ADAPTIVE RECOGNITION

TRAFFIC MONITORING CAMERAS

User Manual

Vidar ANPR Camera

VIDAR

USER MANUAL

Document version: 2021.03.03.

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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.

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 communicate the license plate corresponding to the event.
- In the last section, the tools of camera maintenance (firmware update, logs, etc.) are described.

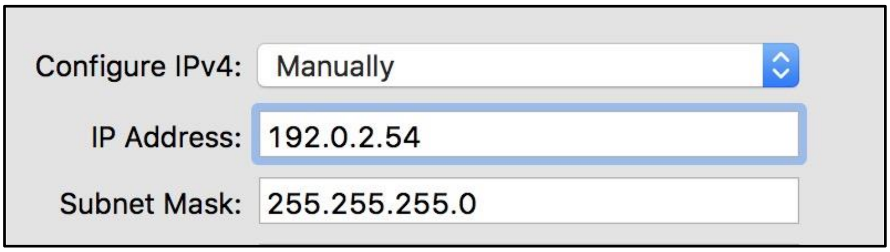
2. ACCESSING THE CAMERA

Note

In order to access the camera, power and network connectors have to be connected appropriately. For more information see the Quick 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



Configure IPv4: Manually
IP Address: 192.0.2.54
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)

Start a browser (Firefox, Chrome or Edge) and enter the default IP of the camera: http://192.0.2.3 into the address bar. The **camera's user interface starts up** with administrator privileges, ready to be set up and configured. 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.

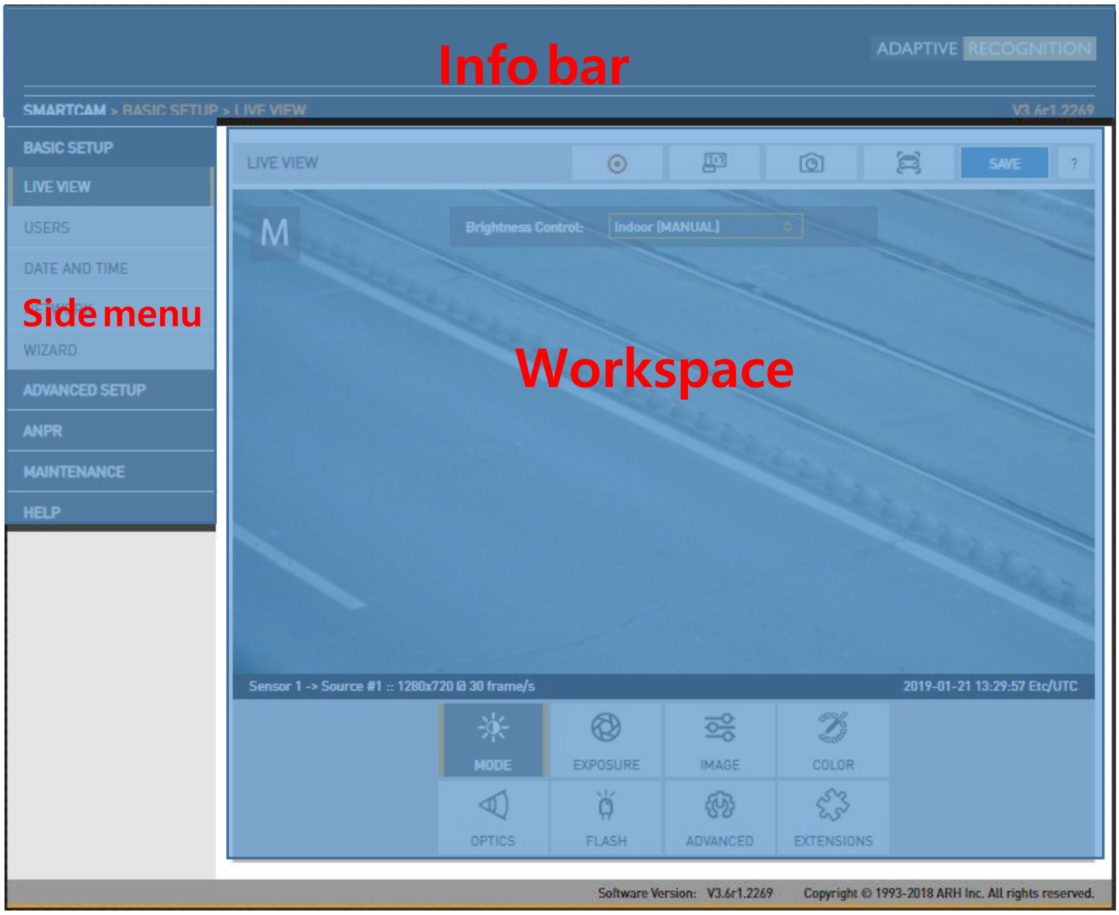
Note

Under recent 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



Info bar
ADAPTIVE RECOGNITION
SMARTCAM > BASIC SETUP > LIVE VIEW
V3.6r1.2269
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
Side menu
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
LIVE VIEW
SAVE
?
M
Workspace
MODE
EXPOSURE
IMAGE
COLOR
OPTICS
FLASH
ADVANCED
EXTENSIONS

Brightness Control: Indoor (MANUAL)

Sensor 1 -> Source #1 :: 1280x720 @ 30 frame/s

2019-01-21 13:29:57 Etc/UTC

Software Version: V3.6r1.2269

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The information bar displays the menu and the current SW version.

- ARH logo
- Version number
- Camera type, menu points

Side menu

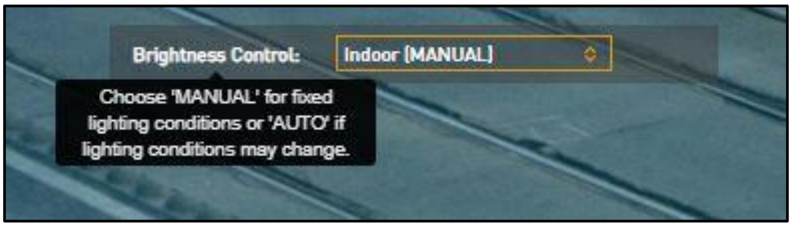
- Basic Setup, advanced Setup, ANPR, Maintenance, Help menu – click to open
- Access camera settings via the navigator. Menu is organized into a tree structure.

Workspace

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

Hint

Workspace buttons have a popup help. Hover the mouse over the label of the setting to see the tooltip. This function only available at few settings.



Brightness Control: Indoor (MANUAL)

Choose 'MANUAL' for fixed lighting conditions or 'AUTO' if lighting conditions may change.

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.

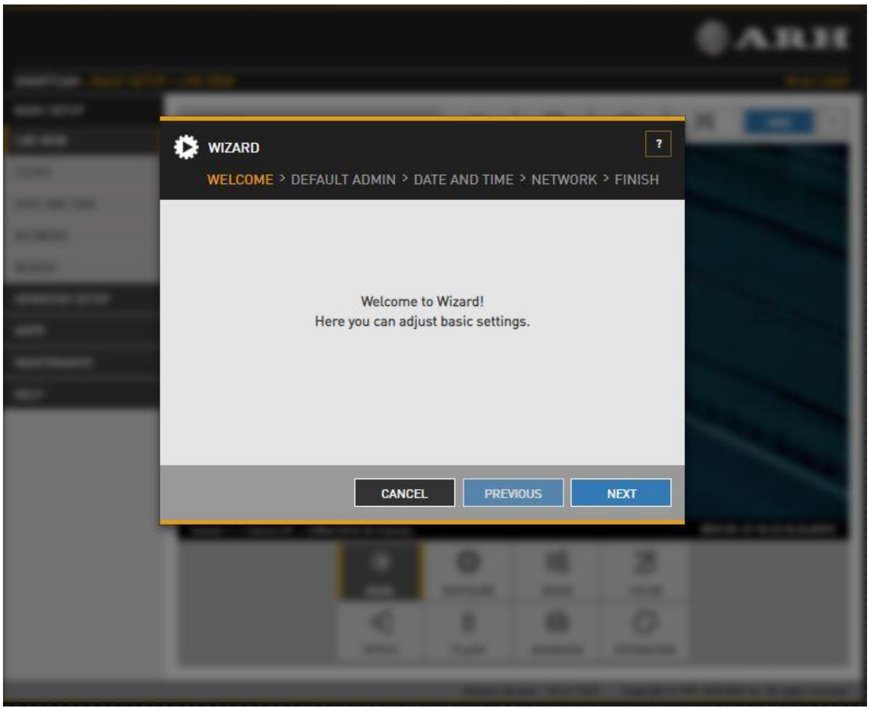
Important

Using Internet Explorer, you may encounter problems with certain sections of the Web User Interface. For best user experience use a recent edition of Google Chrome or Firefox.

4. FIRST STEPS (WIZARD)

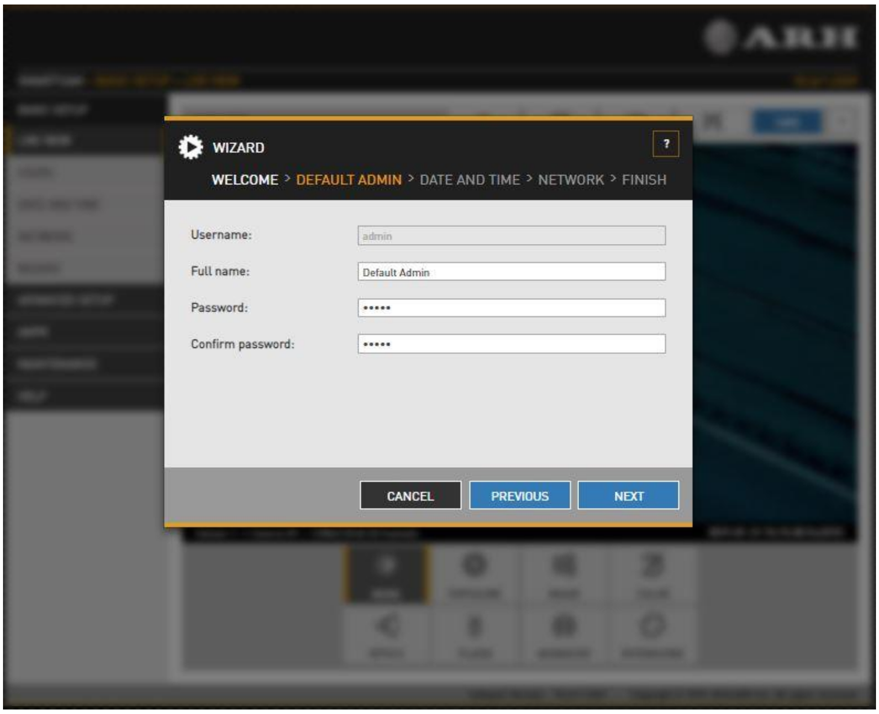
WEB INTERFACE > BASIC SETUP > WIZARD

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


WIZARD
?
WELCOME > DEFAULT ADMIN > DATE AND TIME > NETWORK > FINISH
CANCEL
PREVIOUS
NEXT

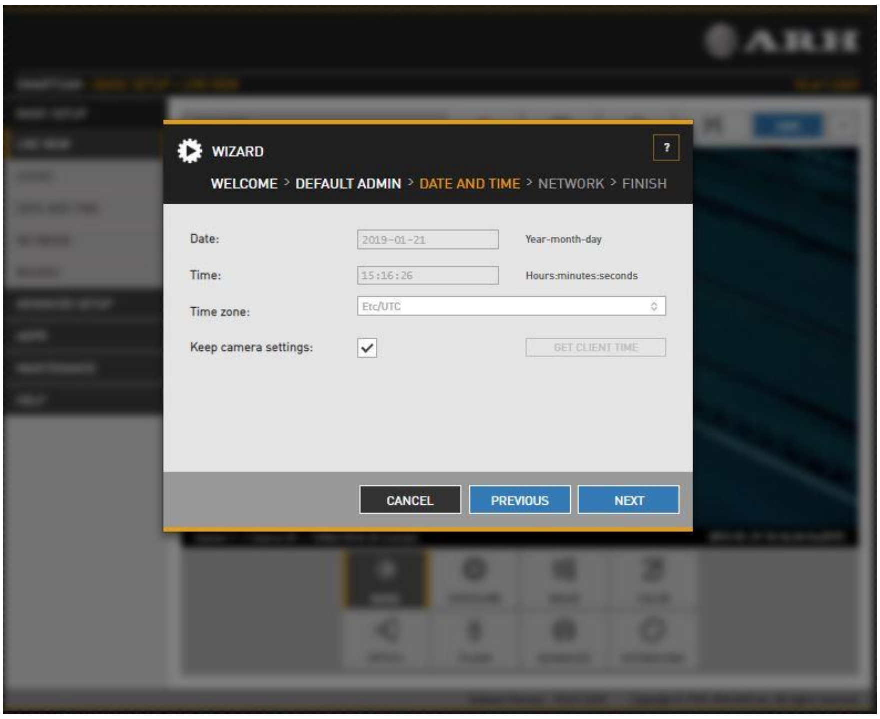
Welcome to Wizard!
Here you can adjust basic settings.

It will guide you through setting up an administrator user


WIZARD
?
WELCOME > DEFAULT ADMIN > DATE AND TIME > NETWORK > FINISH
CANCEL
PREVIOUS
NEXT

Username: admin
Full name: Default Admin
Password: •••••
Confirm password: •••••

Set the current date & time


WIZARD
?
WELCOME > DEFAULT ADMIN > DATE AND TIME > NETWORK > FINISH
GET CLIENT TIME
CANCEL
PREVIOUS
NEXT

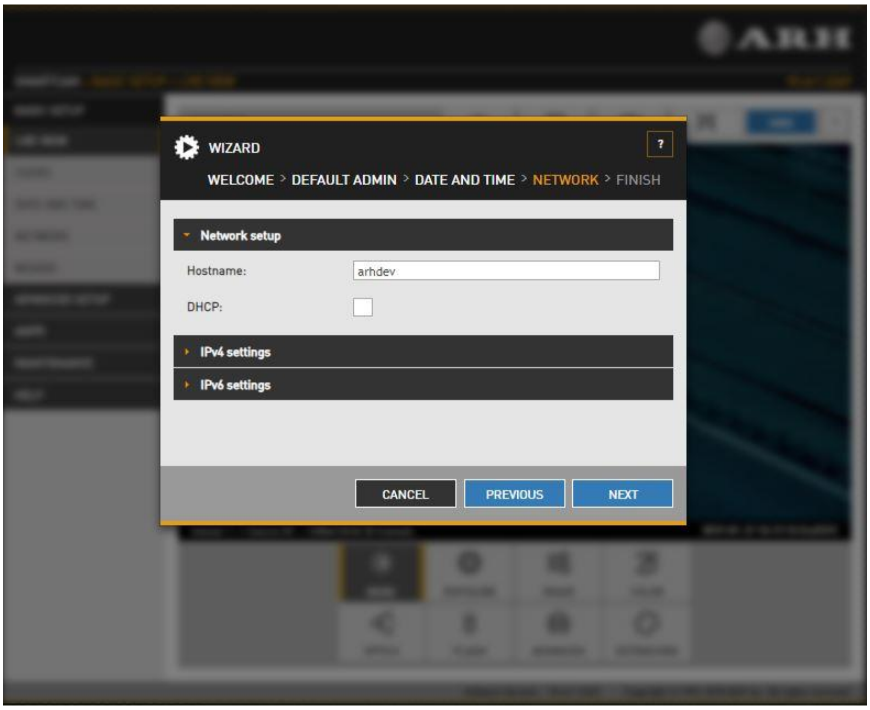
Date: 2019-01-21 Year-month-day

Time: 15:16:26 Hours:minutes:seconds

Time zone: Etc/UTC

Keep camera settings: ☑

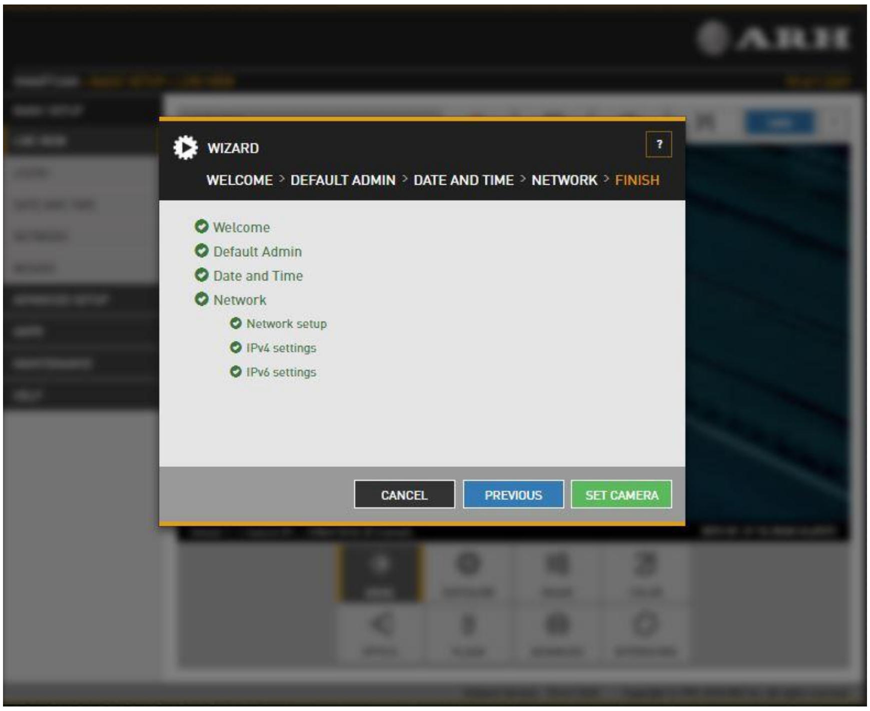
Set up the network


WIZARD
?
WELCOME > DEFAULT ADMIN > DATE AND TIME > NETWORK > FINISH
Network setup
IPv4 settings
IPv6 settings
CANCEL
PREVIOUS
NEXT

