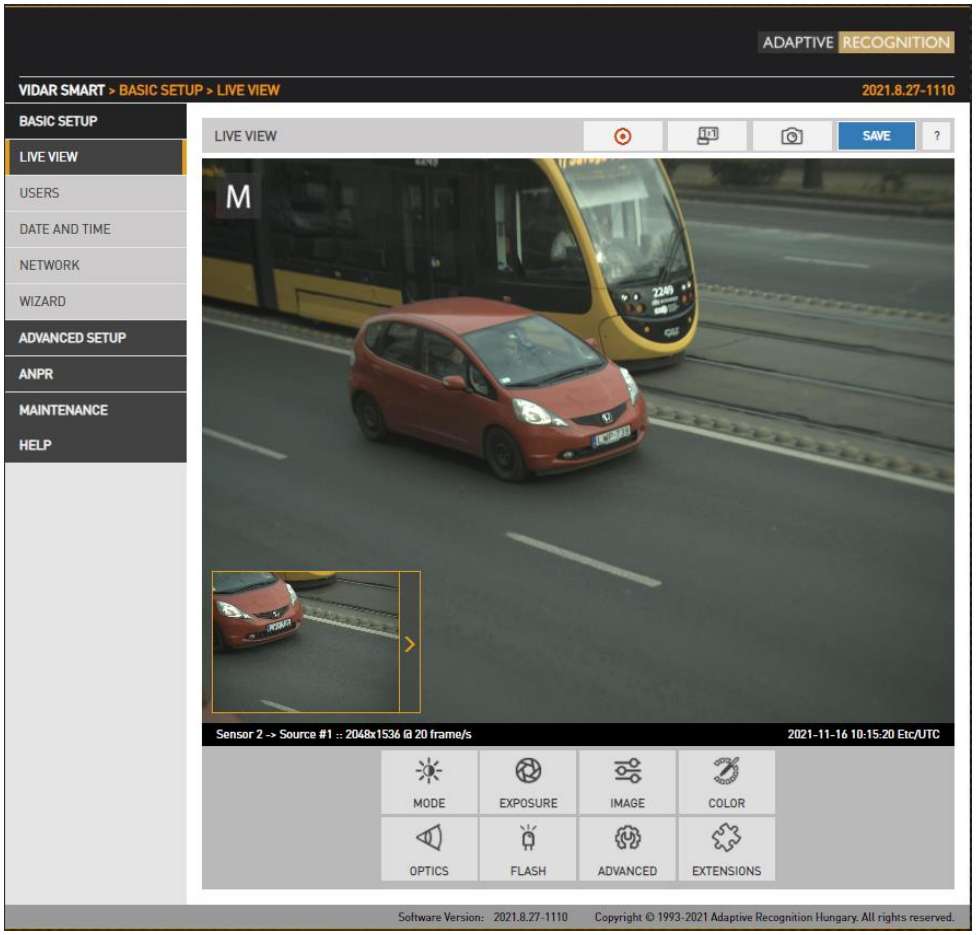
The distance-based focus function can be triggered with the button. By clicking the button, the camera calculates where to focus at a given zoom position so that the image is sharp at the measured or calculated subject distance. Two options are available here:

- **Laser+AF**: Combined distance-based and fine-tuned auto focus for a fast and accurate focus adjustment.
- **Laser only:** Fast distance-based focus adjustment using only the built-in laser unit.

Important!

Both function keys are currently only displayed for cameras with **LIDAR**!

6.6. SECONDARY SENSOR



The live stream of the secondary sensor is shown in the box below (picture in picture). By clicking the live stream box, the main view switches to the secondary sensor, and all settings (Brightness control, Color, Optics etc.) will be applied to the secondary sensor.

Use the left slider (Zoom) to change the field of view from wide angle (0) to telephoto (100). Use the right slider (Focus) to manually adjust focus from near too far.

Clicking the **Autofocus** button will execute one time autofocus performance. By clicking the **Focus Area** button, moving and resizing the yellow rectangle, the area of interest can be defined, and then this part of the image will be sharp after autofocusing.
Auto Tracking, Auto Zoom-Focus Setup and Direct Focus can be adjusted the same method as Sensor 1.
The secondary sensor box will be shown only if none of the on-screen tools are active.

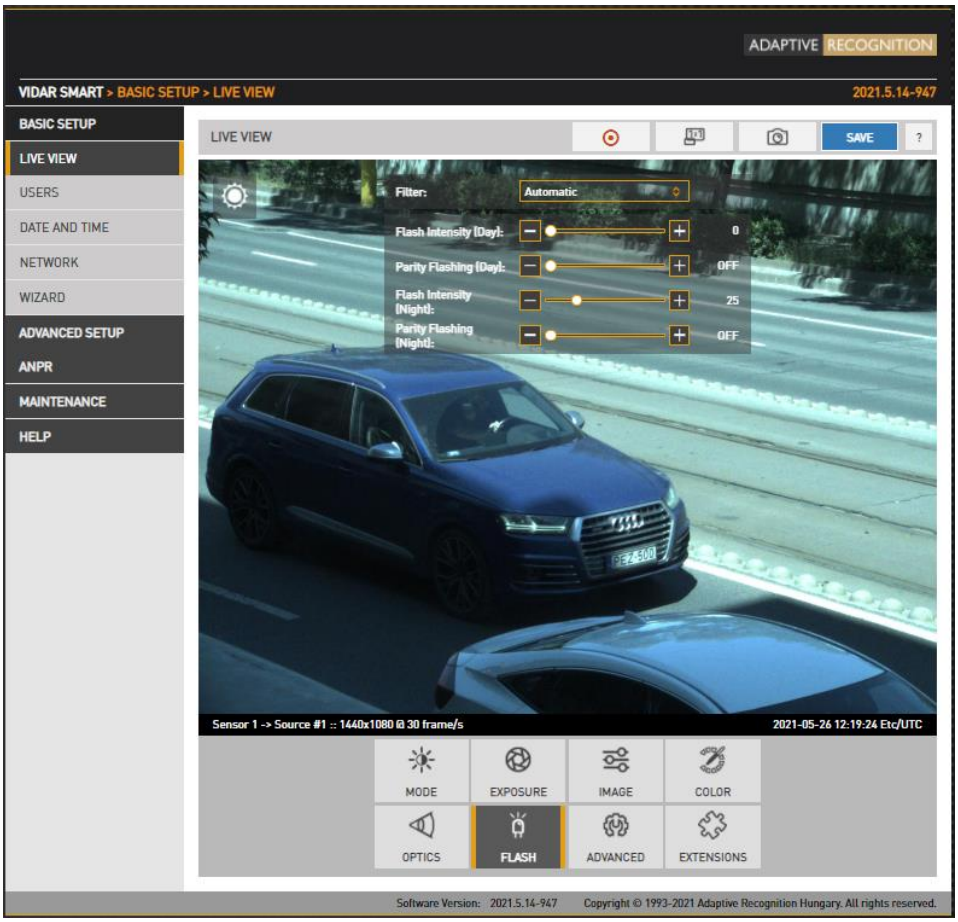
6.7. FLASH CONTROL

WEB INTERFACE > BASIC SETUP > LIVE VIEW > FLASH

The settings of the built-in illuminator and filter exchanger can be managed by clicking in the FLASH

button at the Live View

menu.



Outdoor mode:

- **Filter:** Switch between the three states: Automatic, All pass and Infra Cut
- **Flash Intensity:** Set the intensity of the built-in illuminator between 0 and 100%
- **Flash ID**: For some models (only on **Ultrascale** cameras), an external illuminator can be set.
- **Parity Flashing:** If set, odd frames will be illuminated with reduced intensity. For example, if this value is set to 50%, odd frames will be illuminated with 50% of the intensity of the even frames.

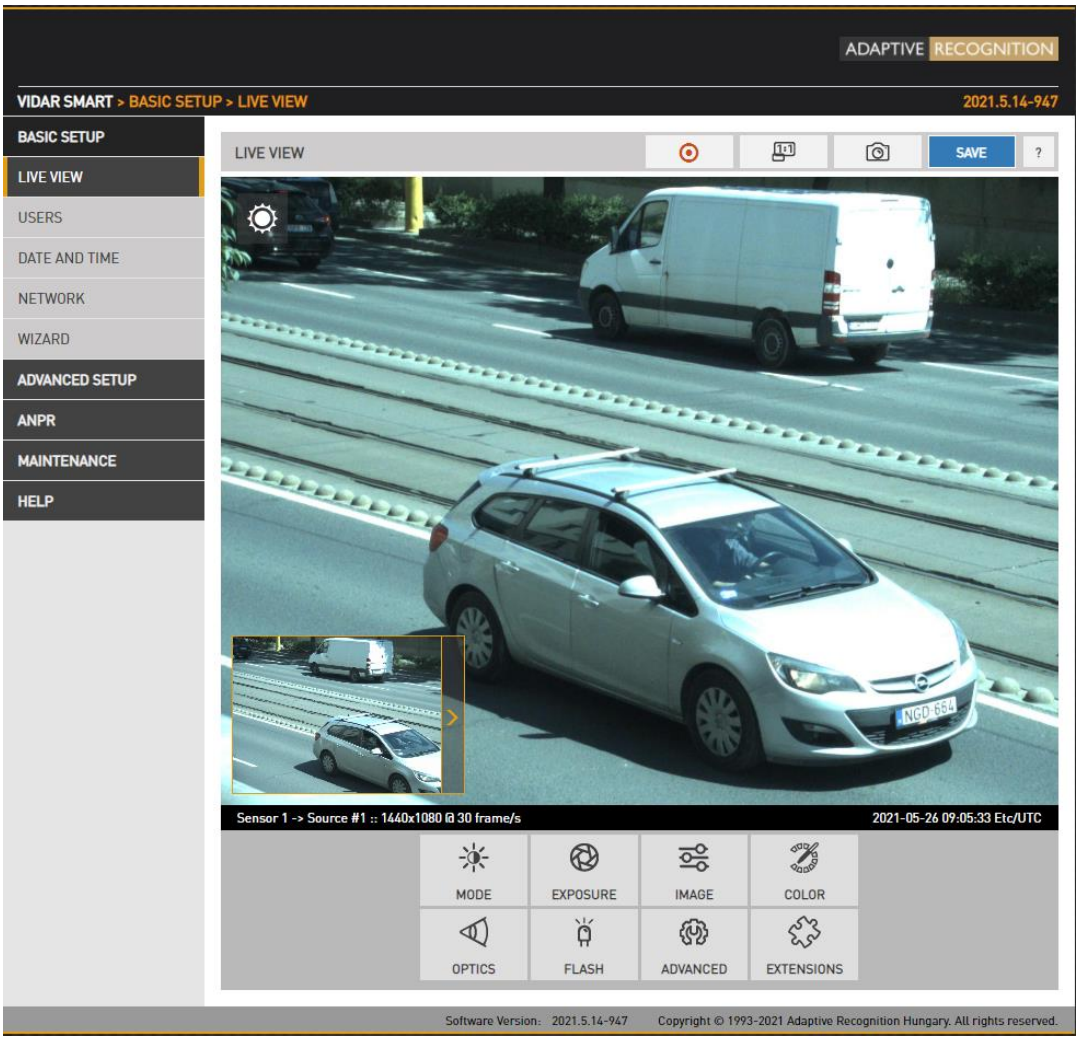
Note

- Both Flash Intensity and Parity Flashing can be defined for day and night mode.
- "Parity Flashing" is expressed as a percentage of "Flash Intensity".

6.8. MISCELLANEOUS

6.8.1. SNAPSHOT, 1:1 VIEW, RECORDING A STREAM

WEB INTERFACE > BASIC SETUP > LIVE VIEW



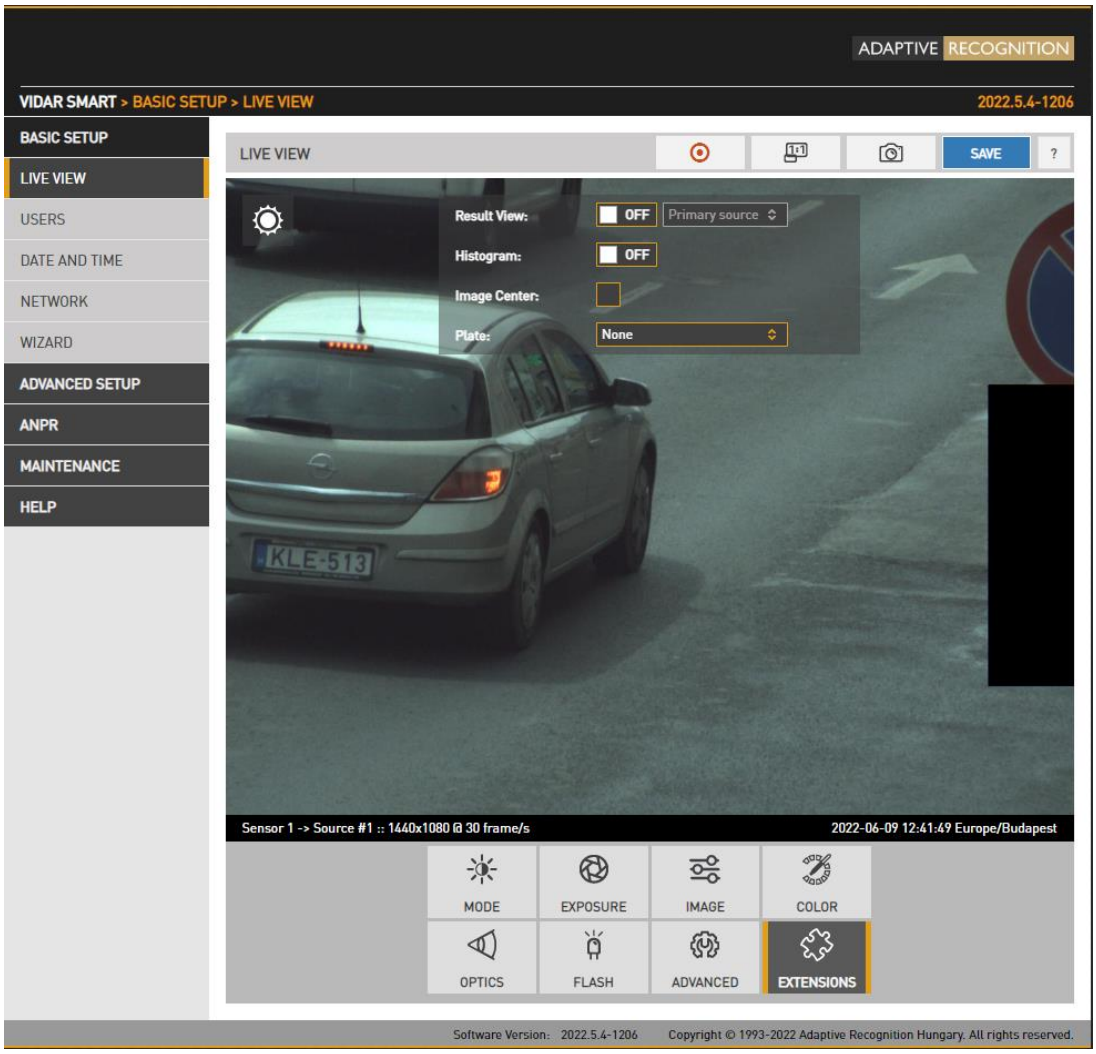
To record the live video stream to a file, click on the icon in the top menu.

To open live video stream in 1:1 full screen in a pop-up window, click on the icon in the top menu.

To save snapshot from the live video stream, click on the icon in the top menu.

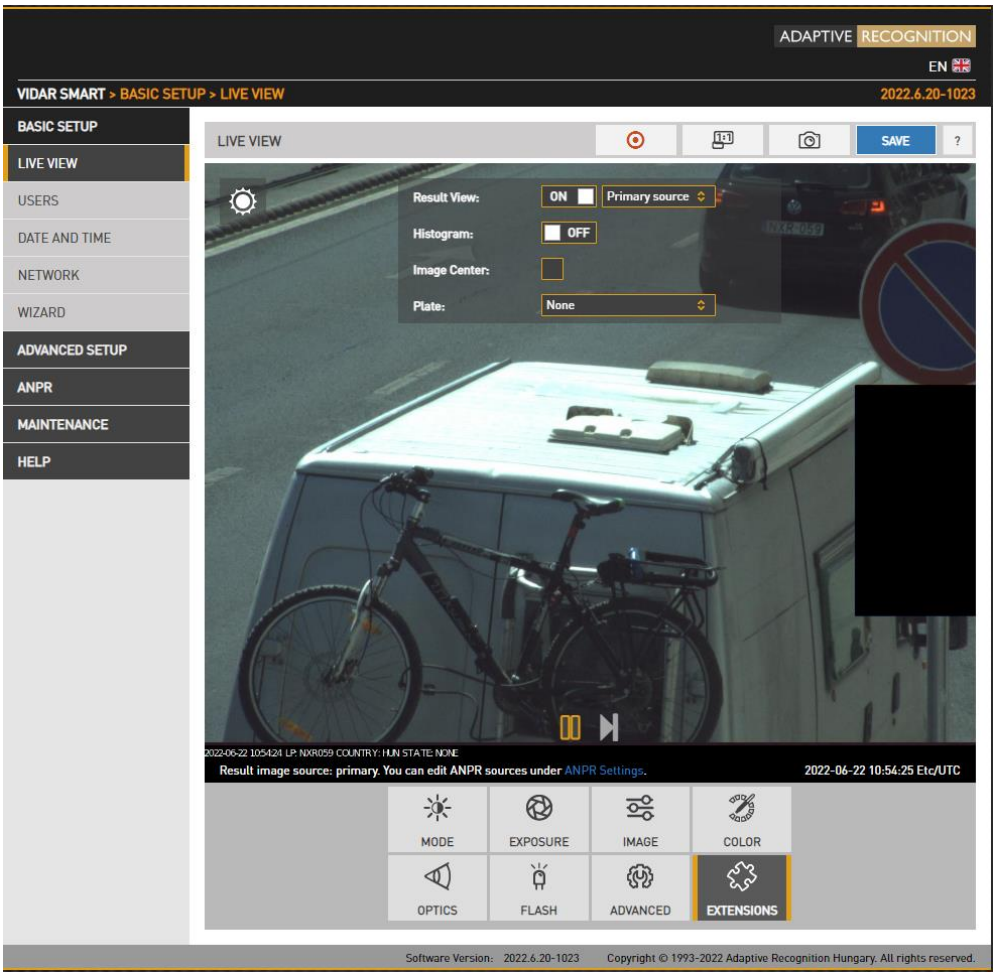
6.8.2. VISUAL AIDS

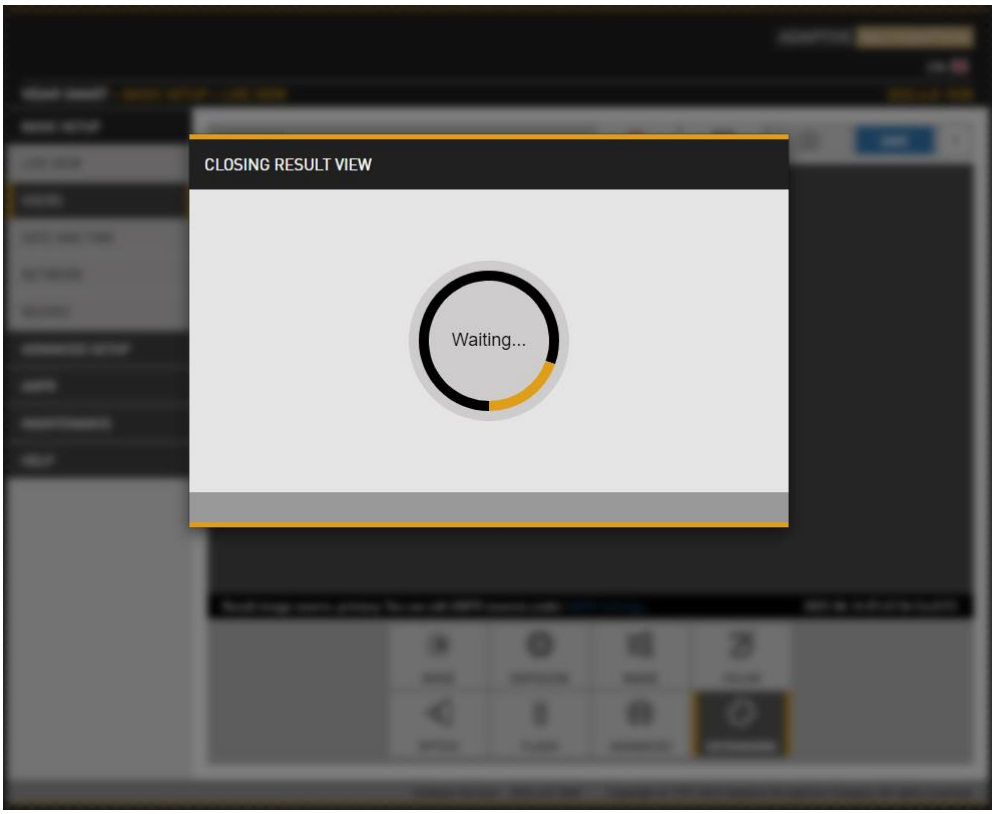
WEB INTERFACE > BASIC SETUP > LIVE VIEW > EXTENSIONS



This menu offers visual aids to set up the camera.

- **Result View:** When this function is turned on, it always shows the last trigger image of the current event. This feature helps you set the right focus for instance, always making changes to the current event. You can edit ANPR sources under ANPR Settings.
  You can pause and jump between events with the appropriate buttons. You can click between tabs in the Live View menu, but if you click elsewhere in the sidebar, the feature will turn off.


ADAPTIVE RECOGNITION
EN
VIDAR SMART > BASIC SETUP > LIVE VIEW
2022.6.20-1023
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
LIVE VIEW
SAVE
Result View:
ON
Primary source
Histogram:
OFF
Image Center:
Plate:
None
Result image source: primary. You can edit ANPR sources under ANPR Settings.
2022-06-22 10:54:25 Etc/UTC
MODE
EXPOSURE
IMAGE
COLOR
OPTICS
FLASH
ADVANCED
EXTENSIONS
Software Version: 2022.6.20-1023
Copyright © 1993-2022 Adaptive Recognition Hungary. All rights reserved.


CLOSING RESULT VIEW
Waiting...

> **Note**
>
> It may take some time to stop the Result View function. Wait until "Closing" window is disappearing.

- **Histogram**: Enable it to draw a luminance histogram on the live video stream

- **Plate:** There is an optimal character size for license plate recognition. With this visual aid, a frame will be shown (either for Latin or Arabic license plates): if the license plate of the vehicle fits into and fills completely, the frame drawn on the live video stream, the character size will be optimal. Use the mouse to drag the frame on the image field to the required position.

- **Image Center:** Black cross is positioned to the center of the image.

7. EVENTS AND ANPR

This chapter explains the mechanism of analysing the video stream, segmenting it to image sequences corresponding to one passing vehicle, then finding, validating, storing and publishing the license plate of said vehicle.

The basic unit of the process is an event, typically consisting of one passing vehicle. In order to segment the video stream into events, an external or internal trigger is needed. A trigger is a pair of time coordinates: a start time stamp and an end time stamp, representing the duration of the event.

An **internal trigger source** may be:

- **Motion Detection:** Image processing algorithm designed to detect motion in a sequence of images (**Only in Vidar 7020 cameras**)
- **Scheduler:** Regular series of triggers, for example every 5 seconds
- **Plate Finder Trigger:** Image processing algorithm designed to detect a license plate inside of a predefined ROI.
- **Laser Trigger (optional):** uses distance measurements taken by the built-in laser device.
- **Object Detection Trigger**: Object detection trigger is an advanced vehicle detector which is specialized to detect and track vehicles.

An **external trigger source** may be:

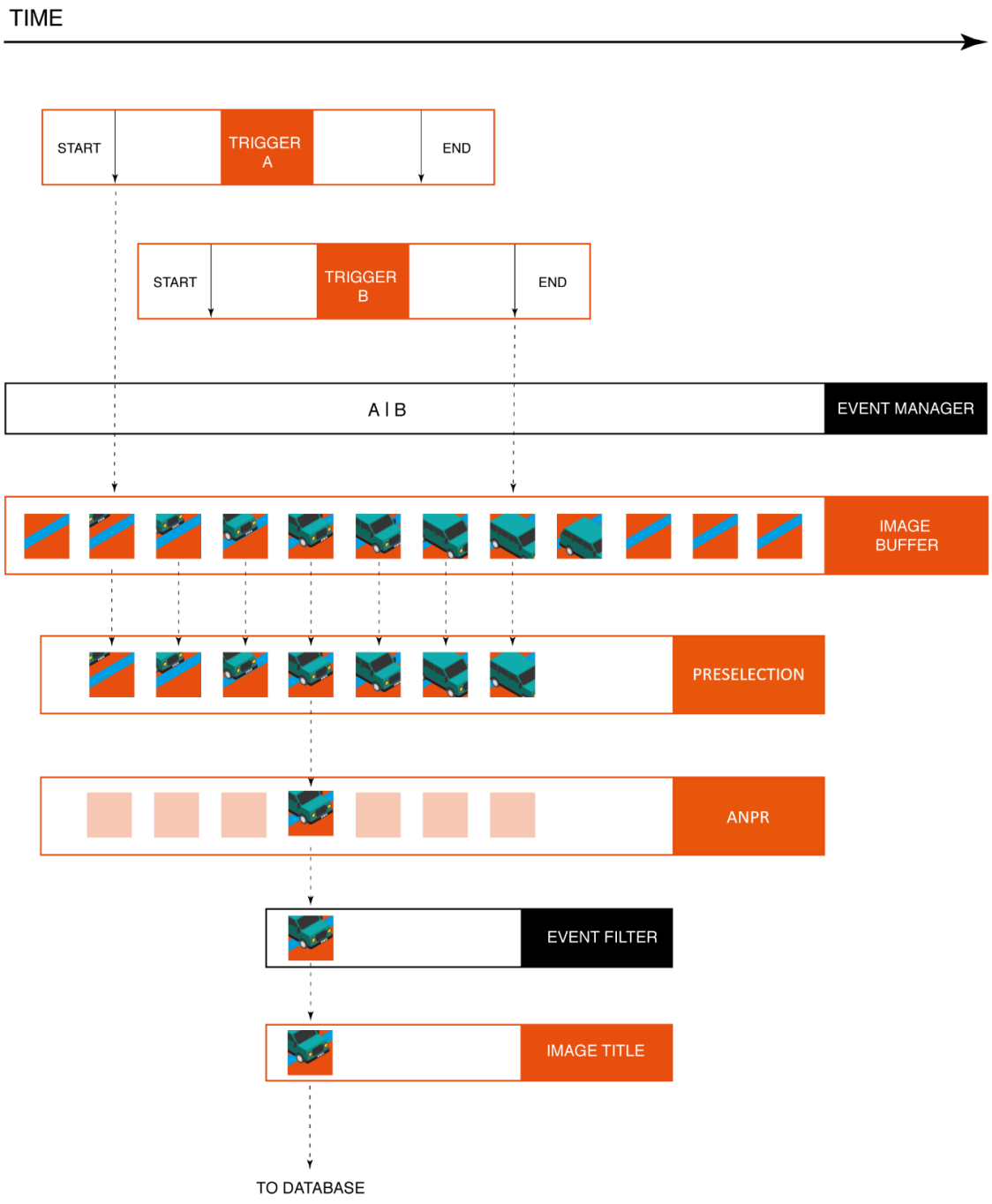
- **GPI:** A TTL level input to the camera (not all models)
- **UART:** A UART (RS232 or RS485 level) input to the camera (not all models)
- **SW:** Direct software-based trigger

The above trigger options cover a wide range of applications, for example:

- Induction loop linked to the GP input
- Radar communicating through the serial port of the camera
- A laser software trigger via Ethernet.

It is possible to combine multiple triggers. An example: license plate recognition is required only during a certain hour of the day: combine Vehicle Detection with an instance of Scheduler set to be asserted during the required hour. This feature is configured in the EVENT MANAGER page.

Upon receiving a trigger event, the Event Manager will locate and mark images in the main image buffer as corresponding to the event. Then, it will either forward them directly to the user (Upload Manager) or to license plate recognition (ANPR).



The above graphic is the schematic overview of trigger events being processed. License plate recognition operates as a multistage pipeline, taking a sequence of images of the same event as input, selecting one image of the vehicle (with the license plate in the best position), license plate and event data (textual form), and a license plate image as an output.

Typically, 3-8 images are first received by a Preselection stage of the pipeline, where a very fast system selects the best image for plate recognition. A preliminary set of license plate data is already available after this stage. The image best representing the event is then forwarded to the ANPR stage, where a slower, but much more thorough analysis determines the final and complete set of license plate data (license plate text, position, nationality, etc.).

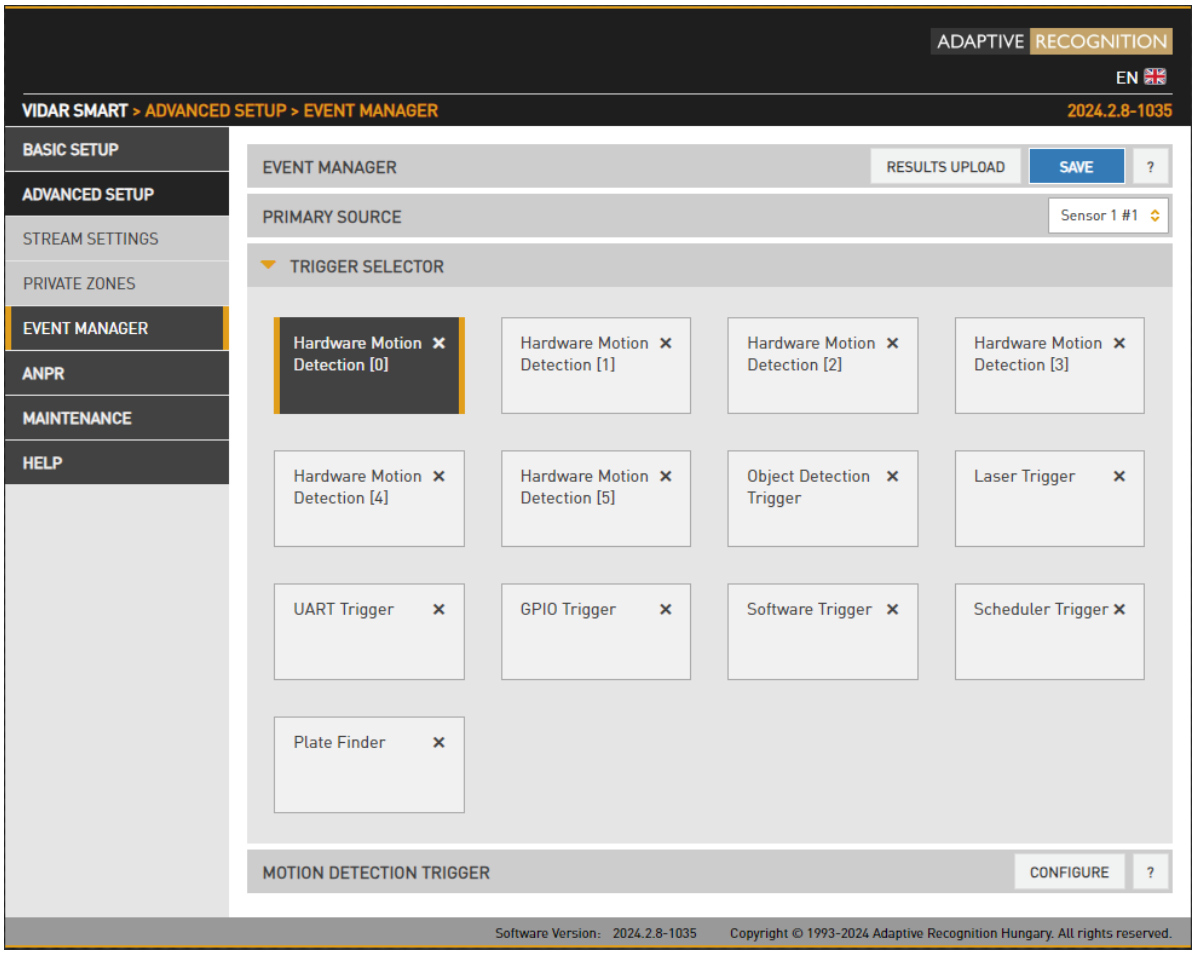
The user can configure multiple ANPR stages in series. An example: the first ANPR stage is equipped with an ANPR engine that recognizes only domestic plate types (in a country or a state), thus it is very fast (e.g., an IRL/GBP engine). This stage will recognize the majority of the vehicle plates; the corresponding events will pass through the next stage.

This next, second ANPR stage is equipped with a broader scope engine (e.g., a latin engine), which is less not quite as fast, but will recognize the remaining (not domestic) plates. Also, an MMR stage can be inserted in the pipeline, which adds make and model info to the event. The result is then stored in a database. The database is accessed through a web server, with structured queries in 'Pull' mode. This is demonstrated in the Browse menu. Alternatively, in 'Push' mode, the camera can forward data using a given protocol (HTTP, FTP, SFTP).
This is configured at the RESULT UPLOAD page.

7.1. EVENTS

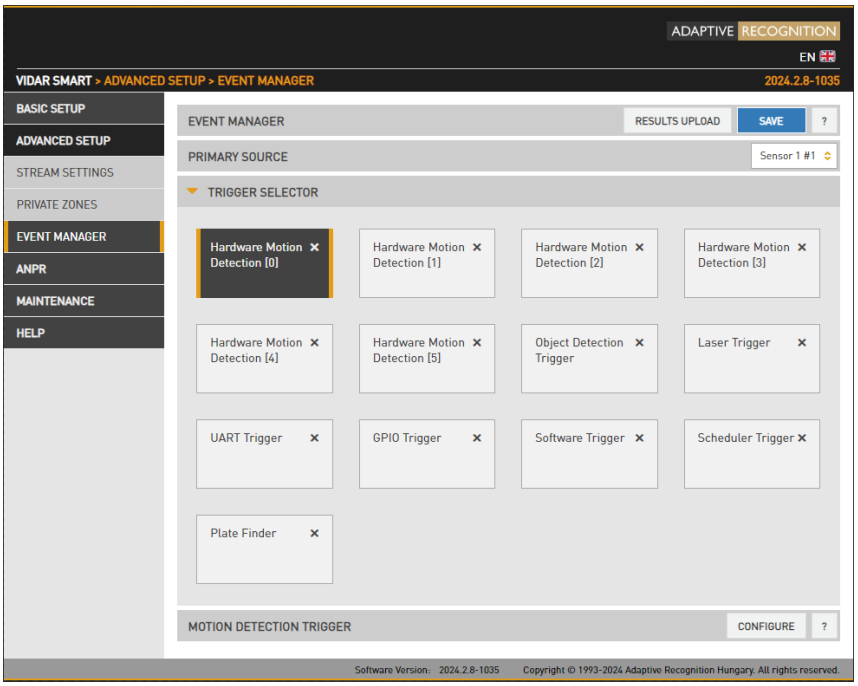
7.1.1. EVENT MANAGER

WEB INTERFACE > ADVANCED SETUP > EVENT MANAGER

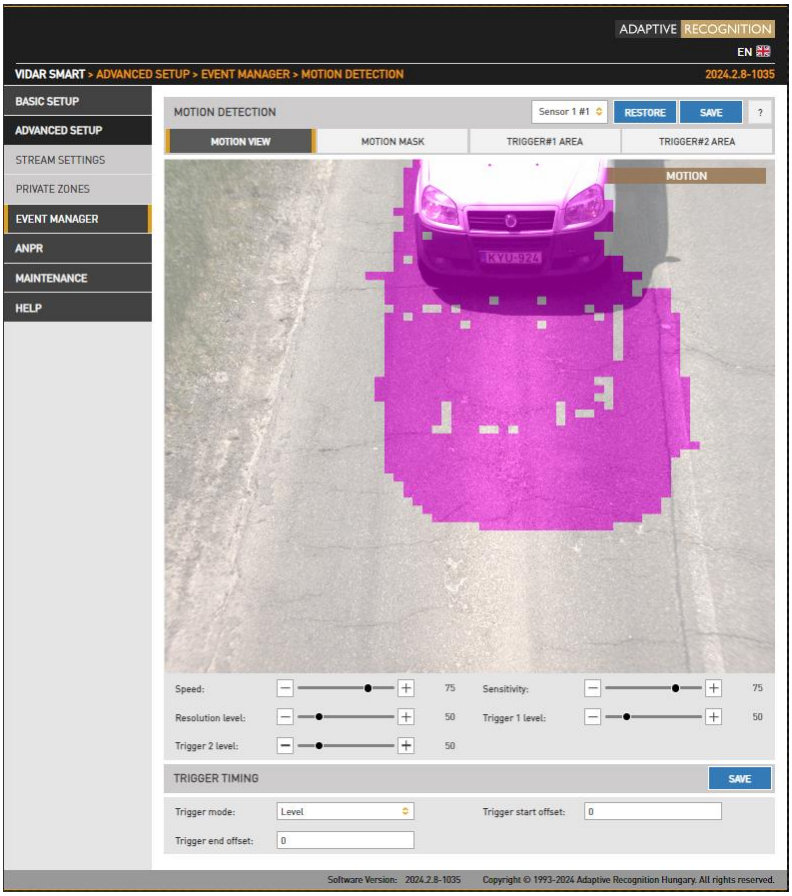


You can add and remove trigger sources in this menu. Clicking the "**+**" icon, you will be presented all available trigger sources. The sources will be connected with an OR conjunction: the trigger will be asserted while any of the trigger sources are active. By selecting a trigger source its configuration will be available at the bottom of the screen.

7.1.2. MOTION DETECTOR (ONLY IN VIDAR 7020 CAMERAS)



First you need to click on Configure button to guide you to Motion Detection settings. On this page you can set all parameters.



The motion detector can provide three trigger sources:

- **Motion #0:** Motion detected in the entire image
- **Motion detected in trigger area #1:** A freehand drawn area may be provided to the camera as a trigger zone. If motion is detected in this zone, motdet trigger #1 will fire
- **Motion detected in trigger area #2:** Identical to #1, with another trigger zone.