Hostname: arhdev

DHCP: ☐

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


WIZARD
?
WELCOME > DEFAULT ADMIN > DATE AND TIME > NETWORK > FINISH
CANCEL
PREVIOUS
SET CAMERA

- ✓ Welcome
- ✓ Default Admin
- ✓ Date and Time
- ✓ Network
  - ✓ Network setup
  - ✓ IPv4 settings
  - ✓ IPv6 settings

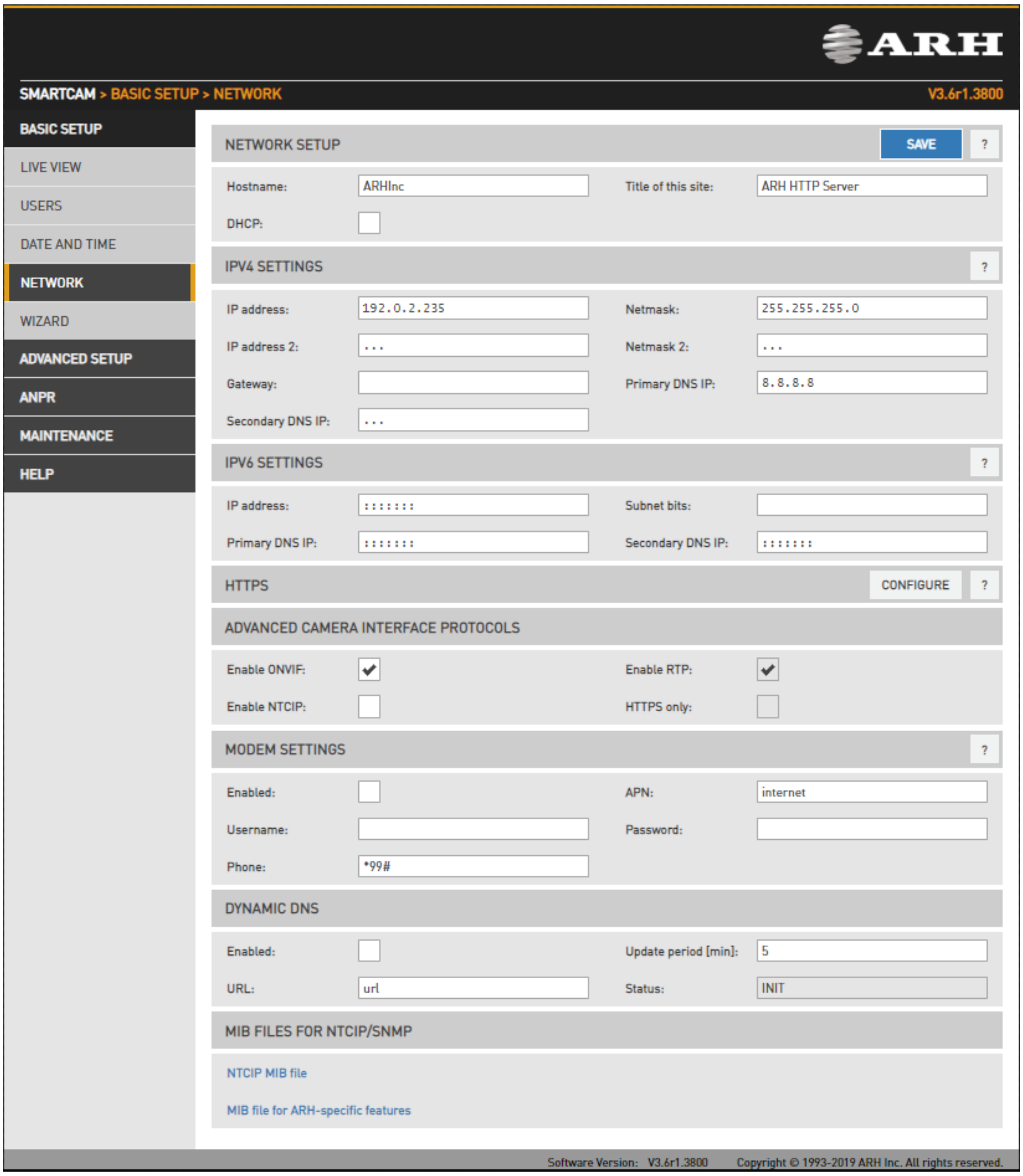
All of these settings are also available as separate configuration pages (see System settings).

5. SYSTEM SETTINGS

5.1. NETWORK

WEB INTERFACE > BASIC SETUP > NETWORK

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


ARH
SMARTCAM > BASIC SETUP > NETWORK
V3.6r1.3800
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
SAVE
?
CONFIGURE

NETWORK SETUP

Hostname:	ARHInc	Title of this site:	ARH HTTP Server
DHCP:	☐		

IPV4 SETTINGS

IP address:	192.0.2.235	Netmask:	255.255.255.0
IP address 2:	...	Netmask 2:	...
Gateway:		Primary DNS IP:	8.8.8.8
Secondary DNS IP:	...		

IPV6 SETTINGS

IP address:	:::::::	Subnet bits:	
Primary DNS IP:	:::::::	Secondary DNS IP:	:::::::

HTTPS

ADVANCED CAMERA INTERFACE PROTOCOLS

Enable ONVIF:	☑	Enable RTP:	☑
Enable NTCIP:	☐	HTTPS only:	☐

MODEM SETTINGS

Enabled:	☐	APN:	internet
Username:		Password:	
Phone:	*99#		

DYNAMIC DNS

Enabled:	☐	Update period [min]:	5
URL:	url	Status:	INIT

MIB FILES FOR NTCIP/SNMP

NTCIP MIB file

MIB file for ARH-specific features

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5.1.1. NETWORK SETUP

- **Hostname**: The name of the device in the network.
- **Title of this site:** Textual description of the device, for example CameraFrontRight, 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).

5.1.2. 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.

- **IPv4:** The IP address for the camera can be set
  - Automatically via DHCP (see option above), or
  - Manually, 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)

5.1.3. HTTPS

The camera’s onboard webserver is capable of running in HTTPS mode, which ensures an encrypted, secure channel between you and the camera.
For more information on HTTPS, please check the HTTPS Guide in the HELP menu of the web interface.

5.1.4. 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.

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!

5.1.5. MODEM

You can enable the modem by clicking **Enabled**. Enter the Access Point Name of your network operator in **APN**. If required, credentials can be entered in **Username** and **Password**. Set the predial number in **Phone**. Use a SIM card with unlocked PIN. Only available on devices equipped with a GPS/4G modem.

5.1.6. 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.

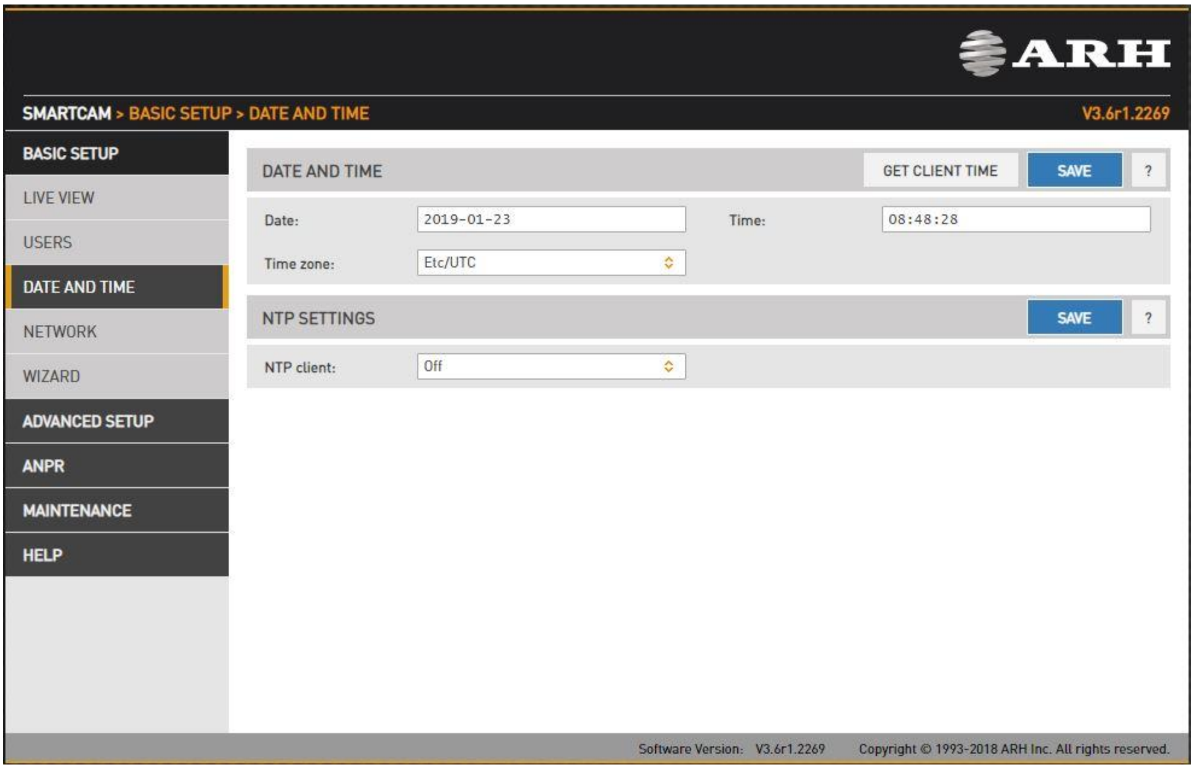
5.1.7. MIB FILES FOR NTCIP/SNMP

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.

Settings are applied after clicking **SAVE**.

5.2. DATE & TIME

WEB INTERFACE > BASIC SETUP > DATE AND TIME


ARH
SMARTCAM > BASIC SETUP > DATE AND TIME
V3.6r1.2269
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
DATE AND TIME
GET CLIENT TIME
SAVE
?
NTP SETTINGS
SAVE
?

Date: 2019-01-23
Time: 08:48:28
Time zone: Etc/UTC
NTP client: Off

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Current date and time and timekeeping settings are managed from this page. Users can choose to set date and time manually once, or to use 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.

For manual time adjustment, either enter date and time in the corresponding fields, or click GET CLIENT TIME to adjust the internal clock of the camera according to the PC's clock. Please note that the latter is a one-time adjustment only, it will not keep the camera synchronized to the client 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. Approximately one second accuracy is guaranteed.
- **Local network NTP client:** Works only if the camera and the NTP server is on the same local network, but guarantees higher accuracy than the standard NTP client. Also places a higher load on the NTP server.

! Important

To initiate an immediate synchronization to the closest active NTP server, click the Synchronize button. Please note that, if the camera won't find the best and closest server fast enough, the pressing of the button will result in an Error message. This does not affect the parameters settled in the NTP fields, so NTP itself will work without clicking on the Synchronize button!

The following parameters have to be set:

NTP server hostname/IP: 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].

Max. I/O time: Maximal duration of a query-answer cycle between the camera and the NTP server, before the answer is dropped. This influences the accuracy. Best practice is to set it to 10000 µs on a local network.

Log: If it is enabled, the current state of synchronization can be monitored at the Maintenance / Camera log page.

To initiate an immediate synchronization to the NTP server, click the SYNCHRONIZE 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.

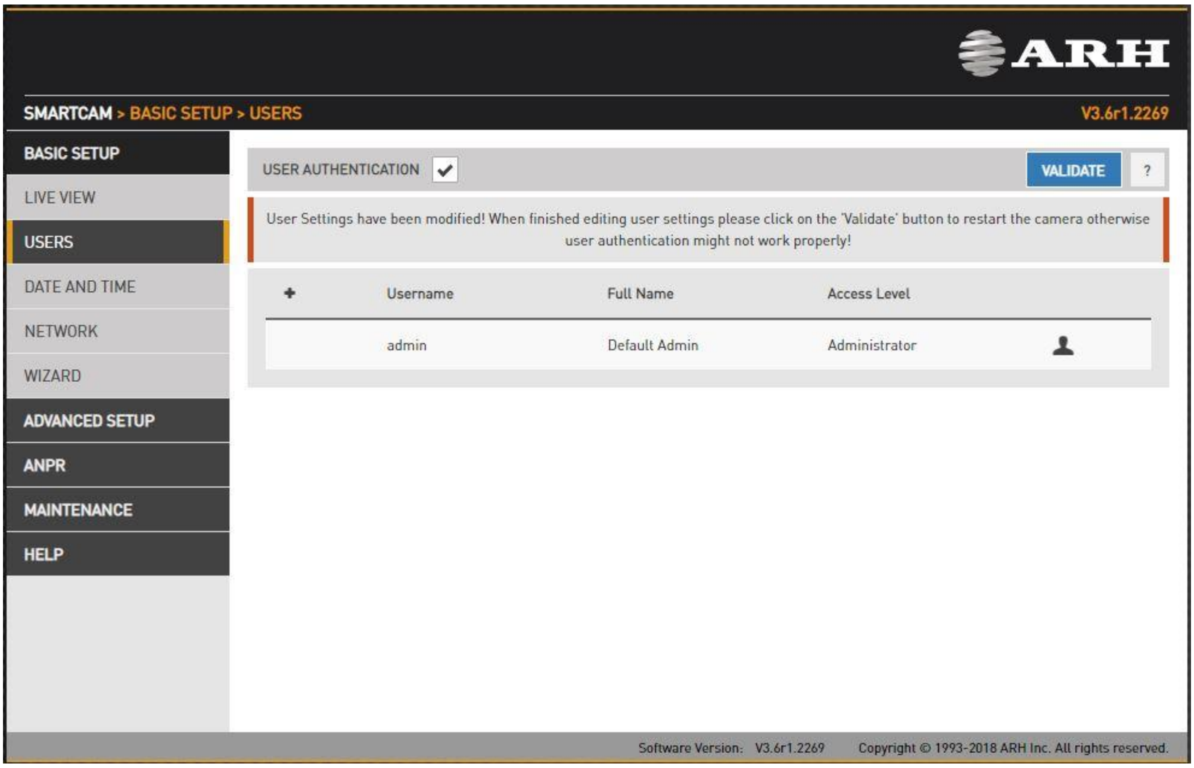
5.3. USERS

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.


ARH
SMARTCAM > BASIC SETUP > USERS
V3.6r1.2269
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
USER AUTHENTICATION ☑
VALIDATE
?
Software Version: V3.6r1.2269
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User Settings have been modified! When finished editing user settings please click on the 'Validate' button to restart the camera otherwise user authentication might not work properly!

+	Username	Full Name	Access Level	
	admin	Default Admin	Administrator	👤

! 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 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.

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 – Motion Detection, Private Zone, Event Manager ANPR - Browse Maintenance – System Information, Camera Log Help
Power	Login Basic Setup – All Menu Items Advanced Setup – All Menu Items (except IP Filter) ANPR – All Menu items Maintenance – System Information, Camera Log, Restart Help
Administrator	Access to every camera feature

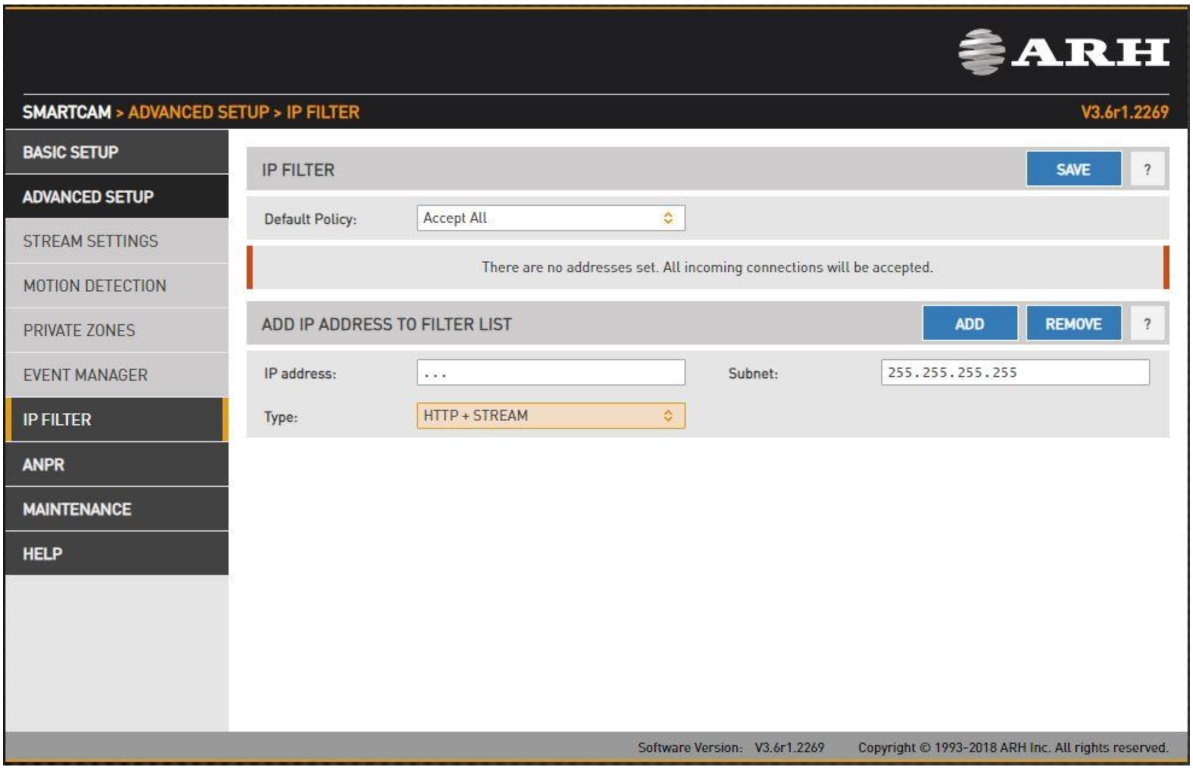
Edit/Delete: It is possible to edit user parameters or delete existing users from the system with the exception of the main "admin" user. This user cannot be deleted and its username and access level cannot be modified.

Note

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

5.4. IP FILTER

WEB INTERFACE > ADVANCED SETUP > IP FILTER


ARH
SMARTCAM > ADVANCED SETUP > IP FILTER
V3.6r1.2269
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
IP FILTER
SAVE
?
ADD IP ADDRESS TO FILTER LIST
ADD
REMOVE
?

Default Policy: Accept All

There are no addresses set. All incoming connections will be accepted.

IP address: . . .

Subnet: 255.255.255.255

Type: HTTP + STREAM

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

Netmask: 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 the recovery procedure may be applied.

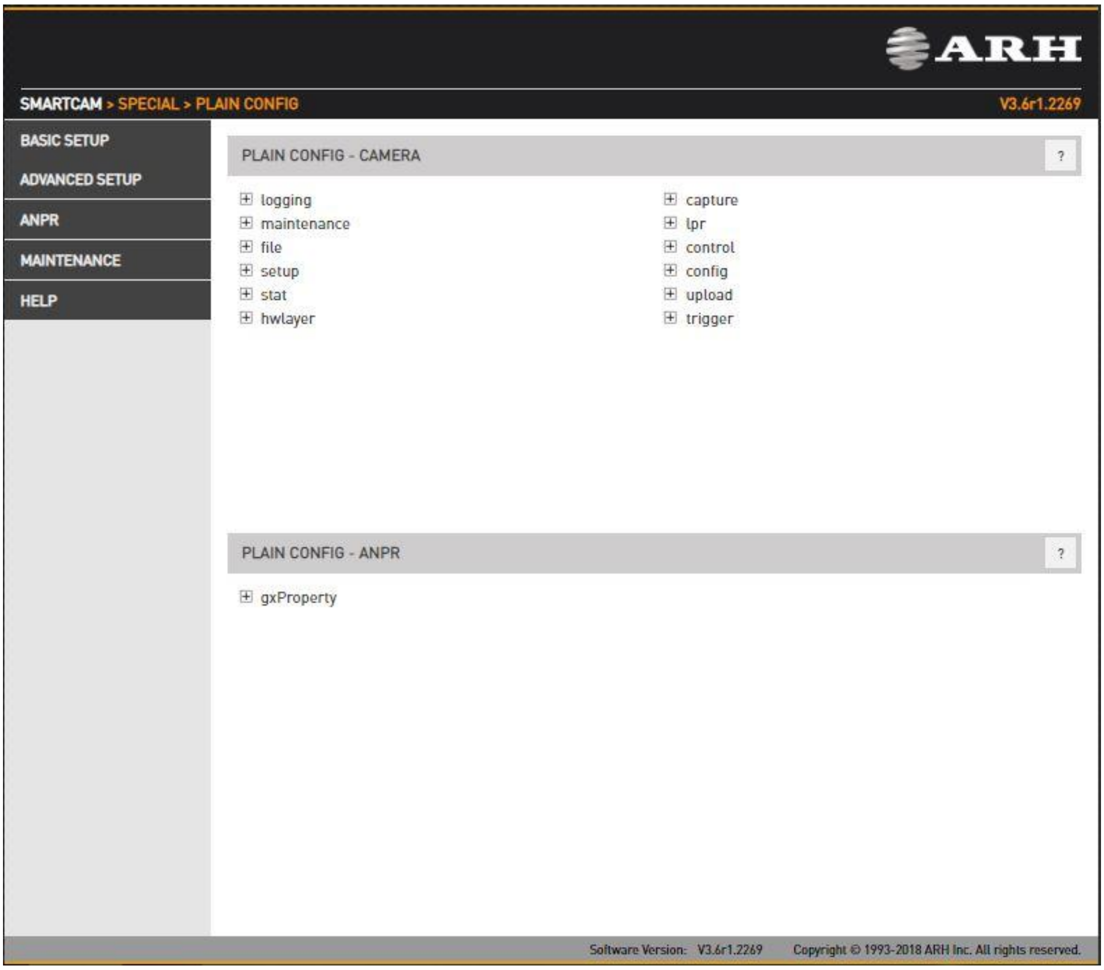
5.5. PLAIN CONFIG

This page is reachable on the following URL: http://CAM_IP/#plainconfig

All configuration settings are available in this menu, organized as a property tree.

Note

Please note that this is an "experts only" feature that steps over the safety measures implemented in the Web User Interface. Any action performed in this menu is strictly at your own risk. Modifying any parameters without Adaptive Recognition's consent could result in a warranty loss in case of any software related camera fault.


ARH
SMARTCAM > SPECIAL > PLAIN CONFIG
V3.6r1.2269
BASIC SETUP
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
PLAIN CONFIG - CAMERA
?
⊞ logging
⊞ maintenance
⊞ file
⊞ setup
⊞ stat
⊞ hwlayer
⊞ capture
⊞ lpr
⊞ control
⊞ config
⊞ upload
⊞ trigger
PLAIN CONFIG - ANPR
?
⊞ gxProperty
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6. IMAGE SETUP

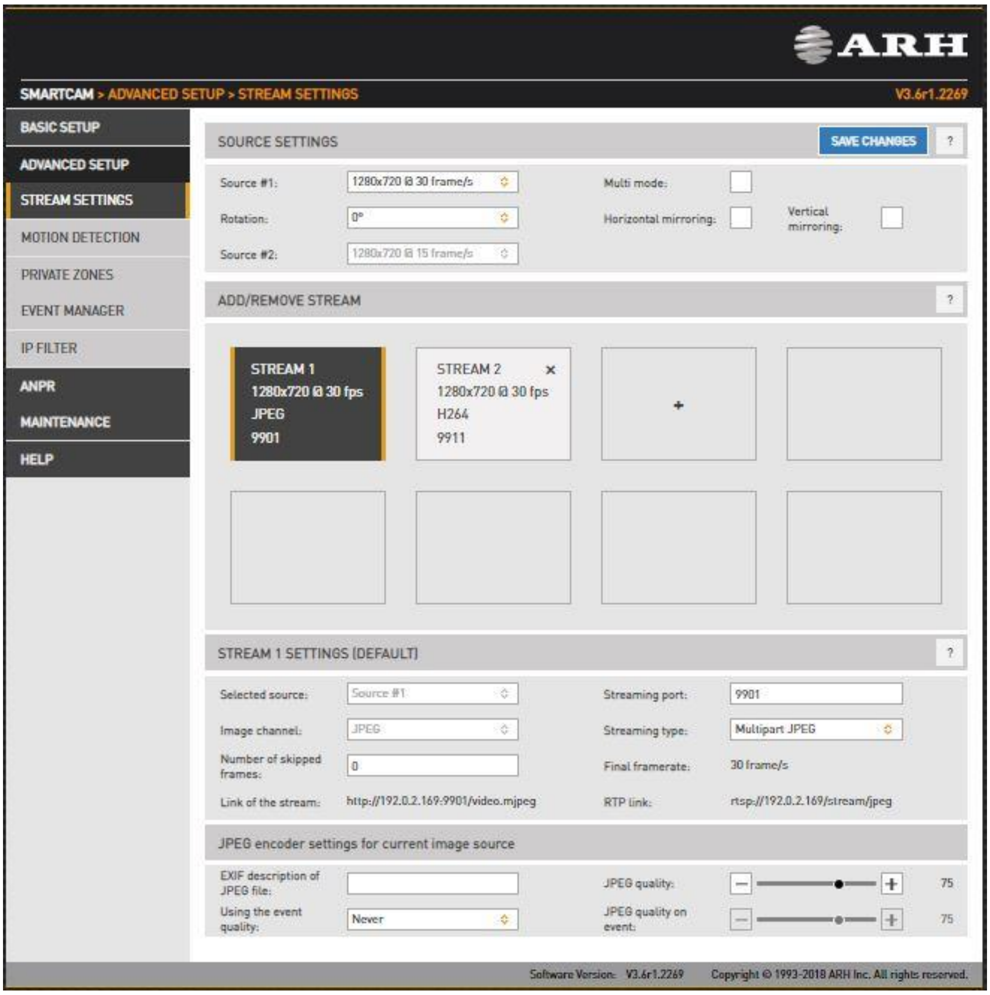
6.1. IMAGING PIPELINE

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: this mode of operation is called Multi mode. The motivation behind Multi mode can be illustrated with the following examples:

- Provide a low-quality stream to display and store, and simultaneously a high-quality stream for ANPR
- In case of mixed (reflective and non-reflective) license plates, to provide two streams with different intensities of illumination using Parity Flashing likewise
- One ANPR (vehicle underexposed, license plate clearly visible) and one overview stream (vehicle visible, license plate overexposed)

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


ARH
SMARTCAM > ADVANCED SETUP > STREAM SETTINGS
V3.6r1.2269
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
SOURCE SETTINGS
SAVE CHANGES
?
ADD/REMOVE STREAM
?
+
STREAM 1 SETTINGS (DEFAULT)
?
JPEG encoder settings for current image source

Source #1: 1280x720 @ 30 frame/s
Rotation: 0°
Source #2: 1280x720 @ 15 frame/s
Multi mode: ☐
Horizontal mirroring: ☐
Vertical mirroring: ☐

STREAM 1
1280x720 @ 30 fps
JPEG
9901

STREAM 2 ×
1280x720 @ 30 fps
H264
9911

Selected source: Source #1
Image channel: JPEG
Number of skipped frames: 0
Link of the stream: http://192.0.2.169:9901/video.mjpeg
Streaming port: 9901
Streaming type: Multipart JPEG
Final framerate: 30 frame/s
RTP link: rtsp://192.0.2.169/stream/jpeg

EXIF description of JPEG file:
Using the event quality: Never
JPEG quality: 75
JPEG quality on event: 75

Software Version: V3.6r1.2269 Copyright © 1993-2018 ARH Inc. All rights reserved.

The primary pipeline is always active. The secondary pipeline is activated by enabling Multi mode. Both pipelines are fed by the same sensor. However, 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 Multi mode 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

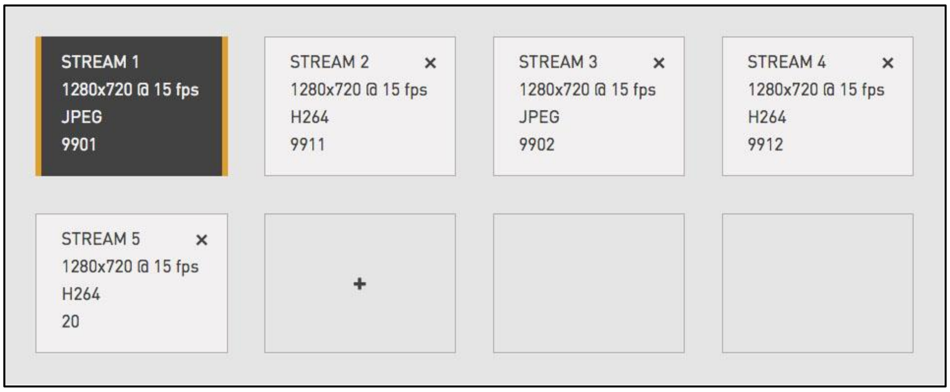
- **Source#1:** The resolution and FPS of the primary imaging pipeline
- **Source#2:** The resolution and FPS of the secondary imaging pipeline
- **Multi Mode:** This checkbox enables Multi Mode
- **Rotation, Horizontal and Vertical mirroring:** Geometric transformations (shared by both pipelines)

Note

Please note that, when Multi Mode is enabled, Parity Flash is not supported!

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.


STREAM 1
1280x720 @ 15 fps
JPEG
9901
STREAM 2
1280x720 @ 15 fps
H264
9911
STREAM 3
1280x720 @ 15 fps
JPEG
9902
STREAM 4
1280x720 @ 15 fps
H264
9912
STREAM 5
1280x720 @ 15 fps
H264
20
+

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
Final framerate: Will display the resulting frame rate
Number of skipped frames: Can be used to further reduce the framerate of the stream, because resolution@framerate is already given at "Source#X"
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/...)
RTP link: Another network protocol to reach the stream. Check the box for **"Enable RTP"** at Network Settings.
Streaming type: The container of the stream, which can be the following:

Image channel:	JPEG	H264	Motion Detecting
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.

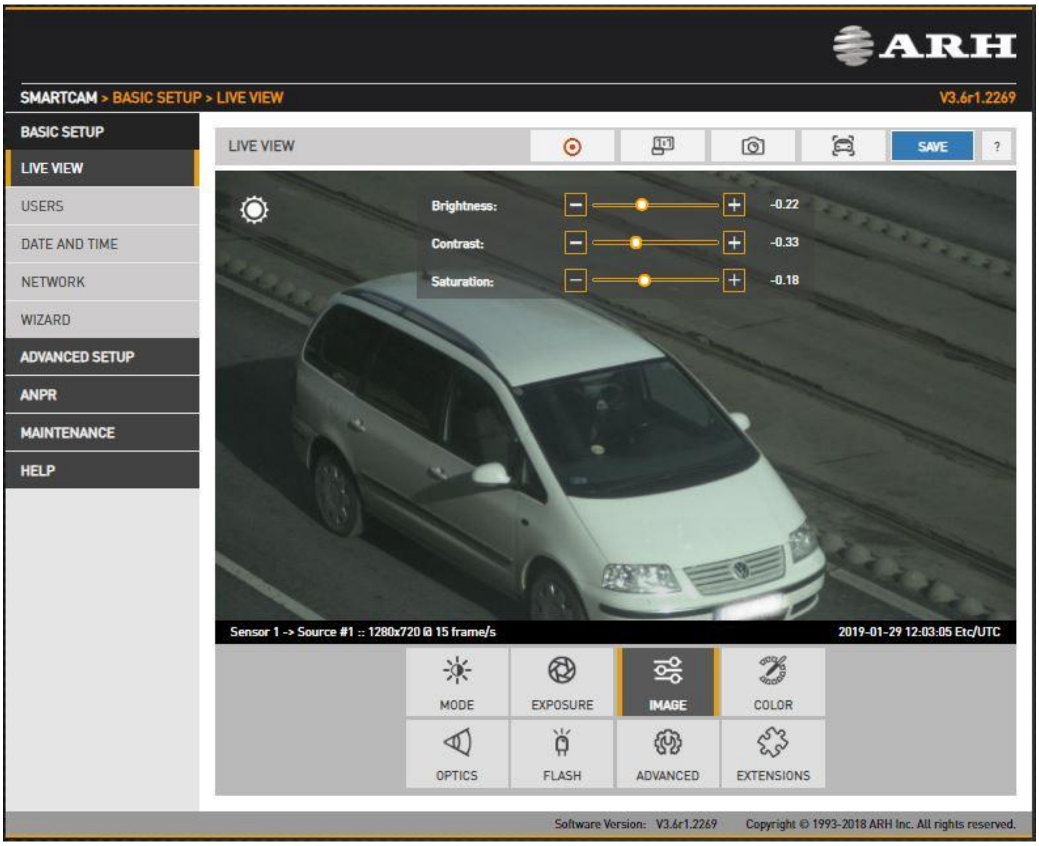
- ○ **Using the event quality:** Definition of what constitutes as an event for H264 quality on event parameter.
- ○ **H264 compression delta on event**: In order to achieve Average bitrate, the event quality (H264 compression on event) may be reduced. This control limits the amount of this reduction.