Four views are available:

- **Motion View:** Blocks with motion detected are shown with a color tone change
- **Motion Mask:** A freehand drawing tool for a motion mask. Motion inside this mask will be ignored by motion detection. Use the tools to draw the mask.
- **Trigger#1 Area:** A freehand drawing tool for trigger area #1
- **Trigger#2 Area:** A freehand drawing tool for trigger area #2

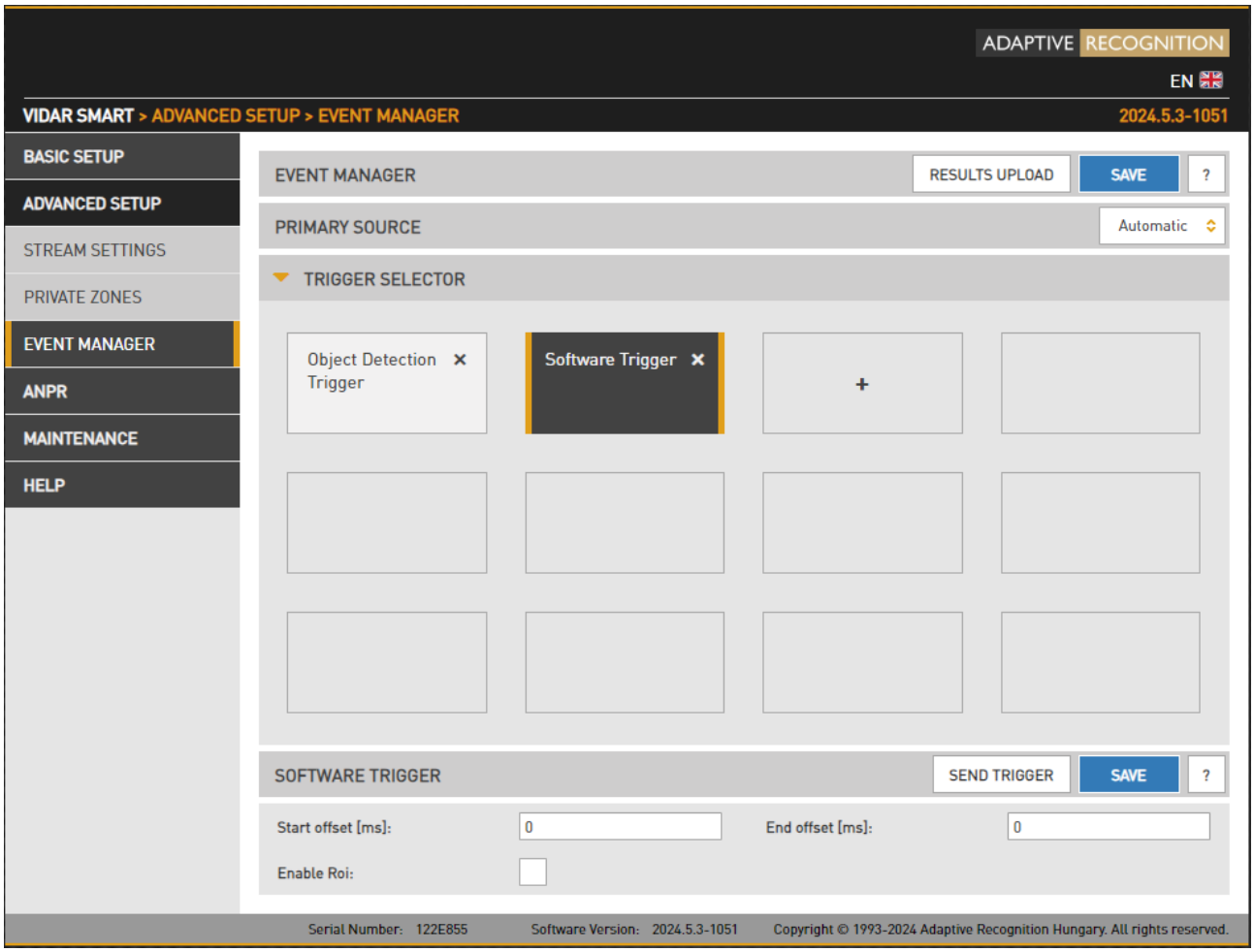
The properties of motion detection are also available:

- **Speed:** Specifies the minimal rate of change required in the image to be detected as motion. If set too low, changes in ambient light conditions may trigger motion.
- **Sensitivity:** Specifies the minimal luminance change required in the image to be detected as motion. If set to 0, will not detect any motion on the image. If set 100, it will trigger to any motion.
- **Resolution Level:** The required minimal number of blocks that must change to be considered as motion in output #0 (entire image)
- **Trigger 1 Level:** The required minimal number of blocks that must change to be considered as motion in output #1 (trigger area #1)
- **Trigger 2 Level:** The required minimal number of blocks that must change to be considered as motion in output #2 (trigger area #2)

Trigger timing can be setup:

- **Trigger mode, Trigger start/end offset:** Please check GPIO TRIGGER **(Chapter 7.1.4.)** where you will find the description of this section!

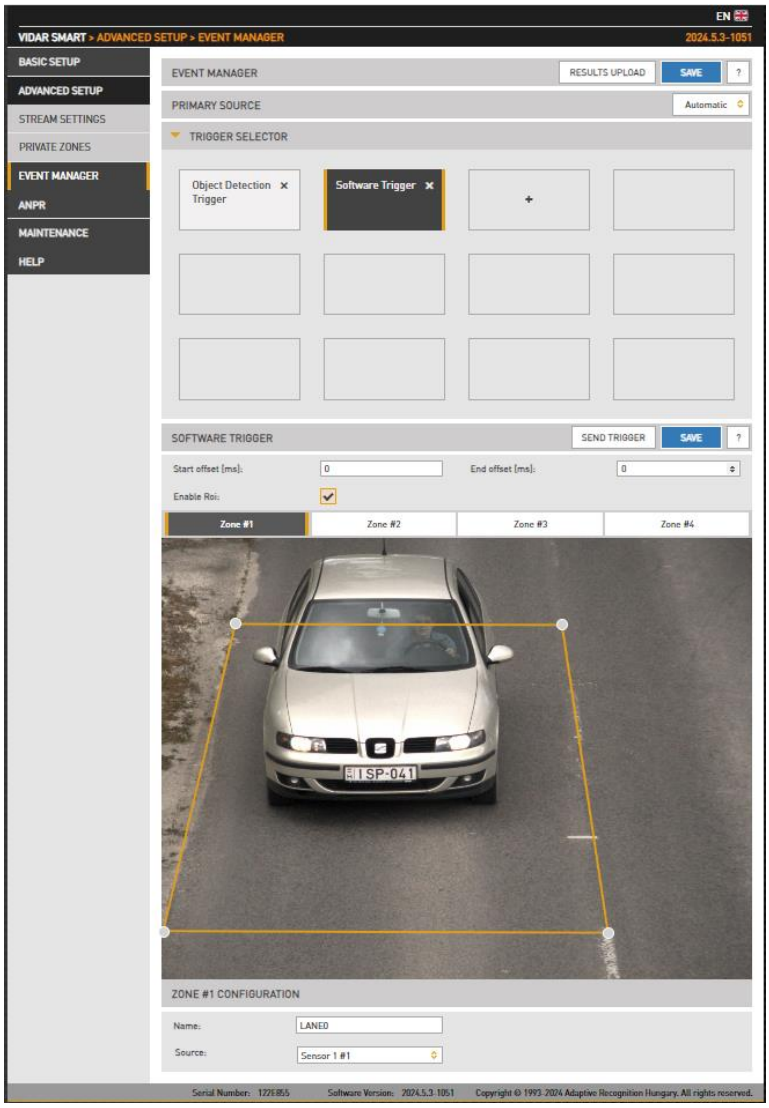
7.1.3. SOFTWARE TRIGGER



In the Event Manager menu, after selecting the Software Trigger, the settings options for the Software Trigger appear in the lower bar. If the user clicks on the Enabled ROI checkbox, the ROI settings interface will appear.

The only difference compared to the other trigger selectors is that there is no individual enabling option. Only the name of the ROI can be specified. You can set up ROI for 4 lanes, each separately.

By clicking the **Save** button for the Software Trigger, these will be saved in the appropriate sections.



A software trigger is an external trigger sent as a HTTP request.

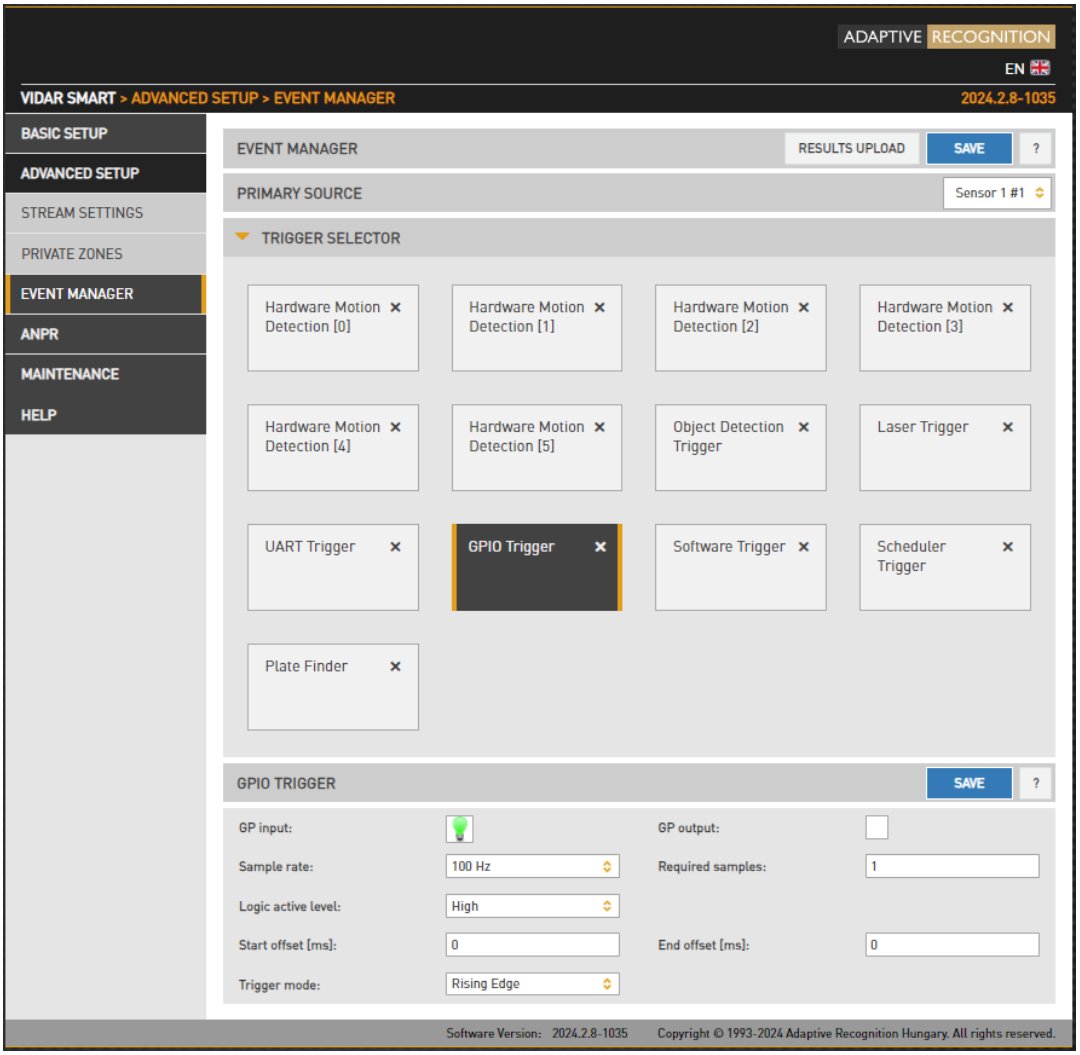
- **Start Offset:** trigger start offset (added to the time stamp of receiving the request)
- **End Offset:** trigger end offset (added to the time stamp of receiving the request)

After you configure the trigger, you can send a trigger signal to the camera using this command: http://cam_ip/trigger/swtrigger?wfilter=1&sendtrigger=1

As an output parameter in the URL, the user receives which ROI the module is working on: http://cam_ip /trigger/swtrigger?wfilter=1&output=2&sendtrigger=1

Here, it is ROI number 3 (indexing starts from 0).

7.1.4. GPIO TRIGGER



GPIO Trigger is a hardware trigger source accepting triggers from one of the General Purpose (GP) Inputs of the device. Please refer to the Install Guide for details of the electric connection.

- **Sample Rate, Required samples:** The voltage across the GP Input's signal and ground pins is sampled with the sample rate given. With mechanical switches it often takes a while for the voltage level to settle. During this interval both high and low samples will be recorded. The device will consider the input as settled when the number of samples that agree (last n samples are low/high) exceeds the value given in Required samples.

- **Logic active level:** The voltage level that corresponds to the logic active level.

> Note
>
> Please note that the trigger will not be asserted until one rising or falling edge is registered, regardless of the value of this setting.

- **GP Input:** Shows the current state of the input. The three-color lightbulb can indicate the following statuses:
  - a **gray indicator** means that the input is **not active**.
  - a **red indicator** shows that the sampling on **the input is uncertain**.
  - a **green indicator** means that the input is currently active.

> Note
>
> Please note that **at least one trigger** (e.g., one passing vehicle) **is required after adding the GPIO trigger to receive a valid status**.

- **GP Output:** Is used to toggle the state of the General Purpose Output pin.

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Trigger Mode: Four trigger modes are available:

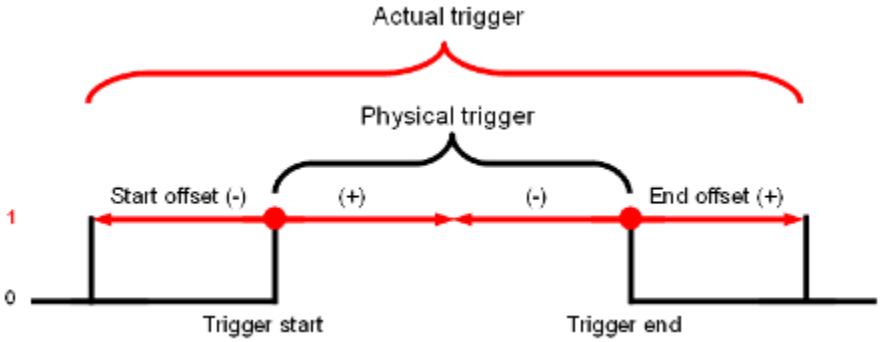
Level: the trigger is asserted while the input is active.

Rising edge: the trigger is asserted only at the rising edge of the input.

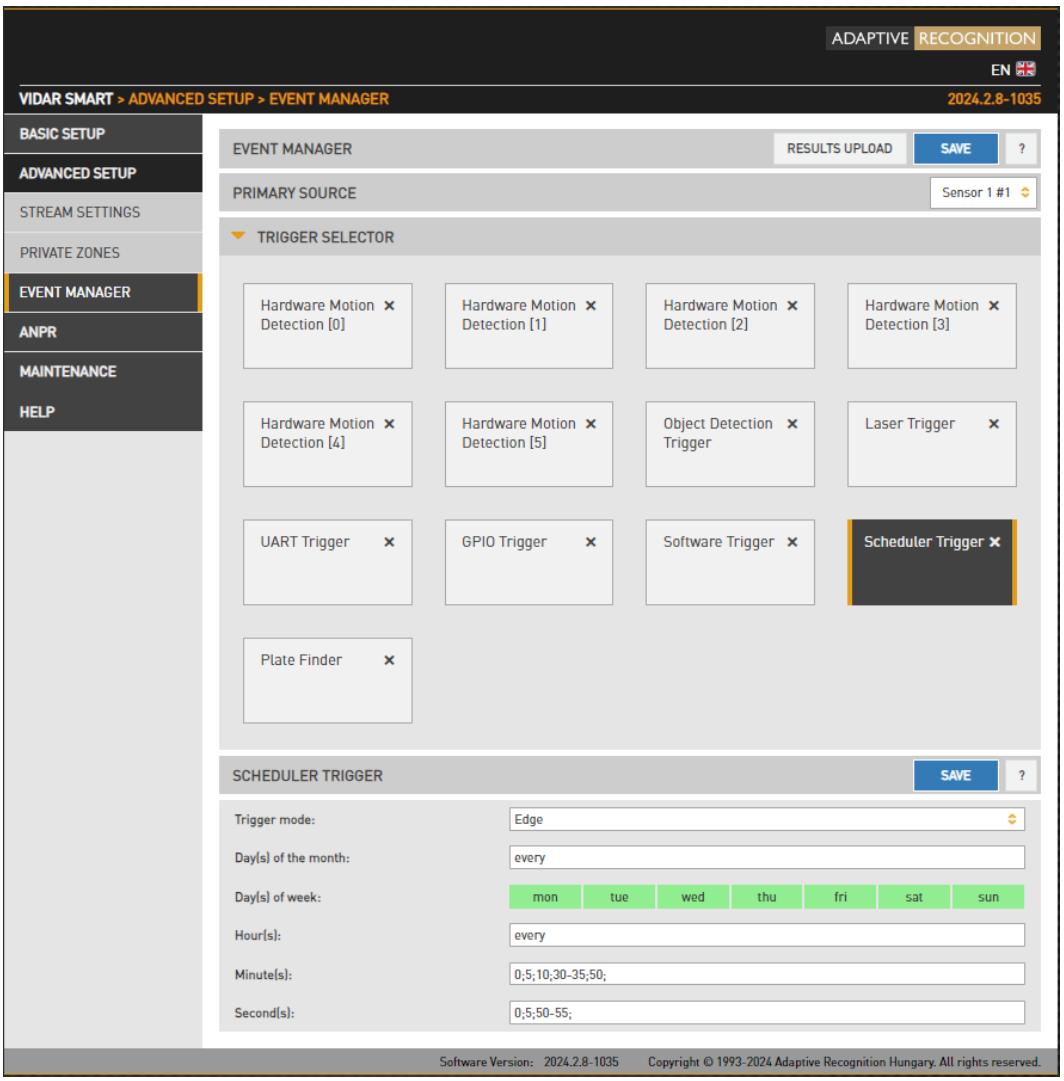
Falling edge: the trigger is asserted only at the falling edge of the input.

Rising/Falling edge: the trigger is asserted both at the rising and at the falling edge of the input.

Start/end offset: the interval during which the trigger is asserted can be extended in both directions with start and end offsets.



7.1.5. SCHEDULER TRIGGER



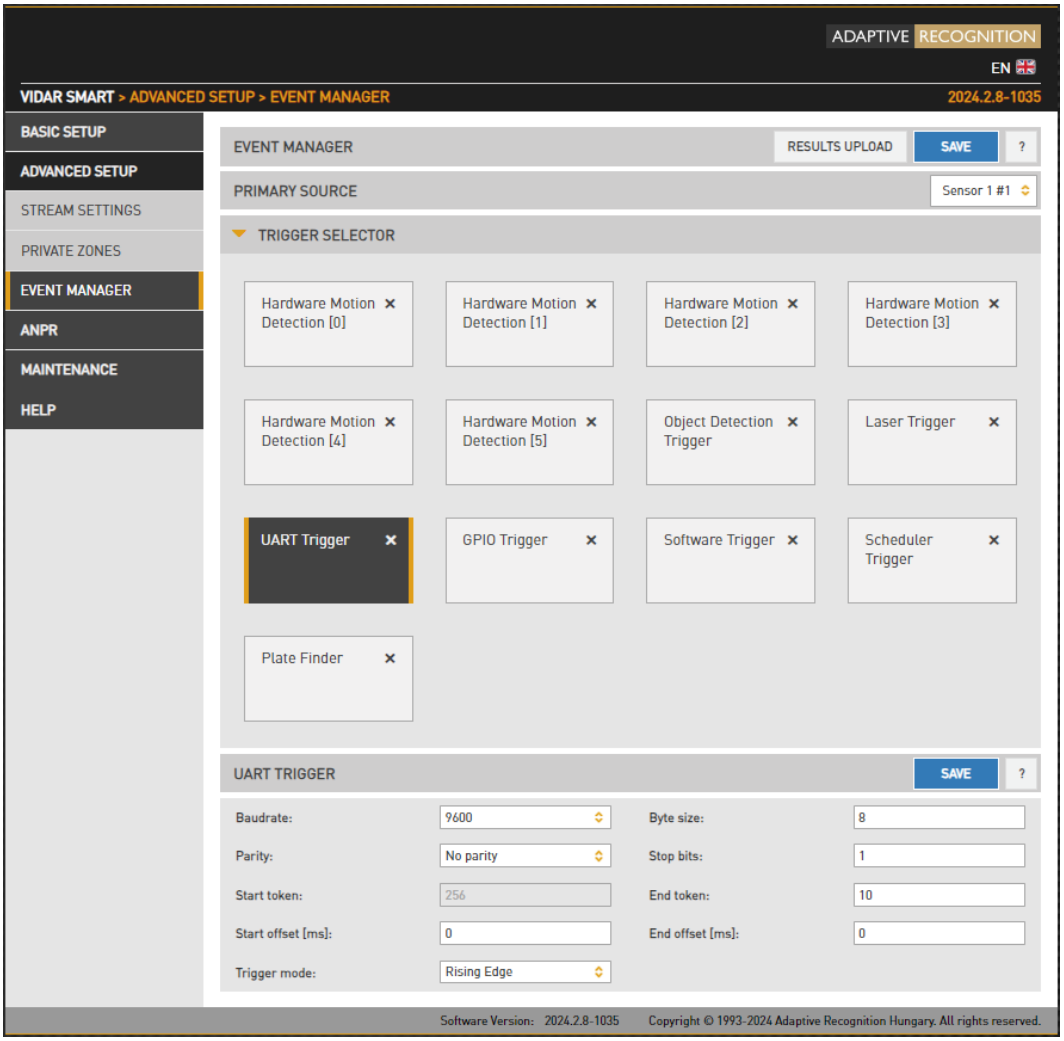
This trigger source provides the user with a timer. Triggers can be scheduled with a precision of one second. Two trigger modes are available:

- **Edge:** the trigger is asserted at only the start of the specified point in time.
- **Level:** the trigger is asserted during the specified second/minute/hour.

In the fields – **Day(s) of the Month, Hour(s), Minute(s), Second(s)** – the following expressions can be used:

- numerals separated by semicolons (e.g., 6;9)
- the word 'every'
- hyphens to express intervals (e.g., 7-9)
- combinations of the above e.g., 6;7;9-11;15

7.1.6. UART TRIGGER



The camera can be triggered through its UART port. Besides the common UART properties (**Baudrate, Byte size**, number of **Parity** bits, and **Stop bits**), the communication protocol can also be specified here. A UART trigger event starts with a Trigger **Start Token** (TST) byte, then maximum of 254 bytes of trigger data may follow, and then it ends with a Trigger **End Token** (TET) byte.

Four **trigger modes** are available:

- **Level:** the trigger is asserted while the input is active (see below)
- **Rising edge:** the trigger is asserted only when TST is received
- **Falling edge:** the trigger is asserted only when TET is received
- **Rising/Falling edge:** the trigger is asserted both when TST and when TET is received

In Level Mode the trigger start timestamp will be the system time at the instant the TST arrives, plus the **Start Offset**, while the trigger end timestamp will be the system time at the instant the TET arrives, plus the **End Offset**. Trigger data (including the TST and TET) will be forwarded to the Event Manager. It is possible to specify the byte value of the TST (e.g., entering 0x0A means the trigger will begin with a '\n' byte) or check 'Start on first byte', which means, whatever byte comes first or follows the last end token will be the trigger start token.

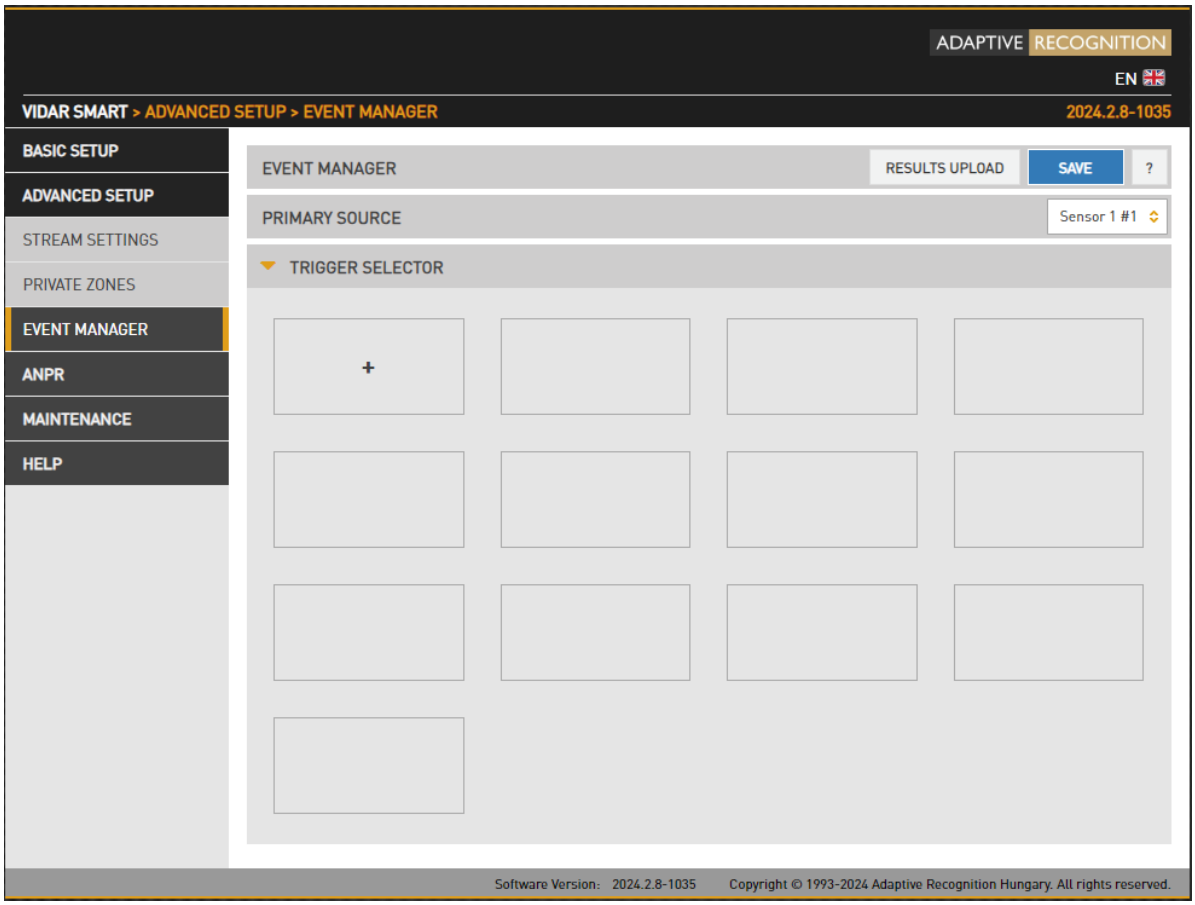
7.1.7. PLATE FINDER TRIGGER

Plate Finder is an advanced license plate detector which is specialized to detect, locate and track available plates.

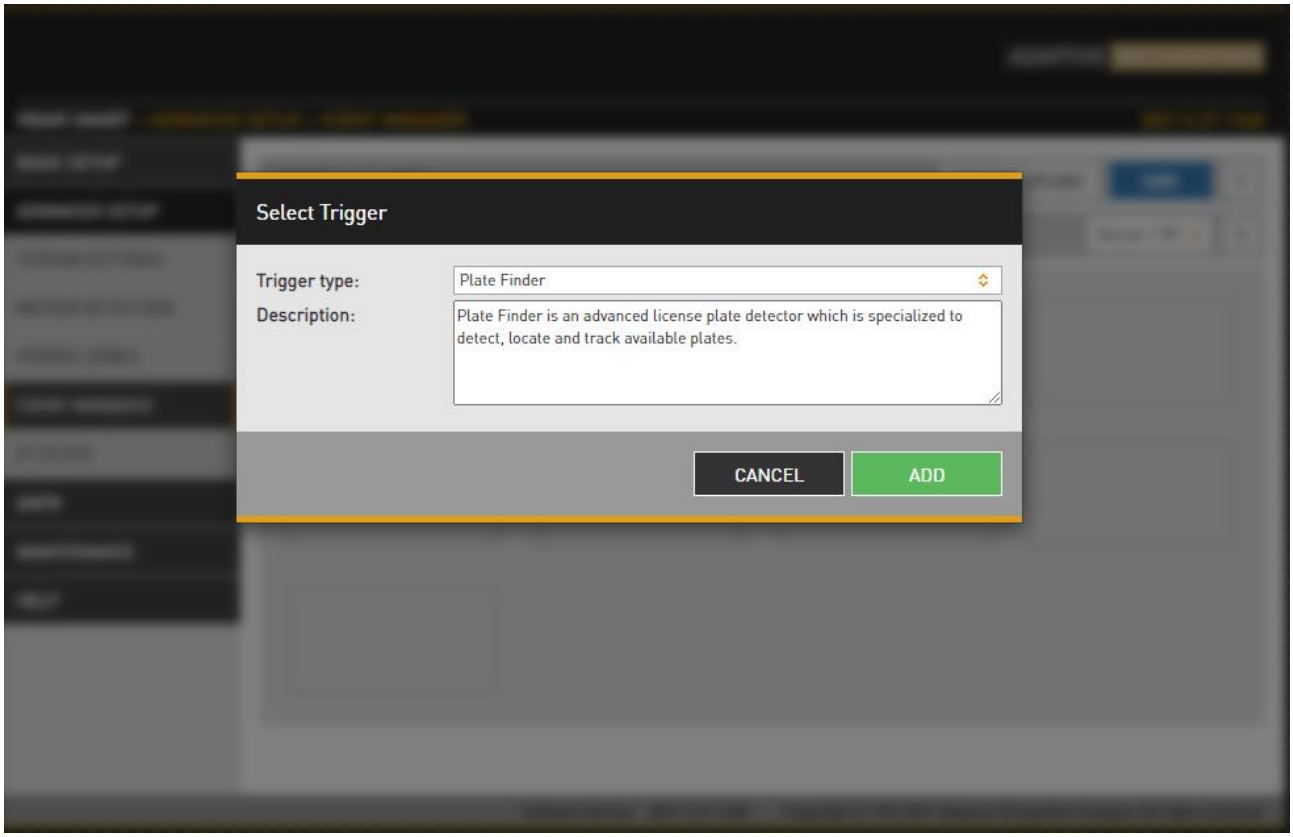
SET PLATE FINDER AS A TRIGGER SOURCE:

As a first step, add Plate Finder as a trigger source. Add the new trigger source to Event Manager as follows:

- Click on "+" to add a trigger source:



- In the drop-down menu, select the Plate Finder Trigger, then click Add.



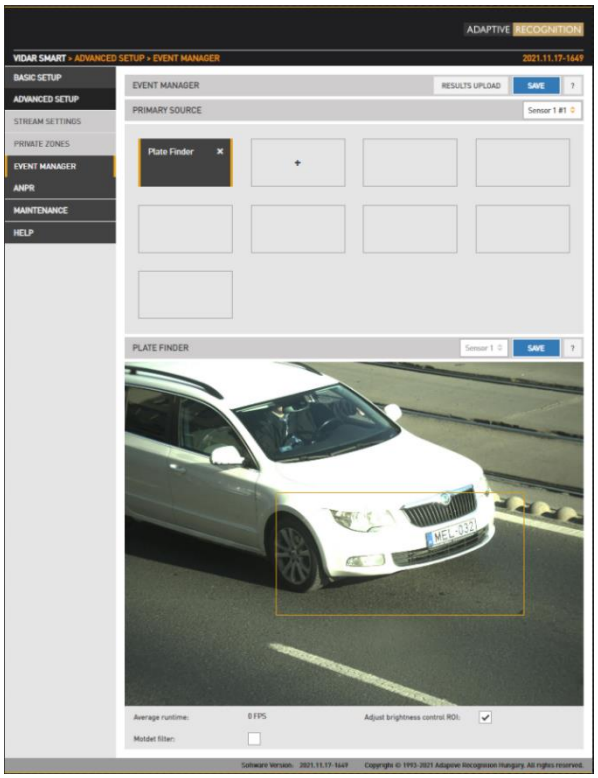
Note

Do not forget to save trigger source(s) by clicking **Save**.

CONFIGURE PLATE FINDER TRIGGER

After added Plate Finder Trigger in the Advance Setup / Event Manager menu, additional setup needs to be done. Inside of the orange ROI (Region of Interest) happens ANPR with average runtime speed.

ROI's position is variable within the live view image for better result. If a single green rectangle flashes, it means that the license plate was recognized by the module and the corresponding image was forwarded to panel 2 for further ANPR.



It is advisable not to make it larger than necessary, so if the relevant part is in the center of the image, at about 1/3 of the screen, it is not worth displaying it in full screen, as it will unnecessarily slow down the system.

Note

Plate Finder Trigger can also return a direction (approaching or leaving) under ideal conditions, and the license plate must remain within the ROI for a specified period of time.

Important!

The **Plate Finder** and **Object Detection Trigger** cannot both be active at the same time as they are mutually exclusive trigger sources. Please regenerate the trigger accordingly, ensuring that only one of them is active at any given time.

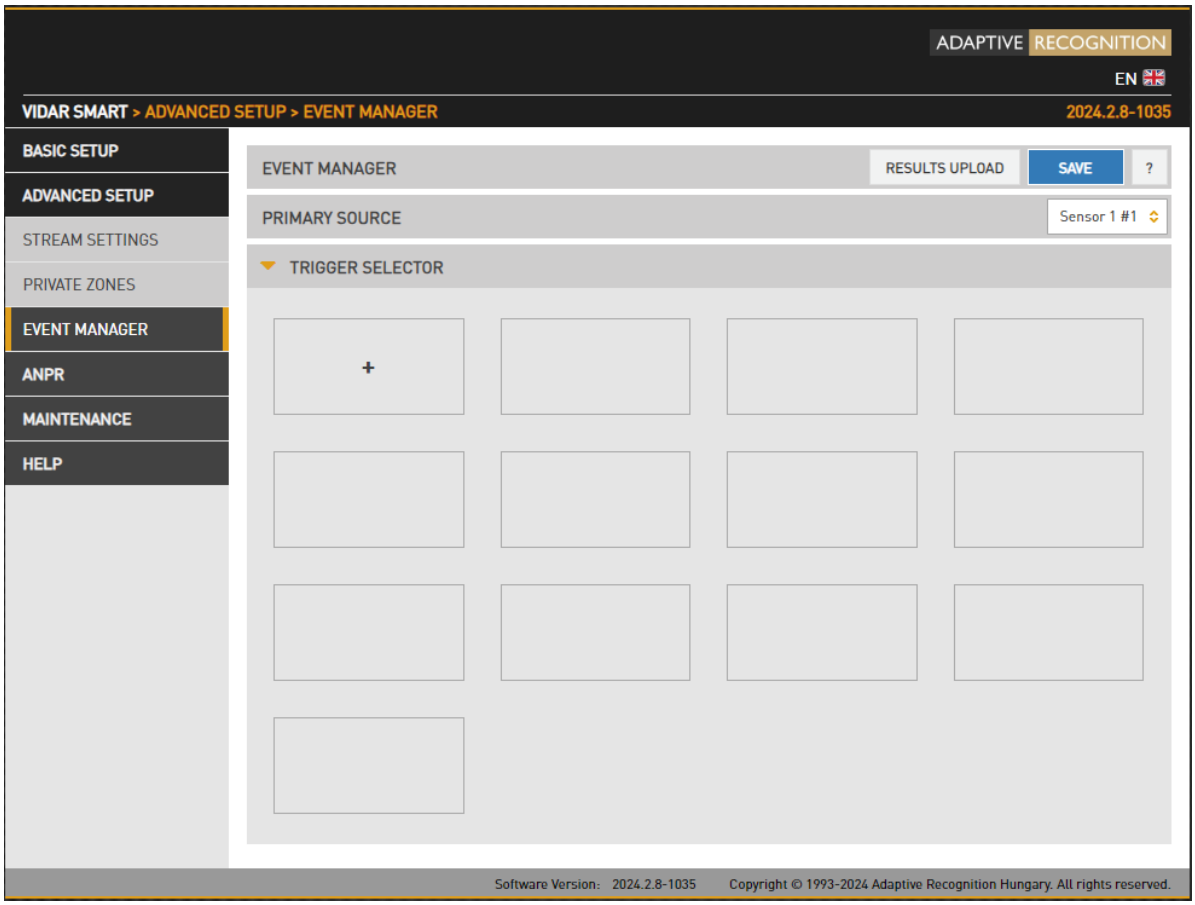
7.1.8. LASER TRIGGER

Laser Trigger uses distance measurements taken by the built-in laser device to generate trigger events.

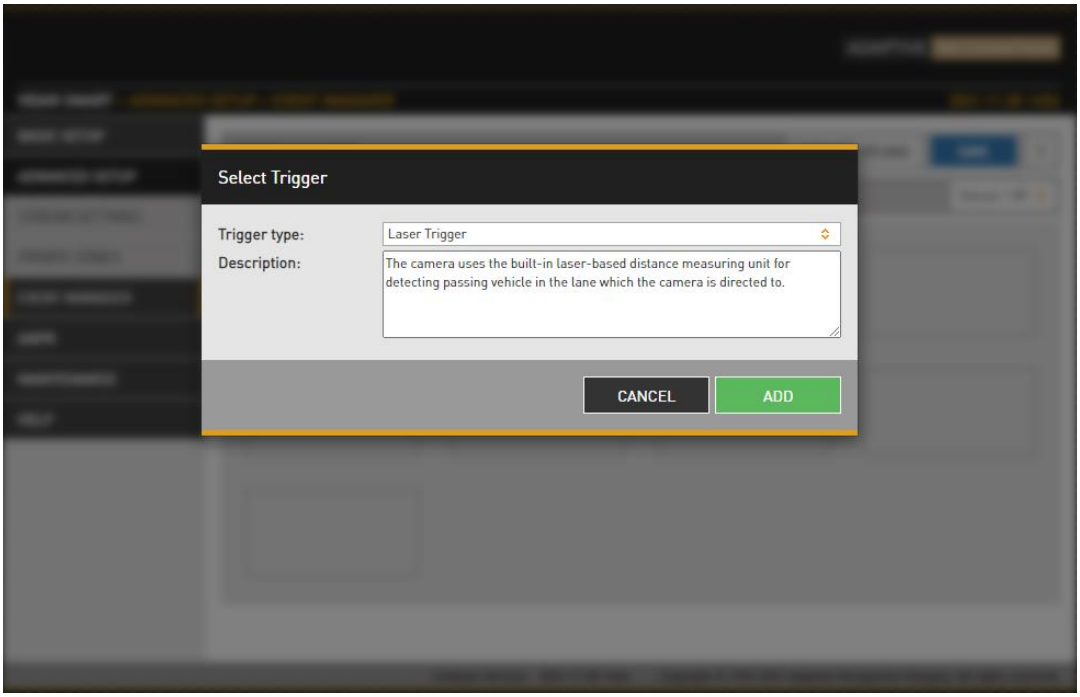
SET LASER AS A TRIGGER SOURCE:

As a first step, add Laser as a trigger source. Add the new trigger source to Event Manager as follows:

- Click on "+" to add a trigger source



- In the drop-down menu, select the Laser Trigger, then click Add.



CONFIGURE LASER TRIGGER

An algorithm filters and separates measured raw distance data into **background** and **foreground (vehicle)**, latter constituting a trigger event.

> **Note**
>
> The Laser Trigger is a point laser, therefore its use is only suitable for one lane.

Background is calculated during a **calibration** phase lasting a couple of seconds. Apart from the common trigger parameters (edge/level mode, offsets), this trigger source has no tuneable properties.

To achieve the proper settings, go to **Live view / Extensions menu**, activate **Image Center** function to see the direction of the laser trigger.