- **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

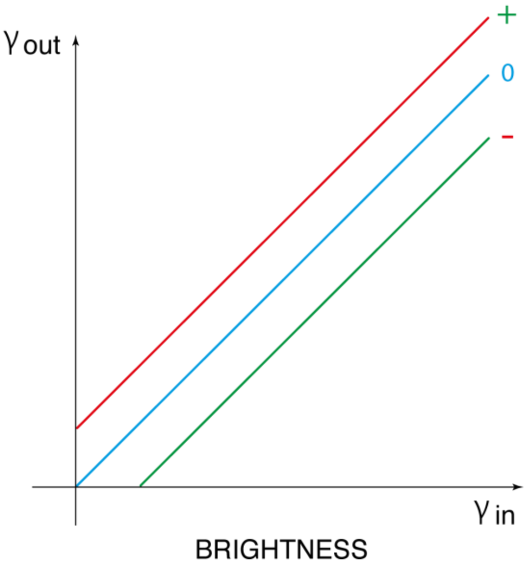
6.2.1. IMAGE

WEB INTERFACE > BASIC SETUP > LIVE VIEW > IMAGE

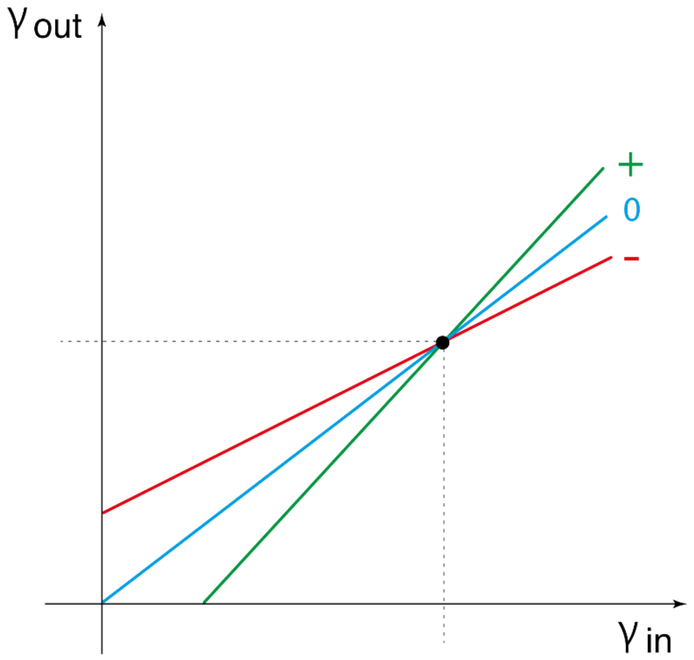

ARH
SMARTCAM > BASIC SETUP > LIVE VIEW
V3.6r1.2269
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
LIVE VIEW
SAVE
?
Sensor 1 -> Source #1 :: 1280x720 @ 15 frame/s
2019-01-29 12:03:05 Etc/UTC
MODE
EXPOSURE
IMAGE
COLOR
OPTICS
FLASH
ADVANCED
EXTENSIONS
Software Version: V3.6r1.2269
Copyright © 1993-2018 ARH Inc. All rights reserved.

Brightness: -0.22
Contrast: -0.33
Saturation: -0.18

The basic post-processing settings are configured here:
Brightness: Increase/decrease the brightness of the image

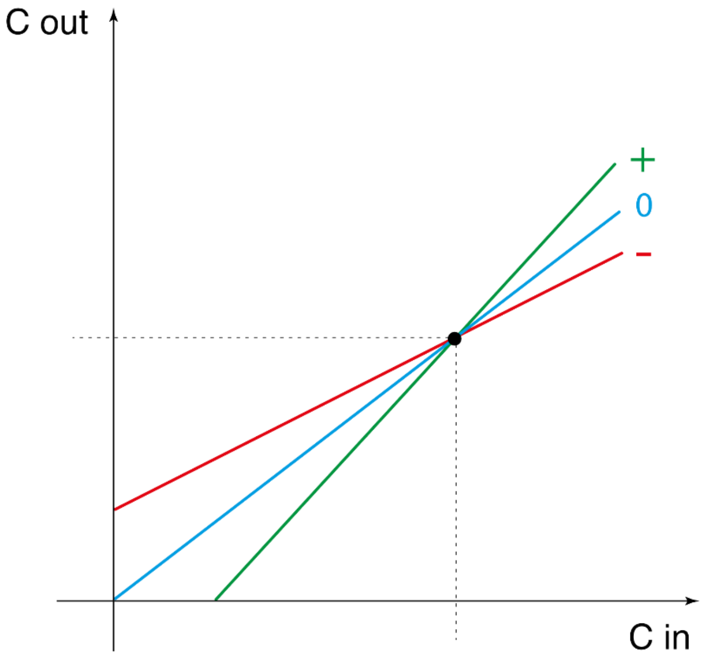

γ out
+
0
-
γ in
BRIGHTNESS

Contrast: Increase/decrease the luminance contrast of the image



CONTRAST

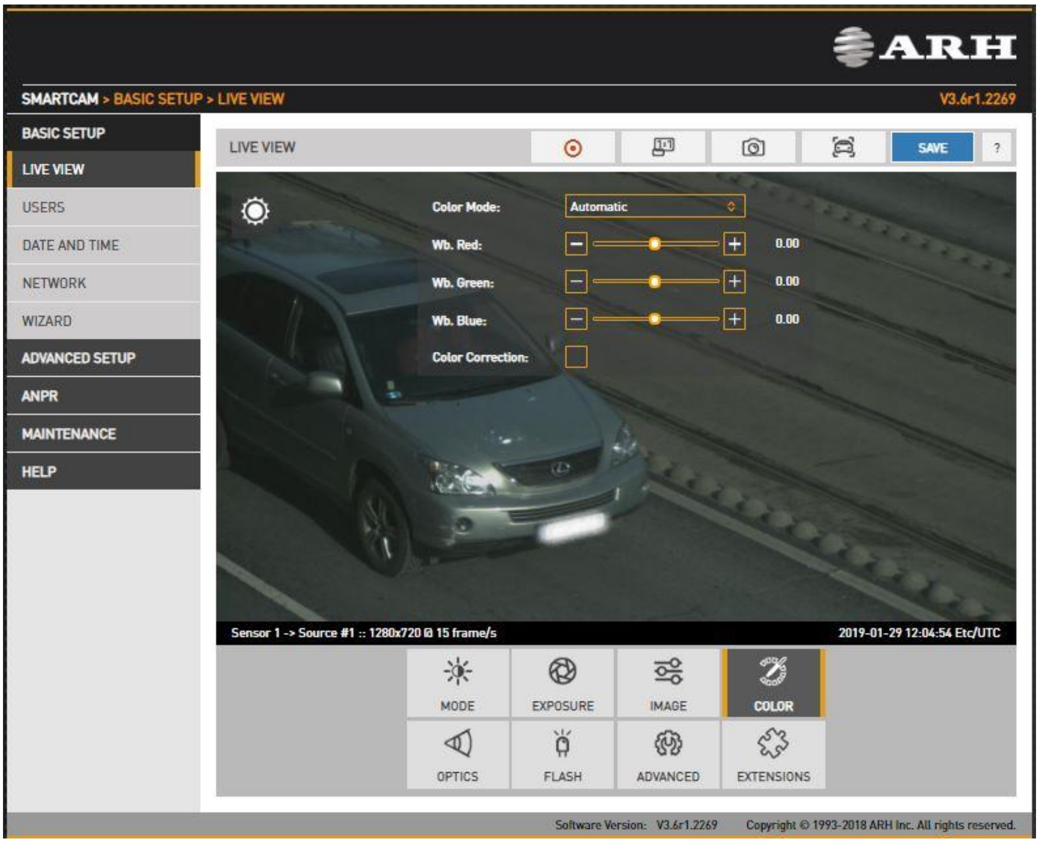
Saturation: Increase/decrease the chrominance contrast of the image



SATURATION

6.2.2. COLOR

WEB INTERFACE > BASIC SETUP > LIVE VIEW > COLOR


ARH
SMARTCAM > BASIC SETUP > LIVE VIEW
V3.6r1.2269
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
LIVE VIEW
SAVE
?
MODE
EXPOSURE
IMAGE
COLOR
OPTICS
FLASH
ADVANCED
EXTENSIONS

Color Mode: Automatic
Wb. Red: 0.00
Wb. Green: 0.00
Wb. Blue: 0.00
Color Correction: ☐

Sensor 1 -> Source #1 :: 1280x720 @ 15 frame/s
2019-01-29 12:04:54 Etc/UTC

Software Version: V3.6r1.2269 Copyright © 1993-2018 ARH Inc. All rights reserved.

Color settings are configured here:

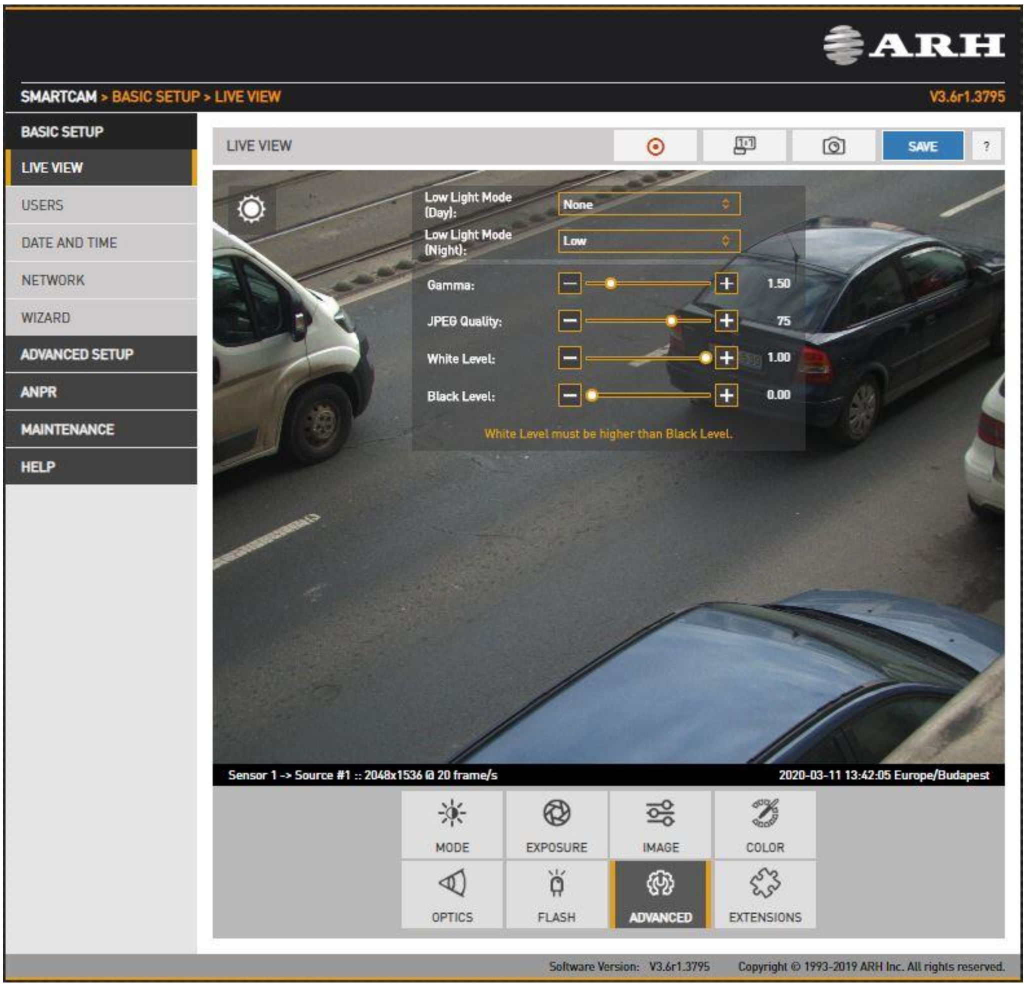
- **Color Mode:** Automatic/Color/Gray mode
  - **Color:** Color mode
  - **Black & White mode:** ideal for night time IR mode

- **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.

6.2.3. ADVANCED

WEB INTERFACE > BASIC SETUP > LIVE VIEW > ADVANCED


ARH
SMARTCAM > BASIC SETUP > LIVE VIEW
V3.6r1.3795
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
LIVE VIEW
SAVE
?
MODE
EXPOSURE
IMAGE
COLOR
OPTICS
FLASH
ADVANCED
EXTENSIONS

Low Light Mode (Day): None
Low Light Mode (Night): Low
Gamma: 1.50
JPEG Quality: 75
White Level: 1.00
Black Level: 0.00

White Level must be higher than Black Level.

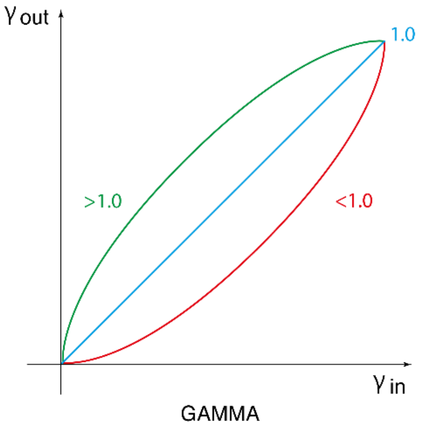
Sensor 1 -> Source #1 :: 2048x1536 @ 20 frame/s
2020-03-11 13:42:05 Europe/Budapest

Software Version: V3.6r1.3795 Copyright © 1993-2019 ARH Inc. All rights reserved.

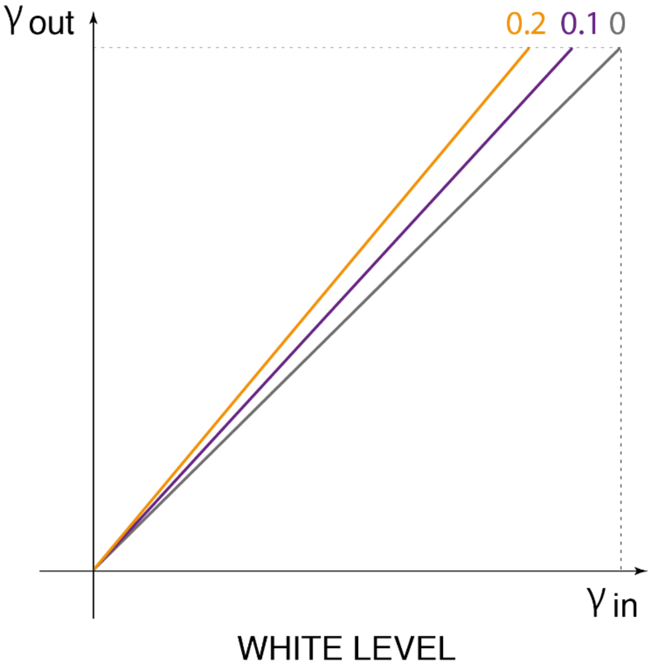
Advanced post-processing settings are configured here:

- **Low light mode**: Under low illumination conditions an algorithm tunes sensor and post processing parameters to still be able to capture an adequate image. (Note: this is not strictly a post processing step). 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.

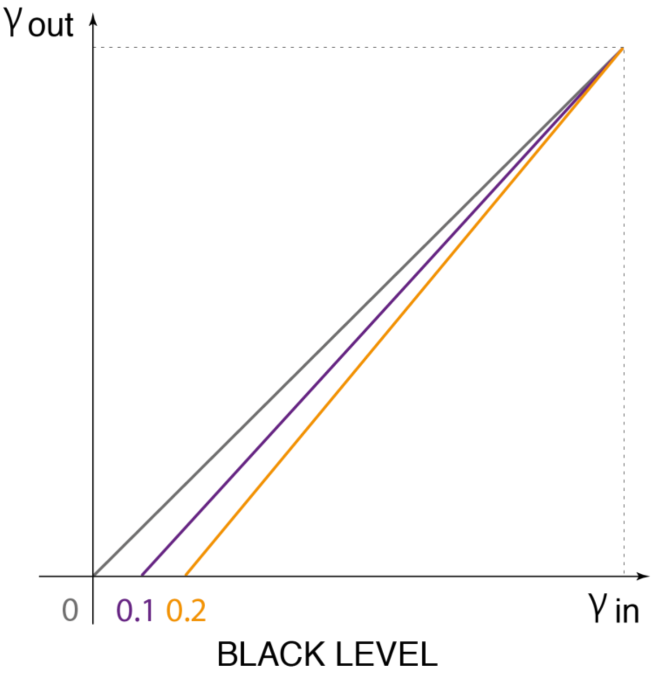
- **Gamma:** Gamma correction of the image