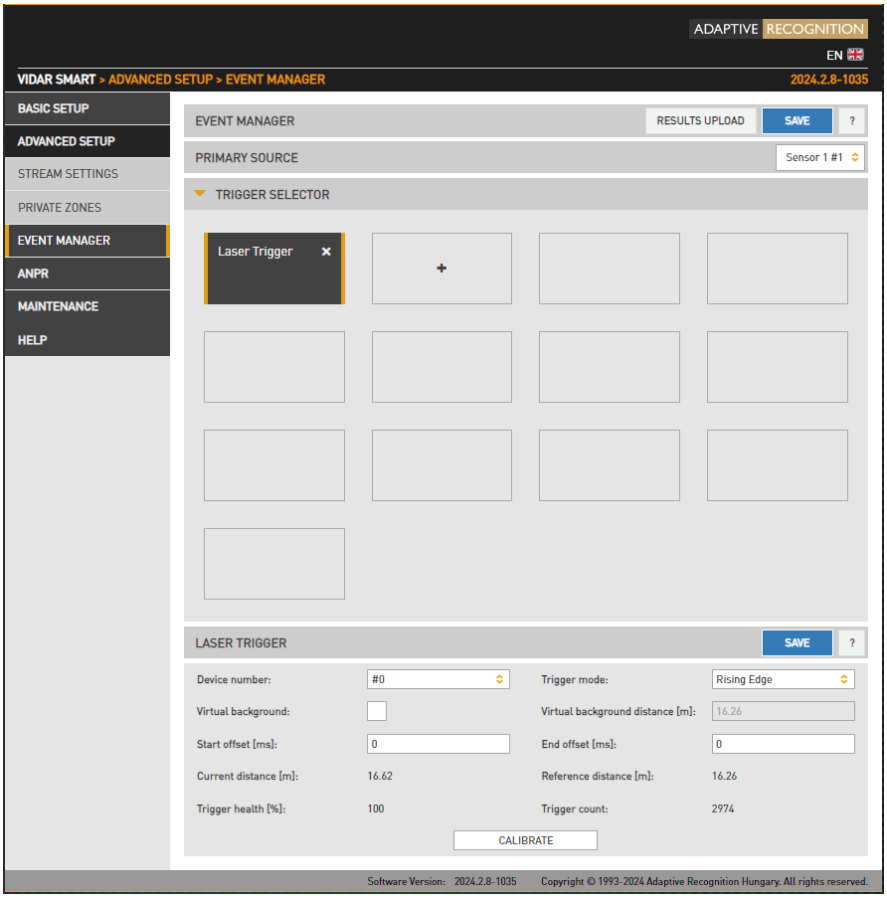
> **Important!**
>
> We can conclude from our measurements that it operates reliably up to a maximum distance of 20 meters.

Note

The Trigger health works effectively above 90%, below this value it must be reconfigured!

When setting up the Laser Trigger, ensure to activate the **Virtual background** option, when the camera sees further than 15 meters. Within the **Virtual Background distance** setting, the user can define a maximum distance which when measured by the laser will still set it off.
Calibration can be triggered manually by pushing the **Calibrate** button. The current background distance is shown in the **Reference distance** field. Raw, unfiltered data is shown in the **Current distance** field in meters. It is normal (and taken care by the algorithm) that this value jitters somewhat.

Trigger health reflects the actual quality of measurements taken. In adverse weather conditions (heavy rain, snowfall) this value will indicate if not enough good quality measurements could be taken, thus triggering may underperform.

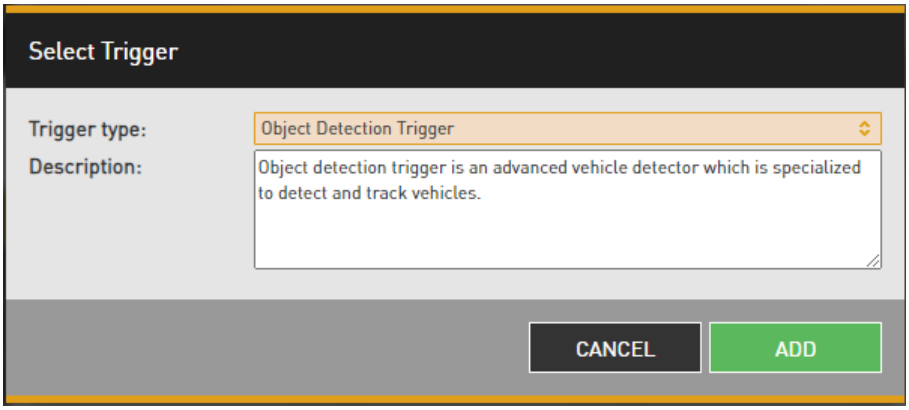


Note

Do not forget to save trigger source(s) by clicking Save.

7.1.9. OBJECT DETECTION TRIGGER (AVAILABLE ONLY ON ULTRASCALE CAMERAS)

Object detection trigger is an advanced vehicle detector which is specialized to detect and track vehicles.



First, by clicking on the **+ Add new trigger line**, we can set where the Object Detection Trigger should

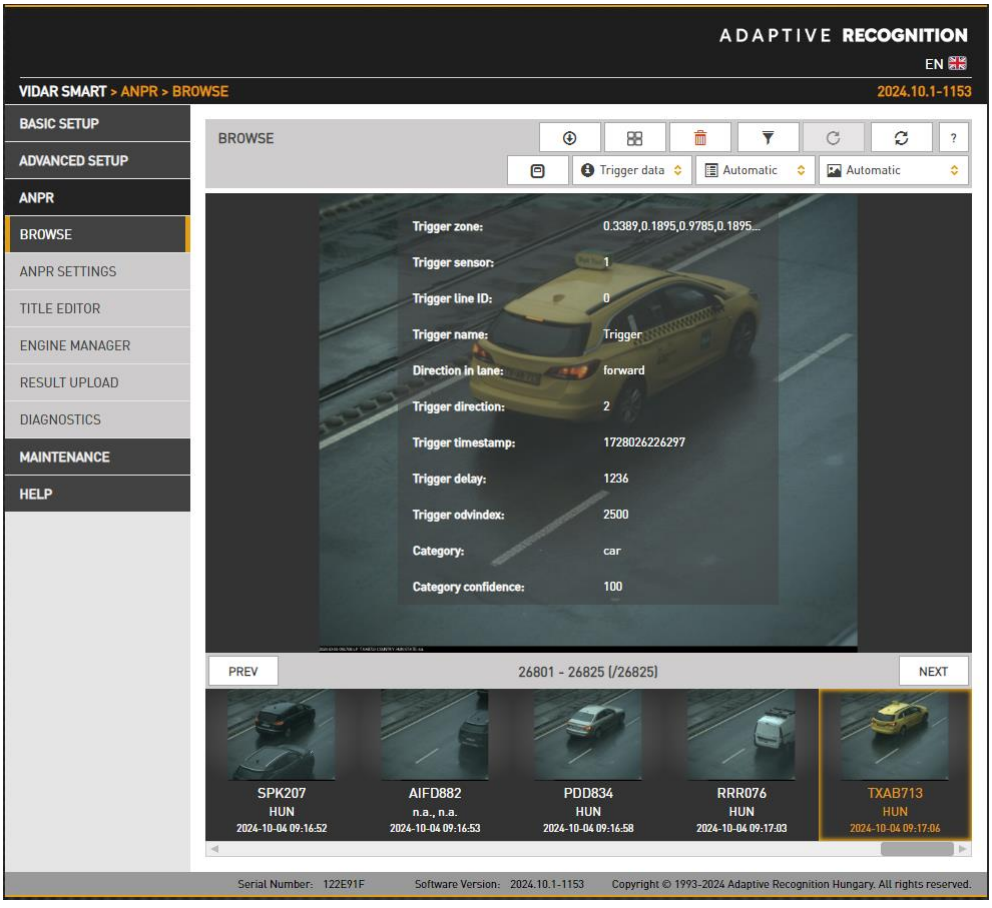
trigger on the image. This can be done by adjusting the width of the line with the points at the two ends to match the width of the lane to be measured and using these points to move the line to another position on the image.The name of this can be changed in the **Name** field.

The **Trigger direction** specifies the direction of the trigger. Here, we can set the direction of the trigger relative to the arrow. The arrow on the image indicates the direction of the lane. If we set the **"Trigger direction"** to **"Forward"** and the arrow is set in the direction of the lane, then the trigger source detects all vehicles passing in that lane in the appropriate direction. If we set it to **"Backward"** in the same position, the trigger detects vehicles passing in the opposite direction in the lane. If we set it to **"Both"**, then the Object Detection trigger source triggers both cases.
The direction of the arrow can also be reversed by clicking on it.

Start Offset: trigger start offset, (-) (added to the time stamp of receiving the request)
End Offset: trigger end offset, (+) (added to the time stamp of receiving the request)
Typically, a setting value of -100 and +100 is recommended for 25fps.

Four trigger lines can be set simultaneously.

In the **ANPR** menu, on the **Browse** page, you can view the detected events. If you click on the **Info** button at the top of the image and switch the **Data group** field to **Trigger data**.



You can get the following information about the event:

- **Trigger zone:** The coordinates are between 0 and 1 and expressed as percentages of the image width and height. The first two values represent the upper left + upper right coordinates, while the second two pairs represent the lower right + lower left coordinates.
- **Trigger sensor**: the sensor used for this trigger. It is numbered from 1-2.
- **Trigger line ID:** the number of the added new line trigger.
- **Trigger name:** the name of the configured trigger, which was set above for that trigger line.
- **Direction in lane:** the crossing direction of the vehicle, according to the arrow that was set for the trigger line, forward / backward.
- **Trigger direction:** The **direction** value indicates the movement of a vehicle relative to the camera. A value of **1** means the vehicle is **approaching**, while a value of **2** indicates the vehicle is **leaving**.
- **Trigger timestamp:** unix timestamp assigned by the camera.
- **Trigger delay:** the time between triggering and image capture in milliseconds.
- **Trigger odvindex:** the index assigned by the Object Detection trigger, starting from 0 at each Object Detection trigger restart.
- **Category:** the type of vehicle.
- **Category confidence:** the reliability of the category.

Important!

The **'Object Detection Trigger'** and **'Plate Finder'** cannot both be active at the same time as they are mutually exclusive trigger sources. Please regenerate the trigger accordingly, ensuring that only one of them is active at any given time.

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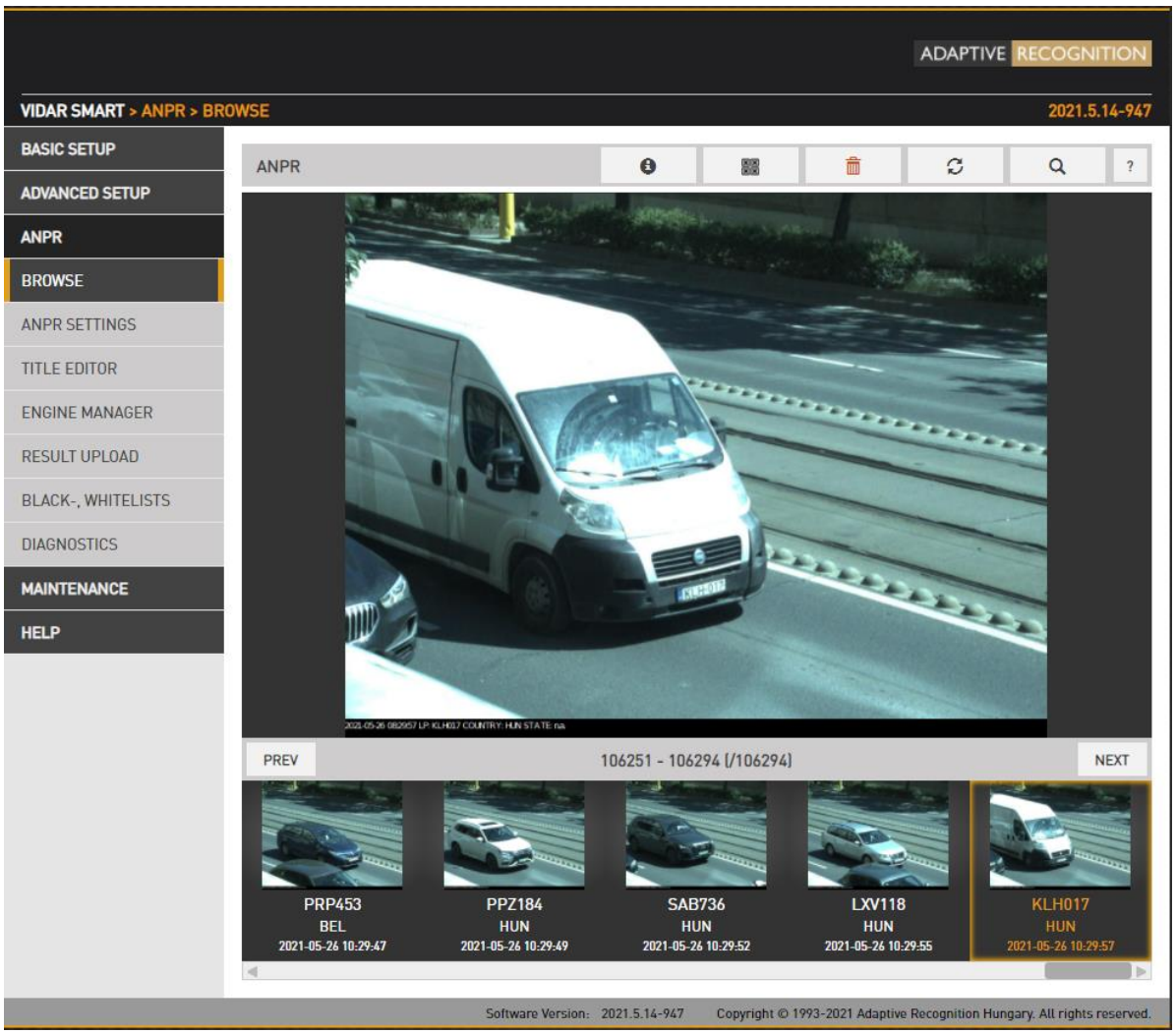
7.2. ANPR

7.2.1. BROWSE

WEB INTERFACE > ANPR > BROWSE



Recorded events are listed on the bottom timeline in ANPR/BROWSE. Use the icons on the top to:

– List image data

– Select/unselect all records

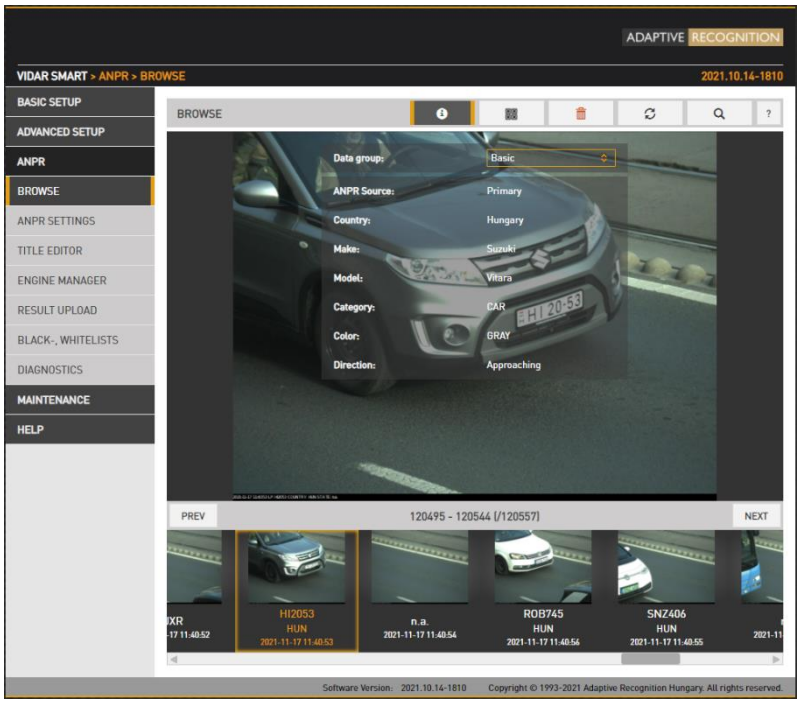
– Delete record(s)

– Reload list of entries

– Search for: timeframe / license plate / vehicle category.

List image data

- Basic Data group:
  - Plate info
  - ADR
  - MMR
  - Direction
- Extended Data group:
  - Event ID
  - Recognition time
  - Confidence

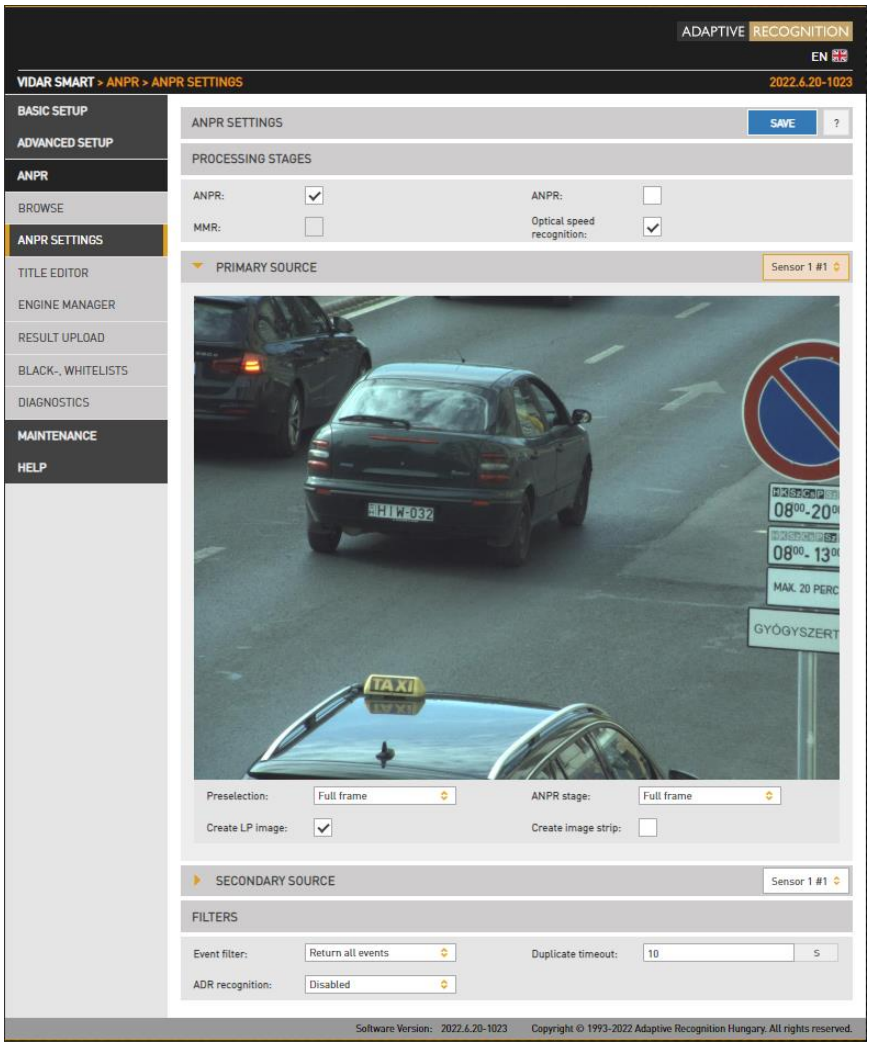


If you hover the mouse over the image, thumbnails will appear in the bottom of the screen, clicking these the main image will switch to:

- Event image: main image in which the license plate was found
- Overview image: the image of the overview sensor
- LP image: the license plate
- Strip image: the index images of the event containing all triggered images

7.2.2. ANPR SETTINGS

WEB INTERFACE > ANPR > ANPR SETTINGS



Processing stages:

You can configure the ANPR pipeline in the following three modes:

ANPR - A single ANPR stage follows the Preselection stage

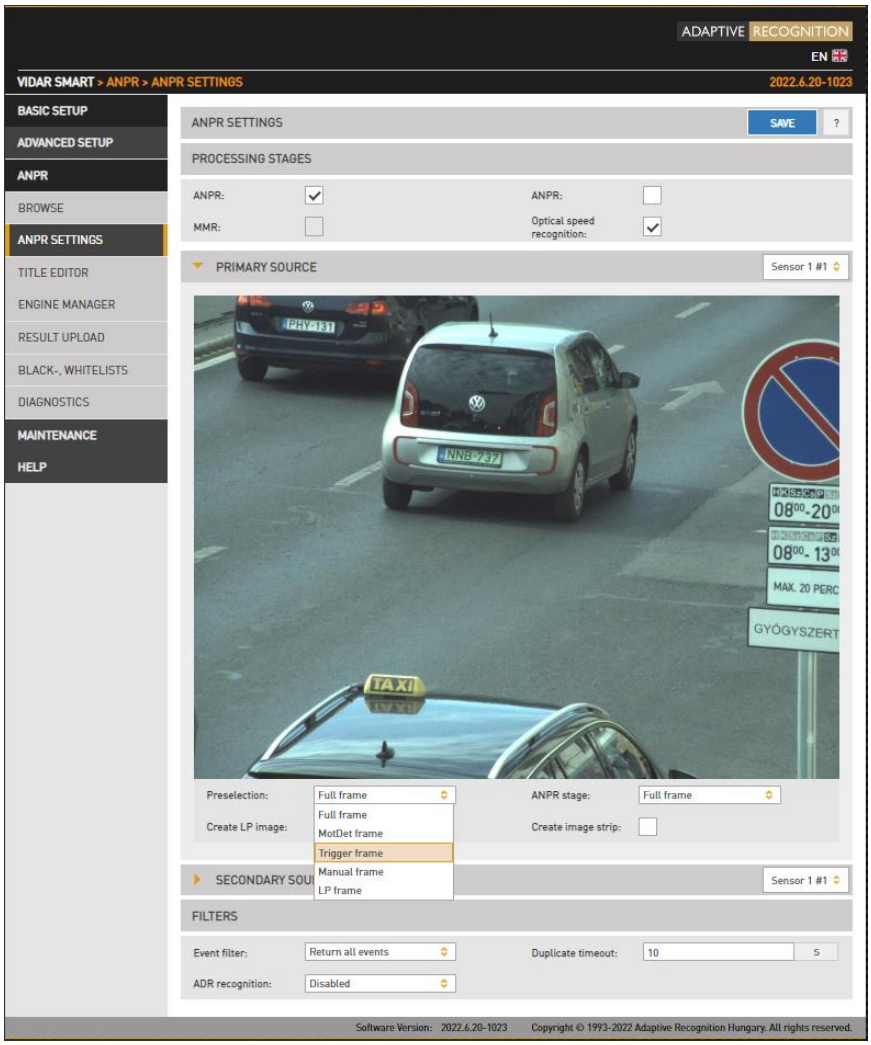
ANPR+MMR - A single ANPR and an MMR stage follows the Preselection stage. The MMR stage adds make and model info to the event. This stage has no configurable parameters. MMR engine updates can be uploaded in the Engine Manager menu, in the same manner as an engine update. Please note that in order to use MMR a corresponding MMR Hardware Key License must be purchased and installed in the device.

ANPR+ANPR - Two ANPR stages follow the Events and ANPR (See Preselection stage for a use case).

OPTICAL SPEED RECOGNITION - By entering multiple license plate frames (Figure 8-10), it calculates the speed of the vehicle based on the movement and the size of the license plate.

The main properties of the license plate recognition pipeline are configured here.
Performance (both accuracy and speed) is higher if license plate recognition is limited to the part of the image in which the vehicle is likely to be found. Vehicle Detection, Motion Detection can provide such a frame, and users can define a manual frame also. Moreover, the preliminary license data provided by the Preselection stage contains a license plate frame which can be used at the ANPR stage.

In devices equipped with two image sensors, you can set up a secondary source functioning as either **Overview** or **ANPR**. In ANPR mode, the system will attempt to find a license plate in the secondary image.



- **Preselection engine:** the frame used by the Preselection stage. Select Manual frame to draw a user defined frame.

The Preselection stage will use:

- **Full Frame:** the entire frame
- **Manual Frame:** the frame drawn by the user
- **Motdet Frame:** the frame returned by motion detection
- **Trigger Frame:** the frame returned by other trigger sources
- **LP frame:** the license plate frame as returned by the previous stage

- **ANPR engine:** the frame used by the ANPR stage

The ANPR stage will use:

- **Full Frame:** the entire frame
- **Manual Frame:** the frame drawn by the user
- **Motdet Frame:** the frame returned by motion detection
- **LP frame:** the license plate frame as returned by the previous stage

- **Create LP images:** Create a cropped image containing the license plate only

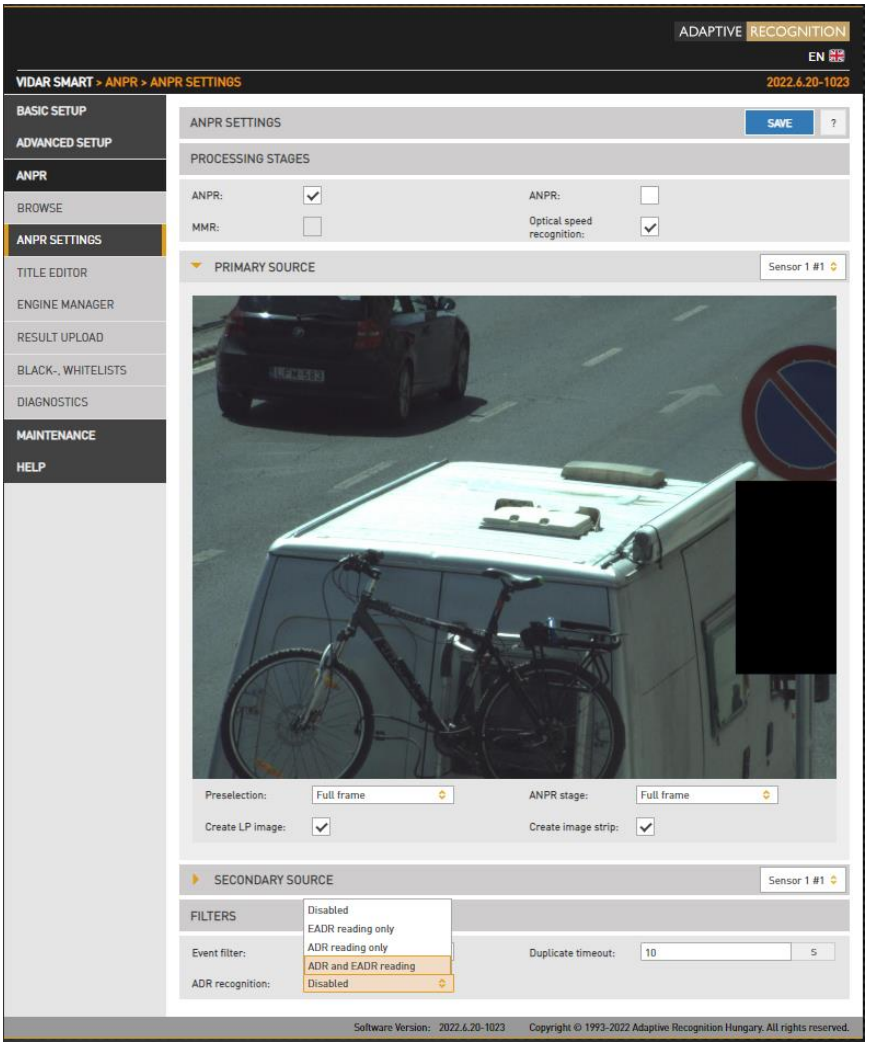
- **Create image strip:** All triggered images are minified and joined to form an index image, which may help to set up trigger timing.

Filtering results can be configured with the following two options:

- **Event filter:**
  - **Return all events:** create a record in the database based on all trigger signals, even if a license plate was not found
  - **Return events with license plate**: Create a record in the database only if a license plate was found
  - **Return events with license plate and type:** Create a record in the database only if both a license plate was found and its nationality was determined.
- **Duplicate timeout:** the time frame in which the same license plate will not be registered again if once read.

- **ADR Recognition:**
  - Disabled
  - ADR plates reading only
  - EADR plates reading only
  - ADR and EADR plates reading

Open Browse menu and click on Info button to see ADR and EADR plate recognition among the events.

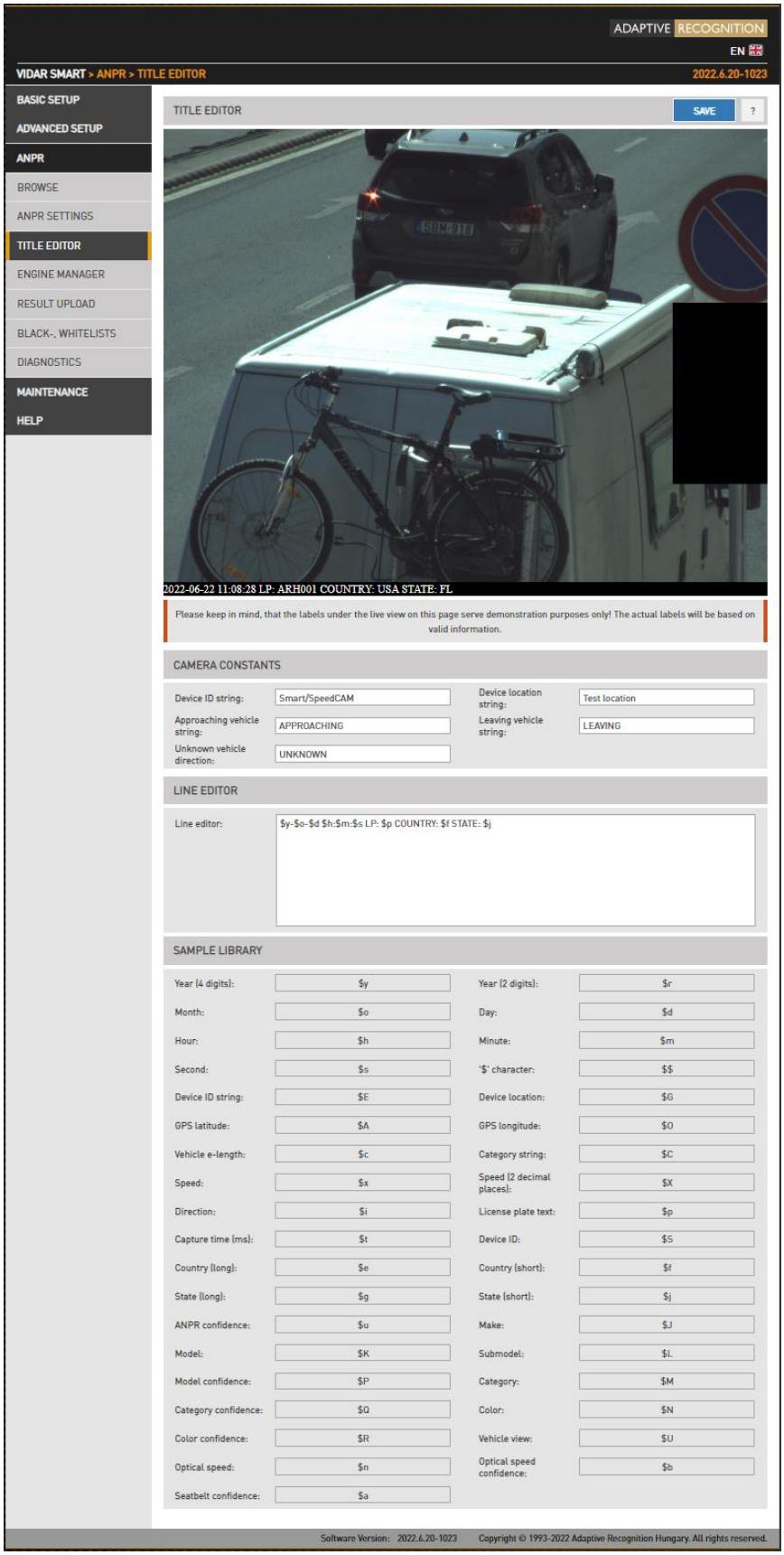


Note

Please note, that the time requirement of reading ADR/EADR plates is comparable to that of reading license plates, thus the net throughput (vehicles processed per seconds) will be affected.

7.2.3. TITLE EDITOR

WEB INTERFACE > ANPR > TITLE EDITOR



The subtitles added to the image are configured here.

In the Camera Constants tab users can assign a string to variables which will be printed according to the value detected.

- **Device ID string:** Device identifier
- **Device location string:** Location identifier
- **Approaching vehicle string:** The string that gets printed in the subtitle when an approaching vehicle is detected (only in models with speed measurement)
- **Leaving vehicle string:** The string that gets printed in the subtitle when a leaving vehicle is detected (only in models with speed measurement)
- **Unknown vehicle direction:** The string that gets printed in the subtitle when vehicle direction cannot be determined.

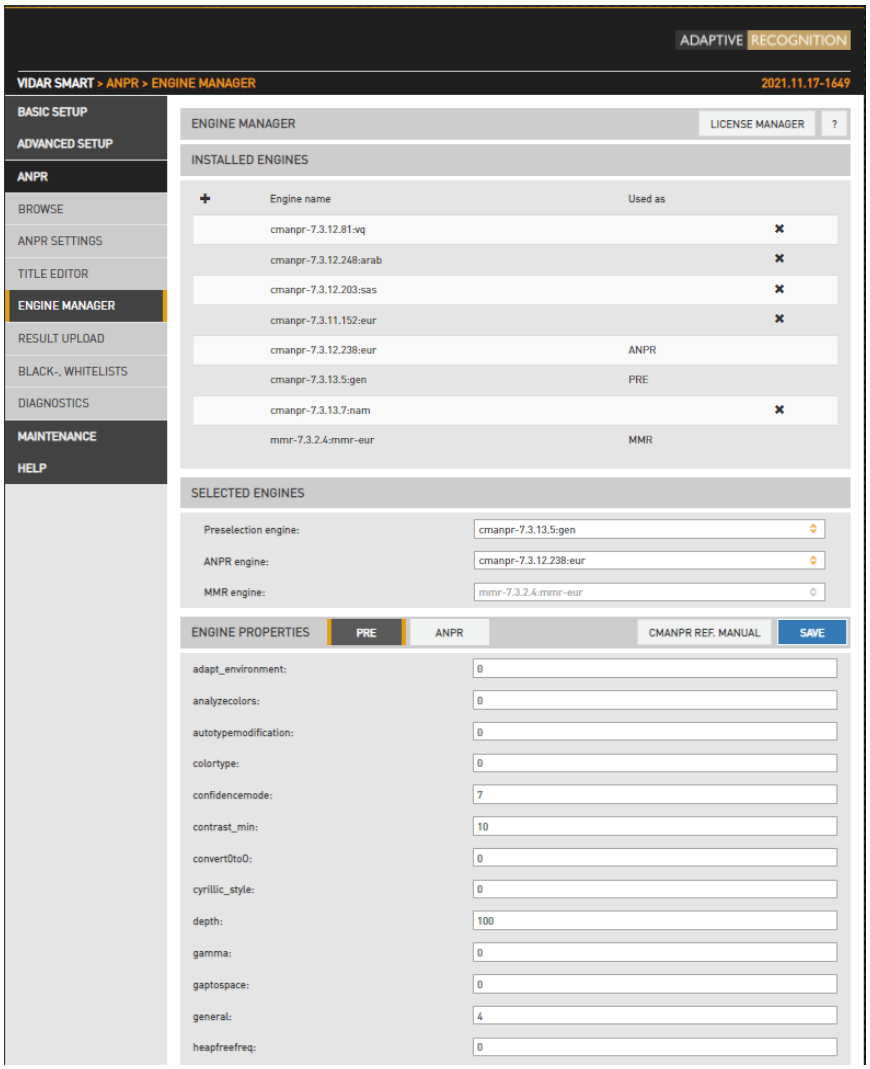
In the Line Editor tab users can customize the subtitle using the wildcards listed below.

7.2.4. ENGINE MANAGER

This tool allows for installing, removing and configuring the Carmen ANPR engines used in the system. The **Install Engines** tab lists the engines currently installed on the camera. Unused engines can be removed with the "×" icon to the right. A new engine can be installed by clicking on the + icon.

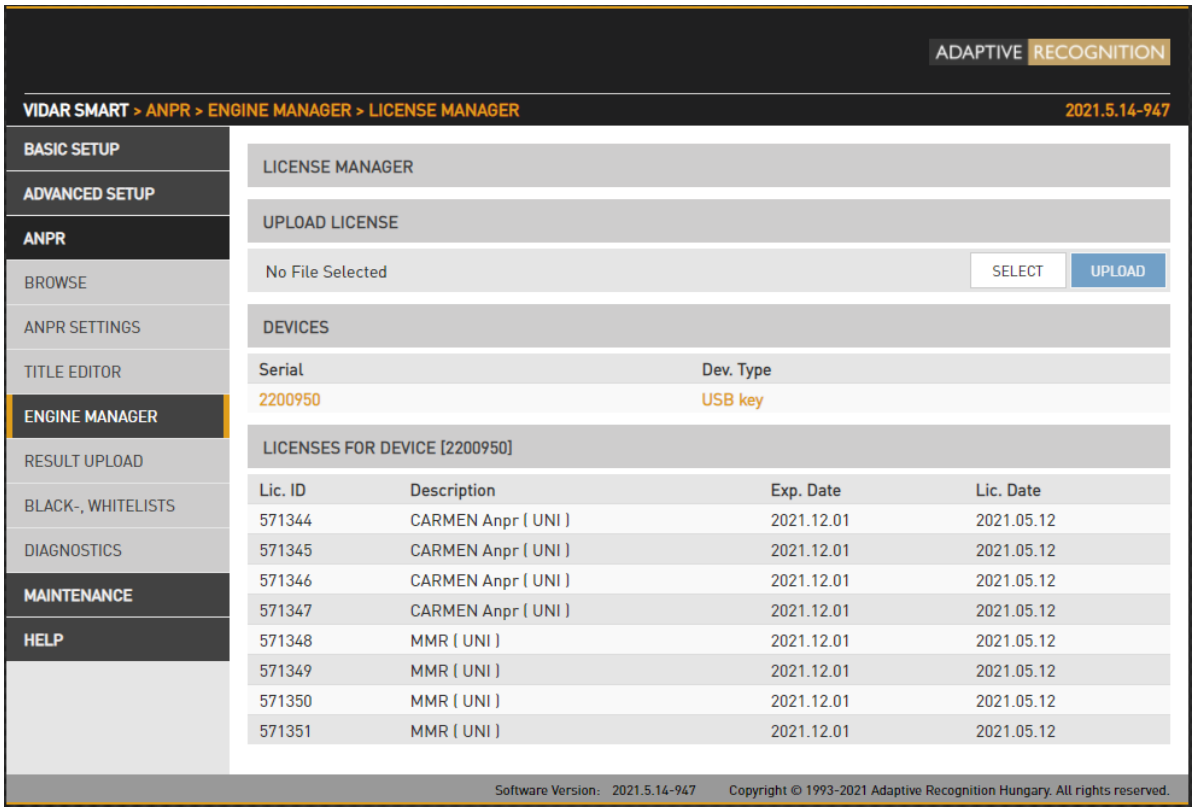
Currently used engines are listed in the **Selected Engines** tab.

Engine properties are configured in the bottom tab. Please check the Carmen ANPR Manual for details.



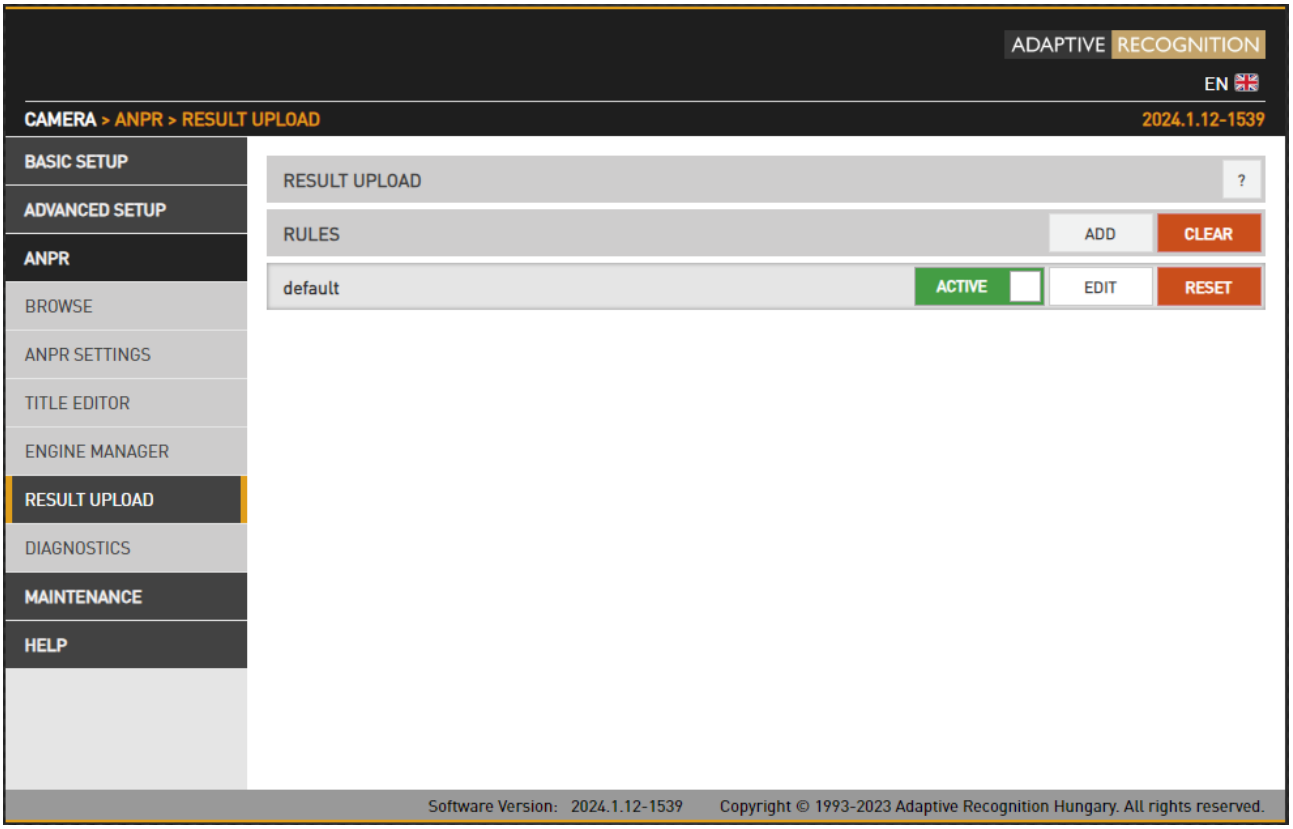
Hardware Key Licenses currently available in the device are listed in the **License Manager** section. Additional licenses (sold separately) can be installed in the **Upload License** menu.

Even with expired license your camera will function as previously (will return license plates), but you will be unable to install engines released after the Expiration Date. Therefore, please contact your sales person or write to requestinfo@adaptiverecognition.com and request an update and your latest engine to keep the highest performance!



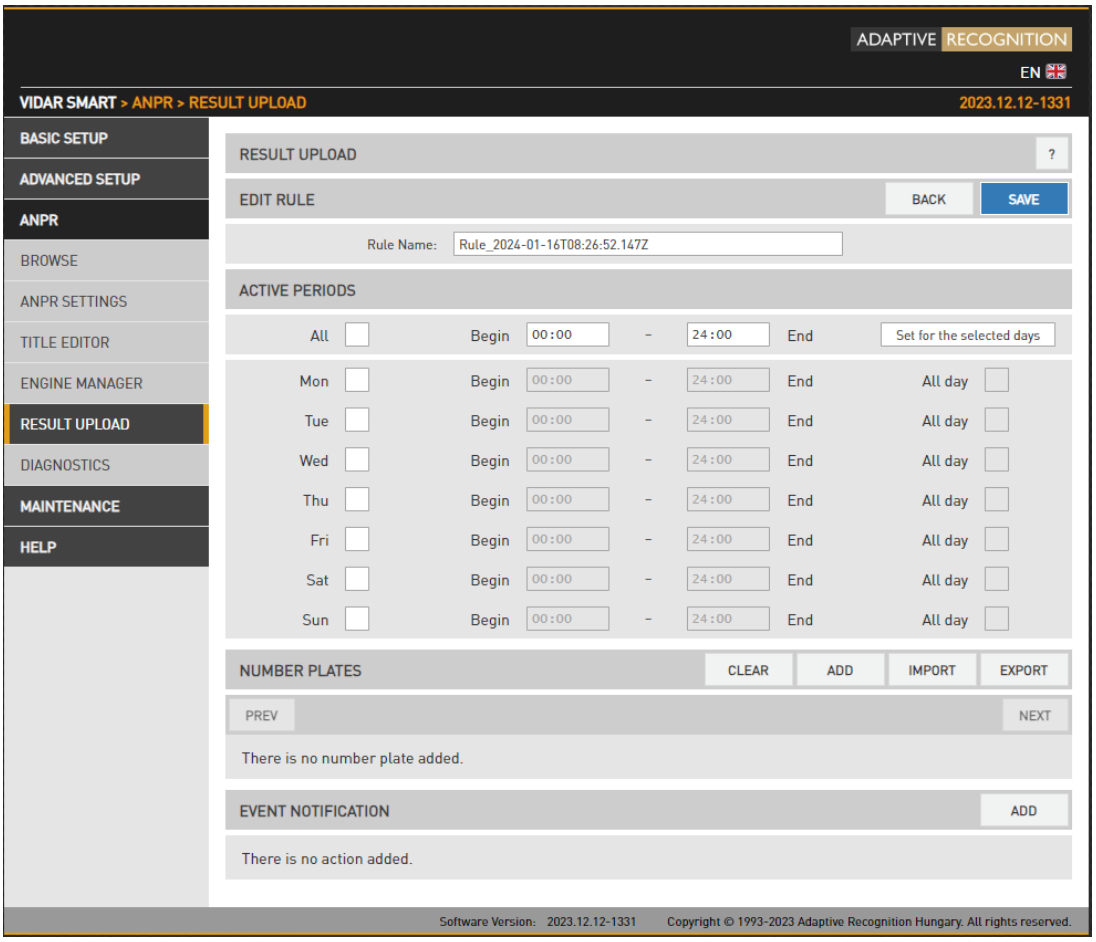
7.2.5. RESULT UPLOAD

WEB INTERFACE > ANPR > RESULT UPLOAD



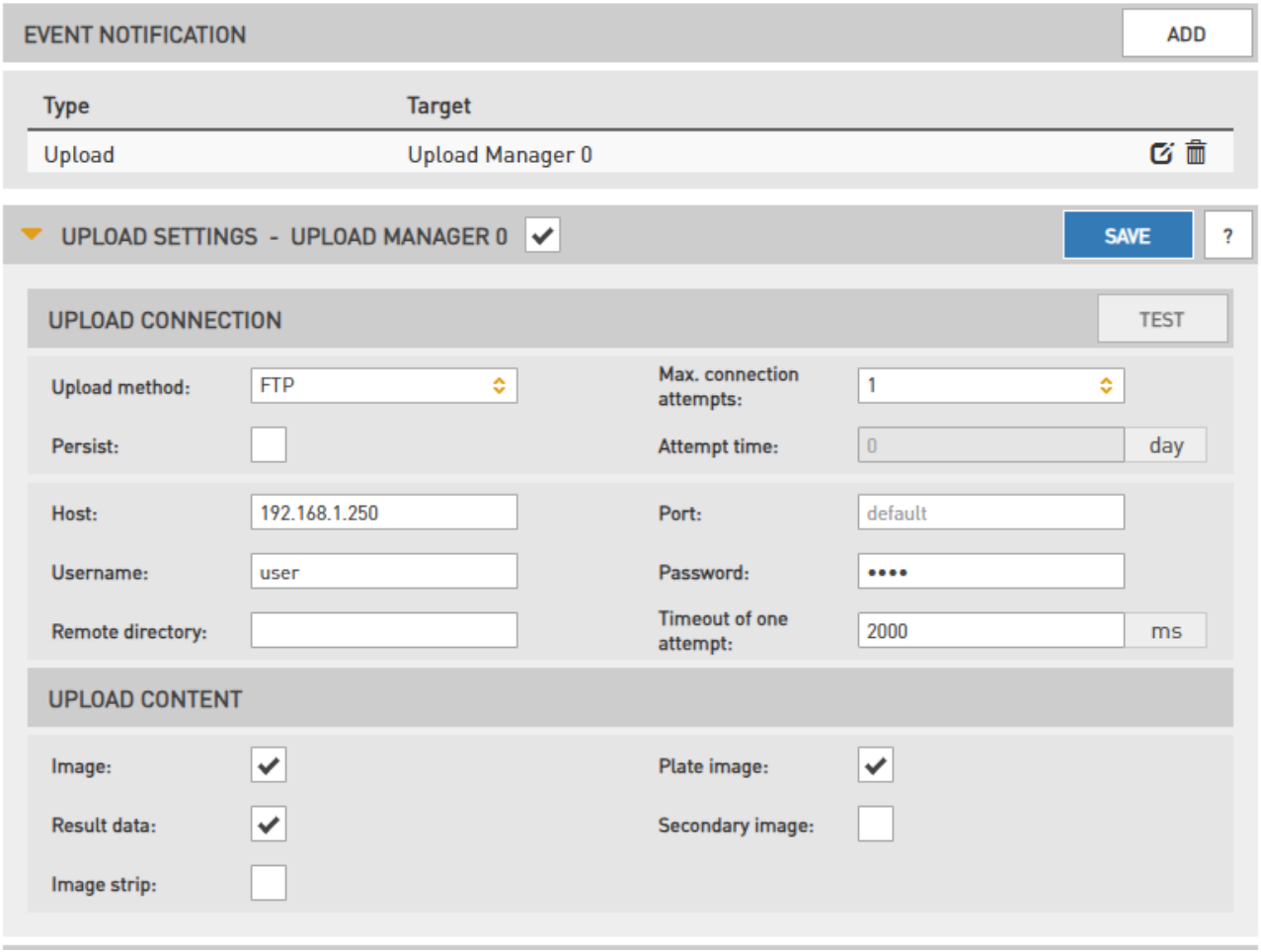
By default, there is a default Rule set. Additionally, multiple Rules can be defined.

As a first step, a Rule needs to be added by pressing the Add button. In the following window, you can set which times the Rule should work.



Under Event Notification, click the Add button, where the Type option will display Upload. Afterward, use the Add button to specify this option.

Press the Edit button to open a window where you can configure the Upload Settings - Upload Manager 0 settings if checked.



Recognition results can be uploaded using the HTTP, FTP or SFTP and *HTTPS protocol. In case of FTP and SFTP the following fields are available and editable:

- **Upload Method:** The protocol used.
- **Max. connection attempts**: In case of failure this is the number of repeated upload attempts.
- **Persist**: You can enable it to try uploading multiple times by checking the persist box.
- **Attempt time**: after checking the Persist checkbox, you can set how many days it will attempt to upload.
- **Host:** Upload target host.
- **Port**:** This allows to easily and visually specify the server port. If no port is specified, a default placeholder is displayed, indicating that the default ports will be used.
- **Username and Password*:** User credentials.
- **Remote directory**:** The directory that the files should be uploaded to.
- **Timeout of one attempt:** The maximal duration of an upload attempt.

*: use this request to upload using HTTPS protocol:
http://cam_ip/lpr/cff?cmd=setproperty&name=/default/cfs/uplm/http/cert_vfy&value=0
**: only present in FTP, SFTP configuration

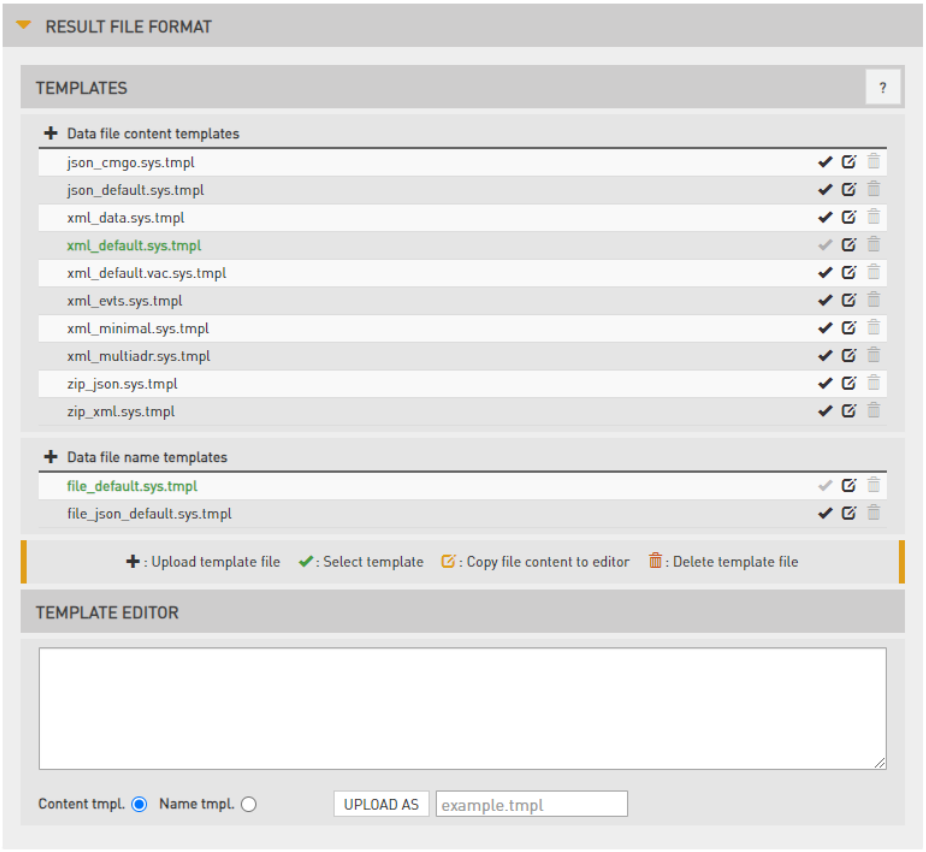
The upload URL now adheres to a standard format that allows the explicit specification of the port number at the end of the URL in case of FTP and SFTP configuration. The format is as follows: protocol://server_name_or_IP:PORT_NUMBER

Example of a custom Port:

- ftp://example.com:2121 → The FTP connection will use port **2121**.
- sftp://192.168.1.1:2200 → The SFTP connection will accept requests on port **2200**.

Upload Content: The selected data and images will be uploaded.

Result file format: You can edit and check trigger information in a selected format.



The upload button + has been added to the header. First part of the filenames has been separated into filename and content templates.

The pencil button inserts the content into the Template editor filed. Clicking on the pencil button enters the contents of the file into the editor, sets the file type, and enters the file name in the appropriate field. After that it is possible to edit, change, and save it. If you save it under an existing name or change it, you will be asked before it. In case that you want to upload under an inadequate name or modify .sys file, it will not allow.

If you change an active template, it will restart automatically afterwards.

The content of the result data file (and the file name) is customizable using templates. The following short example, which will describe a result formatted as an XML contains all features:

1. <?xml version="1.0" encoding="UTF-8"?>
2. <result>
3. <ID value **="$(ID);"**/>
4. <text value**="$DB2XML($(ANPR_TEXT));"**/>
5. <location value**="$(location);"**/>
6. <image value**="$(normal_img);"**/>
7. </result>

Lines #1, #2 and #7 are text only (of course in this example we have to adhere to the XML standard). Line #3 is an example of a database field, line #4 is an example of a function, line 5 and 6 are examples of a property/special field. This template may evaluate to something like:

<?xml version="1.0" encoding="UTF-8"?>
<result>
<ID value ="123456789"/>
<text value="ABC123"/>
<location value="Test Site 34b"/>
<image value="/9j/4AAQSkZJRgABAQAAAQABA[... a base 64 encoded image...]"/>
</result>

The same content in a different format might be:

1. event_id=$(ID);
2. plate_text=$DB2XML($(ANPR_TEXT));
3. camera_location=$(location);
4. vehicle_image=$(normal_img);

which will evalutate to:

1. event_id=123456789
2. plate_text=ABC123
3. camera_location=Test Site 34b
4. vehicle_image=/9j/4AAQSkZJRgABAQAAAQABA[... a base 64 encoded image...

Adaptive Recognition **America**
Adaptive Recognition **Hungary**
Adaptive Recognition **Nordic**
Adaptive Recognition **Singapore**
REQUESTINFO@ADAPTIVERECOGNITION.COM
WWW.ADAPTIVERECOGNITION.COM

Database fields

The contents of the database can be injected using the following syntax:

$([database field id])

Functions

To format the output the following functions are provided, with the general syntax:

$[function name]([argument1],[argument2],...,[argumentN]);

Plate text formatting:

DB2XML(text,flags:optional)-converts the license plate text *text* from DB to XML format, where flags may be one of the following;

- **ARABIC2LATIN-**convert all Arabic characters to their latin equivalent
- **ENCODE_ALL-**encode all characters in **&#x**CCCC; format

DB2JSON(text,flags:optional)-converts the license plate text *text* from DB to JSON format

DB2UTF8(text,flags:optional)-converts the license plate text *text* from DB to UTF8

Time formatting:

Format Time(timestamp,format_string:optional)- formats timestamp given in milliseconds according to the optional format_string (see the POSIX strftime function). For example:

"$FormatTime($(FRAMETIMEMS),%Y%m%dT%H%M%S%z)" evaluates to "20180419T145713+0200". If the format string is omitted, the same timestamp is evaluated as "2018.04.19 14:57:13.594"

Note

Please note that in the case when special rules apply to using the string compiled from the template (for example a file name template that will be used as a part of an URL of an FTP upload), you need to make sure to adhere to these rules. In the previous example it means that spaces will have to be replaced by '%20', filenames on certain systems can't contain ':', etc.

Special fields

The following keywords are defined:

normal_img - the image representing the event, Base64 encoded

lp_img - the cropped license plate image, Base64 encoded

aux_img - the overview image, Base64 encoded

strip_img - the image strip, Base64 encoded

location - the location string as defined in default/cfs/db/location

cameraid - the camera HW id, may be overridden with default/cfs/db/cameraid

Important!

Special characters: The character '$' must always be escaped with '\'. Within an expression the characters '$', '(', ')', ',' and ';' have to be escaped with a '\'character.

For example the following expression:

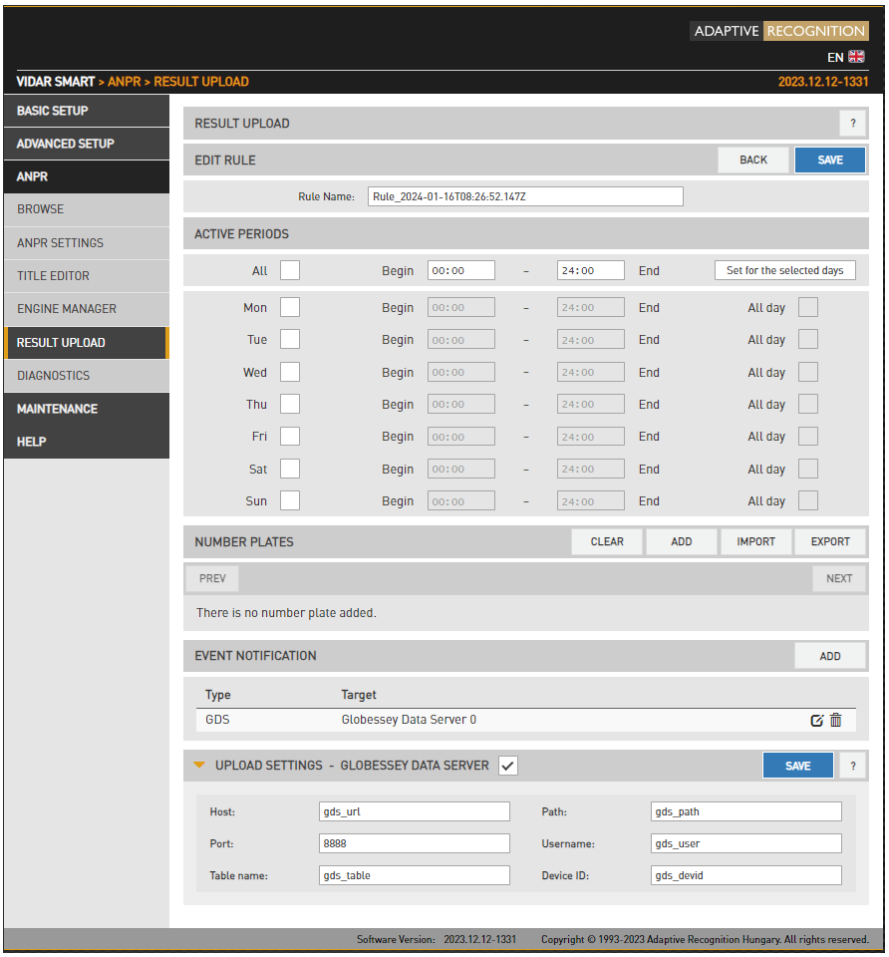
();$TEST(a\$a\,,$(LP));

will evaluate as

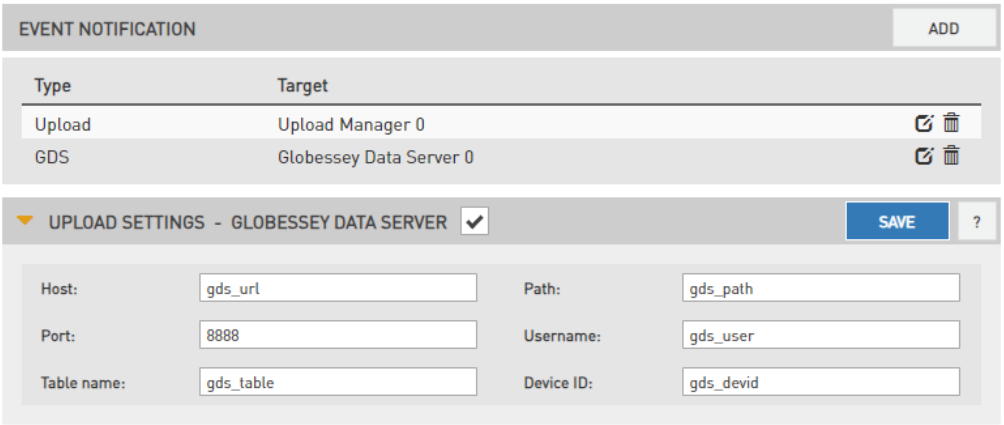
();a$a,DATA

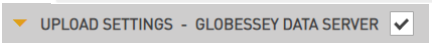
provided that the function TEST concatenates its arguments and the field LP contains the text 'DATA'.

Globessey Data Server



GDS deals with the most complex traffic management challenge in an effortless manner: simultaneously managing data collection from numerous endpoints and serving queries of various business units.

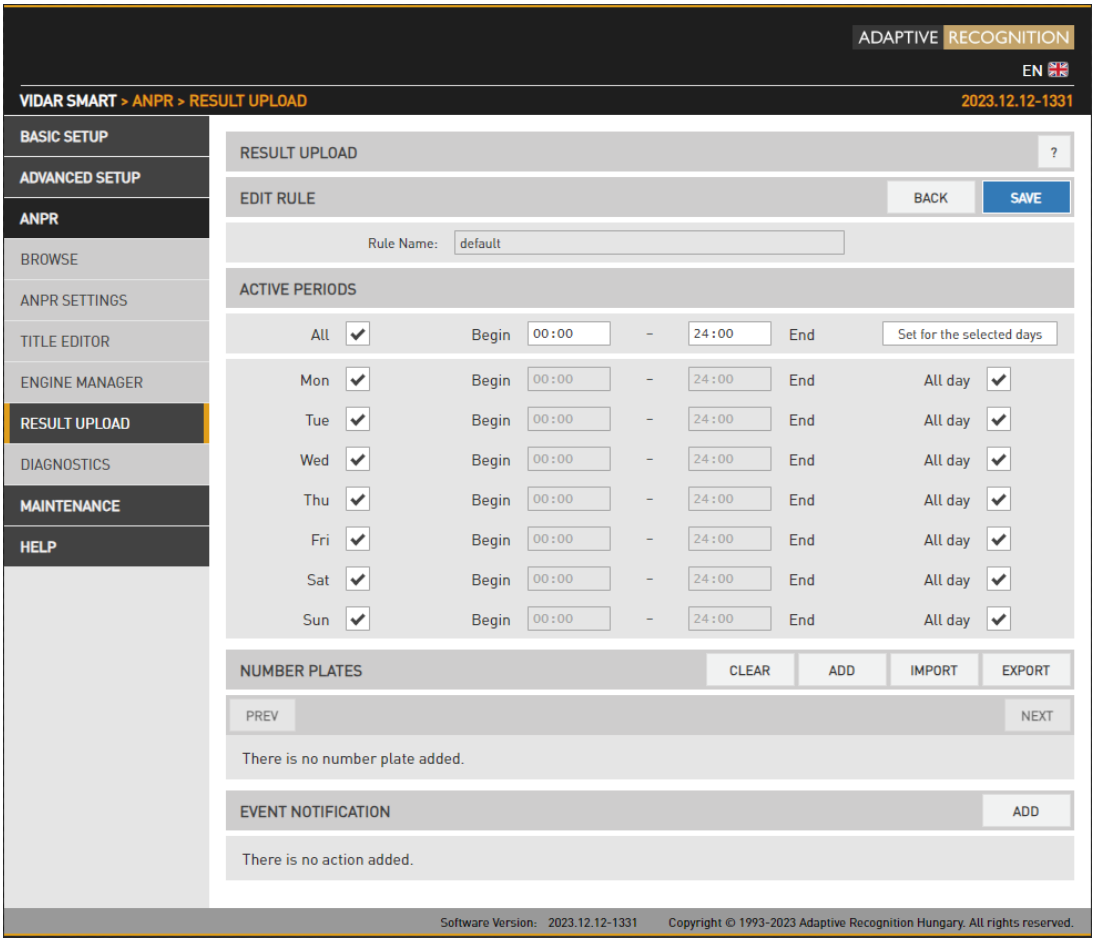


Tick in  checkbox to activate the function.

Under Upload Settings, enter the requested parameters and press the Save button to validate the changes.

7.2.6. NUMBER PLATES

WEB INTERFACE > ANPR > RESULT UPLOAD



The purpose of this feature is to execute tasks upon reading a certain license plate.

To enable the Number Plates feature, use the Add button.

> **Note**
>
> If the feature is disabled, the settings under Upload Manager 0 will be applied. That is all license plates will be uploaded if Upload Manager 0 is enabled and configured. This way compatibility is ensured with previous releases.

The Number Plates feature is based on **rules**. Rules consist of a **time condition** (e.g., workdays 9:00-16:00), a **license plate condition** (ABC123 and DEF456) and an **event notification** (pull GP output to high or upload event data to an FTP server). If and only if both the time and license condition is satisfied, then the event notification will be executed.

Rules must have unique names (LP's corresponding to one rule must be unique). A rule can be deactivated, so users don't have to delete/re-enter the rule if they want to temporarily suspend its action. If it exists, a special rule named 'default' will be executed if no other rule applies. You can add/edit a rule by clicking add/edit.

7.2.7. RULES

A rule will be created with an automatically generated name. It is good practice to change this to a more descriptive name. If the rule is named 'default', then it will be applied if no other rule can be satisfied.

7.2.8. TIME SETTINGS

The day and time range during which the rule applies can be specified. Alternatively, you can use the **All day** check box.

7.2.9. LICENSE PLATES

License plates can be added manually one by one or imported from a CSV file. A license plate can be removed by hovering over the text and clicking the **Trash bin** icon. Alternatively clicking the Clear button all items will be cleared.

7.2.10. EVENT NOTIFICATIONS

You can add multiple tasks to a rule, each will be executed if the conditions are satisfied. The following actions can be:

- Upload via an Upload Manager
- Execute a GPIO 100msec signal
- Execute an RS232 or GPIO output for Wiegand26 Communication protocol

If a task has any settings, those are available clicking the **Cogwheel icon** beside the event notification task list entry. An entry can be removed by clicking the **Trash bin icon**.

EXAMPLES

7.2.11. REPORTING STOLEN VEHICLES

Create a rule, select all week/all day and add the license plates and an Upload type Event Notification. The plates on the list will be reported. You can specify up to 8 receiving servers (Upload Manager 0-7), event data will be uploaded to each.

7.2.12. OPENING A GATE FOR VEHICLES

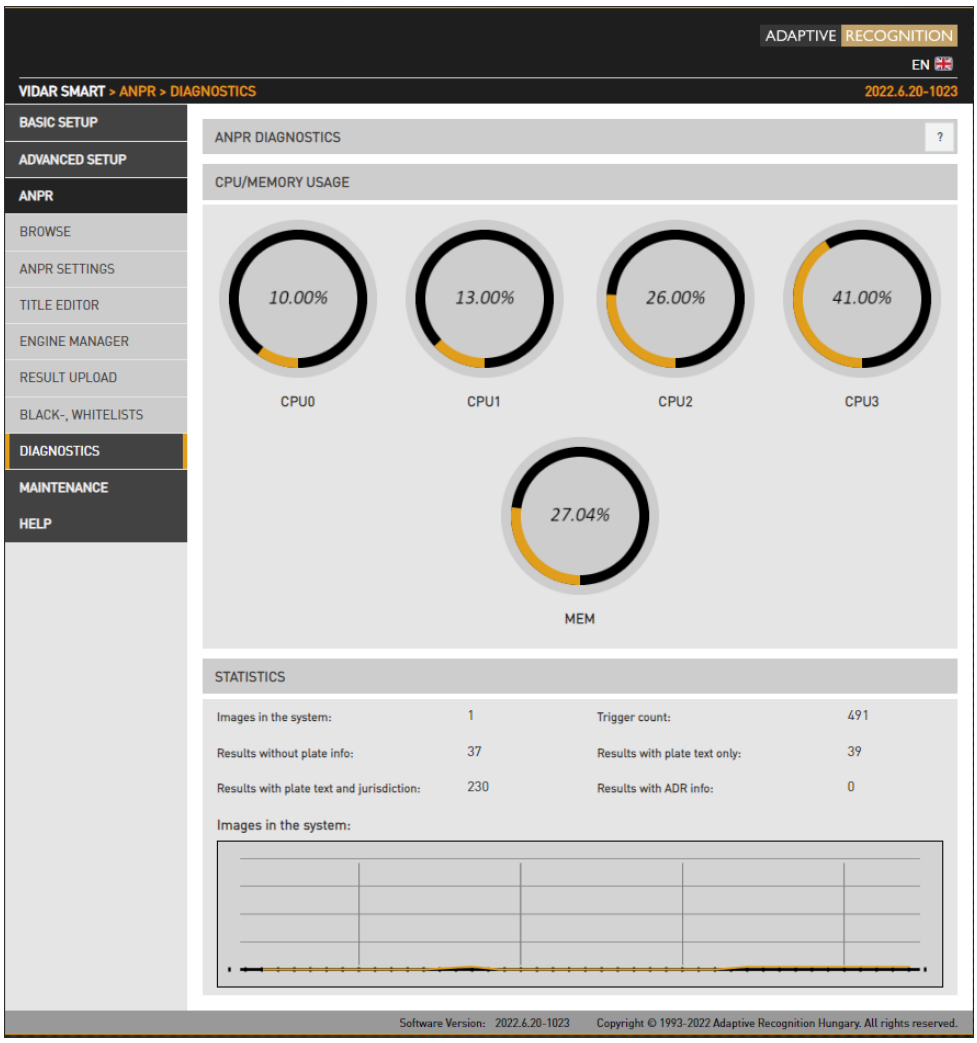
Create a rule, select workdays and add the license plates and an Exec/GPIO type Event Notification. GP output will be triggered when a plate on the list has been read.

7.2.13. REPORTING UNAUTHORIZED USE OF TOLL ROAD

Edit the default rule (named 'default'), add an Upload type Event Notification which by default will forward all license plates to the tolling backend. Now create a second rule (named 'exempt'), and add the license plates that are exempt from paying tolls (ambulance, police, road works). Do not add any Event Notifications, consequently those on this list will not be reported via the Upload feature. Edit time/date settings accordingly, for example if tolls apply only on weekdays uncheck Saturday and Sunday in both rules.

7.2.14. DIAGNOSTICS

WEB INTERFACE > ANPR > DIAGNOSTICS



Use this tool to monitor system workload.

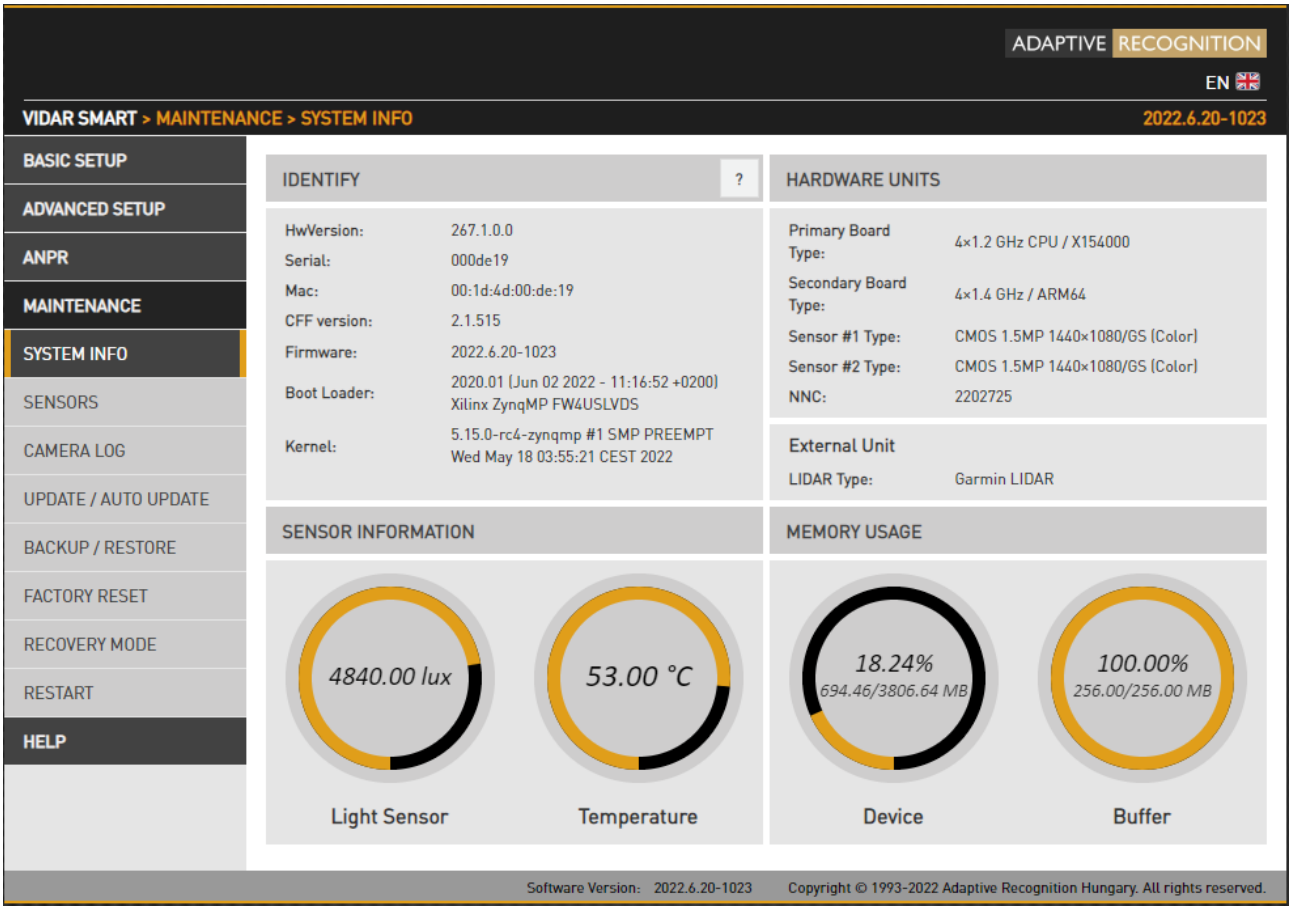
The results in STATISTICS will inform you about current and recent specific tasks like:

- **Images in the system:** the number of captured images waiting for process.
- **Trigger count**: the number of triggers received from the trigger sources
- **Results without plate info:** # of events where no license plate could be recognized
- **Results with plate text only:** # of events where only the license plate text is available (most likely originating from the Preselection stage)
- **Results with plate text and jurisdiction:** # of events where complete ANPR info is available
- **Results with ADR info:** # of events where ADR info is available.

8. MAINTENANCE

8.1. SYSTEM INFO

WEB INTERFACE > MAINTENANCE > SYSTEM INFO

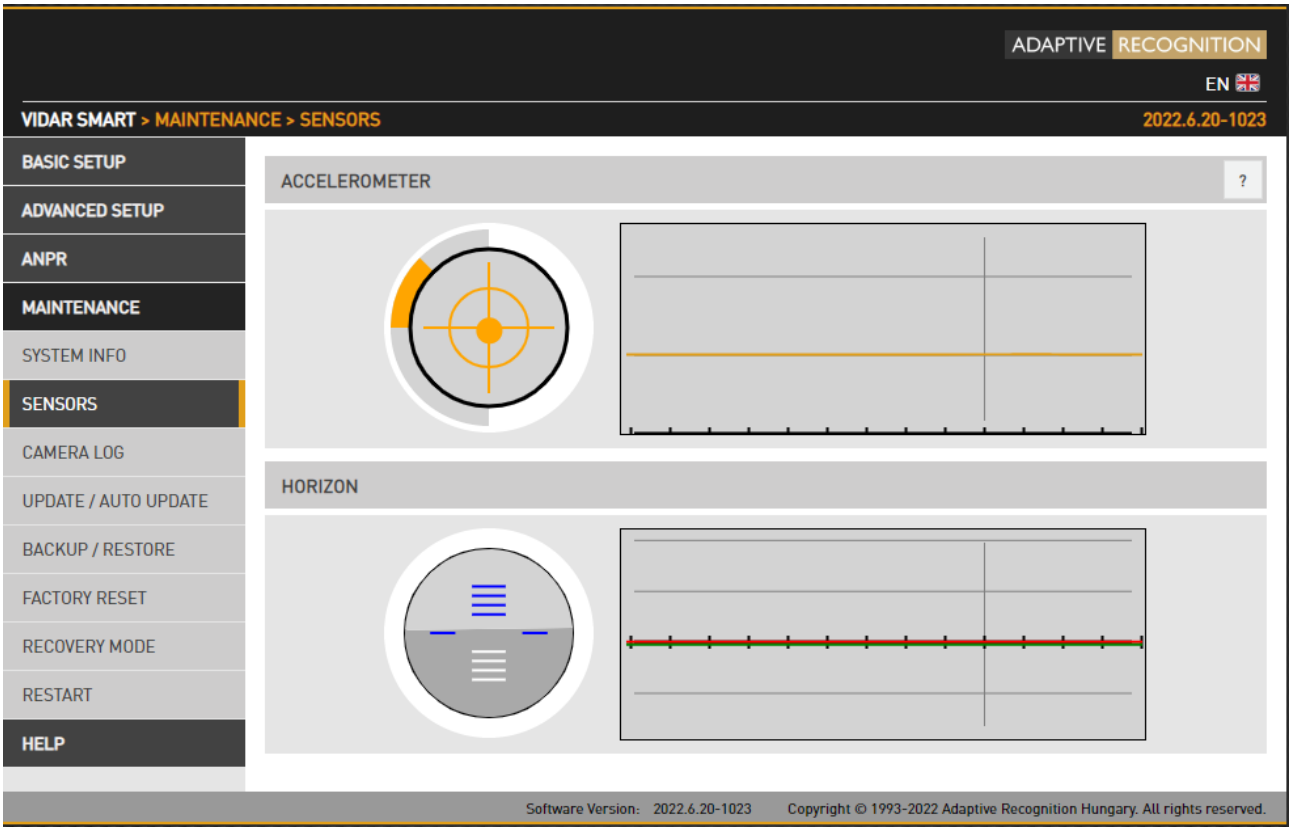


The most important details about the device are listed here.