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

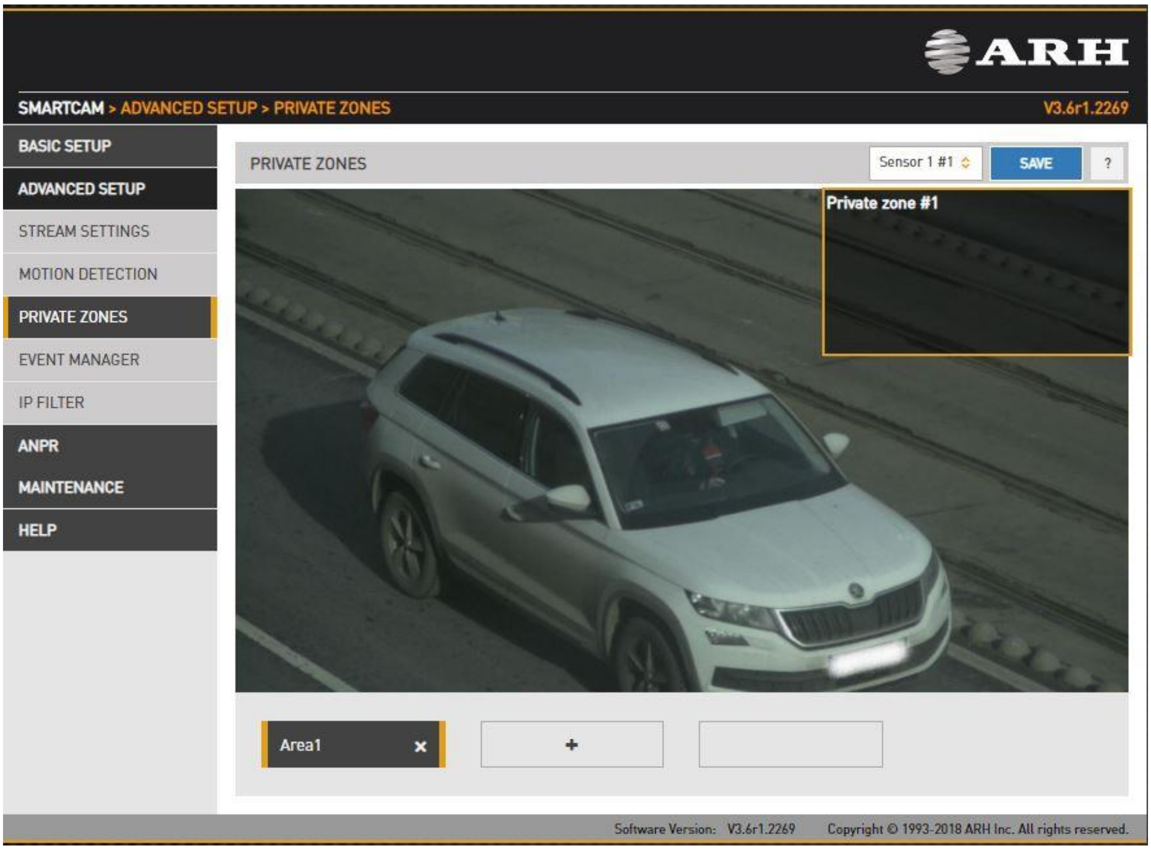


Black level: Defines the pixel value below which all pixels will be mapped to black



6.2.4. PRIVATE ZONES

WEB INTERFACE > ADVANCED SETUP > PRIVATE ZONES

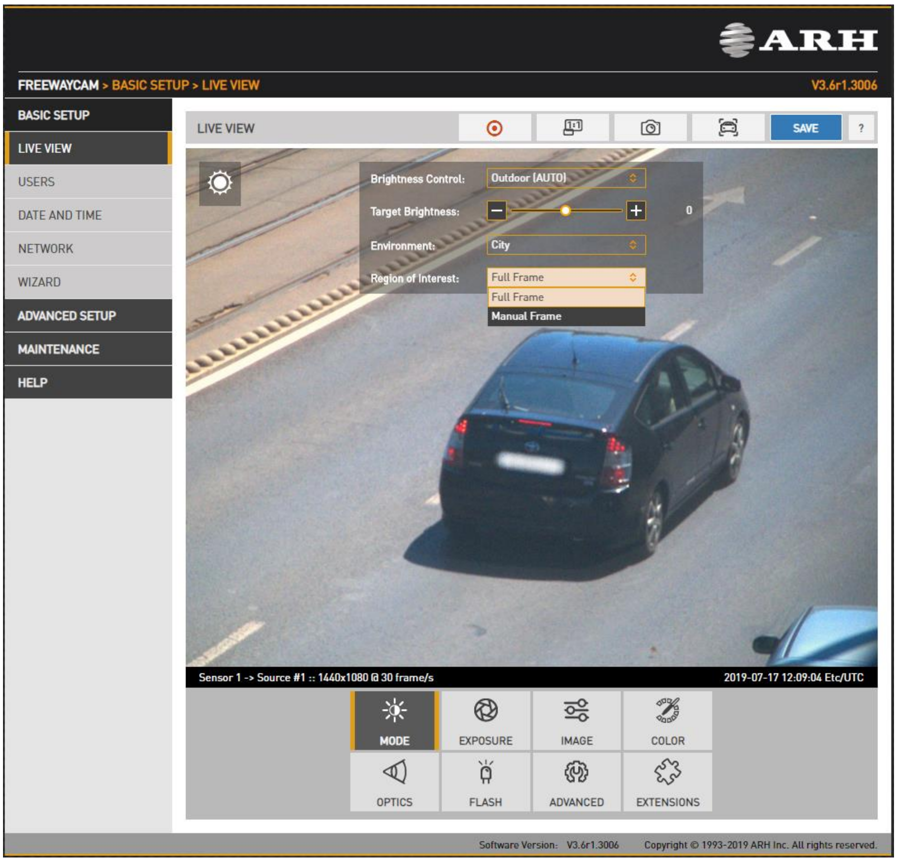

ARH
SMARTCAM > ADVANCED SETUP > PRIVATE ZONES
V3.6r1.2269
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
PRIVATE ZONES
Sensor 1 #1
SAVE
?
Private zone #1
Area1
×
+
Software Version: V3.6r1.2269
Copyright © 1993-2018 ARH Inc. All rights reserved.

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 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


ARH
FREEWAYCAM > BASIC SETUP > LIVE VIEW
V3.6r1.3006
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
MAINTENANCE
HELP
LIVE VIEW
SAVE
?
MODE
EXPOSURE
IMAGE
COLOR
OPTICS
FLASH
ADVANCED
EXTENSIONS

Brightness Control: Outdoor (AUTO)
Target Brightness: 0
Environment: City
Region of Interest: Full Frame
Full Frame
Manual Frame

Sensor 1 -> Source #1 :: 1440x1080 @ 30 frame/s
2019-07-17 12:09:04 Etc/UTC

Software Version: V3.6r1.3006 Copyright © 1993-2019 ARH Inc. All rights reserved.

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.) 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:

M – 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 two 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.

- **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.

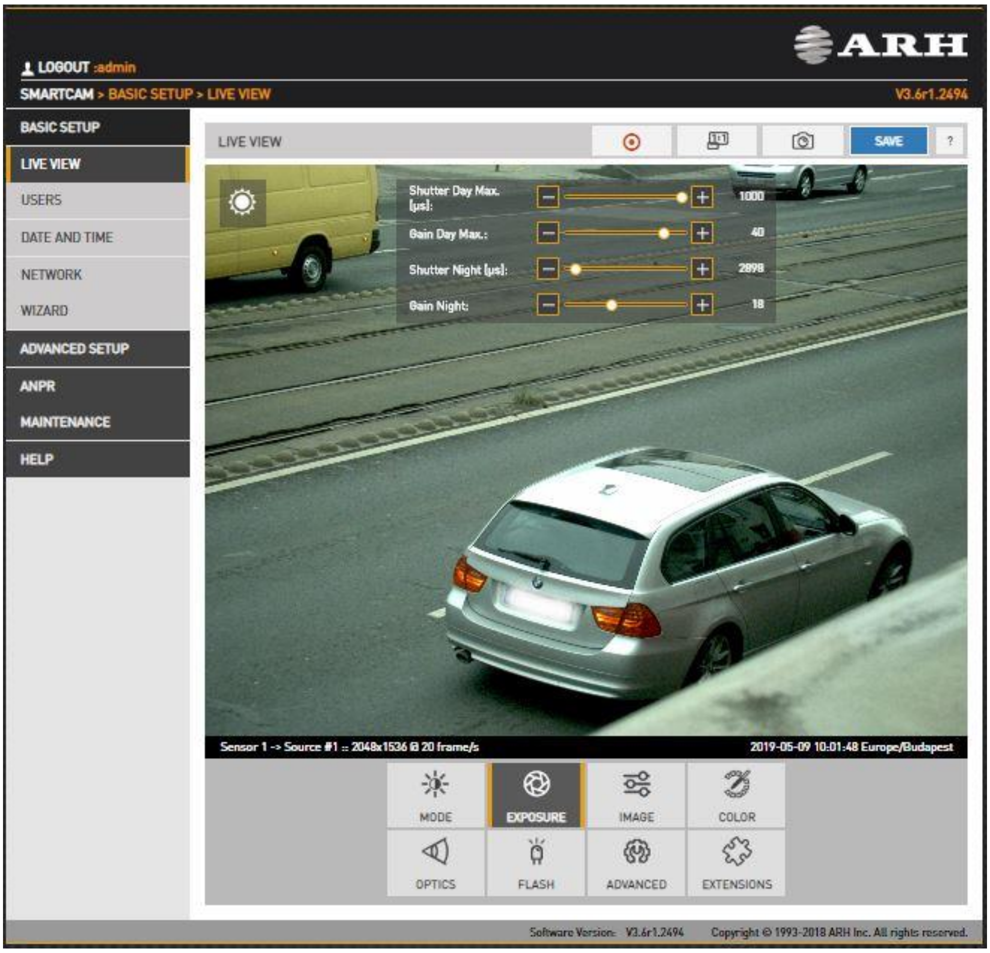
- **Region of Interest:**
  - **Full frame** – Current image illumination is measured in the complete image.
  - **Manual frame** – Current image illumination is measured in the selected region. You can resize and move the rectangle representing the region of interest.

Outdoor	**Max. speed [km/h]**	**Default Max. Shutter [µs]**
Parking	10	5000
City	50	1000
Highway	255	250
Freeway	25	3000
Indoor (MANUAL)	**Max. speed [km/h]**	**Default Max. Shutter [µs]**
		49800

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

6.4. EXPOSURE CONTROL

WEB INTERFACE > BASIC SETUP > LIVE VIEW > EXPOSURE


ARH
LOGOUT :admin
SMARTCAM > BASIC SETUP > LIVE VIEW
V3.6r1.2494
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
LIVE VIEW
SAVE
?
MODE
EXPOSURE
IMAGE
COLOR
OPTICS
FLASH
ADVANCED
EXTENSIONS

Shutter Day Max. [µs]: 1000
Gain Day Max.: 40
Shutter Night [µs]: 2898
Gain Night: 18

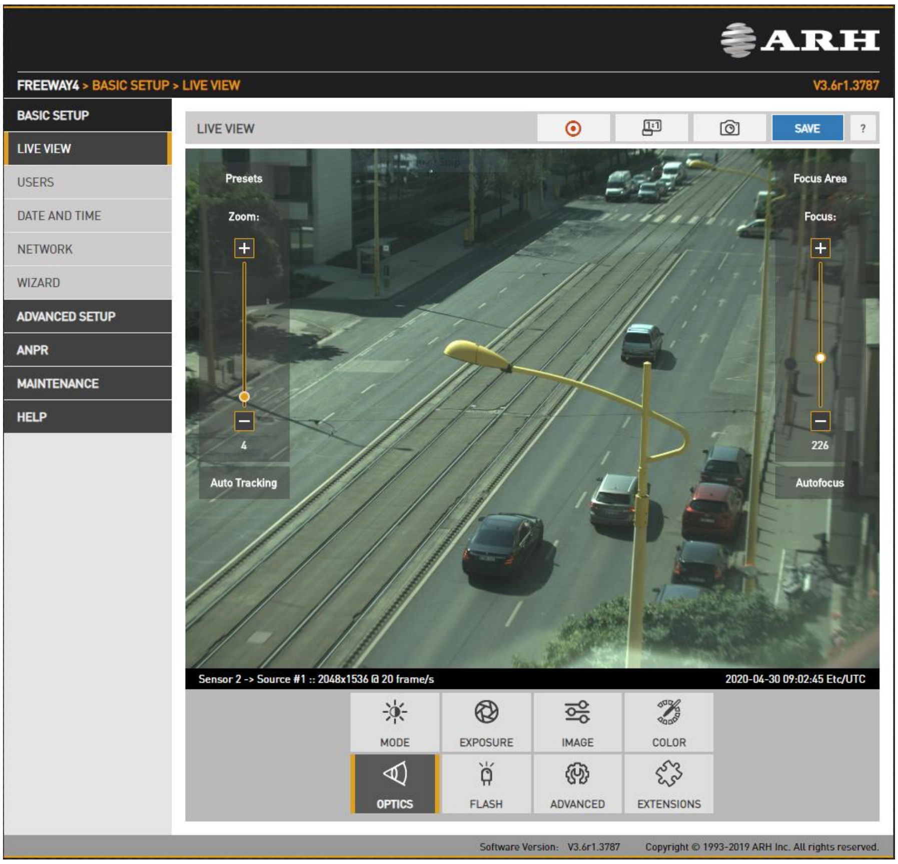
Sensor 1 -> Source #1 :: 2048x1536 @ 20 frame/s
2019-05-09 10:01:48 Europe/Budapest

Software Version: V3.6r1.2494 Copyright © 1993-2018 ARH Inc. All rights reserved.

- 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


ARH
FREEWAY4 > BASIC SETUP > LIVE VIEW
V3.6r1.3787
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
LIVE VIEW
SAVE
?
Presets
Zoom:
4
Auto Tracking
Focus Area
Focus:
226
Autofocus
MODE
EXPOSURE
IMAGE
COLOR
OPTICS
FLASH
ADVANCED
EXTENSIONS

Sensor 2 -> Source #1 :: 2048x1536 @ 20 frame/s

2020-04-30 09:02:45 Etc/UTC

Software Version: V3.6r1.3787 Copyright © 1993-2019 ARH Inc. All rights reserved.

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 too far.

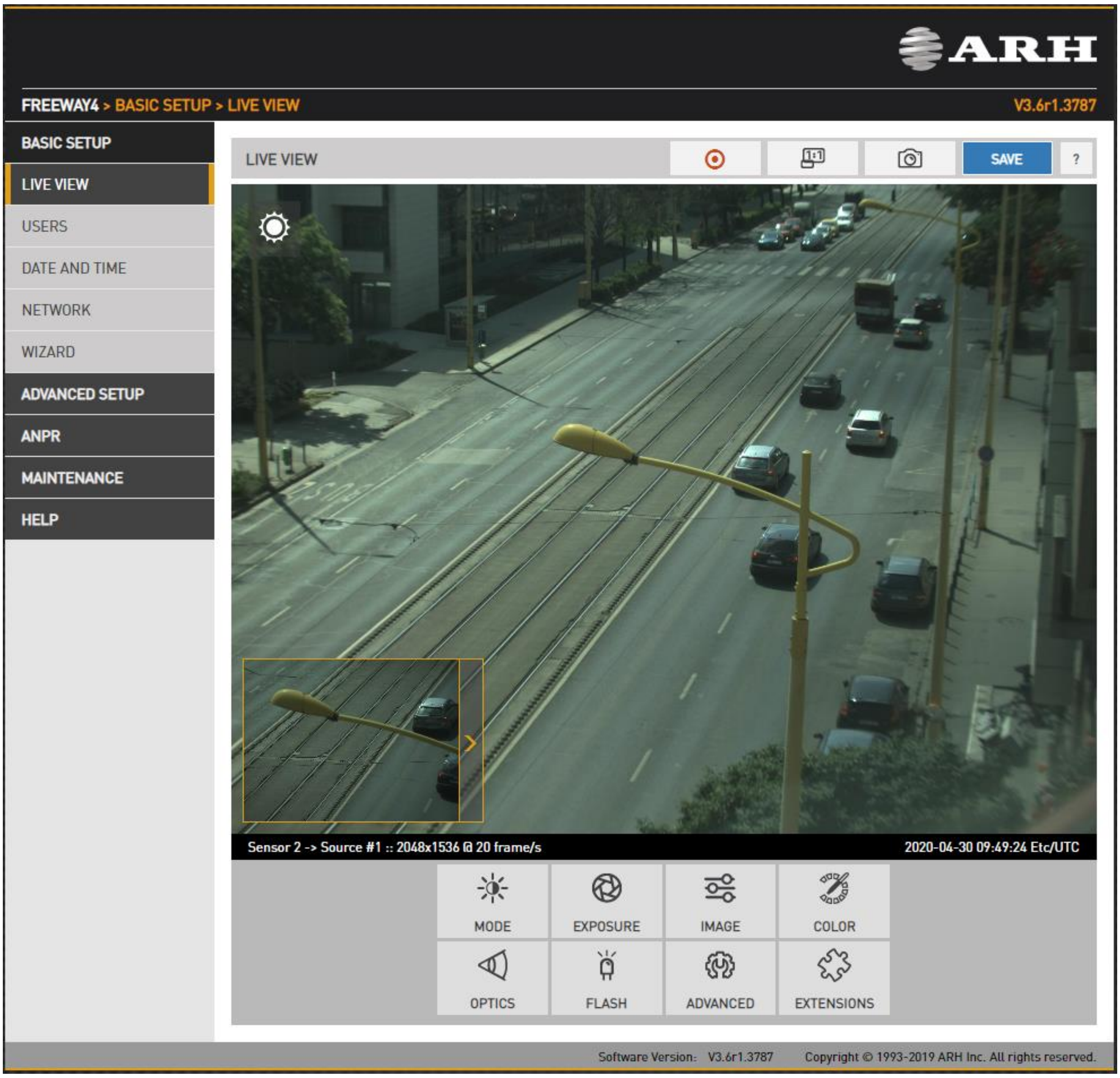
Clicking the **Autofocus** button will execute one time autofocus performance. By clicking the **Focus Area** button, moving and resizing the yellow rectangle, the area of interest can be defined, and then this part of the image will be sharp after autofocusing.

Auto tracking is enabled by clicking the **Auto Tracking** button. 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.