- IDENTIFY tab lists values identifying the system. Please refer to these values when reporting a bug. Be sure to include your HW Version and the Serial Number.
- HARDWARE UNITS lists the hardware components of the camera.
- SENSOR INFORMATION and MEMORY USAGE provide info about temperature, light levels and memory usage. It is normal to have both memory usage stats at or near to 100 %.

8.2. SENSORS

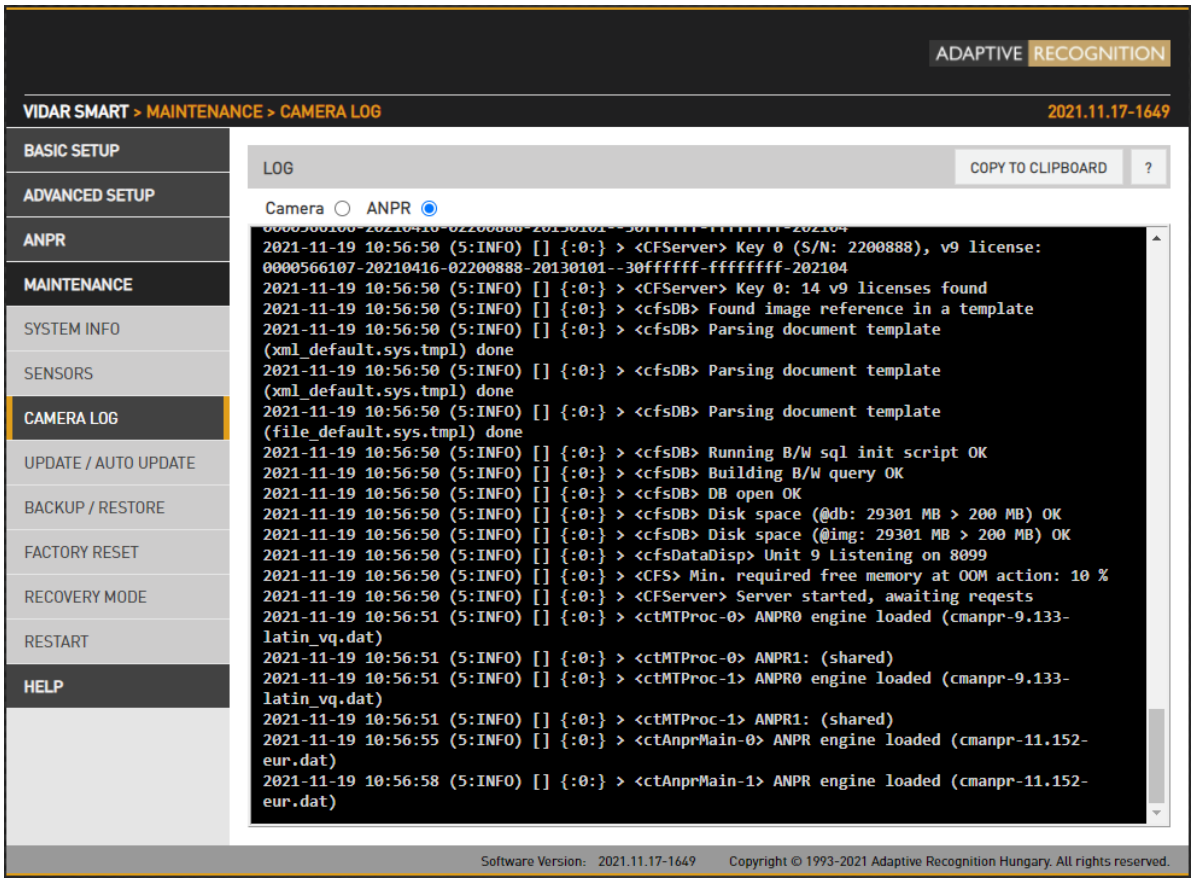
WEB INTERFACE > MAINTENANCE > SENSORS



The built-in accelerometer may provide help aligning the camera.

8.3. CAMERA LOG

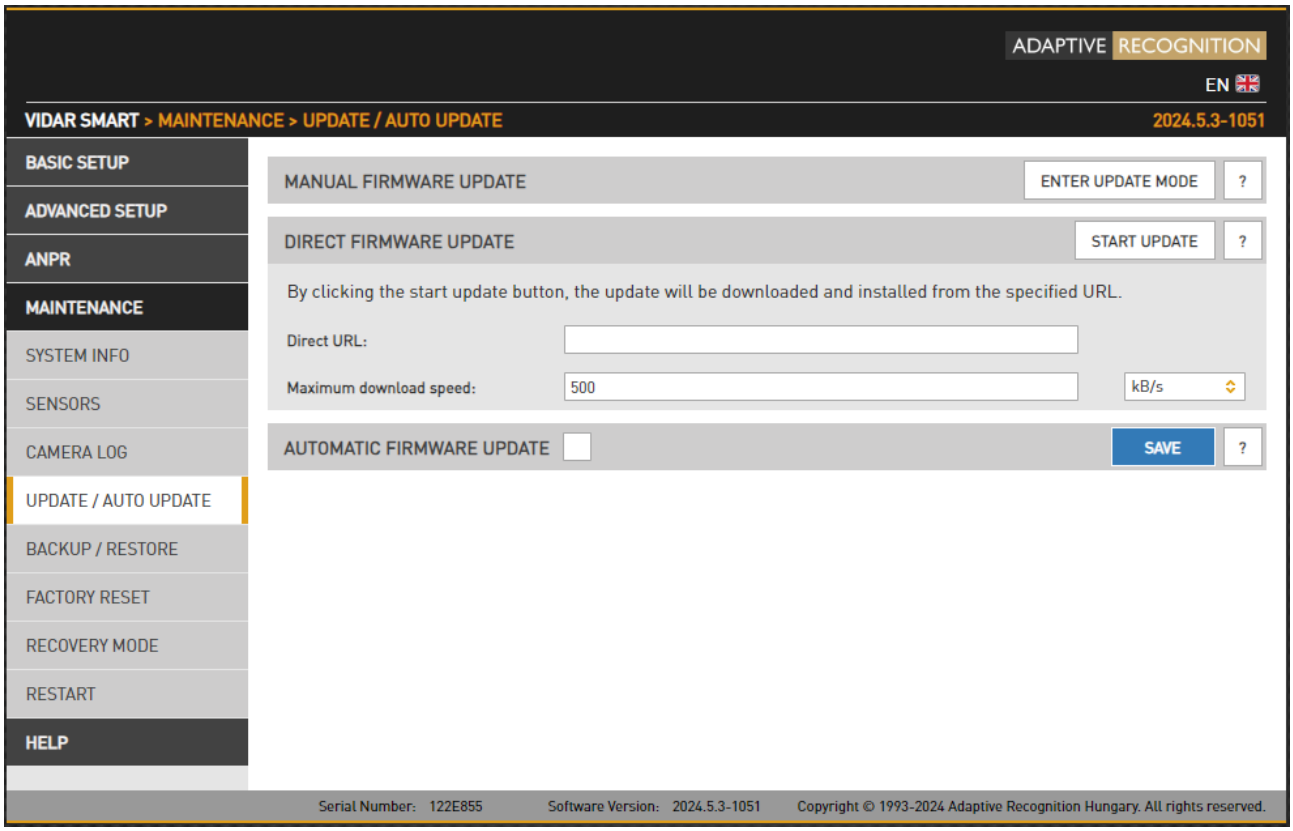
WEB INTERFACE > MAINTENANCE > CAMERA LOG



Camera and ANPR logs provide information about the processes in the camera and the license plate recognition module respectively. Log entries can be copied to the clipboard COPY TO CLIPBOARD and attached to a bug report.

8.4. UPDATE/AUTO UPDATE

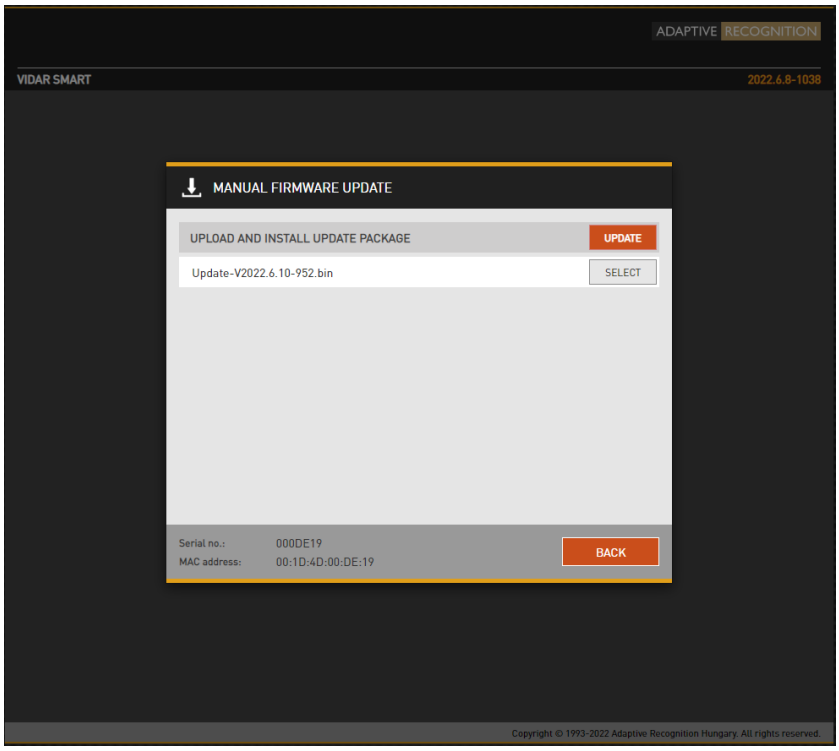
WEB INTERFACE > MAINTENANCE > UPDATE/AUTO UPDATE

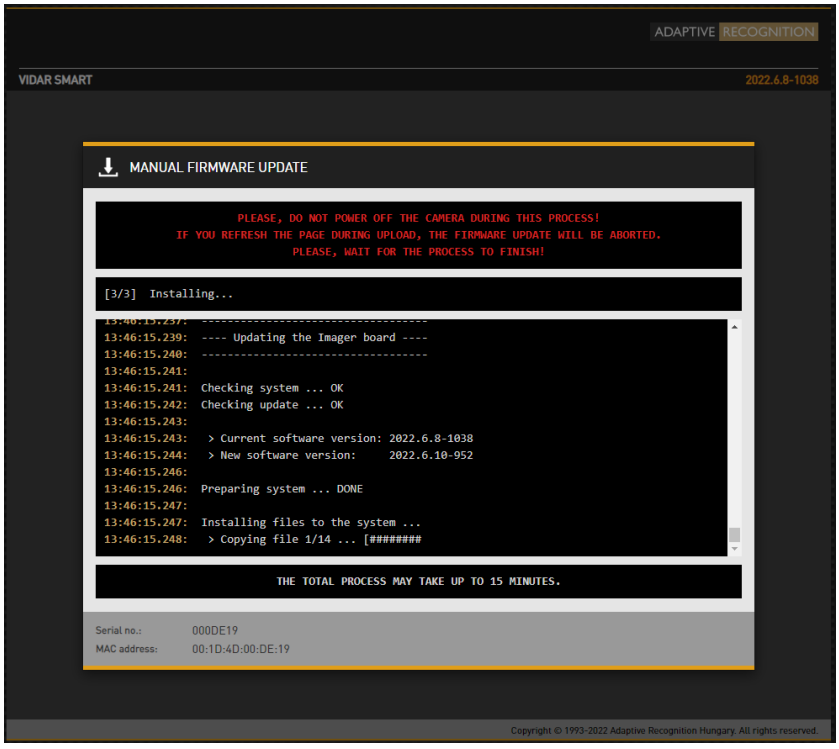


This menu provides tools to manage camera firmware.

Use ENTER UPDATE MODE to upload a new firmware.

First step is to tap „Select" button to choose update package from your computer. When you have loaded, tap „Update" button to start installing the update package.





The total process may take up to 15 minutes.

Important!

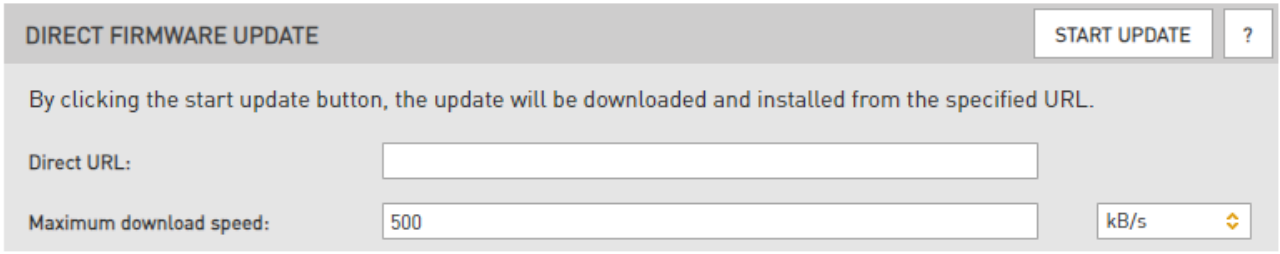
If you power off the camera or refresh the page, the firmware update will be aborted!

Encrypted update

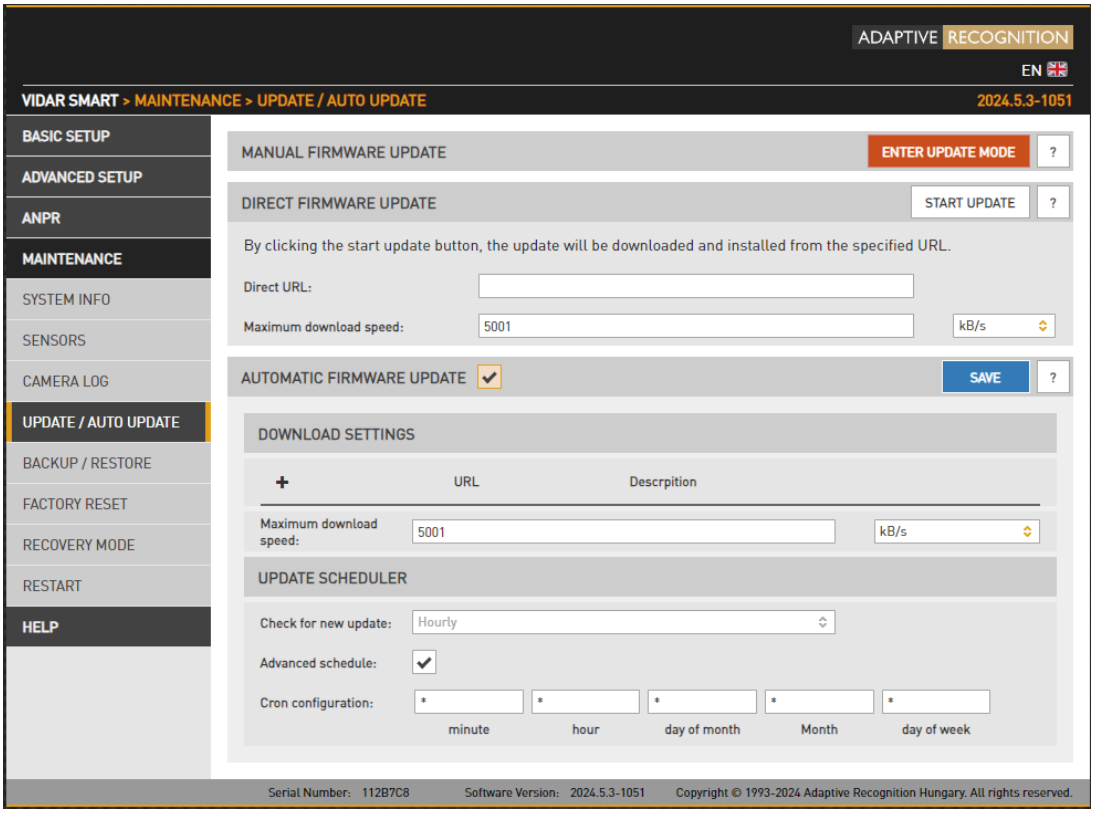
The update can only execute on a camera with firmware version 2021.10.14-1810. For version 2021.10.14-1810, a temporary package called must be installed first.
After that, the operation becomes available. Once the temporary package has been uploaded, it can only be upgraded to later versions than the temporary package.

8.4.1. DIRECT FIRMWARE UPDATE

The **Maintenance -> Update/Auto update** page has been expanded with a new section called Direct Firmware Update.
Here, you can specify a **URL** (the system checks if the format is correct) from which it tries to download and install the update package.
The download speed is common with the auto-update section; changing one affects the other.
By clicking the **Start Update button**, the values are stored, and the update process starts. The camera starts in update mode, and if the package is not valid, the user receives a notification on that interface.



8.4.2. AUTO UPDATE



Auto update function provides to the customer to configure hundreds of cameras updated automatically without install them one by one.

The auto update used in ARH OS is able to retrieve installation packages from a server and automatically install it immediately or on time. By default, it operates in a client-server system.
It can be used to install the following packages:

- Complete firmware update packages
- Smaller patch packages
- License / certificate packages
- Engines
- Configuration packages
- Custom OEM packages, additions

Supported servers:

- HTTP
- HTTPS

Settings:

- Multiple servers can be specified (up to 99), these will go through the list and use the first one that works
- Create a HTTP webserver on your computer
- Copy the actual firmware update package in the folder (**.bin, .chk** and **GET** files)
- It contains the update package and a **GET** file

GET file example:

V1.3|*|*|arm64|*|Update-V2.0.bin|N

Column's description:

- Version number
- Type
- Serial number
- Architecture
- Tag
- Update file
- Flags

The flag field (string) can be several characters long.

Contents:

First character **'N'**: normal mode, does not start the update process immediately.

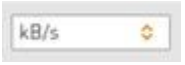
'F': force - start immediately the downloaded update package.

If there is no flag field, **'N'** is the default value.

On the camera web interface:

1. Check

column to switch on Auto Update.
2. Plus sign can be used to add the webservers path. The servers will check camera updates for software.
3. The name/description of the server.

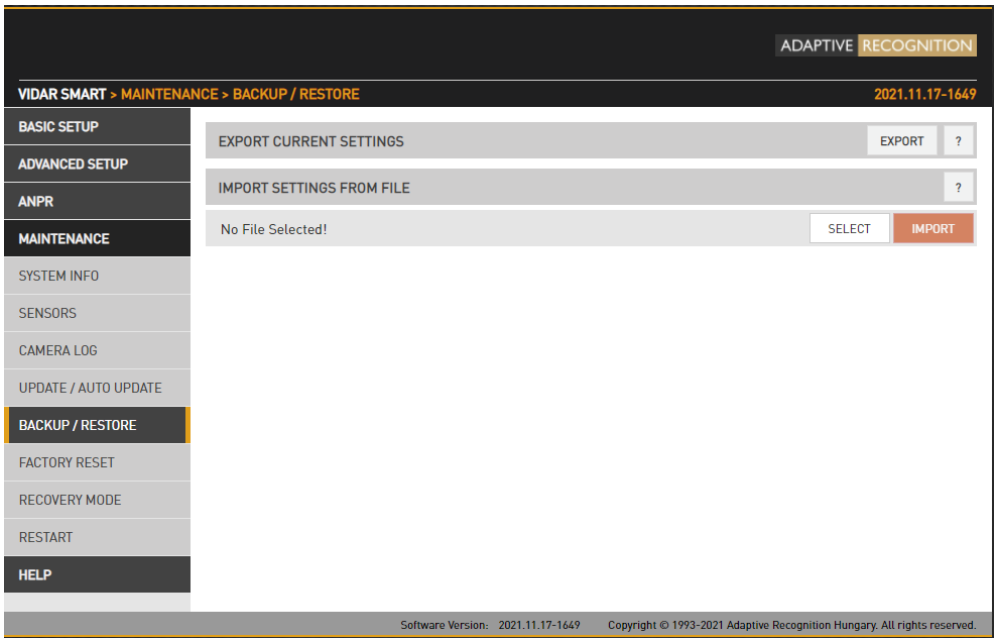
4. Change or delete the current URL.
5. The maximum adjustable download speed and unit of measure for the software package. This is important because downloading during the periods of high data traffic with too much bandwidth, it can slow down the camera's data transfer. 

6. If the

field is not checked, the top input field is active. If it is enabled, the bottom is active. The top field check every hour / day / month that new software version is available on servers (for day and month at midnight). In the Advanced schedule case, Cron configuration can be specified (this is a Linux scheduler, more complicated scheme can be specified as well, like the first day of the month and the middle day, every Wednesday, etc ...)

> Note
>
> Do not forget to save settings by clicking **Save**.

8.5. BACKUP/RESTORE



Important!

Requirement:

- **Firmware Version:** The source and target cameras must have identical firmware versions (System Info > Firmware).
- **Camera Model:** The camera models must match (e.g., 7020 or U (UltraScale), based on identical Board #1 type).
- **Sensor:** The number of sensors in both devices must be the same.

Important compatibility requirements:

Before using the backup and restore function, ensure that the source and target cameras meet the following compatibility requirements:

Cameras must have the **same firmware version.** To check the firmware version, go to System Info.

Camera models and sensor specifications must match:

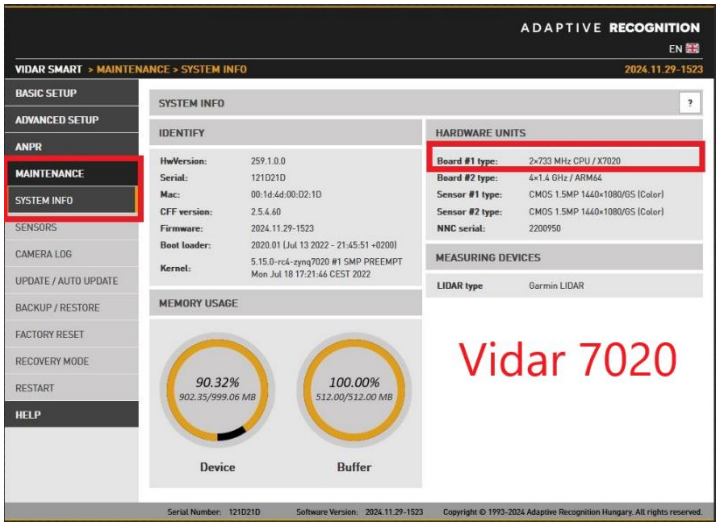
- The number of sensors must be identical.
- The type of sensors and whether they are color or monochrome must match.
- If the camera has two sensors, both must be verified for compatibility.
  For sensor details, check System Info.

How to recognize Vidar 7020 vs. Vidar U cameras in System Info:

In the System Info screen, you can find critical hardware and software details that help determine if your camera is a 7020 or a U model. Here is a line-by-line breakdown:

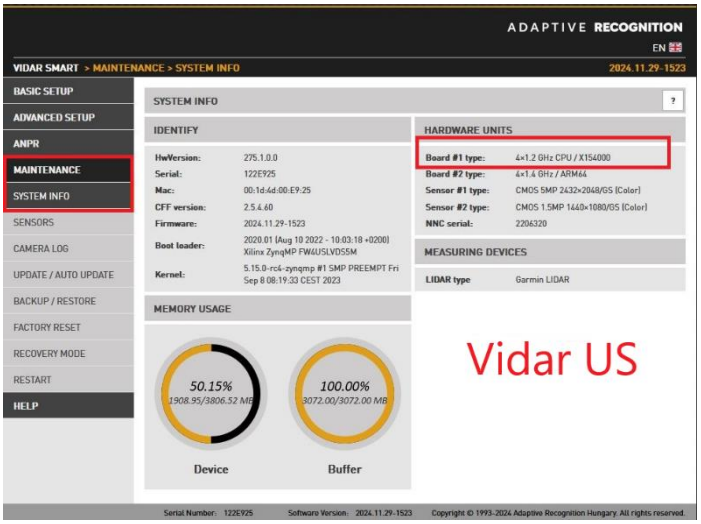
The most Important difference: Board #1 Type

- **7020 Camera:**
  - Displays **2x733 MHz CPU / X7020**.
  - The code "X7020" clearly indicates the 7020 hardware platform.



- **UltraScale Camera:**
  - Displays **4x1.2 GHz CPU / X154000**.
  - This indicates the camera is built on the U (or a newer generation) hardware platform.

Sensor #1 type, Sensor #2 type



- Indicates the resolution, color/monochrome status, and other specs of each sensor.
- For example: CMOS 1.5MP 1400@1080 / color.
- If there are two sensors (e.g., a 2xHDx model), both will be listed. Single-sensor models (HDx) will show only one.

By verifying these details, you can ensure that the source and target cameras match in both **firmware version** and **hardware/sensor specifications**, fulfilling the compatibility requirements necessary for a successful backup and restore process.

When using a backup file to transfer settings from one camera to another, all settable values are copied, **except** for:

- Network Settings
- ANPR engines (Automatic Number Plate Recognition engine).

Additionally:

- User Data is **not** transferred.
- Date, time, and NTP settings are **not** transferred.
- License is **not** copied.

Examples of compatibility:

Vidar U HDx → Vidar U 2xHDx:

- Transfer does not work, even if settings for the second sensor are ignored.

Vidar U 2xHDx → Vidar U HDx:

- Transfer does not work.

Vidar 7020 HDx ↔ Vidar U HDx:

- Transfer is not possible in either direction.

Summary

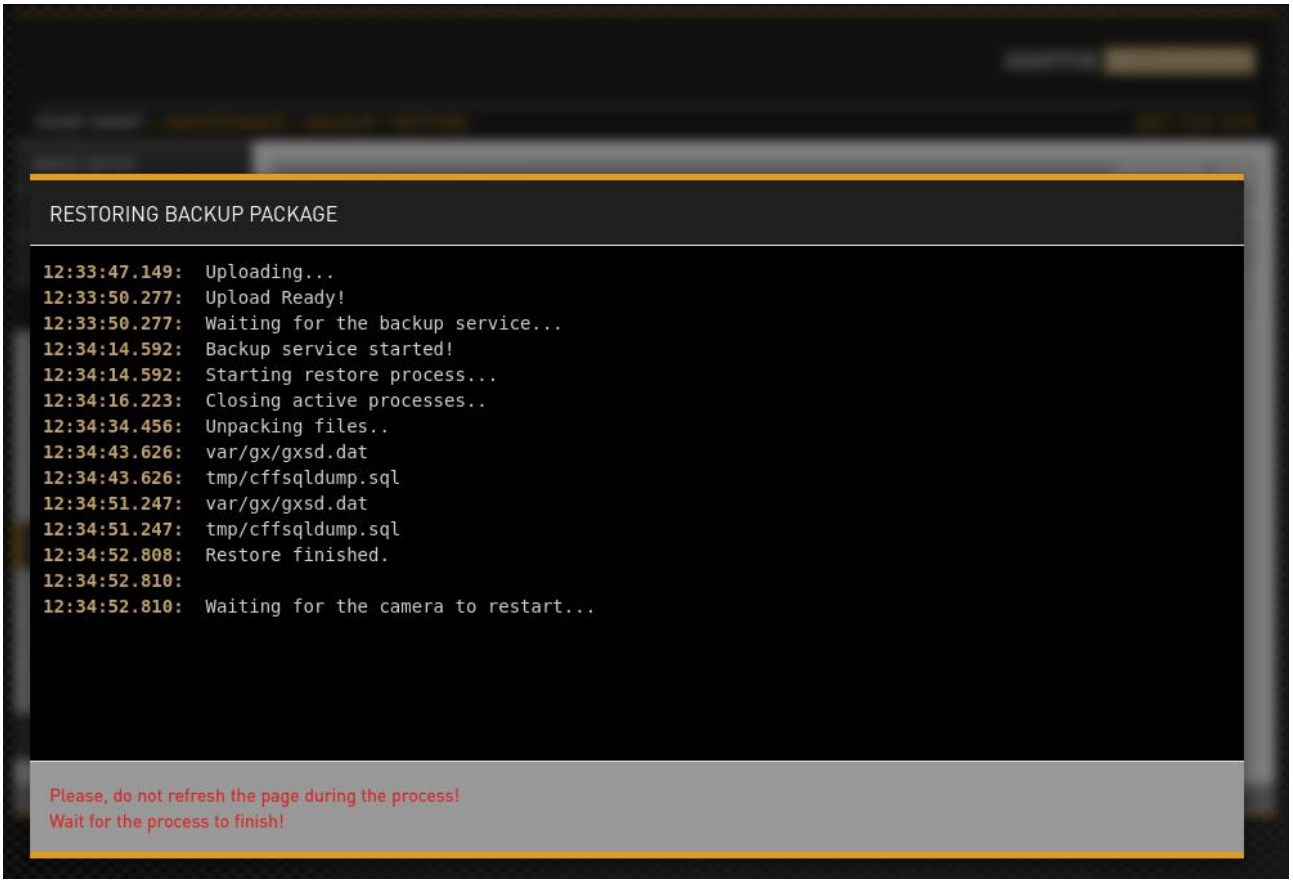
Backup files can only be used between devices with identical firmware versions and compatible sensors. Network settings, ANPR engines, date, time, NTP settings, and licenses are not included in the backup file and must be configured separately on the target device.

Encrypted backup

In the "Backup / Restore" menu, press the Export button EXPORT to download the backup, which will be encrypted.

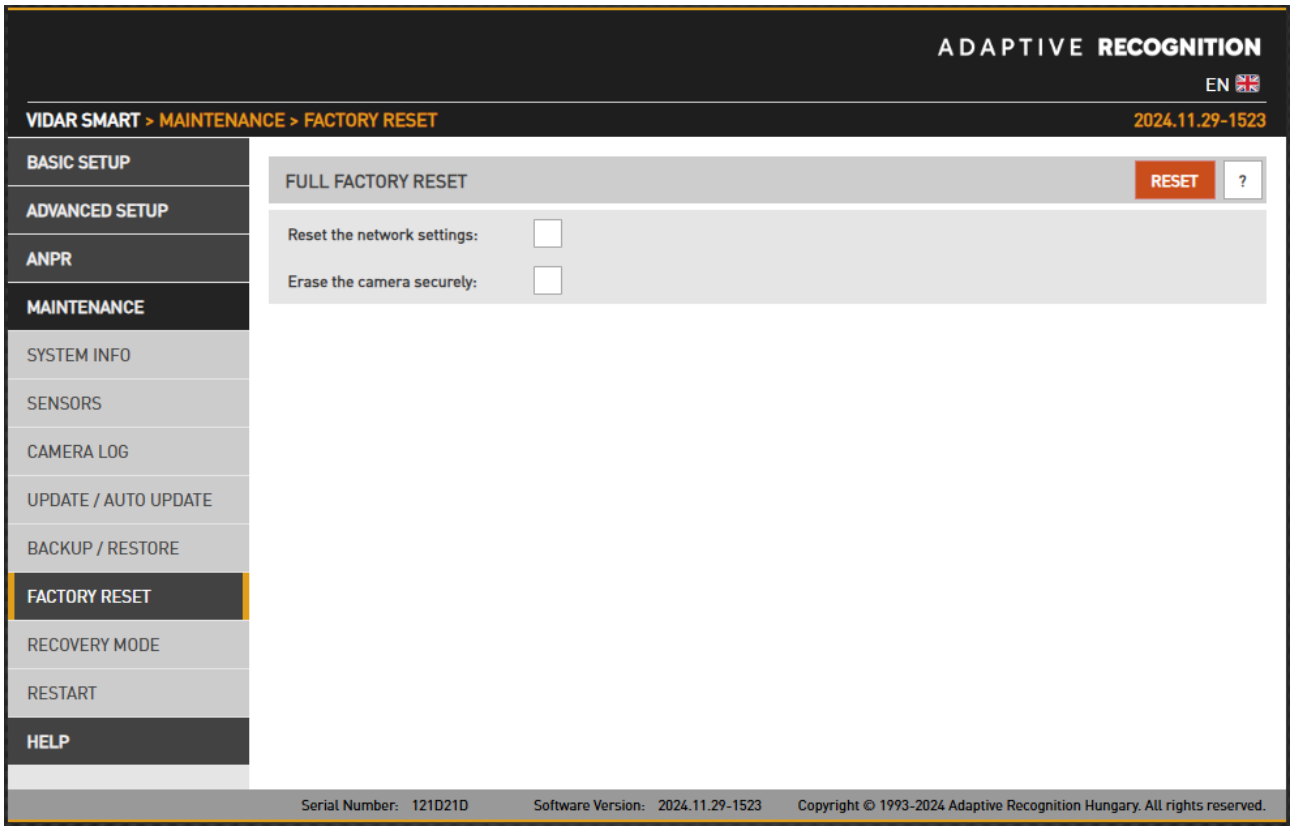
To restore a downloaded backup, first select the backup file you want to restore using the Select button SELECT on the camera's "Backup / Restore" menu, then press the Import button IMPORT and confirm the restore intention in the pop-up window. A backup can only be restored on the same type of camera where the full hardware and software package are the same.

This is the import process when we restore the backup file. Wait until the process is finished.



8.6. FACTORY RESET

WEB INTERFACE > MAINTENANCE > FACTORY RESET



The factory reset process behaves differently depending on the selected options.
Detailed explanation of the behavior and recommendations for each reset options below:

1. **Default full factory reset without any option selected:**
   If no options are selected during the factory reset process, the camera automatically resets itself to the factory default settings after restarting.

> **Note**
>
> After every firmware update, it is strongly recommended to perform a factory reset, if possible, as it ensures stable and reliable operation.

2. **Reset the network settings:**
   Use this option if you want to do a factory reset and restore the default IP address of the camera to its factory IP address (192.0.2.3). This is particularly useful if network configurations need to be reset for troubleshooting.

3. **Erase the camera securely:**
   This option securely deletes all data stored on the camera. We recommend using this option, only if you need to completely delete all data from the camera for security reasons.

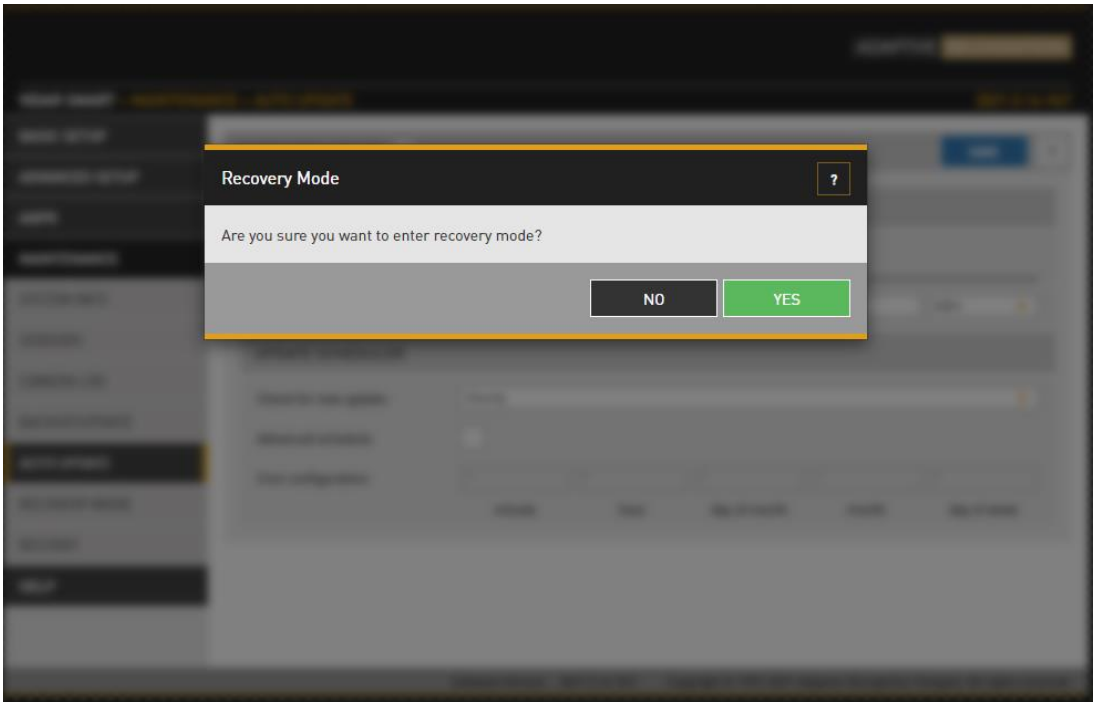
4. **Selecting both options ("Reset the network settings" + "Erase the camera securely"):**
   If both options are selected, the camera will perform a secure erase and also reset the IP address to the default IP address (192.0.2.3.).

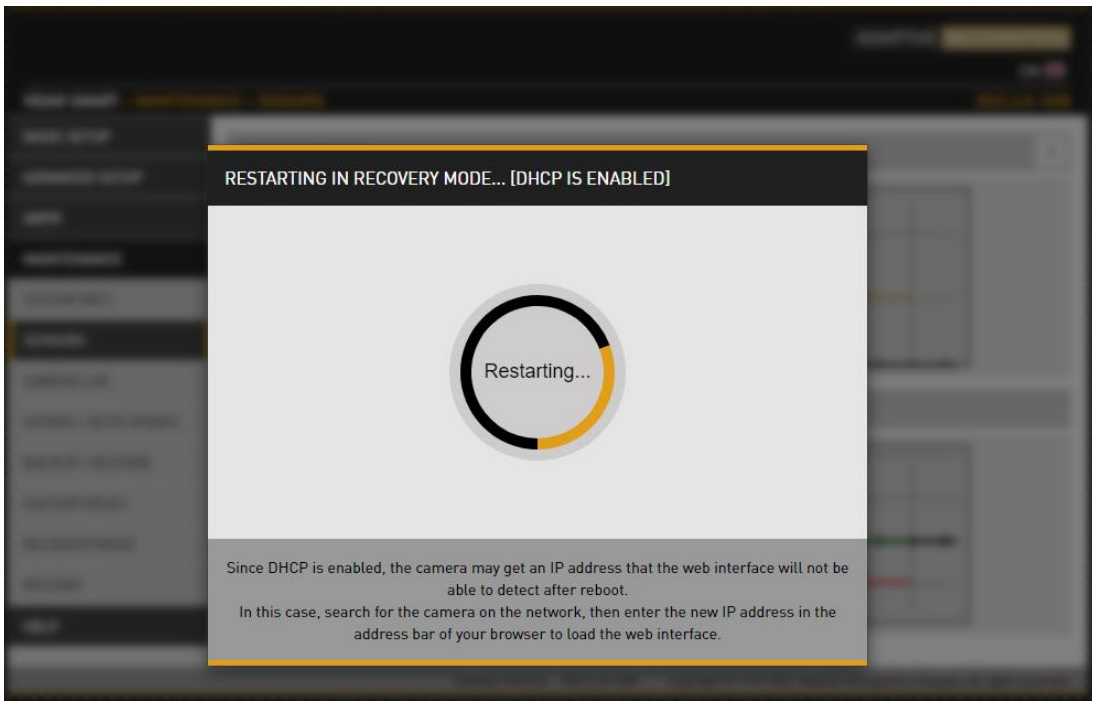
Important!