6.6. SECONDARY SENSOR


ARH
FREEWAY4 > BASIC SETUP > LIVE VIEW
V3.6r1.3787
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
LIVE VIEW
SAVE
?
MODE
EXPOSURE
IMAGE
COLOR
OPTICS
FLASH
ADVANCED
EXTENSIONS

Sensor 2 -> Source #1 :: 2048x1536 @ 20 frame/s
2020-04-30 09:49:24 Etc/UTC

Software Version: V3.6r1.3787 Copyright © 1993-2019 ARH Inc. All rights reserved.

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.

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 FLASH button at the Live View 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%
- **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.
- Both Flash Intensity and Parity Flashing can be defined for day and night mode.

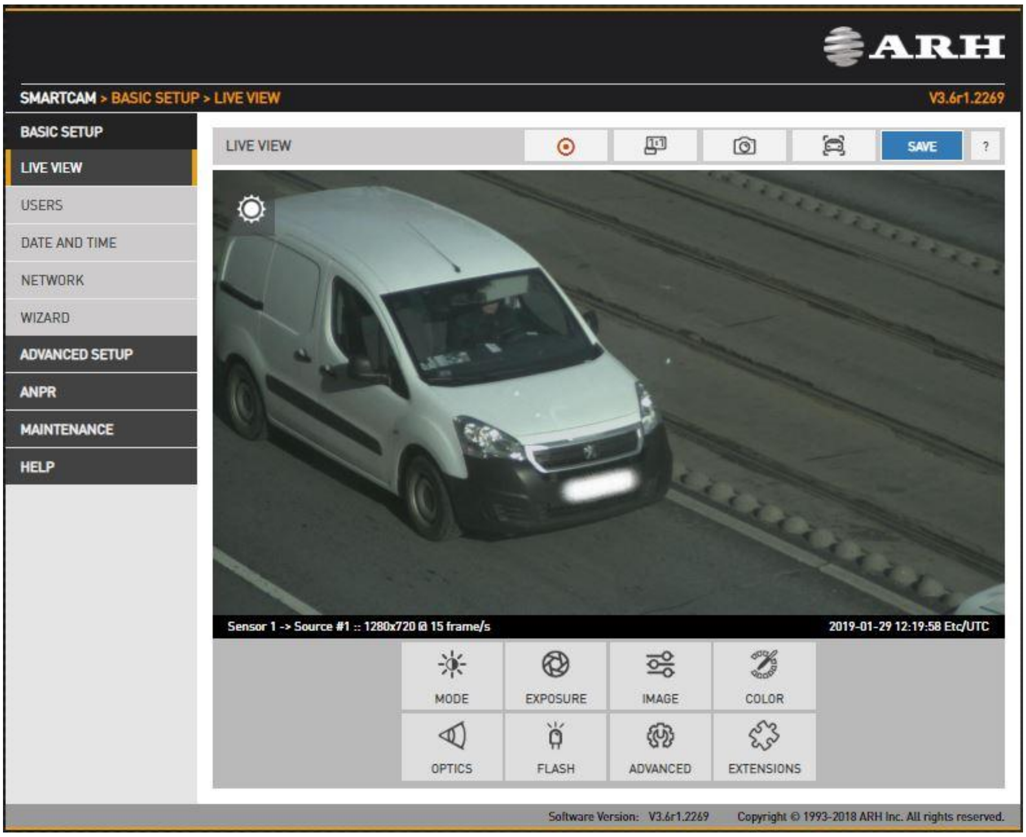
Note

"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


ARH
SMARTCAM > BASIC SETUP > LIVE VIEW
V3.6r1.2269
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
LIVE VIEW
SAVE
?
Sensor 1 -> Source #1 :: 1280x720 @ 15 frame/s
2019-01-29 12:19:58 Etc/UTC
MODE
EXPOSURE
IMAGE
COLOR
OPTICS
FLASH
ADVANCED
EXTENSIONS
Software Version: V3.6r1.2269
Copyright © 1993-2018 ARH Inc. All rights reserved.

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

To open a 1:1 live video stream, click on the 1:1 icon in the top menu.

To save a snapshot, click on the 📷 icon in the top menu.

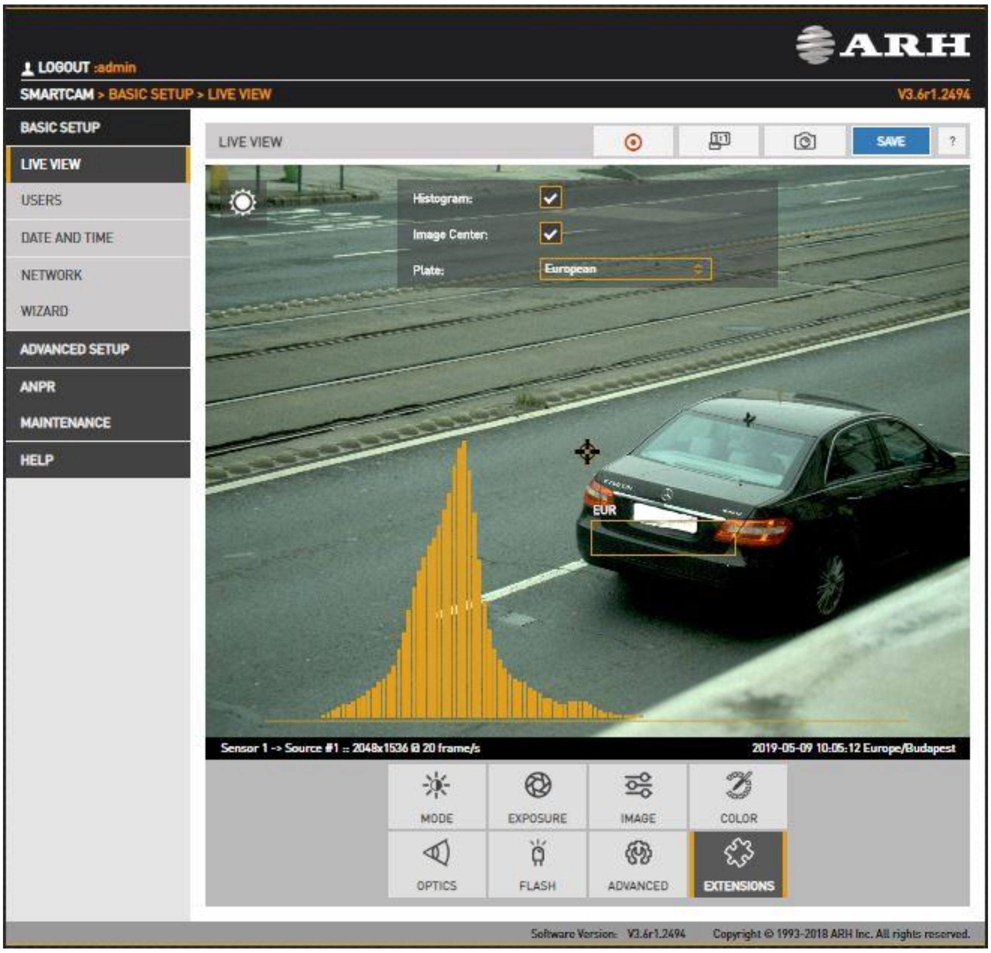
To switch on Vehicle detection frame, click on the 🚗 icon in the top menu.

6.8.2. VISUAL AIDS

WEB INTERFACE > BASIC SETUP > LIVE VIEW > EXTENSIONS

This menu offers visual aids to set up the camera.

- **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.


ARH
LOGOUT :admin
SMARTCAM > BASIC SETUP > LIVE VIEW
V3.6r1.2494
BASIC SETUP
LIVE VIEW
USERS
DATE AND TIME
NETWORK
WIZARD
ADVANCED SETUP
ANPR
MAINTENANCE
HELP
LIVE VIEW
SAVE
?
EUR
MODE
EXPOSURE
IMAGE
COLOR
OPTICS
FLASH
ADVANCED
EXTENSIONS

Histogram: ☑

Image Center: ☑

Plate: European

Sensor 1 -> Source #1 :: 2048x1536 @ 20 frame/s

2019-05-09 10:05:12 Europe/Budapest

Software Version: V3.6r1.2494 Copyright © 1993-2018 ARH Inc. All rights reserved.

7. EVENTS AND ANPR

Note

NOTE to users of previous (before 3.6r1.3787) releases: The 'Normal/Quick' and 'Post' stages have been renamed to 'Preselection' and 'ANPR' respectively, which better reflect their function. The 'Quick' engine has been phased out; the corresponding functionality is implemented internally in the Preselection stage.

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:

- **Vehicle Detection:** Image processing algorithm designed to detect a vehicle in the given image
- **Motion Detection:** Image processing algorithm designed to detect motion in a sequence of images
- **Scheduler:** Regular series of triggers, for example every 5 seconds
- **Virtual Loop Trigger Module:** Advanced 3D motion detection developed for license plate recognition.
- **VVQ Trigger:** Image processing algorithm designed to detect a license plate inside of a predefined ROI.

An **external trigger source** may be:

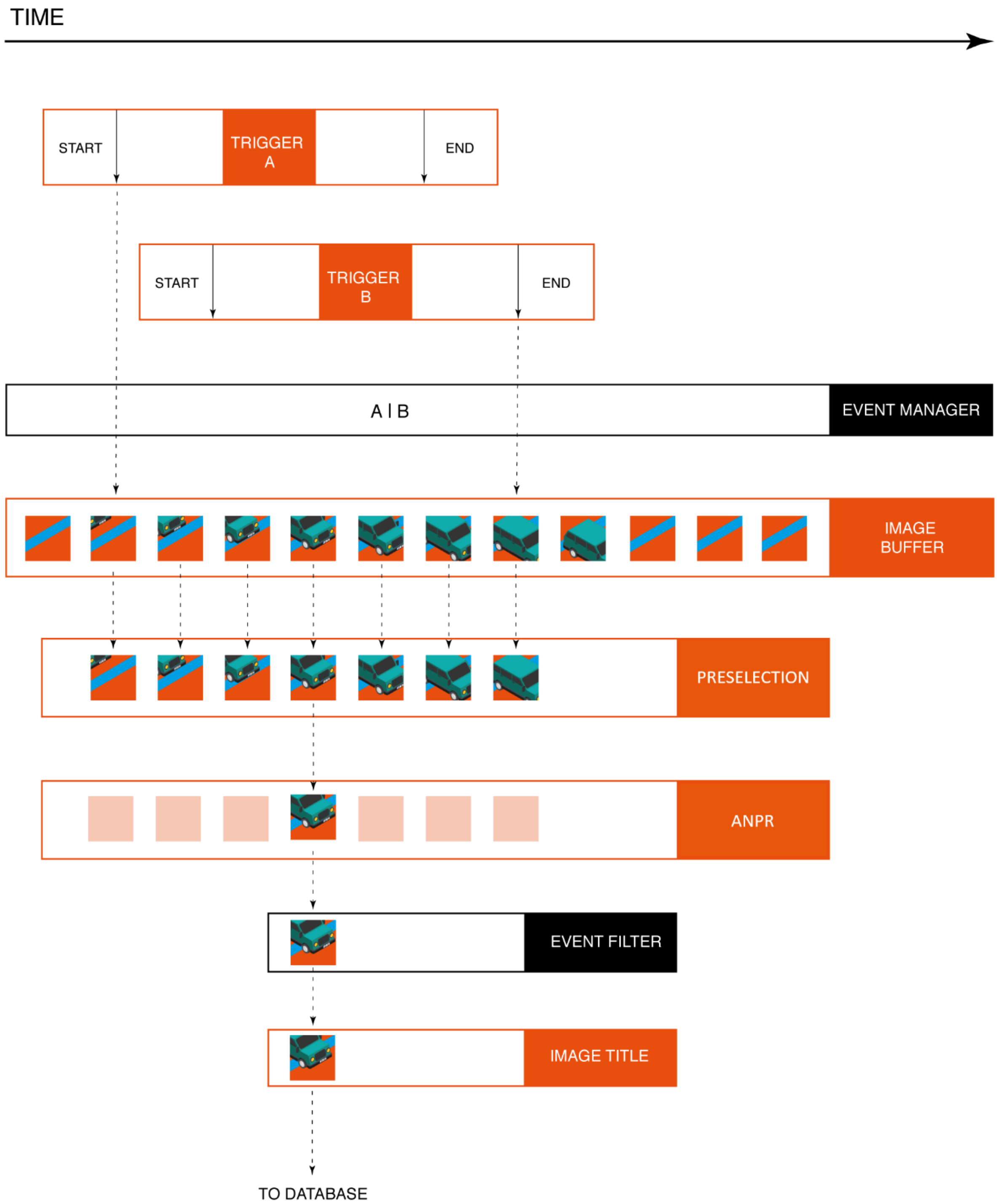
- **GPI:** A TTL level input to the camera (not all models)
- **UART:** A UART (RS232 or RS485 level) input to the camera (not all models)
- **SW:** Direct software-based trigger

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).


TIME
START
TRIGGER A
END
START
TRIGGER B
END
A I B
EVENT MANAGER
IMAGE BUFFER
PRESELECTION
ANPR
EVENT FILTER
IMAGE TITLE
TO DATABASE

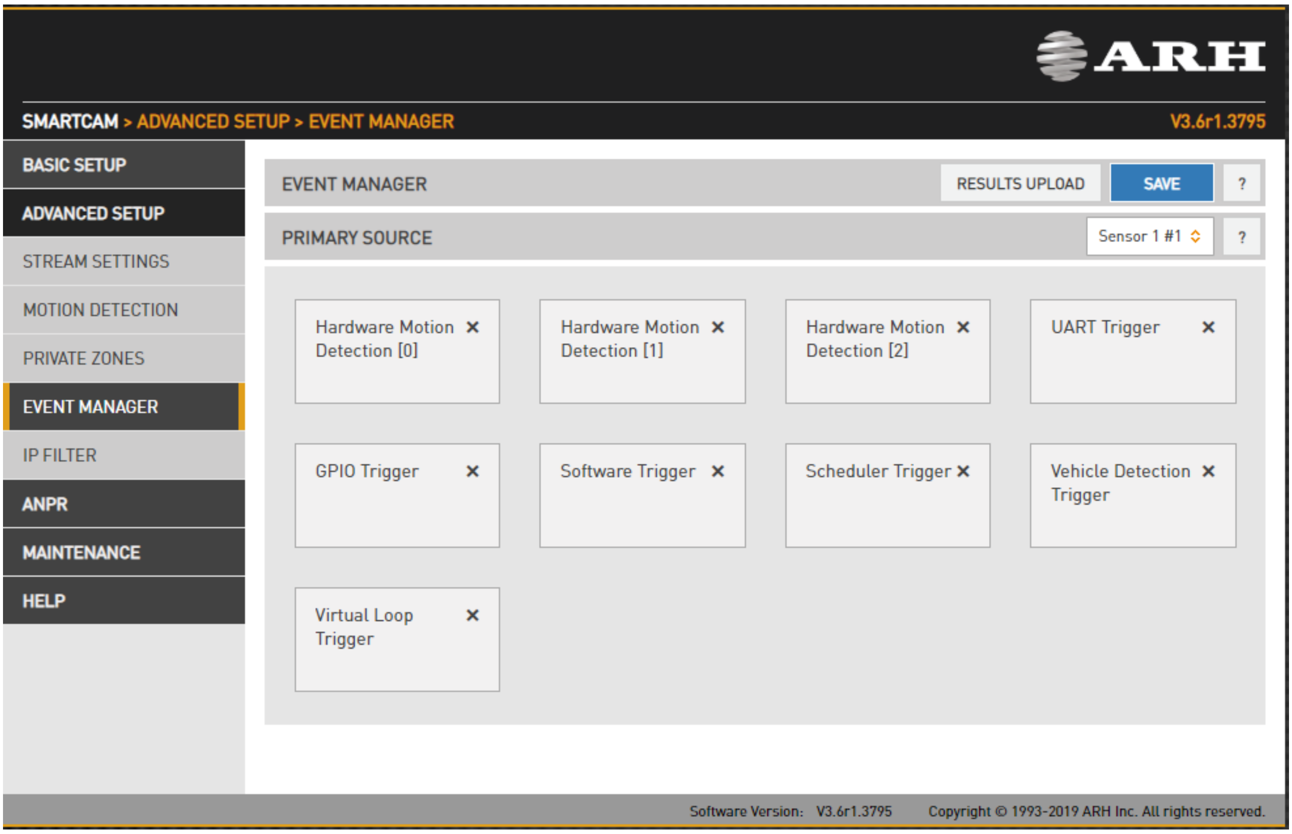
The above graphic is the schematic overview of trigger events being processed. License plate recognition operates as a multistage pipeline, taking a sequence of images of the same event as input, selecting one image of the vehicle (with the license plate in the best position), license plate and event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