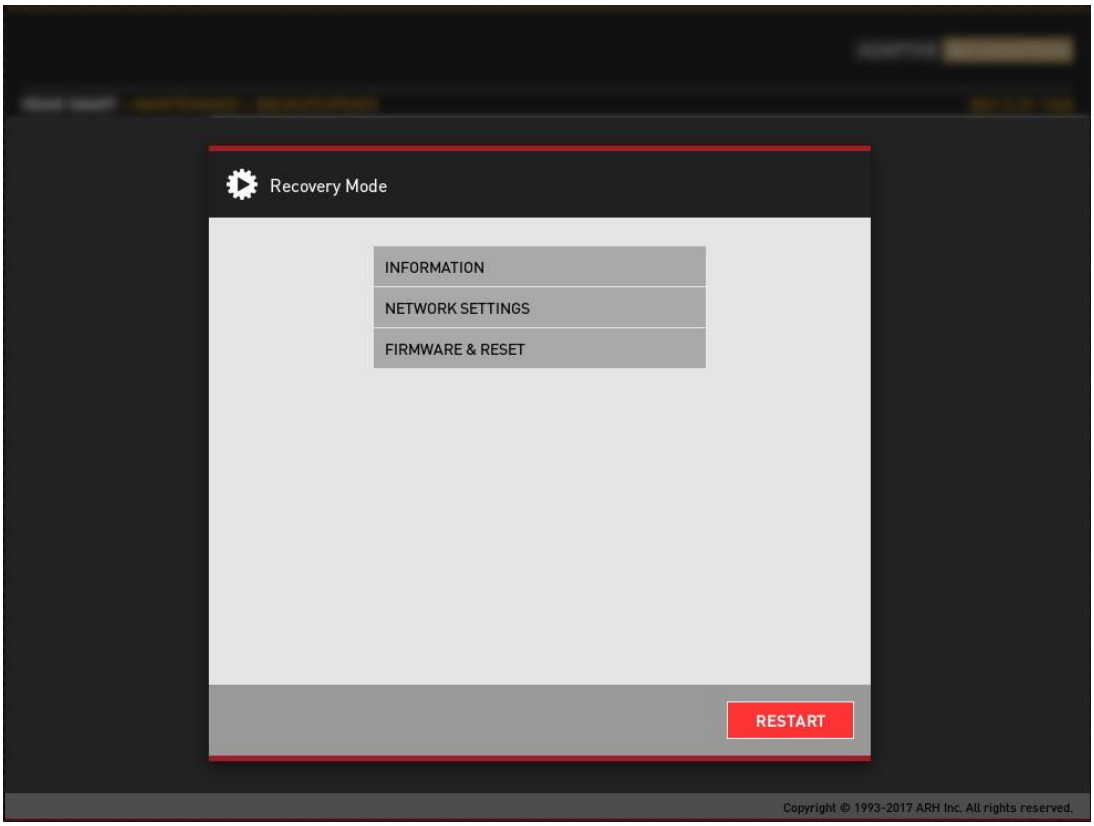
These two options should only be selected simultaneously if the camera is being uninstalled or being sold. Make sure to backup any important data before initiating the reset.

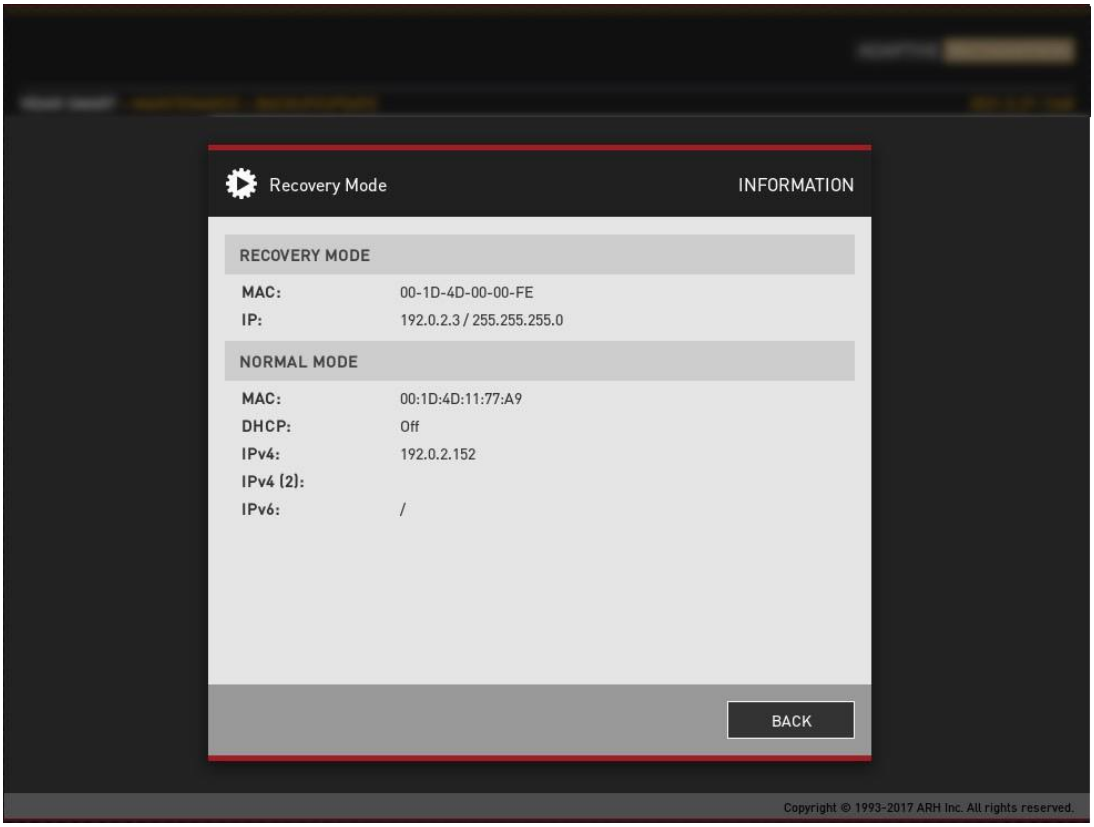
8.7. RECOVERY MODE

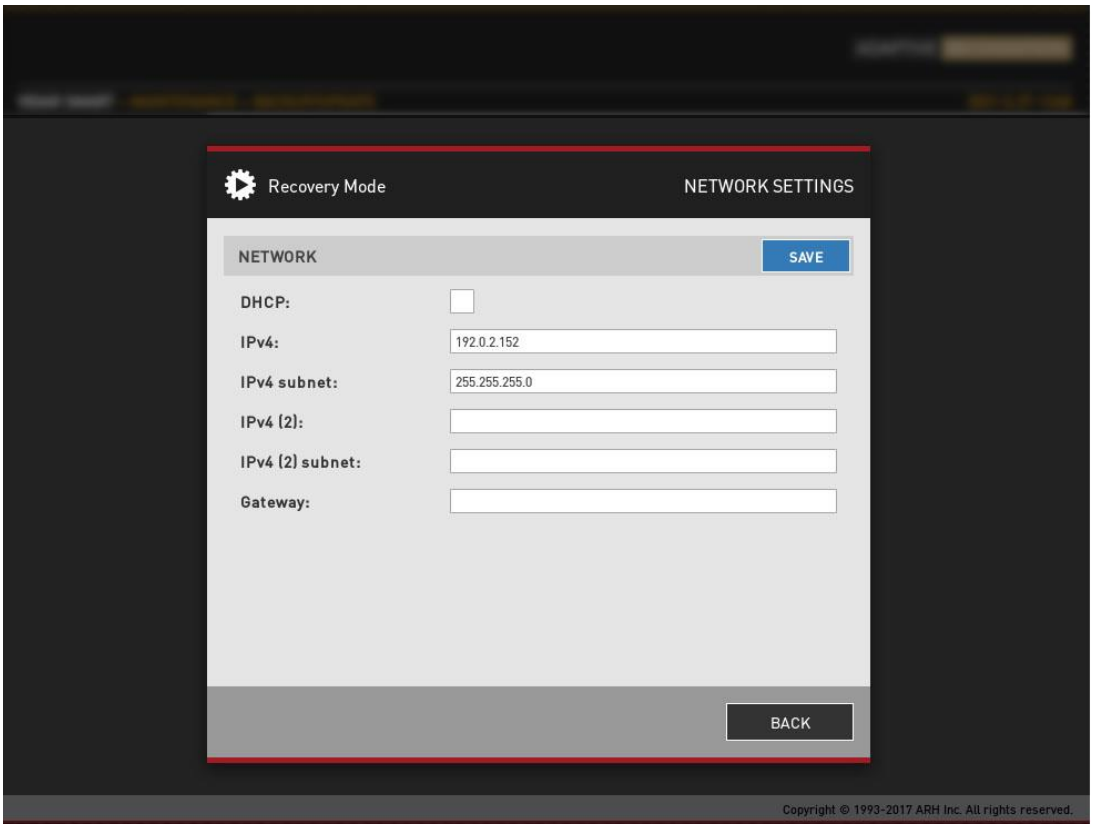
WEB INTERFACE > MAINTENANCE > RECOVERY MODE

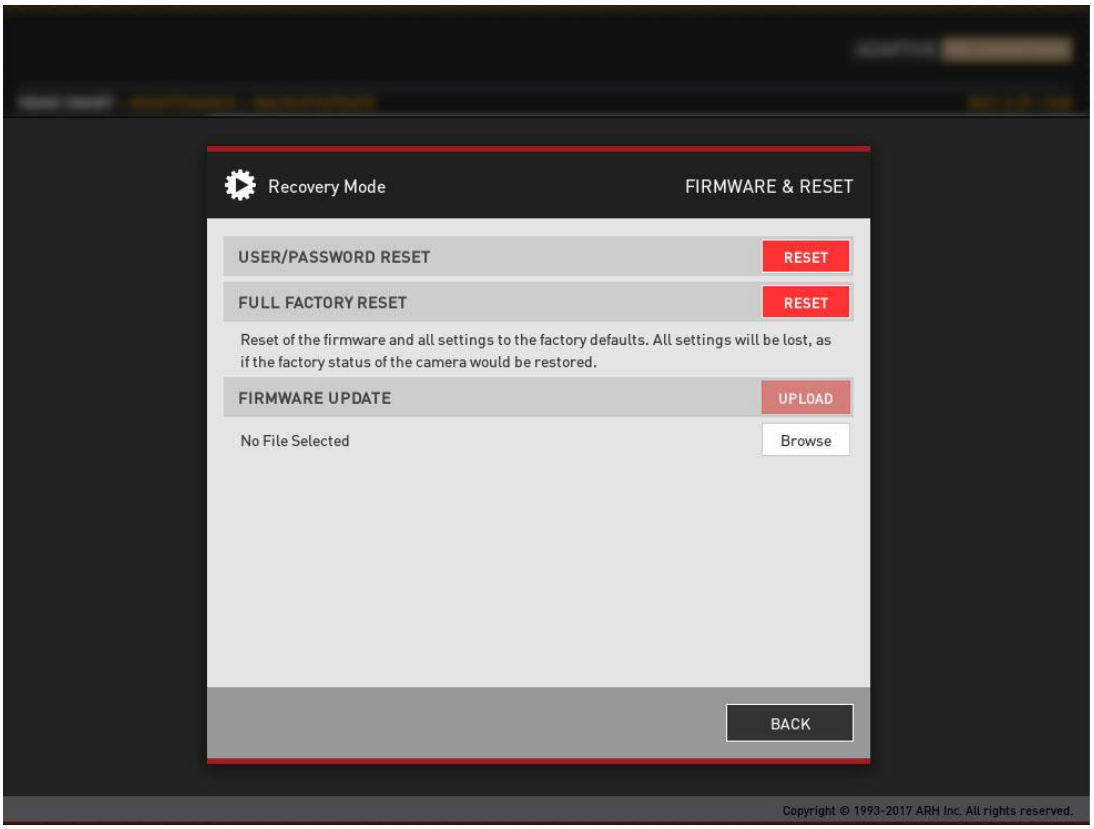





Recovery Mode
INFORMATION
NETWORK SETTINGS
FIRMWARE & RESET
RESTART
Copyright © 1993-2017 ARH Inc. All rights reserved.

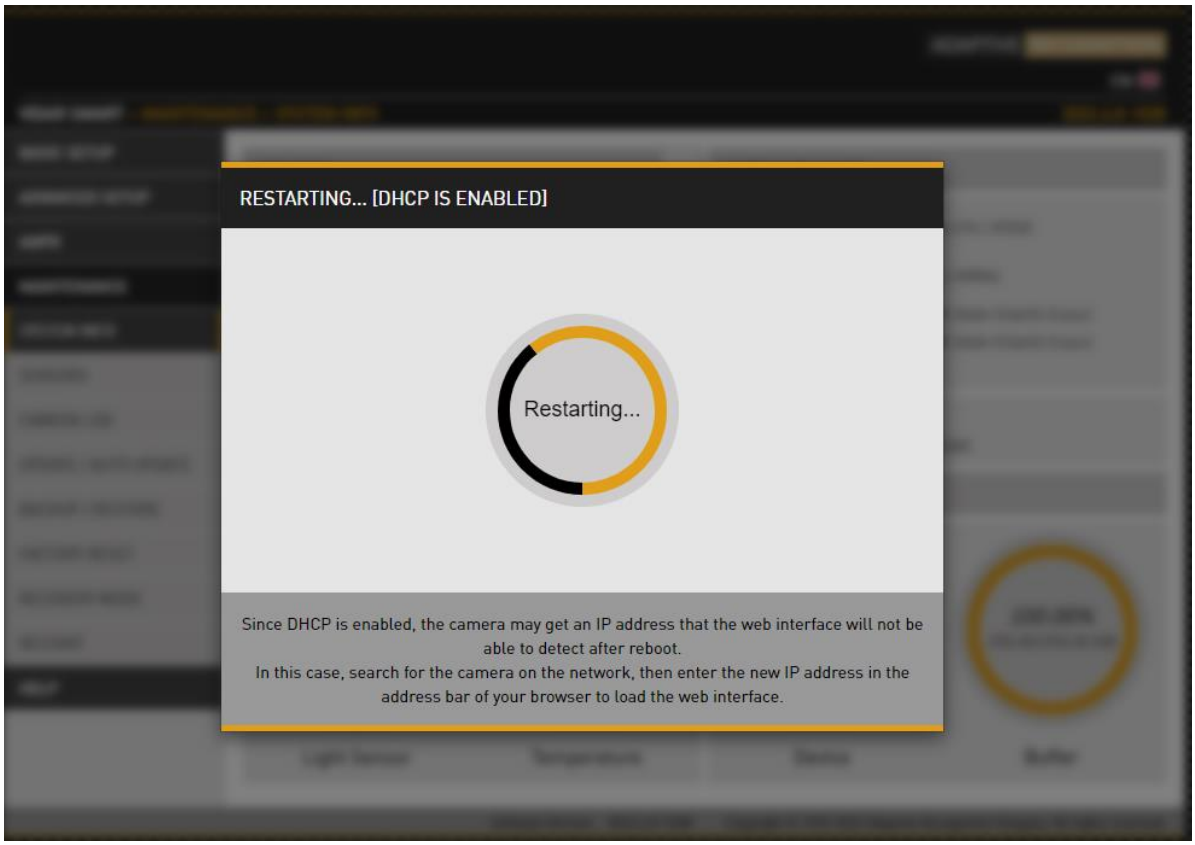

Recovery Mode
INFORMATION
RECOVERY MODE
MAC: 00-1D-4D-00-00-FE
IP: 192.0.2.3 / 255.255.255.0
NORMAL MODE
MAC: 00:1D:4D:11:77:A9
DHCP: Off
IPv4: 192.0.2.152
IPv4 (2):
IPv6: /
BACK
Copyright © 1993-2017 ARH Inc. All rights reserved.

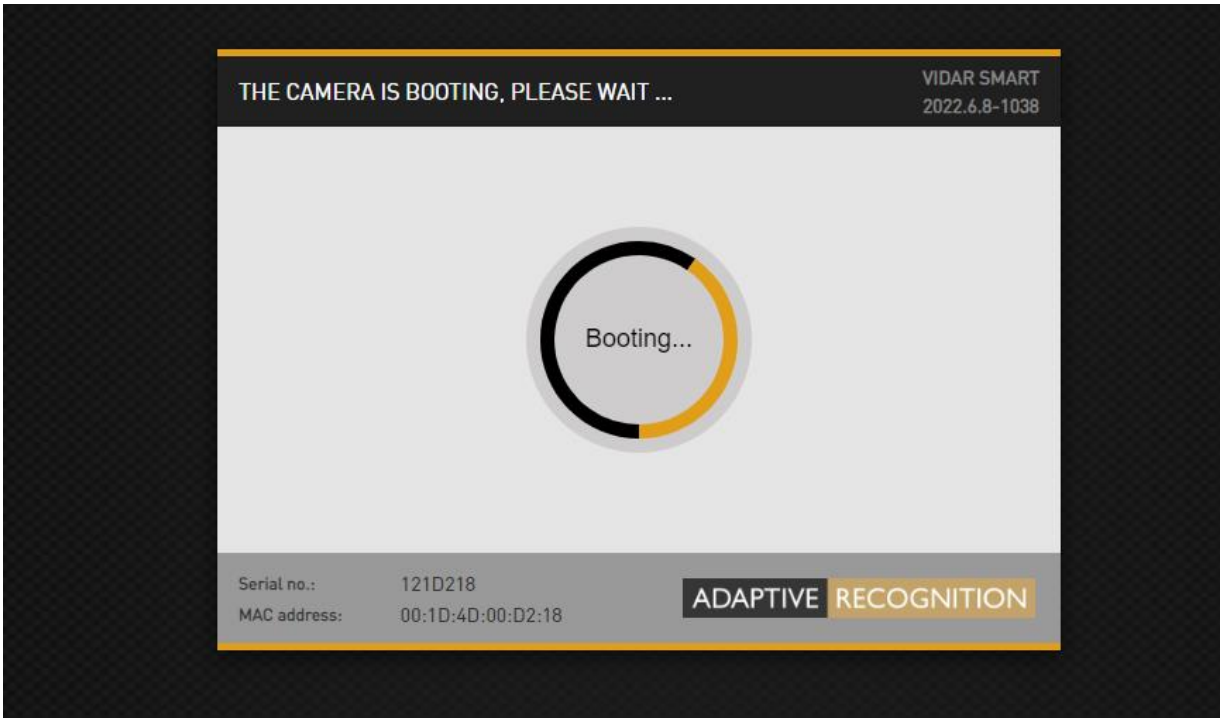

Recovery Mode
NETWORK SETTINGS
NETWORK
SAVE
DHCP:
IPv4:
192.0.2.152
IPv4 subnet:
255.255.255.0
IPv4 (2):
IPv4 (2) subnet:
Gateway:
BACK
Copyright © 1993-2017 ARH Inc. All rights reserved.


Recovery Mode
FIRMWARE & RESET
USER/PASSWORD RESET
RESET
FULL FACTORY RESET
RESET
Reset of the firmware and all settings to the factory defaults. All settings will be lost, as if the factory status of the camera would be restored.
FIRMWARE UPDATE
UPLOAD
No File Selected
Browse
BACK
Copyright © 1993-2017 ARH Inc. All rights reserved.

8.8. RESTART

WEB INTERFACE > MAINTENANCE > RESTART





These menu entries restart the camera in normal or in recovery mode. If the web interface is not functional (for example due to a lost IP), Recovery Mode may also be entered applying the magnetic reset procedure.

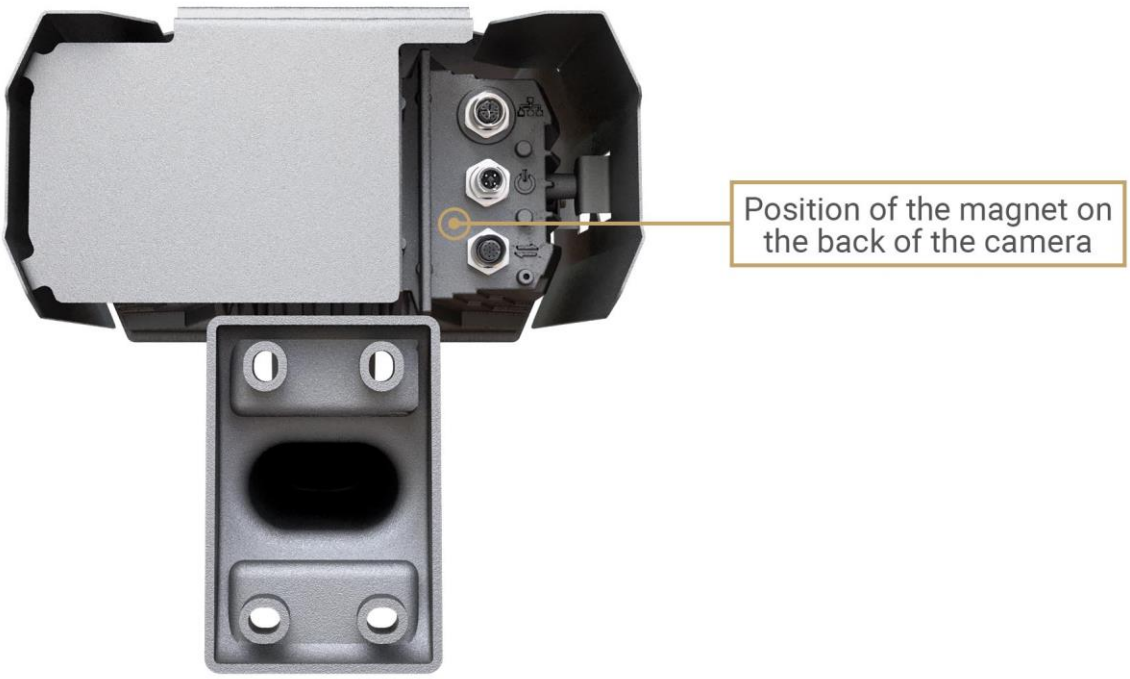
Entering Recovery mode to Vidar camera:

Starting of the Recovery mode can be implemented by magnetization in the following way:

By magnetization:

1. Power off the camera.
2. Touch a magnet (not included) to the back of the camera and hold it in position. See figures below.
3. Power on the camera and wait 5 seconds. If the magnet is in proper position, the green indicator led on the front of the camera will start flashing very fast.
4. Remove the magnet.
5. Reach the camera via its default (192.0.2.3) IP address.

Position of the magnet on the back of the camera (under the shield)



The recommended strength of the magnet is 1210 mT (millitesla).

8.9. COMPLIANCES

CE Certificates:

The AR FreewayCAM4 ANPR digital camera (VIDAR) family complies with the European CE requirements specified in the EMC Directive 2014/30/EU.

The ANPR cameras conform to the following Product Specifications:

Emission and Immunity:

EN 55032:2015, EN 55024:2010+A1:2015

Declaration of RoHS Compliance for Electrical and Electronic Products:

Adaptive Recognition Hungary ("the Company") hereby declares that the VIDAR ANPR camera family placed on the European Community market by the Company after 1st July 2006 are compliant with EC Directive 2002/95/EC on the Restrict of Certain Hazardous Substances in Electrical and Electronic Equipment (commonly known as the EU RoHS Directive.)

Compliance with RoHS means that where the product falls under the scope of the EU RoHS Directive, the product does not contain the following substances:

- Mercury (Hg) 0.1%
- Lead (Pb) 0.1%
- Cadmium (Cd) 0.01%
- Hexavalent Chromium (Cr+6) 0.1%
- Polybrominated Biphenyls (PBB) 0.1%
- Polybrominated Diphenyl Ethers (PBDE) 0.1%

above the indicated maximum concentration values by weight in homogeneous materials unless the substance is subject to an exemption specified in the Directive or in subsequent Commission Decisions.

This declaration represents the Company's best knowledge, which is partially based on information provided by third party suppliers.

Laser safety compliance:

All models of VIDAR ANPR camera which are equipped with a measuring laser module are Class 1 laser products according to the IEC 60825-1:2014 standard.

Federal Communications Commission

The FCC declaration of conformity

47 CFR PART 15 SUBPART B

VIDAR

FCC statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

This device may not cause harmful interference, and

This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

Warning: Where shielded interface cables or accessories have been provided with the product or specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC. Changes or modifications to product not expressly approved by Adaptive Recognition Hungary could void your right to use or operate your product by the FCC.

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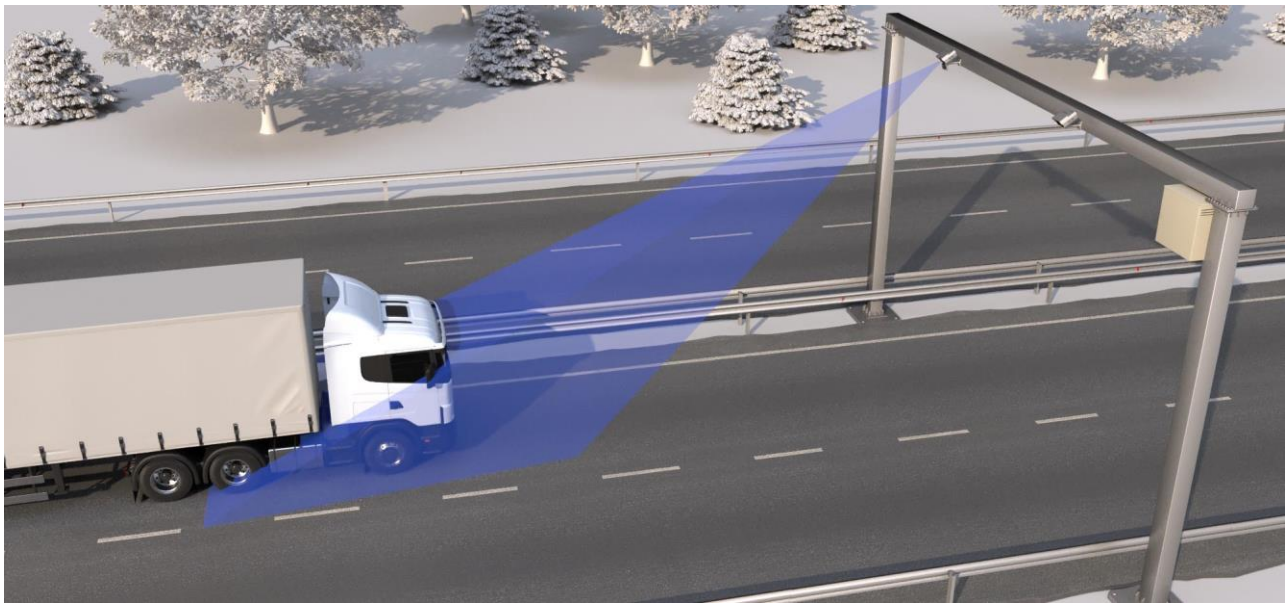
9. HOW TO SETUP YOUR VIDAR CAMERA TO GET THE MOST ANPR EVENTS

A good installation site is the basis of reliable operation. This guide is going through step-by-step all crucial point of the menu to help to the user to setup Vidar camera properly for the first time. Parameters setting by hand via web interface of the camera.
The first part of the document contains the general setting parameters, and the second part presents the steps for a specific installation.
For more information, check Vidar Installation Guide!

9.1. RECOMMENDED CAMERA POSITION



A good ANPR engine can read the plates from images taken in various conditions. However, if you want to achieve over 95% recognition rate with short recognition times, you have to calculate the position of the camera accurately. The best position is if the camera is installed on a gentry above the traffic lane (see below).

The distance between the camera and plate is also important. If the camera is too far from the plate, the characters may not be large enough for recognizing them. In this case, zoom-in until you reach the proper size. If the distance is too short it may happen that a part of the plate is over the camera's field of view (when the vehicle is near to the side of the lane or the plate is not at the middle of the vehicle).
From the point of ANPR/LPR the most important is the size of the characters on the image. For Latin characters it is recommended to have **at least 16 pixels** average **character height**, for Arabic or other special characters it is recommended to have 20 pixels height (due to they are more calligraphic than the Latin characters). The too large characters are also not suitable for ANPR, therefore try to avoid settings where the character size is greater than 50 pixels in height. A **line width** of a character on the image should be **at least 2 pixels**.

9.2. SOFTWARE REQUIREMENTS

The cameras are developed to operate without any kind of special software.

Software requirements:

- For network setup, administrator (root) privileges are necessary.
- Web browser: Mozilla Firefox 52, Microsoft Edge, Google Chrome 51.X.X.X or later editions. If it is possible, update your browser (Firefox or Chrome) to the newest available version.

9.3. ACCESSING THE CAMERA

Steps of accessing the web interface of the camera from a browser:

1. Connect the camera to a computer or network switch, then power on the camera. After it is turned on, both status LEDs (red and green on the camera front) are turned on while the camera is booting. After finished, the green status LED flashes two times while the red one turns off signaling that the camera is ready for operation.
2. Enter an alternate IP address (or set your computer's IP) in the 192.0.2.x subnet – where x is an integer number between 1 and 254 **except 3** – with the subnet mask of 255.255.255.0.
3. For more information, see Appendix.

4. Use the ping command to test the communication with the camera:

Windows: C: \>ping -t 192.0.2.3
Linux: username@mylinux:~$ ping 192.0.2.3

5. Soon, the ping package returns: **Reply from 192.0.2.3.** If not:
   - first check the Ethernet LEDs at the PC or the switch side
   - check whether the IP address is set correctly; the own IP address of the PC can be pinged.
   - proxy is set in the browser or the browser is not set to offline.

If these obstacles are checked and there is still no reply, power off then on and enter the previous ping command again.

6. Start a browser then enter the default IP address of the camera into the address bar (**http://192.0.2.3)**. After this, the camera starts with administrator privileges, ready to be set up and configured.

10. USE CASE

For a precise measurement the installation geometry must be determined precisely. Here it is a good example for a proper camera installation example:

Lane	1
Direction	Front
Height	5m
Pan	0°
Tilt	37°
Camera configuration	VIDAR U 2xFHD, ANPR, Laser, IR, Radar

The proper camera settings are the following:

1. **Users:**

WEB INTERFACE > BASIC SETUP > USERS

First of all, set User Authentication. By default, this function is turned off, but if you tick in the checkbox, it will be turned on.
When finished editing user settings, click on Validate button and the camera will restart.

> Note
>
> When this function is off, Administrator privileges are granted to other users as well, and does not ask for a password to log in.

2. **Date and Time:**

WEB INTERFACE > BASIC SETUP > DATE AND TIME

Current date and time and timekeeping settings are managed in this page.
Set the Time zone first from the drop-down list. For manual time adjustment, either enter date and time in the corresponding fields, or click on **Get Client Time** button to adjust the internal clock of the camera to the PC.

Continuous synchronization is based on NTP (Network Time Protocol). The following settings are available with NTP client:

- **Off**: no NTP synchronization
- **Regular NTP client**: Regular NTP synchronization, according to the NTP standard. This is compatible with all NTP servers and network configurations. Use your local server address. Approx. one second accuracy is guaranteed only.

3. **Network:**

WEB INTERFACE > BASIC SETUP > NETWORK

Set the name of your device in the **Hostname** field (default is ARHInc.). Add textual description of the device in the **Title of this site** (default is Adaptive Recognition).
Tick in **DHCP** mode to set your IP address, Netmask, Gateway and DNS (default is off).
Also tick in **RTP** (Real-Time Transport Protocol).

4. **Stream Settings:**

WEB INTERFACE > ADVANCED SETUP > STREAM SETTINGS

The primary and secondary imaging pipelines are configured at the **Stream Settings** section.
Choose from the scroll-down menu **for Sensor1** and **Sensor2** (both are Source#1 as a primary pipeline)
2048x1536 @ 25 frame/s resolution.

The output of the primary pipeline can be directed into a stream, which is a video feed streamed on a HTTP port. You can add a stream clicking on the + icon at an available (empty) slot. In this case, at the **Add/Remove Stream** section, add these:

- STREAM1, JPEG SENSOR1
- STREAM2, JPEG SENSOR2
- STREAM3, H264 SENSOR1

5. **Event Manager:**

WEB INTERFACE > ADVANCED SETUP > EVENT MANAGER

You can add and remove trigger sources in this menu. The primary source is Sensor 1 #1. From the **Trigger Selector** section, choose **Laser Trigger** module, to use the built-in laser-based distance measuring unit for detecting passing vehicle in the lane which the camera is directed to.

6. **ANPR Settings:**

WEB INTERFACE > ANPR > ANPR SETTINGS

Tick in the first **ANPR** stage and use only one.
At **Primary Source** choose **Full frame** for **Preselection** and **ANPR stage** as well. Both **Create LP image** and **Create image strip** has to ticked in.
At **Secondary source** set **Function** to **Overview**. In the **Filters** section the proper settings are:

- **Event filter**: Return all events
- **ADR recognition:** Disabled
- **Duplicate timeout:** 10 sec

7. **Live view:**

WEB INTERFACE > BASIC SETUP > LIVE VIEW

Proper settings of the camera stream.

Mode tab:

- **Brightness Control:** Outdoor [AUTO]
- **Adaptive Target:** Do not tick
- **Target Brightness:** -20
- **Environment:** City
- **Region of Interest:** Full Frame

Image tab:

- **Brightness:** 0.00
- **Contrast:** 0.00
- **Saturation:** 0.00

Color tab:

- **Color Mode:** Automatic
- **Color Correction:** Tick in

Optics:

- **Zoom:** 1
- **Focus:** 210 (adjustable if it is not enough sharp)

Flash:

- **Filter:** Automatic
- **Flash Intensity (Day):** 0
- **Parity Flashing (Day):** OFF (Capture retroreflective numberplates only)
- **Flash Intensity (Night):** 20
- **Parity Flashing (Night):** OFF

Advanced:

- **Low Light Mode (Day):** None
- **Low Light Mode (Night):** Low
- **Gama:** 1.5 (It could be up to 1.8 or at extreme low light situation 2.2)
- **JPEG Quality:** 75 (Default is 80)
- **White Level:** 1.0
- **Black Level:** 0.00 (Default is 0.02)

8. **Private Zones:**

WEB INTERFACE > ADVANCED SETUP > PRIVATE ZONES

In certain circumstances it may be necessary to cover a part of the image. In this case, it is **not necessary**.

9. **Engine Manager:**

WEB INTERFACE > ANPR > ENGINE MANAGER

This tool allows for managing the Carmen ANPR engines and Hardware Key Licenses used in the system.
Currently used engines are listed in the **Selected Engines** tab.

- **Preselection engine:** latin_vq (Use a proper engine for your country with _vq extension)
- **ANPR engine:** latest:eur (Use a proper engine for your country)

Engine Properties tab:

- **timeout:** 1000 ms
- **contrast_min:** 8 (Use higher value up to 32 at a good lighting condition)
- **size_min:** 16 pixels
- **size_max:** 32 pixels (Try to use a minimal range ~ 20)

10. **Result Upload:**

WEB INTERFACE > ANPR > RESULT UPLOAD

Results can be uploaded using the HTTP, FTP or SFTP and HTTPS protocol.

- **Globessey Data Server:** Tick in
- **Host:** IP address or hostname
- **Port:** 8889
- **Table name:** multi_event (Use proper table name as at your server DB table)
- **Path:** gate
- **Username:** primula (Default is primula)
- **Device ID:** Perbal_01_L1_front

11. **Title Editor:**

WEB INTERFACE > ANPR > TITLE EDITOR

Subtitles added to the image are configured here.

- **Line Editor:** $y-$o-$d $h:$m:$s LP: $p (Use **Line editor** for a proper labelling)

12. **Black-, Whitelist:**

WEB INTERFACE > ANPR > BLACK-, WHITELISTS

- **Black-, Whitelist:** Tick in (You have to tick it)
- **Rules:** Default (No filter)

PROGRAMMER'S GUIDE

11. GENERAL API SPECIFICATION

Every operation on the VIDAR camera is done by setting and getting parameters. Camera functions are implemented by modules, modules are grouped in module groups. Camera parameters are organized in named sections within modules. Parameters are set and get by HTTP queries in the manner detailed in this chapter

11.1. SECTIONS

Querying available parameter sections:

GET:
http://[camera_ip]/[modulegroup]/[modulename]?getsections&wfilter=X
ANSWER:

```
mimetype=text/plain\r\n
sections=default,sectionname1_sectionvalue1,sectionname2_sectionvalue2,..
.\r\n
```

11.2. PARAMETERS

Query of the parameter values:

GET:
http://[camera_ip]/[modulegroup]/[modulename]?get[parameter1_name]&get[parameter2_name]&...&[sectionname]=[sectionvalue]&wfilter=X
ANSWER:

```
...
parameter1_name=parameter1_value\r\n
parameter2_name=parameter2_value\r\n
...
```

Note

- If there is no section, the default section is applied
- One or even more parameters can be queried (if these belongs to one section)

Querying values of all parameters of the default section:

GET:
http://[camera_ip]/[modulegroup]/[modulename]?getall&wfilter=X

ANSWER:

```
mimetype=text/plain\r\n
sections=default\r\n
parametername1=parametervalue1\r\n
parametername2=parametervalue2\r\n
...
```

Querying values of all parameters of the given section:

GET:
http://[camera_ip]/[modulegroup]/[modulename]?getall&[sectionname]=[sectionvalue]&wfilter=X

ANSWER:

```
mimetype=text/plain\r\n
parametername1=parametervalue1\r\n
parametername2=parametervalue2\r\n
...
```

Note

- Only one section can be queried at a time.

Setting parameter values:

GET:
http://[camera_ip]/[modulegroup]/[modulename]?[parametername1]=[parametervalue1]&[parametername1]=[parametervalue1]&...&[sectionname]= [sectionvalue]&wfilter=X

ANSWER:
```
mimetype=text/plain\r\n
ecode=0\r\n
```

ANSWER:
```
mimetype=text/plain\r\n
ecode=-22\r\n
eparams=parametername1,parametername1\r\n
```

Note

- Add &save to the end of the query to have the parameters saved and thus made permanent, otherwise the changes will be lost upon restarting the camera
- If section is not defined, the default section will be modified
- More parameters (in the same section) can be get/set
- In the answer the following fields will be present:
    - If no error occurred:
      ecode = 0
    - If error occurred:
      ecode= Standard Error Code
      eparams=parametername1,parametername2,...