ARH
SMARTCAM > ADVANCED SETUP > EVENT MANAGER
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
EVENT MANAGER
RESULTS UPLOAD
SAVE
?
PRIMARY SOURCE
Sensor 1 #1
?
Hardware Motion Detection [0] ×
Hardware Motion Detection [1] ×
Hardware Motion Detection [2] ×
UART Trigger ×
GPIO Trigger ×
Software Trigger ×
Scheduler Trigger ×
Vehicle Detection Trigger ×
Virtual Loop Trigger ×
Software Version: V3.6r1.3795
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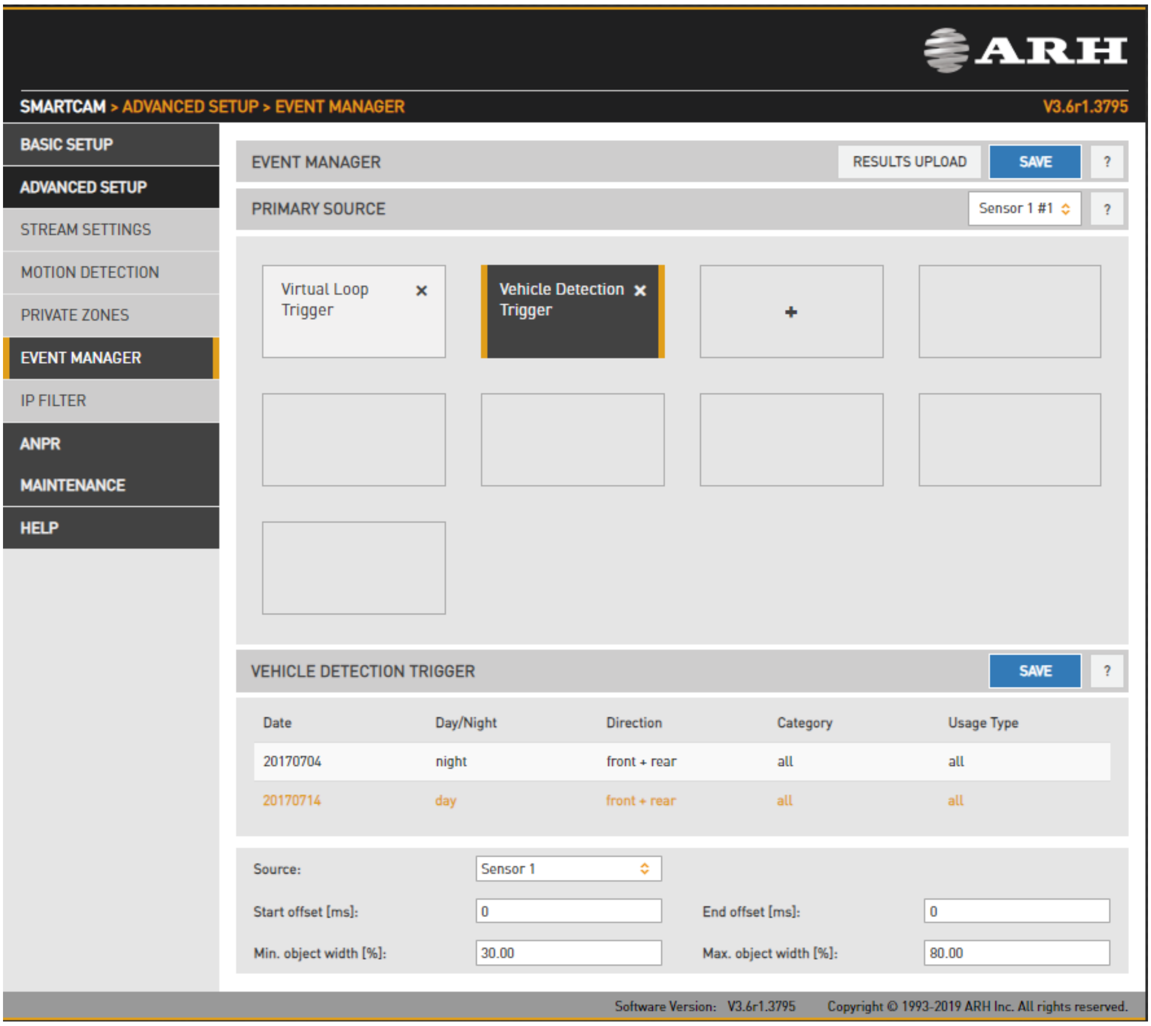
You can add and remove trigger sources in this menu. Clicking the "**+**" icon, you will be presented all available trigger sources. The sources will be connected with an OR conjunction: the trigger will be asserted while any of the trigger sources are active. By selecting a trigger source its configuration will be available at the bottom of the screen.

7.1.2. VEHICLE DETECTION TRIGGER


ARH
SMARTCAM > ADVANCED SETUP > EVENT MANAGER
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
EVENT MANAGER
RESULTS UPLOAD
SAVE
?
PRIMARY SOURCE
Sensor 1 #1
?
Virtual Loop Trigger ×
Vehicle Detection Trigger ×
+
VEHICLE DETECTION TRIGGER
SAVE
?

Date	Day/Night	Direction	Category	Usage Type
20170704	night	front + rear	all	all
20170714	day	front + rear	all	all

Source: Sensor 1

Start offset [ms]: 0

End offset [ms]: 0

Min. object width [%]: 30.00

Max. object width [%]: 80.00

Software Version: V3.6r1.3795

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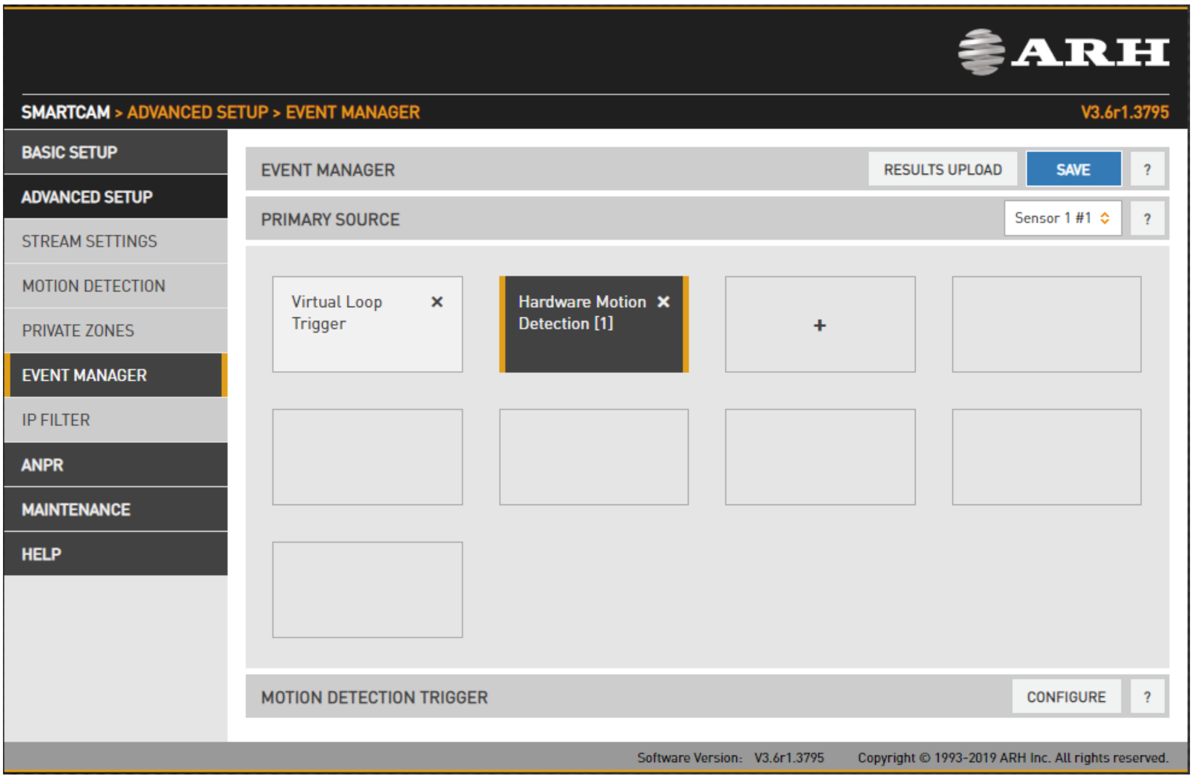
The Vehicle Detector is an image processing algorithm capable of detecting and tracking a vehicle in a stream of images. You can monitor detected vehicles at the Live View menu by clicking the button.

The detector relies on descriptor files containing data for the Vehicle Detection algorithm. These descriptors will be shown with their date, mode (day or night), vehicle direction and category, and geometry.

You can adjust the settings individually by choosing one of the sources of the camera. (Sensor 1, Sensor 2)

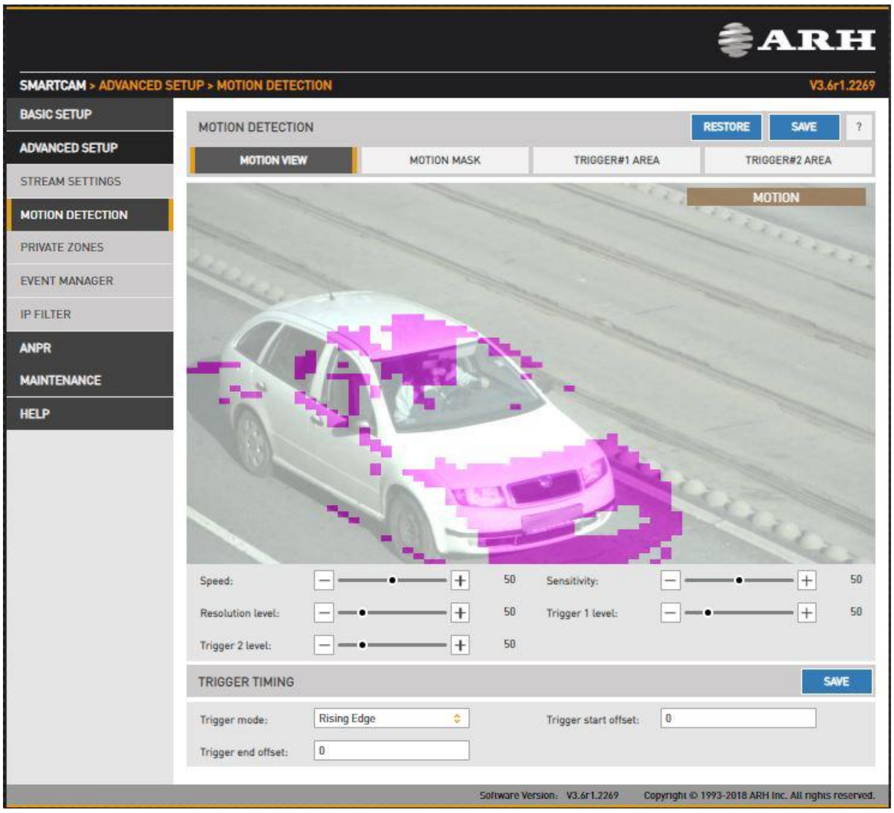
- **Minimal object width:** The minimal detected vehicle width in pixels
- **Maximal object width:** The maximal detected vehicle width in pixels

7.1.3. MOTION DETECTOR


ARH
SMARTCAM > ADVANCED SETUP > EVENT MANAGER
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
EVENT MANAGER
RESULTS UPLOAD
SAVE
?
PRIMARY SOURCE
?
Virtual Loop Trigger ✕
Hardware Motion Detection [1] ✕
+
MOTION DETECTION TRIGGER
CONFIGURE
?
Software Version: V3.6r1.3795
Copyright © 1993-2019 ARH Inc. All rights reserved.

PRIMARY SOURCE: Sensor 1 #1

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


ARH
SMARTCAM > ADVANCED SETUP > MOTION DETECTION
V3.6r1.2269
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
MOTION DETECTION
RESTORE
SAVE
?
MOTION VIEW
MOTION MASK
TRIGGER#1 AREA
TRIGGER#2 AREA
MOTION
TRIGGER TIMING
SAVE
Software Version: V3.6r1.2269
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Speed: 50
Sensitivity: 50
Resolution level: 50
Trigger 1 level: 50
Trigger 2 level: 50

Trigger mode: Rising Edge
Trigger start offset: 0
Trigger end offset: 0

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

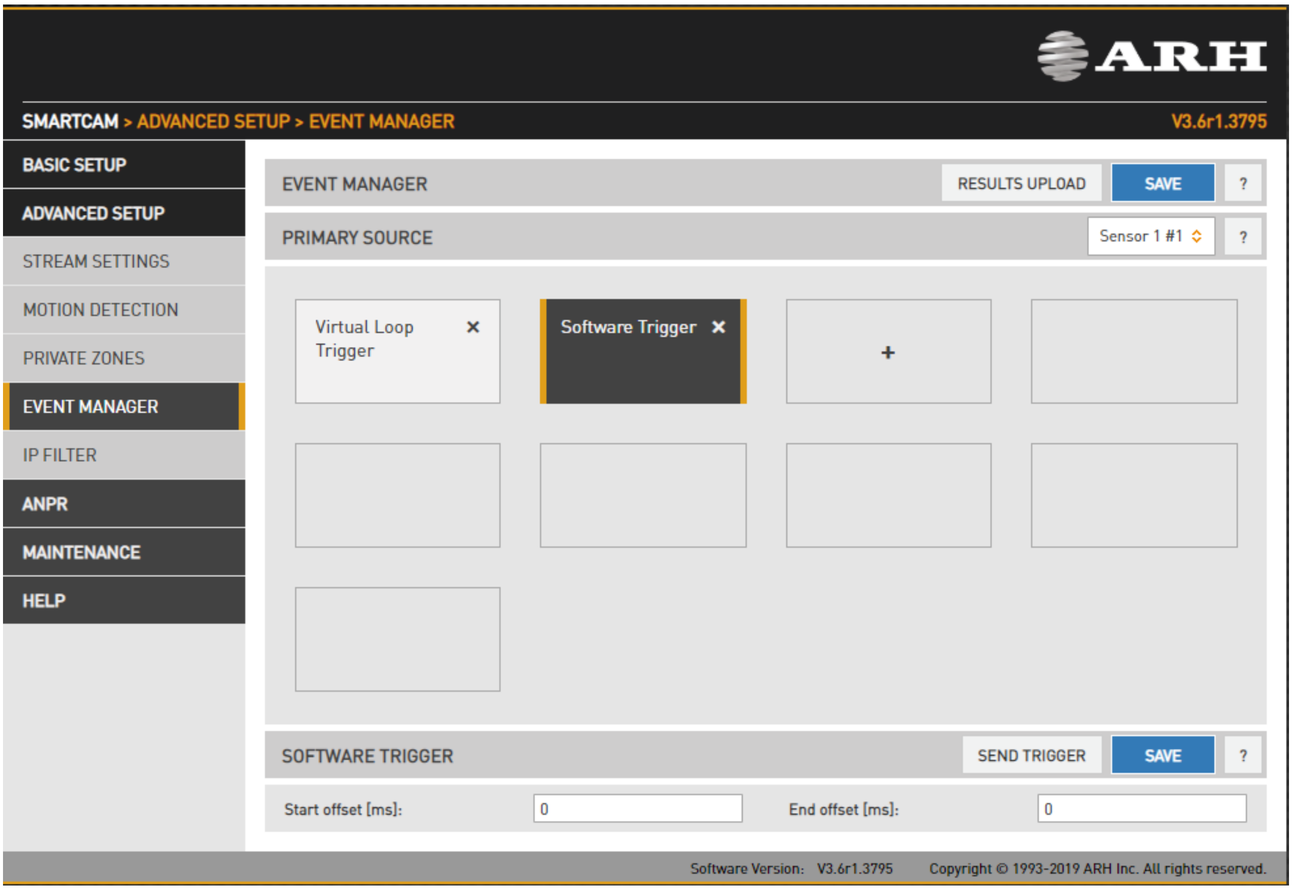
The properties of motion detection are also available:

- **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 7.1.5.)** where you will find the description of this section!

7.1.4. SOFTWARE TRIGGER


ARH
SMARTCAM > ADVANCED SETUP > EVENT MANAGER
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
EVENT MANAGER
RESULTS UPLOAD
SAVE
?
Virtual Loop Trigger ×
Software Trigger ×
+
SOFTWARE TRIGGER
SEND TRIGGER
SAVE
?