11.3. PARAMETER ATTRIBUTES

Query of parameter attributes:

GET:
http://[camera_ip]/[modulegroup]/[modulename]?query[parametername]]&query[parametername2]&...&[sectionname]=[sectionvalue]&wfilter=X

Note

- If there is no section defined, the default section is applied
- More parameters (of the same section) can be queried

http://camera_ip/modulegroup/modulename?queryall[&sectionname=sectionvalue]&wfilter=X

Note

- If there is no section defined, the default section is applied

ANSWER:

```
•    B - bound: B[parametername]=mininum,maximum,default,step
•    L - list: L[parametername]=value1,value2,value3,.. (where value1 is
the default value)
•    T - type
```

EXAMPLE

GET:
http://camera_ip/capture/scapture?queryshutter&wfilter=X

EXAMPLE – ANSWER:

```
...
Bshutter=25,33000,1000,0.001\r\n
Tshutter=rw,f,us\r\n
...
```

The bound answer:

bound[parameter_name]=mininum,maximum,default,step

- **minimum** value of the specified property (integer or floating-point number)
- **maximum** value of the specified property (integer or floating-point number)
- **default** (or recommended) value
- the amount of the steps to be set / advisable to set (helpful for programming)

Note

- Some/all of the fields minimum, maximum, default and step may be missing. This means the corresponding value is undefined.

Example for the bound:

- boundshutter=20,10000,1000,1

The value of the shutter can be set between 20 and 10000 in steps of 1, the recommended value is 1000.

- boundshutter=20,10000, ,1

The value of the shutter can be set between 20 and 10000 in steps of 1, there is no recommended value.

- boundshutter=20,10000,1000

The value of the shutter can be set between 20 and 10000, the recommended value is 1000. There are no steps, so in case of integer it is advisable to step one by one.

- boundshutter=20,10000

The value of the shutter can be set between 20 and 10000. There are no recommended value and steps.

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The list answer:

L[parameter_name]=value1,value2,value3,.. (where value1 is the default value)

- Possible values in the list (the recommended value should be the first). The values can be integers or floating-point number and strings.

L[parameter_name]=$

- The value of the property is not examined (e.g.: username). Return of property, where neither the bound nor the list can be used.

Example for the list:

- Lifps=22.5,11.25

The set FPS value can be 22.5 and 11.25.
The recommended value is 22.5 (the first).

- Lifps=30,10,20,25,45,50,60

The settable FPS values: may be 10,20,25,30,45,50 and 60.
The recommended value is 30 (the first).

- Lcapture=prev,next,best,local

The prev, next, best or local values can be specified for the capture parameter.

- Lpassword=$

The password parameter can be whatever string (no listing).

The type answer:

T[parameter_name]=access,type,unit,reboot

- access: the mode of the access
  - r: read only
  - w: write only
  - rw: read-write
- type: type of the parameter
  - i8, i16, i32, i64: signed integer 8, 16, 32 and 64 bit type (default value: 32)
  - u8, u16, u32, u64: unsigned integer 8, 16, 32 and 64 bit type (default value: 32, only u is defined)
  - f32, f64: floating-point number (default value: 32, only f is defined)
  - s[number of the characters]: string type with specified character number (if it is not specified, the default will be 32). In case of 0 there are minimum and maximum, which is written in the bound.
  - With all these types a square bracket may be present, which means that an array should be used (e.g.: the i16[4] means 4 x 16-bit integer numbers).
- unit: unit of measurement (optional) - arbitrary string
- reboot: should the system be rebooted after rewriting the parameter

- not specified: no need to restart
- q: quick module restart (see Restart)
- f: complete reboot (see Restart)

Example for the type:

- Tshutter=rw,f,us

The shutter is readable and writable, floating-point type and its unit is microseconds. No restart is needed after rewriting the parameter, because it will be entered immediately.

- Timgshutter=r,f,us

The imgshutter is a read only, floating-point type property and its unit is microseconds.

- Tusername=rw,s32,,f

The username is a readable and writable string type containing 32 characters. It does not have measurement, but the system has to be restarted in case of switching.

11.4. ANSWER DOCUMENT

A HTTP query must be assembled according to the previous chapters. By default, the answer is a multipart document, consisting of a binary and a text part (e.g. an image in the binary and its parameters, like shutter gain, etc. in the textual part). A special parameter 'wfilter' may be used to control this behaviour:

- wfilter=1 only the text part,
- wfilter=2 only the binary part,
- wfilter=3 both parts will be returned by the camera.

The HTTP header gives information about parsing the message. The 'mimetype' field determines the type of the data in the answer.

- mimetype=application/octet-stream: general data
- mimetype=text/plain: standard text type (e.g. parameters)
- mimetype=image/jpeg: JPEG image

Parameters are always sent in text/plain format, row by row as `[name]=[value] pairs.` Rows are terminated by `'\r\n'.` For example:

```
contrast=1\r\n
shutter=1000\r\n
gain=4\r\n
```

Parts in the multipart message are separated by a boundary string, for example:

--------------------------732765942131086840206891966l

After the separator the length and the type of the part will be written:

--------------------------732765942131086840206891966l
Content-Length: 93123
Content-Type: image/jpeg

The boundary will be written at the beginning of the answer, between the parts and at the end of the answer.

11.5. ANSWER ERROR CODES

API calls return with the requested document or with an ecode of 0 in case of success. In case of an error, it may return any POSIX error code (we call external programs, e.g., zip, or hardware components, and libraries, e.g., cURL, SQLite, which can return arbitrary error codes). The most commonly occurring error codes that we directly return include:

Value	Code	Description	Explanation
22	**EINVAL**	Invalid argument	The most common error code; we return this if the call is invalid (e.g., missing required parameters, etc.).
2	**ENOENT**	No such file or directory	The record or file we are referring to does not exist.
13	**EACCES**	Permission denied	Permission problem for the given call.
12	**ENOMEM**	Out of memory	No memory can be allocated by a function in the library.
110	**ETIMEDOUT**	Connection timed out	The operation could not be completed within the prescribed time, for example, in communication between the two panels.
61	**ENODATA**	No data available	We did not receive the expected data, for example, from the first panel.
34	**ERANGE**	Math result not representable	The parameter values do not fall within the expected range (do not fully match the original description).
5	**EIO**	Input/output error	In case of any error during communication on the hardware interface.

11.6. USER AUTHENTICATION

Two possible methods are available for user authentication:

- The user is required to request a cookie which can be used throughout all the subsequent requests (the camera will send the required cookie as a response which will allow the user to send further requests via the camera's API without signing in once again) - this can be set by the user through the below HTTP request. This is a thoroughly safe approach, since the user is sending the User/PW combination once:

http://camera-ip/login.html?p_send=1&p_username=USERNAME&p_passw=PASSWORD

- Alternatively, the user can enter the Username/Password combination at the end of every API request. No cookie is involved in this method - every request has to have the following suffix at the end - '&p_urllogin=1&p_username=USER&p_passw=PASSWORD'
  For example:

http://camera-ip/scapture?capture=last&p_urllogin=1&p_username=USER&p_passw=PASSWORD

12. MODULES

12.1. USERS

Module: setup/users
Manual: 5.3

Only administrators have access to this module.

Users are described by the following parameters:
- user id (uid)
- user name (uname)
- full name (ufull)
- access level (ulevel)
- password (passw1,passw2)

Get/Set access level of users without credentials
Parameter: guestlevel
Possible values: 0: Guest, 1: Viewer, 2: Normal, 3: Power, 4: Administrator

Example:
http://camera_ip/setup/users?wfilter=X&getall

Getting the list of users

Example:
http://camera_ip/setup/users?wfilter=X&getall

In the response for 'getall' we get the 'guestlevel' and lists of the user parameters as comma-separated values. Parameter values with the same position/index in the lists belong to the same user. Passwords cannot be obtained.

Response example:
```
guestlevel=0
useridlist=1001,1002
nicknamelist=user00,user01
fullnamelist=,
userlevellist=2,4
```


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Add new user
To add a new user 'uid' must be set to 'new'. 'passw1' and 'passw2' must match.
http://camera_ip/setup/users?wfilter=X&getall&uid=new&uname=user00&ufull=&ulevel=2&passw1=x&passw2=x

Modify the parameters of a user
To modify the parameters of a user the corresponding 'uid' must be given with the modified parameters. 'passw1' and 'passw2' parameters can be omitted if we don't want to change the password.
http://camera_ip/setup/users?wfilter=X&getall&uid=1001&uname=user007&ufull=&ulevel=2&passw1=y&passw2=y

Delete user
To delete a user the user id ('uid') and the 'delete' parameter must be given.
http://camera_ip/setup/users?wfilter=X&getall&uid=1001&delete

12.2. IMAGE RESOLUTION

Module: capture/scapture
Manual: 6.1

Get maximum and set resolutions
GET:
http://camera_ip/capture/scapture?getall&wfilter=X[&source=X]

ANSWER:

```
...
imgcapxsize=1280\r\n (maximum)
imgcapysize=960\r\n ...
imgxsize=640\r\n (current)
imgysize=480\r\n
...
```

Note

- The source # 1 is the default (primary image source) if there is no source parameter.
- In this property list, each value is listed twice: with and without the 'img' prefix. The parameter value with the 'img' prefix represents the value of the parameter at the time the image was captured, while the one without it represents the actual value.
- In case of two optical systems, each sensor can be controlled separately with the following optional parameter: & sensor = 1 or 2. If this parameter is not specified, the parameters for the main sensor are controlled.

12.3. SIMPLE RETRIEVAL OF AN IMAGE

Module: capture/scapture
Manual: 6.1

Capture an image
GET:
http://camera_ip/capture/scapture?wfilter=0[&source=X]
http://camera_ip/capture/scapture?capture=best&framemonotimems=98741855&wfilter=0[&source=X
http://camera_ip/capture/scapture?capture=best&frameindex=8390&wfilter=0[&source=X]
http://camera_ip/capture/scapture?sensor=2

Note

- The source # 1 is the default if there are no source parameters (primary image source).
- See also #4.Image/Image Parameter Queries
- In case of two optical systems, each sensor can be controlled separately with the following optional parameter: & sensor = 1 or 2. If this parameter is not specified, the parameters for the main sensor are controlled.

12.4. IMAGE/IMAGE PARAMETER QUERIES

Module: capture/scapture
Manual: 6.1

Get all image parameters
GET:
http://camera_ip/capture/scapture?getall&wfilter=X[&source=X]
http://camera_ip/capture/scapture?queryall&wfilter=X&source=X]
http://camera_ip/capture/scapture?getall&wfilter=X&capture=next[&source=X]

Note

- The source # 1 is the default (primary image source) if there are no source parameters.
- In this property list, each value is listed twice: with and without the 'img' prefix. The parameter value with the 'img' prefix represents the value of the parameter at the time the image was captured, while the one without it represents the actual value.
- In case of two optical systems, each sensor can be controlled separately with the following optional parameter: & sensor = 1 or 2. If this parameter is not specified, the parameters for the main sensor are controlled.

The scapture module returns three parameters for every captured frame: imgframeindex, imgframetimems and imgframemonotimems.

imgframeindex: After camera startup, captured frames are counted. This parameter provides the number of the frame.
imgframetimems: Time elapsed since 1st of January 1970 until the capturing of the frame in milliseconds.
imgframemonotimems: Time elapsed since camera startup until the capturing of the frame in milliseconds.

The above parameters can be used to determine the time of capturing when getting frames/parameters from the scapture module.

Querying the image buffer

capture=last
The camera returns the last captured image/parameter.
GET:
http://camera_ip/capture/scapture?capture=last&wfilter=X

capture=next
It returns the frame/frame's parameter that follows the last returned (queried) one. If this frame is not in the buffer anymore, (too much time has elapsed and it has been rewritten by newer images), it returns the oldest image from the buffer.
The **capture=next** can be used by itself or together with the framemonotimems, imgframetimems and frameindex parameters: In these cases, frames, following the specified number/timestamp are returned (if they are still in the buffer):

GET:
http://camera_ip/capture/scapture?capture=next&framemonotimems=98741855&wfilter=X
http://camera_ip/capture/scapture?capture=next&frameindex=8390&wfilter=X

capture=best
It returns the frame/frame's parameter that is closest (before or after) to the specified timestamp or frame index. If the buffer does not contain such a frame, the oldest one is returned. If the specified timestamp (framemonotimems, imgframetimems) or frameindex value is too high (refers to a yet non-existing frame) then the newest frame from the buffer is returned.

GET:
http://camera_ip/capture/scapture?capture=best&framemonotimems=106964188&wfilter=X
http://camera_ip/capture/scapture?capture=best&frameindex=193390&wfilter=X

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Note

- Use 'wfilter' to get either or both the image and its parameters.

SET:
http://camera_ip/capture/scapture?parametername1=parametervalue1&parametername2=parametervalue2&...&wfilter=X[&source=X]

SAVE:
http://camera_ip/setup/profiles?save_imgparams&wfilter=1[&c_source=X]

12.5. FREQUENTLY USED IMAGE PARAMETERS

Module: capture/scapture
Manual: 6.1

Get image parameters

GET:
http://camera_ip/capture/scapture?getall&wfilter=X[&source=X]

ANSWER:

```
...
imggamma=1.700\r\n
gamma=1.700\r\n
...
```

SET:
http://camera_ip/capture/scapture?gamma=1.0&brightness=0.0&contrast=0.0&jpegquality=75&blacklevel=0.0 &whitelevel=1.0&whitebalance=0.0,0.0,0.0&saturation=0.0&wfilter=1[&source=X]

SAVE:
http://camera_ip/setup/profiles?save_imgparams&wfilter=X[&c_source=1]

12.6. CAPTURE PARAMETERS

Module: capture/scapture
Manual: 6.1

Get and set capture parameters (shutter, gain, etc.)
GET:
http://camera_ip/capture/scapture?getall&source=1&wfilter=X

ANSWER:

```
...
imggain=2.000\r\n
imgshutter=4000.000\r\n
imgllm=3\r\n
...
gain=2.000\r\n
shutter=4000.000\r\n
llm=3\r\n
...
```

SET:
http://camera_ip/capture/scapture?gain=2.5&shutter=2000&wfilter=X

SAVE:
http://camera_ip/setup/profiles?save_imgparams&wfilter=X

12.7. AUTO BRIGHTNESS CONTROL

Module: control/brightnesscontrol
Manual: 6.3

Get/Set Brightness Control Properties

GET:
http://camera_ip/control/brightnesscontrol?getall&wfilter=1
http://camera_ip/control/brightnesscontrol?queryall&wfilter=1
SET:
1. sensor settings:
http://camera_ip/control/brightnesscontrol?enable_0=1&save&wfilter=1
http://camera_ip/control/brightnesscontrol?target_0=-20&save&wfilter=1

2. sensor settings:
http://camera_ip/control/brightnesscontrol?enable_1=0&save&wfilter=1
http://camera_ip/control/brightnesscontrol?target_1=10&save&wfilter=1

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GET/SET Brightness control ROI (Region of Interest)

http://camera.ip/capture/scapture?wfilter=1&sensor=1&source=1&histowinpc=50,50,100,100

The first two values are the coordinates of the upper left corner of the square, the second two values are the coordinates of the lower right corner of the square as a percentage (x1, y1, x2, y2). The position of the origin increases in the upper left corner of the image, with the y axis going down.

12.8. AUTO FOCUS

Module: control/focuscontrol
Manual: 6.5

Get autofocus state and properties
GET:
http://camera_ip/control/focuscontrol?getall&wfilter=1

ANSWER:

```
...
mode=0\r\n
roi=0,0,1280,960\r\n
...
```

SET:
http://camera_ip/control/focuscontrol?roi=0,0,100,200&save&wfilter=1
http://camera_ip/control/focuscontrol?mode=1&wfilter=1

Note

- During focusing mode will equal 1, when the focusing is done resets to 0
- ROI: operation area of the autofocus; x1, y1, x2, y2, where x1, y1 the upper left corner of the rectangle and x2, y2 the lower right corner of the rectangle

12.9. AUTO COLOR COMPENSATION

Module: control/colcorr
Manual: 6.2.2

Get color correction state and properties
GET:
http://camera_ip/control/colcorr?getall&wfilter=1[&sensor=X]

ANSWER:

...
`mode=0\r\n`
...

SET: http://camera_ip/control/colcorr?mode=1&save&wfilter=1[&sensor=X]

where

X=1, sensor 1

X=2, sensor 2

12.10. OPTICS CONTROL

Module: hwlayer/extopt, control/focuscontrol
Manual: 6.5

Operate motorized optics (zoom, focus, iris, filter exchanger)
GET:
http://camera_ip/hwlayer/extopt?getall&wfilter=1

ANSWER:

```
...
focus_pc=56\r\n
zoom_pc=28\r\n
iris_pc=100\r\n
zfcomovement=1\r\n
filter=0\r\n
...
```

> **Note**
>
> In the case of two optical systems, each optic can be controlled separately with the following optional parameter: & ix = 0 or 1. If this parameter is not specified, the parameters of the optics belongs to the main sensor are controlled.

Add zoom/focus presets
GET:
http://camera_ip/control/focuscontrol?getall&wfilter=1

ANSWER:

```
...
zfc_mode=0\r\n
zfc_pairs=564,327;1120,213;\r\n
...
```

SET:
http://camera_ip/hwlayer/extopt?zoom_pc=10&focus_pc=20&iris_pc=30&zfcomovement=0&filter=1&save&wfilter=1
http://camera_ip/control/focuscontrol?zfc_addpair=1120,213&save&wfilter=1
http://camera_ip/control/focuscontrol?zfc_rmpair=1120,213&save&wfilter=1
http://camera_ip/control/focuscontrol?zfc_mode=2&save&wfilter=1

> **Note**
>
> - extopt/zfcomovement (can be 0,1) is equal to focuscontrol/zfc_mode, recommended to use zfc_mode (can be 0,1,2)

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12.11. FLASH CONTROL

Module: hwlayer/cperiph, config/ledpc
Manual: 6.7

Get current settings
GET:
http://camera_ip/config/ledpc?getall&wfilter=1
http://camera_ip/hwlayer/cperiph?getall&wfilter=1

ANSWER:

```
...
mimetype=text/plain\r\n
sections=default,panel_0,panel_1,panel_2\r\n
npanels=3\r\n
...
```

http://camera_ip/config/ledpc?getall&panel=0&wfilter=1

Note

- Index of the internal flash index: panel 0; external illuminators: panel 1, 2, ... npanels = 3, in this case 2 external illuminators are connected

ANSWER:

```
...
mimetype=text/plain\r\n
led_diff_pc=-1\r\n
led_pcdose=0\r\n
...
```

SET:
http://camera_ip/config/ledpc?led_diff_pc=20&led_pcdose=10&panel=0&save&wfilter=1
http://camera_ip/config/ledpc?led_diff_pc=-1&led_pcdose=0&panel=0&save&wfilter=1

http://camera_ip/hwlayer/cperiph?flashpwr=2&ftime_even=200&panel=0&ledena=1&wfilter=1
http://camera_ip/hwlayer/cperiph?ftime_odd=100&panel=0&fpfena=1&wfilter=1
http://camera_ip/hwlayer/cperiph?ledena=0&fpfena=0&panel=0&save&wfilter=1

Note

- In case of cameras equipped with rolling shutter sensors the camera illumination can be only enabled or disabled. For enabling: led_pcdose=100

12.12. EVENT MANAGER

Module: trigger/eventman
Manual: 7.1.1

Get available trigger sources
GET:
http://camera_ip/trigger/eventman?getsources&wfilter=1

ANSWER:

```
...
mimetype=text/plain\r\n
sources=__motdet[3](Hardware Motion
Detection),trigger/swtrigger[1](Software
Trigger),trigger/uarttrigger[1](UART Trigger),trigger/gpiotrigger[1](GPIO
Trigger),trigger/scheduler[2](Scheduler Trigger), trigger/vvq (Plate
Finder), trigger/radtrigger (Radar Trigger)\r\n
...
```

General syntax
sources=groupname/modulename[numberofoutputs](stringname),groupname/modulename[numberofoutputs](stringname),...\r\n

Get registered trigger sources and input configuration
http://camera_ip/trigger/eventman?getconfig&wfilter=1

ANSWER:

```
...
mimetype=text/plain\r\n
config=trigger/swtrigger/0:A,__motdet/0:B,trigger/uarttrigger/0:C\r\n
...
```

GENERAL SYNTAX:

```
config=
groupname/modulename/outputindex:assignedletter,groupname/modulename/outp
utindex:assignedletter\r\n
```

Get/set formula
http://camera_ip/trigger/eventman?getformula&wfilter=1

ANSWER:

```
...
mimetype=text/plain\r\n
formula=C\r\n
...
```


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Get/set state
http://camera_ip/trigger/eventman?getstate&wfilter=1

ANSWER:

```
...
mimetype=text/plain\r\n
state=1\r\n
...
```

SET:
Register
http://camera_ip/trigger/eventman?register=__motdet/0:A&wfilter=1
http://camera_ip/trigger/eventman?register=__motdet/1:B&wfilter=1
http://camera_ip/trigger/eventman?register=trigger/swtrigger/0:C&wfilter=1
http://camera_ip/trigger/eventman?register=trigger/uarttrigger/0:D&wfilter=1
http://camera_ip/trigger/eventman?register=trigger/gpiotrigger/0:E&wfilter=1
http://camera_ip/trigger/eventman?register=trigger/scheduler/0:F&wfilter=1
http://camera_ip/trigger/eventman?register=trigger/scheduler/1:G&wfilter=1

Note

- The digit ID of each trigger source must be unique during the registration (recommended alphabetically, see above). The system will manage it automatically during registration via web interface.

Start module
http://camera_ip/trigger/eventman?formula=B&state=1&save&wfilter=1

Stop module
http://camera_ip/trigger/eventman?state=0&save&wfilter=1

Reset module
http://camera_ip/trigger/eventman?state=2&save&wfilter=1

12.13. MOTION DETECTION TRIGGER (ONLY IN VIDAR 7020 CAMERAS)

Module: capture/scapture
Manual: 7.1.2

Get/set motion detection parameters
GET:
http://camera_ip/capture/scapture?queryall&wfilter=X
http://camera_ip/capture/scapture?getall&wfilter=X&follow=0&frame=2

ANSWER:

```
...
mdsensitivity=75\r\n
mdspeed=75\r\n
mdreslevel=50\r\n
mdtriglevel=50,50\r\n
...
```

SET:
http://camera_ip/capture/scapture?mdsensitivity=80&mdspeed=80&mdreslevel=55&mdtriglevel=55,55&wfilter=X&follow=0&frame=0

SAVE:
http://camera_ip/setup/profiles?wfilter=X&save_motdets

12.14. SOFTWARE TRIGGER

Module: trigger/swtrigger
Manual: 7.1.3

Get/set software trigger properties
GET:
http://camera_ip/trigger/swtrigger?getall&output=0&wfilter=1

ANSWER:
...
```
start_offs=0\r\n
end_offs=0\r\n
```
...

SET:
http://camera_ip/trigger/swtrigger?sendtrigger=1&wfilter=1
http://camera_IP/trigger/swtrigger?start_offs=-100&end_offs=100&save&output=0&wfilter=1

It is possible to attach max. 256 bytes of data to a software trigger (e.g. a trigger ID, device measurement data, etc.):
http://camera_ip/trigger/swtrigger?sendtrigger=1&trigger_data=TRIGGER_0057&wfilter=1

- This piece of data will be inserted in the uploaded data file (See 18. Upload Manager) with parameter name 'triggerdata'.
- In case of ANPR capable devices, trigger data will be available addressing the database column TRIGGER_DATA (See 21. Database contents)

In both cases, trigger data will be encoded with Base64.

12.15. UART TRIGGER

Module: trigger/uarttrigger
Manual: 7.1.6

Get/set UART trigger properties
GET:
http://camera_ip/trigger/uarttrigger?getall&wfilter=1
http://camera_ip/trigger/uarttrigger?getall&output=0&wfilter=1

SET:
http://camera_ip/trigger/uarttrigger?baudrate=9600&bytesize=8&parity=0&stopbits=1&start_token=256&end_token=10&mode=0&save&wfilter=1

http://camera_ip/trigger/uarttrigger?start_offs=0&end_offs=0&mode=0&save&output=0&wfilter=1

Note

- Start_token=256 means: Start on first byte (decimal value)
- Start/End token can be decimal and hexadecimal (in case of hexadecimal the 0x prefix is needed)
- The website returns the values in decimal

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12.16. GPIO TRIGGER

Module: trigger/gpiotrigger
Manual: 7.1.4

Get/set GPIO trigger properties
GET:
http://camera_ip/trigger/gpiotrigger?getall&wfilter=1
http://camera_ip/trigger/gpiotrigger?getall&output=0&wfilter=1
http://camera_ip/trigger/gpiotrigger?getgpin&wfilter=1
http://camera_ip/trigger/gpiotrigger?getgpout&wfilter=1

SET:
http://camera_ip/trigger/gpiotrigger?gpout=1&wfilter=1
http://camera_ip/trigger/gpiotrigger?gpout=0&wfilter=1
http://camera_ip/trigger/gpiotrigger?gpout=0&samplerate=100&reqsamples=10&act_level=1&save&wfilter=1
http://camera_ip/trigger/gpiotrigger?start_offs=0&end_offs=0&mode=0&output=0&save&wfilter=1

12.17. SCHEDULER TRIGGER

Module: trigger/scheduler
Manual: 7.1.5

Get/set scheduler trigger properties
GET:
http://camera_ip/trigger/scheduler?getall&wfilter=1&output=0
http://camera_ip/trigger/scheduler?getall&wfilter=1&output=1

SET:
http://camera_ip/trigger/scheduler?enabled=1&mode=1&wday=mon;tue;wed;thu;fri;sat;sun;&day=every&hour=every&min=0;5;10;30-35;50;&sec=0;5;50-55;&output=0&save&wfilter=1
http://camera_ip/trigger/scheduler?enabled=0&output=0&save&wfilter=1

12.18. PLATE FINDER

Module: trigger/vvq

Manual: 7.1.7

SET: http://camera_ip/trigger/vvq?roi=10,10,80,80&save&wfilter=1

http://camera_ip/trigger/vvq?enabled=0&save&wfilter=1

GET:

http://camera_ip/trigger/vvq?getenabled=0&getroi&wfilter=1

12.19. LASER TRIGGER

Module: trigger/dsttrigger

Manual: 7.1.8

GET:

http://camera_ip/trigger/dsttrigger?getall&wfilter=1

http://camera_ip/trigger/dsttrigger?getall&device=0&wfilter=1

http://camera_ip/trigger/dsttrigger?getT_health&device=0&wfilter=1

12.20.UPLOAD MANAGER (NON-SMART CAMERAS ONLY)

Module: upload/uploadman
Manual: 7.2.5

Get log of event upload attempts
GET:
http://camera_ip/upload/uploadman?getlog

ANSWER:

```
...
2,15-13/2221093.jpg,0,1,Couldn't resolve host name;0,15-
13/2331476.jpg,0,0,No error;0x00
...
```

GENERAL SYNTAX:

```
protocol,filenametemplate,include,ecode,estring;...;0x00

protocol: [ftp:0, smtp:1, http:2, gxdctrf:3, invalid:4]
content: [image+data: 0, image: 1, data: 2]
ecode: [0: OK, 1: failed, 2: image OK, data failed]
```

Note

- If no log information exists, 1 byte of data will be returned (0x00)
- At the end there will be one 0x00 byte even if there is log information.

Upload data to FTP server

GET:

http://camera_ip/upload/uploadman?getall&wfilter=X

ANSWER:

```
...
sections=default,protocol_smtp,protocol_ftp,protocol_post\r\n
currentprotocol=0\r\n
...
```

http://camera_ip/upload/uploadman?getall&wfilter=X&protocol=ftp
http://camera_ip/upload/uploadman?content=0&currentprotocol=0&host=testserver&username=&password=&filenametemplate=$d-$h/ms$l&protocol=ftp&save&wfilter=X

Upload Data to SMTP Server (e-mail)

GET:

http://camera_ip/upload/uploadman?getall&wfilter=X

ANSWER:

```
...
sections=default,protocol_smtp,protocol_ftp,protocol_post\r\n
currentprotocol=0\r\n
...
```

http://camera_ip/upload/uploadman?getall&wfilter=X&protocol=smtp
http://camera_ip/upload/uploadman?content=0&currentprotocol=1&host=testserver&username=&password=&from=&to=user1@testserver;user2@testserver&filenametemplate=$d-$h/ms$l&protocol=smtp&save&wfilter=X

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Upload Data to HTTP Server

GET:

http://camera_ip/upload/uploadman?getall&wfilter=X

ANSWER:

...

```
sections=default,protocol_smtp,protocol_ftp,protocol_post\r\n
currentprotocol=0\r\n
```

...

http://camera_ip/upload/uploadman?getall&wfilter=X&protocol=post
http://camera_ip/upload/uploadman?content=0&currentprotocol=2&host=testserver&filenametemplate=$d-$h/ms$l&protocol=post&save&wfilter=X

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12.21. SET/GET ANPR PROPERTIES (SMART CAMERAS ONLY)

Module: lpr/cff
Manual: 7.2.1

> **Note**
>
> This module will deliver its response in the binary part either as an XML document or a JPEG file.

Get a property of the License Plate Recognition module
GET:
http://[camera_ip]/lpr/cff?cmd=getproperty&name=[property path]

ANSWER:

```
...
<ans>\r\n
      <property>\r\n
            <[property name] value ="[property value]"/>\r\n
      <property/>\r\n
</ans>
...
```

Set a property of the License Plate Recognition module
GET:
http://[camera_ip]/lpr/cff?cmd=setproperty&name=[property path]&value=[property value]

ANSWER:

```
...
<ans>\r\n
      <ecode value ="0"/>\r\n
</ans>
...
```

Save properties of the License Plate Recognition module
GET
http://[camera ip]/lpr/cff?cmd=saveproperties

ANSWER:

```
...
<ans>\r\n
<ecode value="0"/>\r\n
</ans>
...
```


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12.22.BROWSE THE DATABASE (SMART CAMERAS ONLY)

Module: lpr/cff
Manual: 7.2.1

> Note
>
> This module will deliver its response in the binary part either as an XML document or a JPEG file.

Get last record ID
GET:
http://camera_ip/lpr/cff?cmd=getid&id=last

ANSWER:

```
...
<ans>\r\n
<ecode value="0"/>\r\n
<id value="1396268058242"/>\r\n
</ans>
...
```

Get data file corresponding to ID
GET:
http://camera_ip/lpr/cff?cmd=getdata&id=last
http://camera_ip/lpr/cff?cmd=getdata&id=1396268058242

ANSWER:

```
...
<result>
      <location value="-"/>
      <cameraid value="00001009"/>
      <ID value="1396306892338"/>
      <image_hash value="D834B424BBE513390F635AD59E8EDED796D978F0"/>
      <capture>
            <frametime value="2014.04.02 3:59:16.733"/>
            <frametimems value="1396403956733"/>
            <frameindex value="0"/>
      </capture>
      <anpr>
            <text value="ARH002"/>
            <type value="111"/>
            <frame value="578,443,734,412,730,445,574,476"/>
            <bgcolor value="16777215"/>
            <color value="0"/>
            <confidence value="94"/>
            <timems value="360"/>
            <resultcnt value="1"/>
      </anpr>
```

```
      <motdet>
            <rect value="0,0,1,1"/>
            <confidence value="100"/>
            <objectid value="22257"/>
            <objectix value="4"/>
      </motdet>
      <trigger>
            <speed value="52.00"/>
            <speed_limit value="1.00"/>
            <direction value="1"/>
            <category value="679"/>
            <vclass value="1"/>
            <timems value="0"/>
      </trigger>
      <misc>
            <gps_lat value="47.4930"/>
            <gps_lon value="19.0234"/>
      </misc>
</result>
```

Get image corresponding to ID

GET:

http://camera_ip/lpr/cff?cmd=getimage&id=last

http://camera_ip/lpr/cff?cmd=getimage&id=1396268058242

http://camera_ip/lpr/cff?cmd=getimage&id=1396268058242 (cropped license plate image, will not exist, if plate was not found)

12.23. DATABASE CONTENTS (SMART CAMERAS ONLY)

The following table lists the data stored to each event

Field	Type	Description
ADR_BGCOLOR	INTEGER	ADR plate background color
ADR_COLOR	INTEGER	ADR plate text color
ADR_CONFIDENCE	INTEGER	ADR plate confidence
ADR_FRAME	TEXT	ADR plate coordinates (x0,y0,...,x3,y3)
ADR_FRAME_X1	INTEGER	ADR frame coordinate x1
ADR_FRAME_X2	INTEGER	ADR frame coordinate x2
ADR_FRAME_X3	INTEGER	ADR frame coordinate x3
ADR_FRAME_X4	INTEGER	ADR frame coordinate x4
ADR_FRAME_Y1	INTEGER	ADR frame coordinate y1
ADR_FRAME_Y2	INTEGER	ADR frame coordinate y2
ADR_FRAME_Y3	INTEGER	ADR frame coordinate y3
ADR_FRAME_Y4	INTEGER	ADR frame coordinate y4
ADR_TEXT	TEXT	ADR plate text
ADR_TYPE	INTEGER	ADR plate type
ANPR_BGCOLOR	INTEGER	License plate background color
ANPR_CATEGORY	TEXT	License plate category (platetypeconf/platetypeinfos/category)
ANPR_COLOR	INTEGER	License plate text color
ANPR_CONFIDENCE	INTEGER	License plate confidence
ANPR_FRAME	TEXT	License plate coordinates (x0,y0,...,x3,y3)
ANPR_FRAME_X1	INTEGER	LP frame coordinate x1

Field	Type	Description
ANPR_FRAME_X2	INTEGER	LP frame coordinate x2
ANPR_FRAME_X3	INTEGER	LP frame coordinate x3
ANPR_FRAME_X4	INTEGER	LP frame coordinate x4
ANPR_FRAME_Y1	INTEGER	LP frame coordinate y1
ANPR_FRAME_Y2	INTEGER	LP frame coordinate y2
ANPR_FRAME_Y3	INTEGER	LP frame coordinate y3
ANPR_FRAME_Y4	INTEGER	LP frame coordinate y4
ANPR_PLATESRC	INTEGER	ANPR source (0 : none, 1 : main, 2 : overview image)
ANPR_RESULTCNT	INTEGER	Number of identical readings
ANPR_TEXT	TEXT	License plate text
ANPR_TIMEMS	INTEGER	Recognition time [ms]
ANPR_TYPE	INTEGER	License plate jurisdiction code
AUXIMG_HASH	TEXT	Overview image hash (SHA1)
BELTIMG_HASH	TEXT	Belt image hash (SHA1)
CMHWAY_BELT_CONF	REAL	Seatbelt detected, confidence
CMHWAY_OPT_SPEED	REAL	Optical speed [km/h]
CMHWAY_OPT_SPEED_CONF	REAL	Optical speed confidence
COUNTRY_LONG	TEXT	License plate jurisdiction/country, textual, long
COUNTRY_SHORT	TEXT	License plate jurisdiction/country, textual, short
CTRL_AGAIN	UNSIGNED SMALLINT	Image analog gain
CTRL_BLACKLEVEL	UNSIGNED SMALLINT	Image blacklevel

Field	Type	Description
CTRL_DGAIN	UNSIGNED SMALLINT	Image digital gain
CTRL_IRIS	UNSIGNED SMALLINT	Image iris
CTRL_SHUTTERMS	UNSIGNED INTEGER	Image shutter [us]
EVENT_LOG	TEXT	Processing log (base64)
EVTS_DATA_ACK_TIME	BIGINT	Deprecated
EVTS_DATA_EXTID	TEXT	Deprecated
EVTS_DATA_IS_ACK	UNSIGNED SMALLINT	Deprecated
EVTS_DATA_IS_FINISHED	UNSIGNED SMALLINT	Deprecated
EVTS_DATA_IS_SENT	UNSIGNED SMALLINT	Deprecated
EVTS_DATA_SEND_TIME	BIGINT	Deprecated
EVTS_DATA_TRYING	UNSIGNED SMALLINT	Deprecated
EVTS_IMG0_ACK_TIME	BIGINT	Deprecated
EVTS_IMG0_EXTID	TEXT	Deprecated
EVTS_IMG0_IS_ACK	UNSIGNED SMALLINT	Deprecated
EVTS_IMG0_IS_FINISHED	UNSIGNED SMALLINT	Deprecated
EVTS_IMG0_IS_SENT	UNSIGNED SMALLINT	Deprecated
EVTS_IMG0_SEND_TIME	BIGINT	Deprecated
EVTS_IMG0_TRYING	UNSIGNED SMALLINT	Deprecated

Field	Type	Description
FRAMEINDEX	UNSIGNED INTEGER	Image frame index
FRAMETIMEMS	BIGINT	Image /event timestamp [ms]
HASH	TEXT	Main image hash (SHA1)
HYD_CONF	INTEGER	HyDetect confidence
HYD_FRAME_X1	INTEGER	HyDetect vehicle bounding rectangle x1
HYD_FRAME_X2	INTEGER	HyDetect vehicle bounding rectangle x2
HYD_FRAME_X3	INTEGER	HyDetect vehicle bounding rectangle x3
HYD_FRAME_X4	INTEGER	HyDetect vehicle bounding rectangle x4
HYD_FRAME_Y1	INTEGER	HyDetect vehicle bounding rectangle y1
HYD_FRAME_Y2	INTEGER	HyDetect vehicle bounding rectangle y2
HYD_FRAME_Y3	INTEGER	HyDetect vehicle bounding rectangle y3
HYD_FRAME_Y4	INTEGER	HyDetect vehicle bounding rectangle y4
HYD_ISVEH	INTEGER	HyDetect vehicle present (1 : yes, 0 : no)
ID	BIGINT	Primary key/Event ID
IMGSIZ_AUX_X	INTEGER	Overview image x size [px]
IMGSIZ_AUX_Y	INTEGER	Overview image y size [px]
IMGSIZ_BELT_X	INTEGER	Belt image x size [px]
IMGSIZ_BELT_Y	INTEGER	Belt image y size [px]
IMGSIZ_LP_X	INTEGER	Plate image x size [px]
IMGSIZ_LP_Y	INTEGER	Plate image y size [px]
IMGSIZ_NORM_X	INTEGER	Main image x size [px]
IMGSIZ_NORM_Y	INTEGER	Main image y size [px]

Field	Type	Description
IMGSIZ_STP_X	INTEGER	Strip image x size [px]
IMGSIZ_STP_Y	INTEGER	Strip image y size [px]
LP_BRG	INTEGER	Deprecated
LP_SRP	INTEGER	Deprecated
LPIMG_HASH	TEXT	Plate image hash (SHA1)
MD_CONFIDENCE	INTEGER	Motion detection confidence
MD_FRAME_BOTTOM	INTEGER	Motion detection frame bottom
MD_FRAME_LEFT	INTEGER	Motion detection frame left
MD_FRAME_RIGHT	INTEGER	Motion detection frame right
MD_FRAME_TOP	INTEGER	Motion detection frame top
MD_OBJECTID	UNSIGNED INTEGER	Motion detection Event ID
MD_OBJECTIX	UNSIGNED INTEGER	Motion detection Image index (nth frame of the event)
MD_RECT	TEXT	Motion frame (left,top,right,bottom)
MISC_GPS_LAT	TEXT	GPS latitude
MISC_GPS_LON	TEXT	GPS longitude
MMR_CATEGORY	TEXT	MMR category
MMR_CATEGORY_CONF	INTEGER	MMR category confidence
MMR_COLOR	TEXT	MMR color
MMR_COLOR_CONF	INTEGER	MMR color confidence
MMR_MAKE	TEXT	MMR make
MMR_MAKE_CONF	INTEGER	MMR make confidence
MMR_MODEL	TEXT	MMR model

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Field	Type	Description
MMR_MODEL_CONF	INTEGER	MMR model confidence
MMR_SUBMODEL	TEXT	MMR submodel
STATE_LONG	TEXT	License plate jurisdiction/state, textual, long
STATE_SHORT	TEXT	License plate jurisdiction/state, textual, short
STRIPIMG_HASH	TEXT	Strip image hash (SHA1)
TRIGGER_CATEGORY	INTEGER	Vehicle e-length
TRIGGER_DATA	BLOB	Trigger data (base64)
TRIGGER_DATALEN	INTEGER	Trigger data length
TRIGGER_DIRECTION	SMALLINT	Vehicle heading (1 : approaching, 2 : leaving)
TRIGGER_SOURCE	TEXT	Trigger source
TRIGGER_SPEED	UNSIGNED INT	Vehicle speed
TRIGGER_SPEEDLIMIT	INTEGER	Vehicle speed limit
TRIGGER_TIMEMS	BIGINT	Trigger time [ms]
TRIGGER_VCLASS	INTEGER	Vehicle class (user defined limits)

12.24.QUERY DATABASE (SMART CAMERAS ONLY)

Module: lpr/cff
Manual: 7.2.1

> Note
>
> This module will deliver its response in the binary part either as an XML document or a JPEG file.

Steps of retrieving results from the database:

1. Query IDs with regular SQL commands formulating searching criteria
2. Get image and data of the events corresponding to the returned IDs

(see Browse the database Programmers section)

Executing an SQL query

GET:
http://camera_ip/lpr/cff?cmd=getresultlist&select=WHERE ID>0

ANSWER:

```
<results>
<result_0 value="1633966169774"/>
<result_1 value="1633966169773"/>
<result_2 value="1633966169772"/>
<result_3 value="1633966169771"/>
.
.
.
<result_396 value="1633966169378"/>
<result_397 value="1633966169377"/>
<n_results value="398"/>
</results>
```

> Note
>
> - default value of max_record parameter is 1000. This value can be increased using the default/cfs/db/max_record parameter

GET:
http://camera_ip/lpr/cff?cmd=getresultlist&select=WHERE ID>1396465612672 AND ID<1396465612680
http://camera_ip/lpr/cff?cmd=getresultlist&select=WHERE ANPR_TEXT LIKE '%5%'

> Note
>
> - use '%25' instead of '%' in the web browser
>   ex.: ... LIKE '%255%25'

GET:
http://camera_ip/lpr/cff?cmd=getresultlist&select=WHERE TRIGGER_SPEED>5000

Note

- 'speed' and 'speed limit' values are stored as fixed point numbers (multiplied by 100), thus SQL queries must be formulated accordingly: 50.00 km/h should be entered as 5000

Last Event ID:

http://camera_ip/lpr/cff?cmd=getid&id=last

ANSWER:
```
<ans>
<ecode value="0"/>
<id value="1633966170027"/>
</ans>
```

Details of the last event:

http://camera_ip/lpr/cff?cmd=getdata&id=last

ANSWER:
```
<result>
<location value="Test location"/>
<cameraid value="2200888"/>
<ID value="1633966169894"/>
<image_hash value="09147619822f582f10c75b1ae6b9b2baf12b2e61"/>
<capture>
<frametime value="2021.10.11 15:47:01.260"/>
<frametimems value="1633967221260"/>
<frameindex value="157191"/>
</capture>
<anpr>
<text value="RIU701"/>
<type value="101011"/>
<country value="HUN"/>
.
.
.
```

Details of an event with a specific ID:

http://camera_ip/lpr/cff?cmd=getdata&id=1633966169378

ANSWER:

```
<result>
<location value="Test location"/>
<cameraid value="2200888"/>
<ID value="1633966169378"/>
<image_hash value="3da8434d18fce551c7fd3dc05948a34db5932711"/>
<capture>
<frametime value="2021.10.11 15:28:46.995"/>
<frametimems value="1633966126995"/>
<frameindex value="135305"/>
</capture>
<anpr>
<text value="n.a."/>
<type value="0"/>
<country value=""/>
.
.
.
```

Image for an event with a given ID:

http://camera_ip/lpr/cff?cmd=getimage&id=1633966169378

ANSWER:
<picture>

To retrieve the ID of events where the license plate contains the string "MB":

http://camera_ip/lpr/cff?cmd=querydb&sql=select id from cffresult where anpr_text like '%MB%'

ANSWER:

```
<results>
<row>
<ID value="1633966169787"/>
</row>
<row>
<ID value="1633966170001"/>
</row>
<row>
<ID value="1633966170297"/>
</row>
<n_results value="3"/>
</results>
```

Query the license plates of an event where the trigger speed is greater than 50:

http://camera_ip/lpr/cff?cmd=querydb&sql=select anpr_text from cffresult where trigger_speed > 50

ANSWER:

```
<results>
<row>
<ANPR_TEXT value="ARH001"/>
</row>
<row>
<ANPR_TEXT value="ABC123"/>
</row>
<n_results value="2"/>
</results>
```

Query the ID and FRAMETIMES value of events where the event created between 2021-10-11 16:35:00 and 2021-10-11 16:35:10:

http://camera_ip/lpr/cff?cmd=querydb&sql=SELECT id, frametimems from cffresult where substr(frametimems,1,10) <TIME_COMPENSATION_SEC> BETWEEN cast(strftime('%s','2021-10-11 16:35:00') as int) and cast(strftime('%s','2021-10-11 16:35:10') as int)

Note

The value of <TIME_COMPENSATION_SEC> depends on which time zone the user is. In the ANPR database, the time of events is stored in UTC and the time of the events to be filtered during the query must be shifted according to the geographically valid time zone for the time stored in UTC. For example, in the Europe / Budapest time zone in summertime will be +1 hour plus compared to UTC, so <TIME_COMPENSATION_SEC> will be +3600. The '+' sign with URL encoding is '% 2b' and the '-' sign is '% 2d'.

ANSWER:

```
<results>
<row>
<ID value="1633966169571"/>
<FRAMETIMEMS value="1633966503733"/>
</row>
<row>
<ID value="1633966169572"/>
<FRAMETIMEMS value="1633966505533"/>
</row>
<row>
<ID value="1633966169573"/>
<FRAMETIMEMS value="1633966508033"/>
</row>
<n_results value="3"/>
</results>
```

12.25. TEMPLATES (SMART CAMERAS ONLY)

The content of the result data file (and the file name) is customizable using templates. The following short example, which will describe a result formatted as an XML contains all features:

```
1      <?xml version="1.0" encoding="UTF-8"?>
2     <result>
3          <ID value ="$(ID);"/>
4          <text value="$DB2XML($(ANPR_TEXT));"/>
5          <location value="$(location);"/>
6           <image value="$(normal_img);"/>
7     </result>
```

Lines #1, #2 and #7 are text only (of course in this example we have to adhere to the XML standard). Line #3 is an example of a database field, line #4 is an example of a function, line 5 and 6 are examples of a property/special field. This template may evaluate to something like:

```
<?xml version="1.0" encoding="UTF-8"?>
<result>
<ID value ="123456789"/>
<text value="ABC123"/>
<location value="Test Site 34b"/>
<image value="/9j/4AAQSkZJRgABAQAAAQABA[... a base 64 encoded
image...]"/>
</result>
```

The same content in a different format might be:

```
1     event_id=$(ID);
3     plate_text=$DB2XML($(ANPR_TEXT));
4     camera_location=$(location);
5     vehicle_image=$(normal_img);
```


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which will evalutate to:

```
event_id=123456789
plate_text=ABC123
camera_location=Test Site 34b
vehicle_image=/9j/4AAQSkZJRgABAQAAAQABA[... a base 64 encoded image...]
```

Database fields

The contents of the database (see Chapter ...) can be injected using the following syntax:

`$([database field id])`

Functions

To format the output the following functions are provided, with the general syntax:

`$[function name]([argument1],[argument2],...,[argumentN]);`

Plate text formatting:

DB2XML(*text,flags:optional*) - converts the license plate text *text* from DB to XML format

DB2JSON(*text,flags:optional*) - converts the license plate text *text* from DB to JSON format

DB2UTF8(*text,flags:optional*) - converts the license plate text *text* from DB to UTF8

The following flags are available:

ARABIC2LATIN - which converts arabic numbers to their latin equivalent, and non-numeric arabic to ''.

Time formatting:

FormatTime(*timestamp,format_string:optional*) - formats timestamp given in milliseconds according to the optional format_string (see the POSIX strftime function) For example:

"$FormatTime($(FRAMETIMEMS),%Y%m%dT%H%M%S%z)"

evaluates to "20180419T145713+0200". If the format string is omitted, the same timestamp is evaluated as "2018.04.19 14:57:13.594".

Special fields

The following keywords are defined:

`normal_img` - the image representing the event, Base64 encoded

`strip_img` - image strip Base64 encoded

`lp_img` - the cropped license plate image, Base64 encoded encoded < imagestrip value="$(strip_img);"/ >

`aux_img` - the overview image, Base64 encoded

`location` - the location string as defined in default/cfs/db/location

`cameraid` - the camera HW id, may be overridden with default/cfs/db/cameraid

Note

Special characters

The character '$' must always be escaped with '\'. Within an expression the characters '$', '(', ')', ',' and ';' have to be escaped with a '\' character. For example the following expression:

();$TEST(a\$a\,,$(LP));

will evaluate as

();a$a,DATA

provided that the function TEST concatenates its arguments and the field LP contains the text 'DATA'.

Administration

You can upload a template with the `cmd = uploadtemplate` command as an HTTP POST request as multipart / form-data. As a parameter, enter the name you want to reference the template in the `updatefilename` field.
The device template in use and the system template cannot be deleted / overwritten.

The browser sends with this header:

```
Accept: */*

Accept-Encoding: gzip, deflate

Accept-Language: en-US,en;q=0.9

Connection: keep-alive

Content-Length: 889

Content-Type: multipart/form-data; boundary=----
WebKitFormBoundaryCAHOjxAq53NgEqQK

Host: 121d219.ar.local

Origin: http://121d219.ar.local

Referer: http://121d219.ar.local/

User-Agent: Mozilla/5.0 (X11; Fedora; Linux x86_64)
AppleWebKit/537.36 (KHTML, like Gecko) Chrome/92.0.4515.107
Safari/537.36
```

Form Data:

```
------WebKitFormBoundaryCAHOjxAq53NgEqQK

Content-Disposition: form-data; name="updatefilename";
filename="proba.tmpl"

Content-Type: application/octet-stream

------WebKitFormBoundaryCAHOjxAq53NgEqQK--
```

The list of available templates can be queried with the command `cmd = listtemplates`, the device will give an XML response like this:

```
<ans>

<template0 value="file_default.sys.tmpl"/>

<template1 value="file_json_default.sys.tmpl"/>

<template2 value="json_cmgo.sys.tmpl"/>

<template3 value="json_default.sys.tmpl"/>

<template4 value="xml_data.sys.tmpl"/>

<template5 value="xml_default.sys.tmpl"/>

<template6 value="xml_evts.sys.tmpl"/>

<template7 value="xml_minimal.sys.tmpl"/>

</ans>
```

Templates can be deleted with the `cmd = removetemplate` command (system templates are not allowed to be deleted), e.g. *`lpr/cff?cmd=removetemplate&name=proba.tmpl`*".

The device generates the output files using the templates specified in the properties under the `/ default / cfs / template` group. The template name want to be used must be entered here.

template - formats the web search (getdata) with this template
user_template - formats the files to be uploaded with this template
filename_template - format the names of the files to be uploaded with this template

12.26.ENGINE MANAGER (SMART CAMERAS ONLY)

Module: lpr/cff
Manual: 7.2.4

> **Note**
>
> This module will deliver its response in the binary part either as an XML document or a JPEG file.

Pipeline

The pipeline can be built freely, up to 8 elements, in any order. The following example can be configured.

```
<structure>
      <stage0>
         <type value="scapture"/>
         <grp value="capture"/>
      </stage0>
      <stage1>
         <type value="presel"/>
         <grp value="presel"/>
      </stage1>
      <stage2>
         <type value="anpr_main"/>
         <grp value="recognize"/>
      </stage2>
      <stage3>
         <type value="post"/>
         <grp value="postproc"/>
      </stage3>
      <stage4>
         <type value="void"/>
         <grp value="void"/>
      </stage4>
      <stage5>
         <type value="void"/>
         <grp value="void"/>
      </stage5>
      <stage6>
         <type value="void"/>
         <grp value="void"/>
      </stage6>
      <stage7>
         <type value="void"/>
         <grp value="void"/>
      </stage7>
   </structure>
```


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The pipeline will be built from the elements in the specified order (0-7). Several of the same elements can be placed in the pipeline with different settings, in which case it is advisable to use a separate path to store the properties (see below). Note that adding any extra stages (especially analytics) will seriously increase processing time.

The type of stage must be specified in the type field, the following are possible:

scapture - image receiving stage, it is advisable to put at least one at the beginning of the processing
presel - preselector, gets all incoming images, runs ANPR (preferably on a fast vq / vvq engine) and segments the image sequence into passages based on the results
anpr_main - ANPR stage, this is where the type engine will run
cmhway - search for optical speed and seat belt
mmr - Make and Model Recognition
hyd - vehicle detection
post – post-processing (attaching thumbnails, captioning images, etc.)

Each stage has a property group where its settings are stored, this must be specified in the *grp* field. For example, above the *stage3* stage (post) settings are under the *default / cff / postproc* path.

Stages

The following stages can be stitched in any order you like (most of the possible combinations are obviously meaningless, but this is the only way to ensure flexibility).

Single Capture

Its task is to receive and decompress the images and provide them with an event ID and index.

```
<capture>
    <misc>
       <manual_direction value="0"/>
    </misc>
    <aux>
       <id value="203.0.113.1"/>
       <enabled value="0"/>
       <delayms value="0"/>
    </aux>
    <filter>
       <direction value="0"/>
       <speeding_only value="0"/>
       <min_trg_pulse value="0"/>
    </filter>
    <manual_frame>
       <left value="0"/>
       <top value="0"/>
       <right value="46"/>
       <bottom value="83"/>
    </manual_frame>
    <classes>
       <class00>
          <speed_limit value="100"/>
          <range_min value="10"/>
          <range_max value="499"/>
          <name value="CAR"/>
       </class00>
       <class01>
          <speed_limit value="90"/>
          <range_min value="500"/>
          <range_max value="1299"/>
          <name value="TRUCK"/>
       </class01>
       <class02>
          <speed_limit value="80"/>
          <range_min value="1300"/>
          <range_max value="3999"/>
          <name value="LONG TRUCK"/>
       </class02>
       <class03>
          <speed_limit value="9999"/>
          <range_min value="0"/>
          <range_max value="9"/>
          <name value="OUT OF RANGE (S)"/>
       </class03>
       <class04>
          <speed_limit value="9999"/>
          <range_min value="4000"/>
          <range_max value="999999"/>
          <name value="OUT OF RANGE (L)"/>
       </class04>
    </classes>
    <image_strip>
       <enabled value="0"/>
       <timeout value="6000"/>
       <scale_factor value="33"/>
    </image_strip>
    <gps>
       <enabled value="0"/>
    </gps>
    <proc>
       <fifo_maxitems value="300"/>
       <priority value="-2"/>
       <port value="4444"/>
       <debug value="0"/>
    </proc>
 </capture>
```


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misc / manual_direction - Determines the direction of traffic as follows:

- if you force it with the * *manual_direction* property, it will overwrite everything (see the negative values in the table below), otherwise
- if the trigger sends direction, it will be, otherwise
- if it does not send direction but sends speed, then if negative, then leaving, if positive, then approaching, otherwise
- if you do not send a speed, the value of **manual_direction** will be (see the positive values in the table below), otherwise
- it is unknown.

***misc/manual_direction* value**	**function**
0	does nothing
1	if no direction, ARRIVING
2	if there is no direction, LEAVING
-1	be sure it is ARRIVING
-2	be sure it is LEAVING

- aux / id - Overview camera IP (can't resolve URL)
- aux / enabled - Enable OV camera

***aux / enabled* value**	**function**
0	none
1	overview only
2	If you do not find a license plate on the image, see the overview as well

- ***aux / delayms*** - fixed offset between normal and OV image, in milliseconds, requesting a later image as OV
- ***filter / direction*** - interesting for radar, directional filtering as for radar, 0 - no filtering
- ***filter / speeding_only*** - interesting for radar, filtering according to the speed limits specified in classes, lower speed events are dropped, 0 – turned off
- ***filter / min_trg_pulse*** - 0 minimum e-length for radar, under it will be discard
- ***manual_frame / left*** - manually specified frame in % of the image
- ***manual_frame / top*** - manually specified frame in % of the image
- ***manual_frame / right*** - manually specified frame in % of the image
- ***manual_frame / bottom*** - manually specified frame in % of the image
- ***classes / class00 / speed_limit*** - 5 classes can be specified, in which the passages can be classified according to e-length, and the speed limit for them
- ***classes / class00 / range_min*** - the minimum of the class e-length
- ***classes / class00 / range_max*** - the maximum of the class e-length
- ***classes / class00 / name*** - the name of the class (eg car, small truck, etc.)
- ***image_strip / enabled*** - whether to create a series of thumbnails of the passages (help to set up a trigger). IMPORTANT! all images have to be compressed / reduced for this, so it will be very slow if we are in vvq / mx04 performance mode, it is advisable to turn it off!
- ***image_strip / timeout*** - to close the event thumbnail timeout (in ms), if the trigger end signal does not appear, max. it waits for a given time before closing the thumbnail
- ***image_strip / scale_factor*** - reduce thumbnail (% of original image)
- ***gps / enabled*** - whether to read GPS data
- ***proc / fifo_maxitems*** - storage size, will probably never need to be set
- ***proc / priority*** - line priority
- ***proc / port*** - the value of the image receiving port (this should also be used on the sending side if you change it)

Preselection

type: *presel*
Its task is to quickly pre-select the images already grouped by the trigger into a pass, segmenting them into multiple passes if necessary, and selecting the image that best represents the pass, from which the more time-consuming processing steps will be performed later in the pipeline. (The terms "event" and "passage" are used interchangeably.) Of the similar license plates in the passage pictures, the one that best represents the passage should be selected. License plate position, syntax, etc. based on the pictures you get points and the license plate that gets the most points will be the selected picture.

```
<presel>
   <lpr>
      <max_plates value="1"/>
      <lp_filter value="1"/>
      <duplicate>
         <timeout value="10"/>
         <similarity value="100"/>
      </duplicate>
      <lp_pos_limit value="1"/>
      <min_lp_dt value="0"/>
      <max_lpcnt value="4"/>
      <anpr_frame value="0"/>
      <debug value="0"/>
      <anpr0 value="cffengines/presel/engine0"/>
      <anpr1 value="cff_auto"/>
      <def_speed_ix value="2"/>
      <min_frames value="0"/>
      <lrtext value="0"/>
      <use_trg_lpinfo value="0"/>
   </lpr>
   <proc>
      <event_timeoutms value="1000"/>
      <fifo_maxitems value="300"/>
      <event_max_frames value="16"/>
      <priority value="1"/>
   </proc>
   <proc_units>
      <quick_limit value="6"/>
      <nthreads value="2"/>
      <mtinlen value="30"/>
      <mtoutlen value="30"/>
   </proc_units>
   <syntax>
      <syntax_cnt value="0"/>
      <syntax00>
         <syntax value="LLLDDD"/>
         <syntax_weight value="1"/>
      </syntax00>
      <syntax01>
         <syntax value=""/>
         <syntax_weight value="1"/>
      </syntax01>
   </syntax>
   <syntax_grp value="presel/syntax"/>
</presel>
```


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- ***lpr / max_plates*** - Max. search for the license plate in the picture (FindNext () calls, 1 - no FindNext ()),

    - if we look at several license plates in one picture, the frame of the ANPR stage should be an LP frame so that you know where the 2nd, etc. should be search for a license plate, otherwise ANPR will find the one that suits the most.
    - for the same reason, reading the ADR is not possible in this case, there is a detailed explanation in the DR description
- ***lpr / lp_filter*** - Filter results

***lp_filter* value**	**function**
0	do not discard, if there is any license plate
1	No filtering
2	discard if there is no type
3	discard if only the license plate found in the preselection stage (this allows us to keep the result, for example, if ANPR Main found it, but no type)

Important: if the *use_trg_lpinfo* flag is set, the license plate number found by the trigger (vvq) will also be considered a license plate number, so even if set to 0, the system will not discard it, since there is no license plate text, *n.a.* will be included instead. If you don't want to keep these, set the filter of the last ANPR stage to 3, which filters such events (only vvq found something on it, not the next ANPRs), it discards.

- ***lpr / duplicate / timeout*** - Do not return two matching license plates within the specified time. In seconds, the filter is inactive when set to zero.
- ***lpr / duplicate / similarity*** - In which case we consider the license plates to be identical (in%).
- ***lpr / lp_pos_limit*** - The minimum distance of the license plate from the edge of the image in pixels, if closer, is ignored. You'll probably never need it.
- ***lpr / min_lp_dt*** - Millisecond value, if two license plates are closer than this, they will probably match. You'll probably never need it.
- ***lpr / max_lpcnt*** - If we find so many same license plates, we will not examine the other images of the passage.
- ***lpr / anpr_frame*** - Limit the location of the license plate search within the image (separate multiple license plates, increase reading speed). Use the full image if the frame is invalid.

anpr_frame value	function
0	ANPR is running in full screen
1	is the motdet frame given by the camera
2	trigger frames (radar, virtual loop, vvq triggers)
3	manually entered frames
4	License plate frame found by previous stages
5	Using a frame found by a vehicle detector (hydet)

- ***lpr / anpr0*** - Property path to the ANPR engine.
- ***lpr / anpr1*** - Property path to the associated ANPR engine. (See *proc_units / quick_limit*)
- ***lpr / def_speed_ix*** - Help when using radar. We maintain a table in which we record the image of the license plate, grouped by speed. If there is a pass that we could not read, we find out from this table that how many images we 'usually' return at the speeds associated with the pass, and we forward it as a selected image. This is the default value of this index.
- ***lpr / min_frames*** - examine at least as many images from the passage, don't close it until it's done
- ***lpr / lrtext*** - reverse the writing direction of Arabic plates
- ***lpr / use_trg_lpinfo*** - Do not run your own engine, but accept the license plate text and frame from the trigger (typically running vvq on the camera).
- ***proc / event_timeoutms*** - Refers to the time elapsed since the event was received, in milliseconds. If this is exceeded, the event will be closed / forwarded. This limits, how much time the stage can spend processing a passage.
- ***proc / fifo_maxitems*** - Stage storage size (in image)
- ***proc / event_max_frames*** - The maximum number of images per event
- ***proc / priority*** - Stage line priority
- ***proc_units / quick_limit*** - If the number of queued images for ANPR exceeds this, we will switch to the faster, associated ANPR engine (lpr / anpr1).
- ***proc_units / nthreads*** - Number of ANPR processing threads
- ***proc_units / mtinlen*** - ANPR thread storage size
- ***proc_units / mtoutlen*** - The size of the ANPR threads
- ***syntax_grp*** - Location of syntax checking properties.
- ***syntax / syntax_cnt*** - How many syntaxes have been specified
- ***syntax / syntax00 / syntax*** - Syntax L - letter, D - digit, pl LLLDDD is the Hungarian license plate.
- ***syntax / syntax00 / syntax_weight*** - Syntax weight (how many points the license plate gets if it matches the given syntax)

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ANPR Main

type: *anpr_main*
It is advisable to do this after the preselection stage. Runs a type engine (ANPR, ADR, etc.) on the incoming image. It is possible to bond several of them in a row, e.g. one *eur* after *hun-local*. In this case, the *eur* does not examine the passes already typed by *hun-local*, it only passes them on, but if there is no type, it runs the slower *eur* engine.

```
<recognize>
   <lpr>
      <anpr_frame value="0"/>
      <lp_filter value="1"/>
      <duplicate>
         <timeout value="10"/>
         <similarity value="100"/>
      </duplicate>
      <anpr0 value="cffengines/recognize/engine0"/>
      <adr value="0"/>
      <lrtext value="0"/>
      <min_confidence value="-1"/>
   </lpr>
   <proc_units>
      <nthreads value="2"/>
   </proc_units>
</recognize>
```

- ***lpr / anpr_frame*** - See above
- ***lpr / lp_filter*** - See above
- ***lpr / duplicate / timeout*** - See above
- ***lpr / duplicate / similarity*** - See above
- ***lpr / anpr0*** - See above
- ***lpr / adr*** - Enable ADR reading

***adr* value**	**function**
0	none
1	EADR read only
2	ADR read only
3	EADR and ADR readings

The important thing is that you read the ADR in the same frame as the license plate, so if you pass on a license plate frame that has ANPR there and does not contain the ADR table, it will never find it. If you find an ADR table in an image, you are no longer looking for an EADR table on it. If you are looking for more than one license plate in an image (presel / max_plates), the normal ANPR will run on the presel license plate, so you won't find the ADR table. In this case, there would be confusion to which plate belongs to which license plate. (Not not the one you are closer to.)

- ***lpr / lrtext*** - See above
- ***lpr / min_confidence*** - Required ANPR confidence, discarding under it. Can be turned off with -1.
- ***proc_units / nthreads*** - See above

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CMHighway

type: *cmhway*
It is able to estimate the speed optically and check the seat belt. Must be done after the ANPR Main stage because it needs (more) ANPR results. The trigger must also be set to send some pictures where you can find some license plates.

```
<cffcmhway>
   <opt_speed_enabled value="1"/>
   <check_belt_enabled value="1"/>
</cffcmhway>
```

- ***opt_speed_enabled*** - whether to estimate optical speed
- ***check_belt_enabled*** - whether a seat belt check is required

Make and Model (MMR)

type: *mmr*
Identifies the brand and type of the vehicle. It is only worth doing after the ANPR Main stage, because it needs an ANPR result, it is worth running on the selected image (representing the event). It has no extra settings.

Vehicle Detector

type: *hyd*
This stage can be placed in front of the presel stage as a pre-filter or as a post-filter, e.g. to filter out false positive events after ANPR. This way, we can filter out false license plates (e.g. billboards, graffiti, fences, cornfields, etc.) but do not throw away events that have a vehicle on it but no license plate, or we could not read the license plate.

```
<cffhyd>
   <filter value="0"/>
   <engine value="hydetect-7.2.0.0"/>
   <minsizex value="0.100000"/>
   <maxsizex value="0.900000"/>
   <minsizey value="0.100000"/>
   <maxsizey value="0.900000"/>
</cffhyd>
```

- ***filter*** - you can filter out events based on the result

***filter* value**	**function**
0	no filter, it allows everything
1	if there is no vehicle and no license plate, discard the passage
2	if there is no vehicle, discard the passage
3	if there is no vehicle and no standard license plate, discard the passage

- ***engine*** - the location of the hydetect engine in the property tree
- ***minsizex, etc.*** - the minimum / maximum x or y object size specified in % of the image size

Postprocessing

type: *post*
Post - processing.

```
<postproc>
   <lp_img_en value="15"/>
   <titler>
      <enabled value="1"/>
      <nlines value="1"/>
      <title_string00 value="$y-$o-$d $h:$m:$s LP: $p COUNTRY: $f STATE: $j"/>
      <title_string01 value=""/>
      <title_string02 value=""/>
      <ID value="Smart/SpeedCAM"/>
      <location value="Test location"/>
      <direction_string00 value="UNKNOWN"/>
      <direction_string01 value="APPROACHING"/>
      <direction_string02 value="LEAVING"/>
      <alt_charset value="0"/>
   </titler>
   <titler_grp value="postproc/titler"/>
</postproc>
```

- ***postproc / lp_img_en*** - create a cropped license plate image
- ***postproc / titler / enabled*** - whether to have captions
- ***postproc / titler / nlines*** - how many lines (max. 8) the caption should be
- ***postproc / titler / title_string00*** - caption first line
- ***postproc / titler / ID*** - user ID, this can be added to the caption
- ***postproc / titler / location*** - user location ID
- ***postproc / titler / direction_string00*** - for radar, user direction identifier (unknown), this may be added to the caption
- ***postproc / titler / direction_string01*** - for radar, user direction identifier (approaching), this may be added to the caption
- ***postproc / titler / direction_string02*** - for radar, user direction identifier (leaving), this may be added to the caption
- ***postproc / titler / alt_charset*** - caption alternative font
- ***postproc / titler / titler_grp*** - subtitle property group

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12.27.RESULT UPLOAD (ONLY SMART CAMERAS)

Module: lpr/cff
Manual: 7.2.5

> Note
>
> This module will deliver its response in the binary part either as an XML document or a JPEG file.

Upload settings can be managed by setting and querying properties with the setproperty and getproperty commands #19.Set/Get ANPR properties

The properties of the upload module reside in the 'default/cfs/uplm' property path:

```
<uplm>
  <general>
    <method value="-1"/>
    <maxtryconnect value="1"/>
  </general>
  <http>
    <host value="192.168.1.250"/>
    <content value="7"/>
    <timeoutms value="2000"/>
  </http>
  <ftp>
    <host value="192.168.1.250"/>
    <content value="7"/>
    <timeoutms value="2000"/>
    <username value="user"/>
    <password value="pass"/>
  </ftp>
</uplm>
```

'general/method': Upload method.
Possible values:

- -1: disabled
- 0: HTTP/HTTPS
- 1: FTP.
- 2: SFTP

'general/maxtryconnect': Max. number of connection attempts. Possible values: 1-10

'content': Bitfield that describes what data should be uploaded. Possible values: 1-7

- bit 0: image (jpg)
- bit 1: plate image (jpg)
- bit 2: result (xml)

example:

```
all data -> content=7 (=0b111),
image+result -> content=5 (=0b101)
```

'timeoutms': Timeout of one attempt in milliseconds.

Examples:
SET 'maxtryconnect':
http://IP/lpr/cff?cmd=setproperty&name=/default/cfs/uplm/general/maxtryconnect&value=5

GET 'maxtryconnect':
http://IP/lpr/cff?cmd=getproperty&name=/default/cfs/uplm/general/maxtryconnect

ANSWER:

```
<ans>
  <property>
    <maxtryconnect value="1"/>
  </property>
</ans>
```

Possible error messages in ANPR LOG:

- UploadMan:: Cannot initialize curl.
- UploadMan:: Upload is disabled.
- UploadMan:: No HTTP host defined.
- UploadMan:: No FTP host defined.
- UploadMan:: No FTP username defined.

12.28. CLEAR DATABASE/REMOVE RECORD (SMART CAMERAS ONLY)

Module: lpr/cff
Manual: 7.2.1

> Note
>
> This module will deliver its response in the binary part either as an XML document or a JPEG file.

Clear database or remove record
GET:
http://camera_ip/lpr/cff?cmd=cleardb
http://camera_ip/lpr/cff?cmd=removebyid&id=1396465617988

ANSWER
```
<ans>
<ecode value="0"/>
</ans>
```

12.29. ANPR MODULE RESTART (SMART CAMERAS ONLY)

Module: lpr/cff
Manual: 8.8

> Note
>
> This module will deliver its response in the binary part either as an XML document or a JPEG file.

Restart license plate reading module

GET
http://[camera ip]/lpr/cff?cmd=restart

ANSWER:
```
<ans>\r\n
<ecode value="0"/>\r\n
</ans>
```


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12.30.SYSTEM INFORMATION

Module: stat/identify, stat/system, hwlayer/cperiph
Manual: 8.1

Get information about system diagnostic values
GET:
http://camera_ip/stat/identify?getall&wfilter=X
http://camera_ip/stat/system?getall&section=memory&wfilter=X
http://camera_ip/hwlayer/cperiph?getcamtemp&panel=0&wfilter=X
http://camera_ip/hwlayer/sensors?getEv&device=lightsensor&wfilter=X

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12.31. CAMERA LOG

Module: logging/logstream
Manual: 8.3

Get camera log
GET:
http://camera_ip/logging/logstream?getfilter&wfilter=X
http://camera_ip/logging/logstream?getlog

Note

- Lines are separated by '\n' (0x0a characters)
- The log will not be empty after the query, so the queried lines will remain even after the next query, unless it was not overwritten

(It is possible to set the already queried rows to be deleted.
See: plainconfig mode parameter)

SET:
http://camera_ip/logging/logstream?filter=uarttrigger&save&wfilter=X
http://camera_ip/logging/logstream?filter=*&save&wfilter=X

Note

- '*' no filtering is applied

Only Smart cameras:

GET:
http://camera_ip/lpr/cff?cmd=getfcontent&name=/mnt/data/cfreeflow/cff.log

Note

- The answer is base64 encoded.

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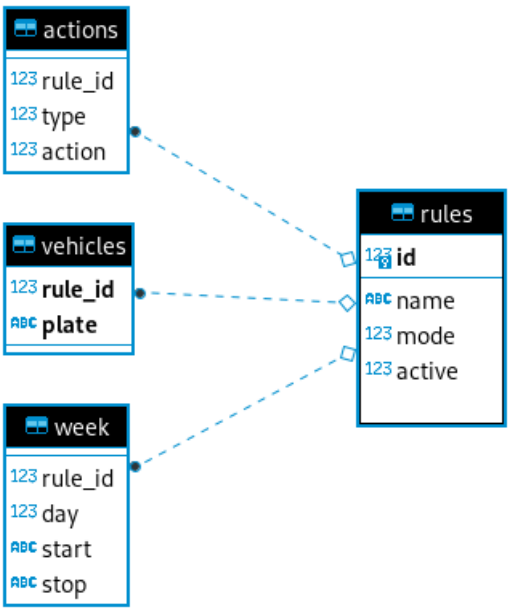
12.32. BLACK/WHITELIST (SMART CAMERAS ONLY)

Black- / Whitelist functionality allows us to perform tasks depending on the time and the license plate read. It can be enabled with the `/ default / cfs / db / bw / enabled` property. Tasks can be:

- Upload (HTTP, FTP, etc.)
- GDS insertion
- run script (eg to pull GP output)
- write to websocket, TCP port
- etc.

Configurable SQL commands are used next to the table structure below.



The *rule* table:

- **id** - rule identifier, the other tables refer to it
- **name**
- **mode** - whether black (0) or white (1) list
- **active** - is the given rule active (1)

The *week* table:

- **rule_id** - which rule the time limit belongs to
- **day** - 0-6 to which of the days of the week it applies (0-Sunday, 1-Monday, ... 6-Saturday)
- **start** - between 0:00 and 24:00 when the active time interval starts
- **end** - between 0:00 and 24:00 when the active time interval ends

The *vehicles* sign:

- **rule_id** - which rule the license plate belongs to
- **plate** - license plate text
-

The *actions* table:

- **rule_id** - which rule the action belongs to
- **type** - what type of event, possible task types:

Type	Name
0	Upload (Upload Manager)
1	Execute script
2	Stream
3	Datadisplay (websocket)
4	GDS Insertion

- **action** - within which (eg which from several UploadManagers - for example, in case of 3, it uses the Upload Manager configured under `* default / cfs / uplm / extras / uplm3`)

Principle of operation

Read a **license plate** at a **given time**. Look all the rules in the rules table to see if any of them apply to a given time (day and time are correct). If yes, check the vehicles license plate to see if it has the license plate text. After that, depending on whether the rule was recorded in black or whitelist mode, we execute (black) or do not execute (white), the task added to the rule in the action table. If no such rule is found and there is a rule called default, the corresponding action is executed independently of the license plate text.

Note

The mode parameter is only present in newer releases for compatibility, it does nothing, so it can only be used in mode 0. Whitelist functionality can be implemented with rules where we do not assign a task to the listed license plates (whitelist, we do not penalize them, eg ambulance on the highway), and we define a default rule for all others (they can be penalized).

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Commands

Tables can be written with SQL commands (cmd = querydb) using the following examples:

- New rule

```
INSERT INTO rules (name) VALUES("[rule name]")
```
(e.g.: http://192.0.2.3/lpr/cff?cmd=querydb&sql=INSERT INTO rules (name) VALUES('example'))

- Activate a rule

```
UPDATE rules SET active="1" WHERE id="[rule ID]")
```

- Add a task to a rule

```
INSERT INTO actions (rule_id,type,action) VALUES ("[rule id]", "[type]", "[action index]")
```

- Add a date to a rule

```
INSERT INTO week VALUES("[rule id]","[weekday]","[start date]","[end date]")
```

- Add a vehicle to a rule

```
INSERT INTO vehicles VALUES("[rule id]","[license plate text]")
```

- Listing the already existing rules (by default the list is empty)

`SELECT * FROM` rules (e.g.: http://192.0.2.3/lpr/cff?cmd=querydb&sql=SELECT * FROM rules)

- Delete a selected rule

`DELETE FROM` rules `WHERE` id='[rule id]'
(e.g.: http://192.0.2.3/lpr/cff?cmd=querydb&sql=DELETE%20FROM%20rules%20WHERE%20id='9')

Bulk filling

There is a `cmd = uploadtable` command that can be used to upload an entire table separated by '\ n', e.g. if you want to add many license plates to a rule. This is how it should look:

```
[table name]
[key (column names listed in parentheses)]
[values 0 (column values separated by commas)
[values 1 (comma-separated column values]
(...)
[values N (column values separated by commas)
```

For example:

```
vehicles
(rule_id,plate)
"2","ABC123"
"2","DEF456"
"2","GHI678"
"2","JKL901"
"2","MNO234"
```

12.33. RESTART

Restart the camera
Manual: 8.8

GET:
http://camera_ip/setup/exit?retcode=1

> Note
>
> Return codes (retcode) available:
> - 1: restart modules (quick restart)
> - 3: reboot camera
> - 7: reboot and enter recovery mode

12.34. CAMERA MODULES

List all modules currently loaded
GET:
http://camera_ip/stat/system?getall&section=module&wfilter=X

ANSWER:

```
...
mn00=logging/logstream\r\n
mv00=3.1.0.6,0\r\n
md00=Device Log Streamer\r\n
mn01=maintenance/backup\r\n
mv01=3.1.1.4,2\r\n
md01=Backup System\r\n
...
```

General syntax:

```
mnXX=group of the module/ name of module\r\n
mvXX=version of the module\r\n
mdXX=description of the module\r\n
where XX is the index of the module
```


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13. CARMEN ANPR REFERENCE MANUAL

The **latest Carmen ANPR Reference Manual** can be found on this page: https://adaptiverecognition.com/app/uploads/DOC/Software/Carmen/ANPR/carmen_anpr_reference_manual.pdf

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Adaptive Recognition Hungary Technical Support System (ATSS) is designed to provide you the fastest and most proficient assistance, so you can quickly get back to business.

Information regarding your hardware, latest software updates and manuals are easily accessible for customers via our Documents Site (www.adaptiverecognition.com/doc) after a quick registration.

New User

If this is your first online support request, please contact your sales representative to register you in our Support System. More help here (www.adaptiverecognition.com/support)!

Returning User

All registered ATSS customers receive a personal access link via e-mail. If you previously received a confirmation message from ATSS, it contains the embedded link that allows you to securely enter the support site.