PRIMARY SOURCE: Sensor 1 #1

Start offset [ms]: 0

End offset [ms]: 0

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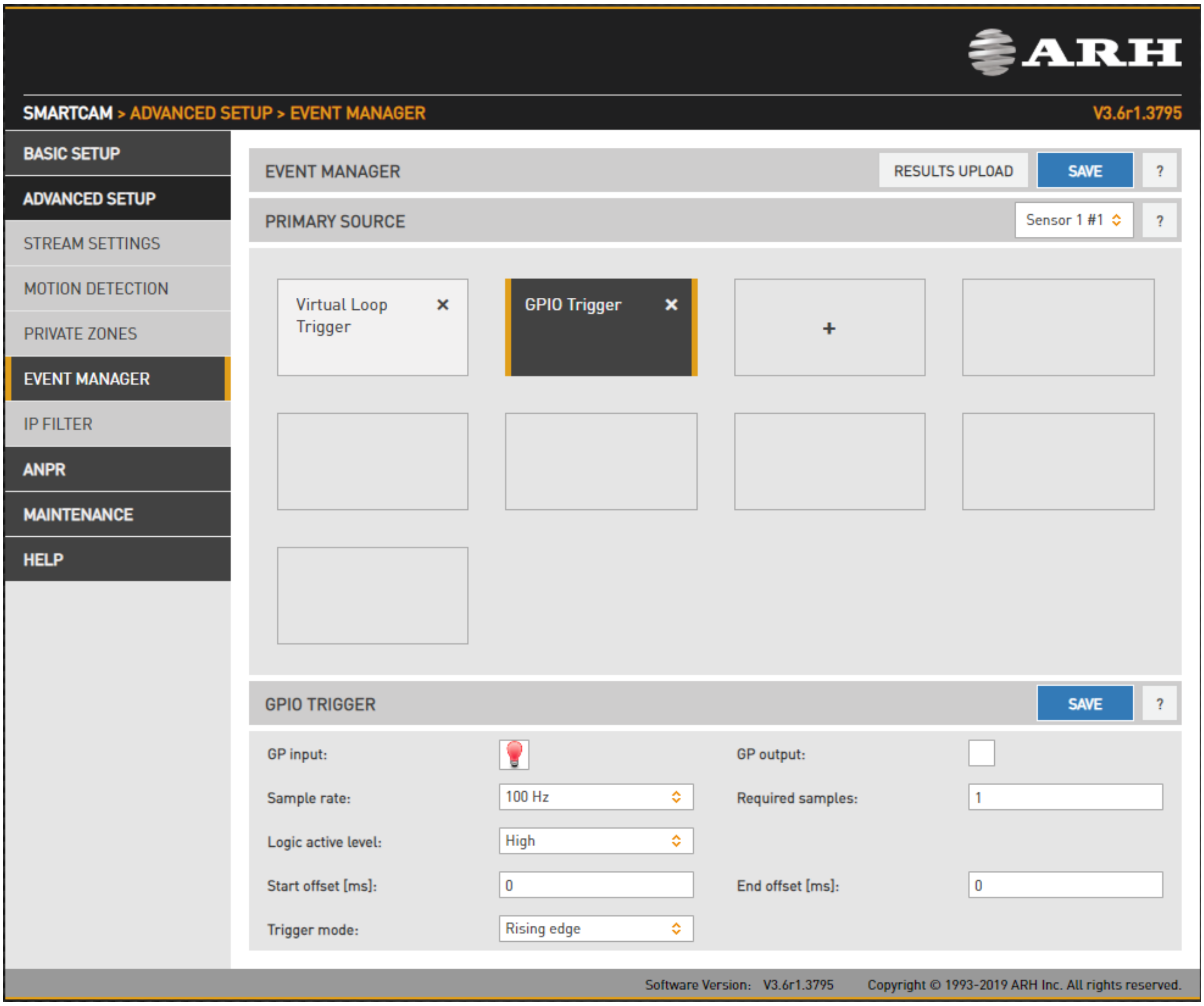
A software trigger is an external trigger sent as a HTTP request.

- **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)

7.1.5. GPIO TRIGGER


ARH
SMARTCAM > ADVANCED SETUP > EVENT MANAGER
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
EVENT MANAGER
RESULTS UPLOAD
SAVE
?
PRIMARY SOURCE
Sensor 1 #1
?
Virtual Loop Trigger ×
GPIO Trigger ×
+
GPIO TRIGGER
SAVE
?
Software Version: V3.6r1.3795
Copyright © 1993-2019 ARH Inc. All rights reserved.

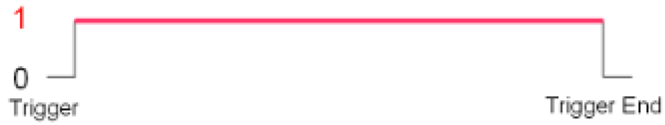
GP input:
Sample rate: 100 Hz
Logic active level: High
Start offset [ms]: 0
Trigger mode: Rising edge
GP output: ☐
Required samples: 1
End offset [ms]: 0

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.

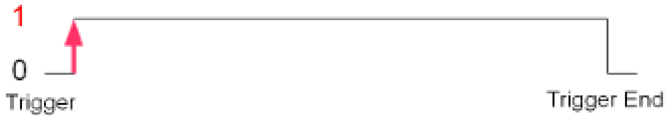
- **Sample Rate, Required samples:** The voltage across the GP Input's signal and ground pins is sampled with the sample rate given. With mechanical switches it often takes a while for the voltage level to settle. During this interval both high and low samples will be recorded. The device will consider 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. **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.
- **GP Output:** Is used to toggle the state of the General Purpose Output pin.

Trigger Mode: Four trigger modes are available:

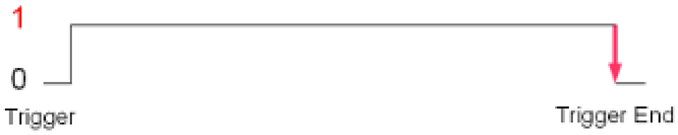
Level: the trigger is asserted while the input is active.


1
0
Trigger
Trigger End

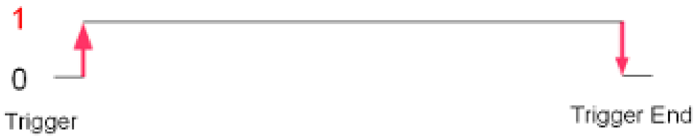
Rising edge: the trigger is asserted only at the rising edge of the input.


1
0
Trigger
Trigger End

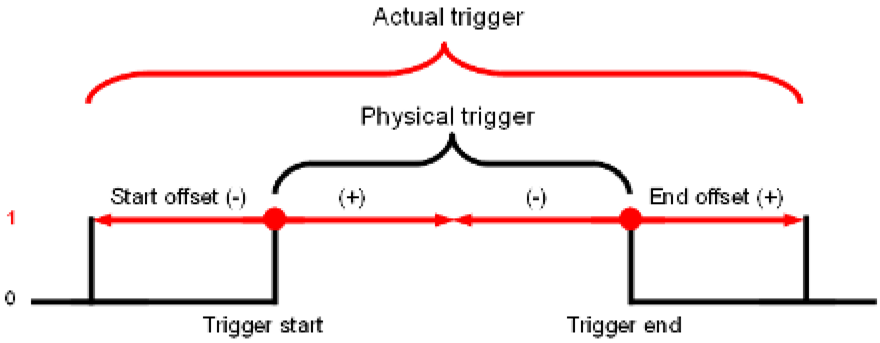
Falling edge: the trigger is asserted only at the falling edge of the input.


1
0
Trigger
Trigger End

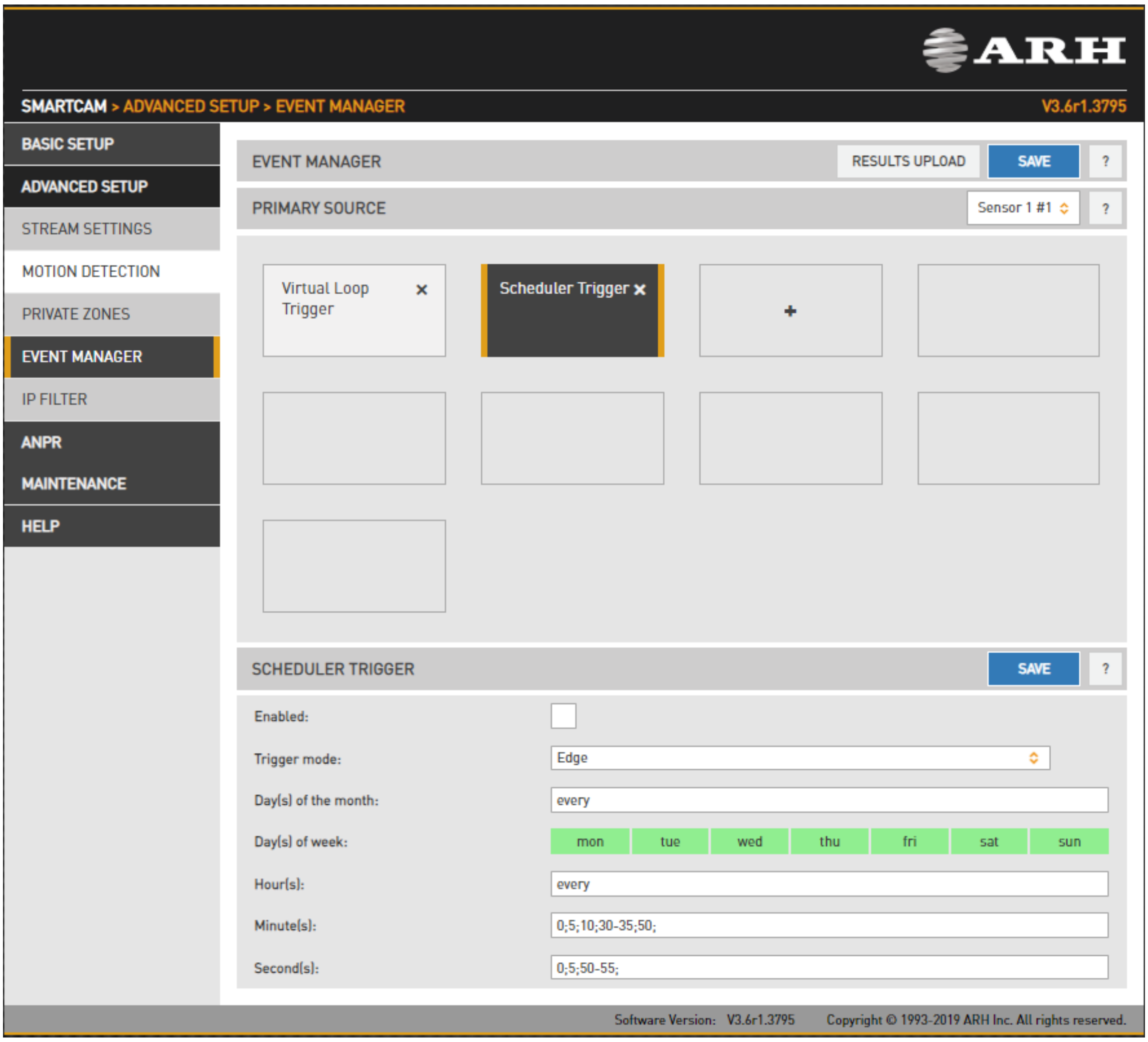
Rising/Falling edge: the trigger is asserted both at the rising and at the falling edge of the input.


1
0
Trigger
Trigger End

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


Actual trigger
Physical trigger
Start offset (-)
(+)
(-)
End offset (+)
1
0
Trigger start
Trigger end

7.1.6. SCHEDULER TRIGGER


ARH
SMARTCAM > ADVANCED SETUP > EVENT MANAGER
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
EVENT MANAGER
RESULTS UPLOAD
SAVE
?
PRIMARY SOURCE
Sensor 1 #1
?
Virtual Loop Trigger ×
Scheduler Trigger ×
+
SCHEDULER TRIGGER
SAVE
?
Software Version: V3.6r1.3795
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Enabled: ☐
Trigger mode: Edge
Day(s) of the month: every
Day(s) of week: mon tue wed thu fri sat sun
Hour(s): every
Minute(s): 0;5;10;30-35;50;
Second(s): 0;5;50-55;

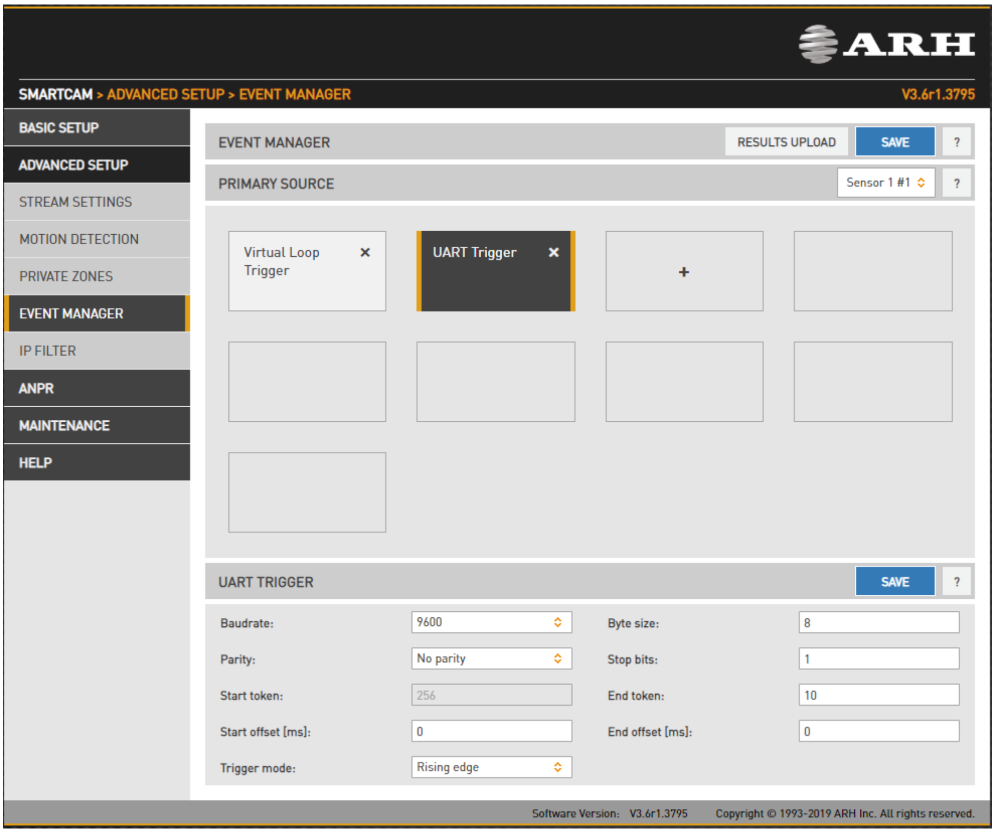
This trigger source provides the user with a timer. Triggers can be scheduled with a precision of one second. Two trigger modes are available:

- **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

7.1.7. UART TRIGGER


ARH
SMARTCAM > ADVANCED SETUP > EVENT MANAGER
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
EVENT MANAGER
RESULTS UPLOAD
SAVE
?
PRIMARY SOURCE
Sensor 1 #1
Virtual Loop Trigger
UART Trigger
+
UART TRIGGER
Software Version: V3.6r1.3795
Copyright © 1993-2019 ARH Inc. All rights reserved.

Baudrate: 9600
Byte size: 8
Parity: No parity
Stop bits: 1
Start token: 256
End token: 10
Start offset [ms]: 0
End offset [ms]: 0
Trigger mode: Rising edge

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.

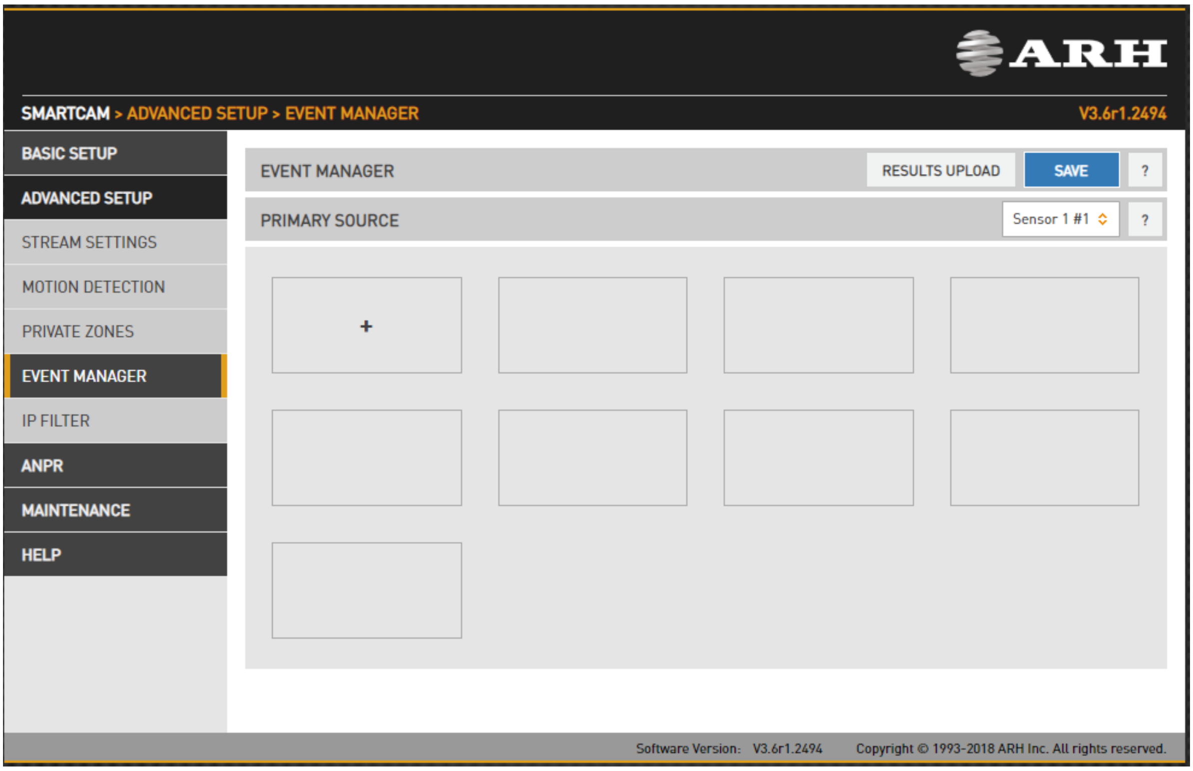
7.1.8. VIRTUAL LOOP TRIGGER MODULE

Virtual Loop is an advanced 3D motion detection algorithm specialized to detect the best position of the vehicle for ANPR.

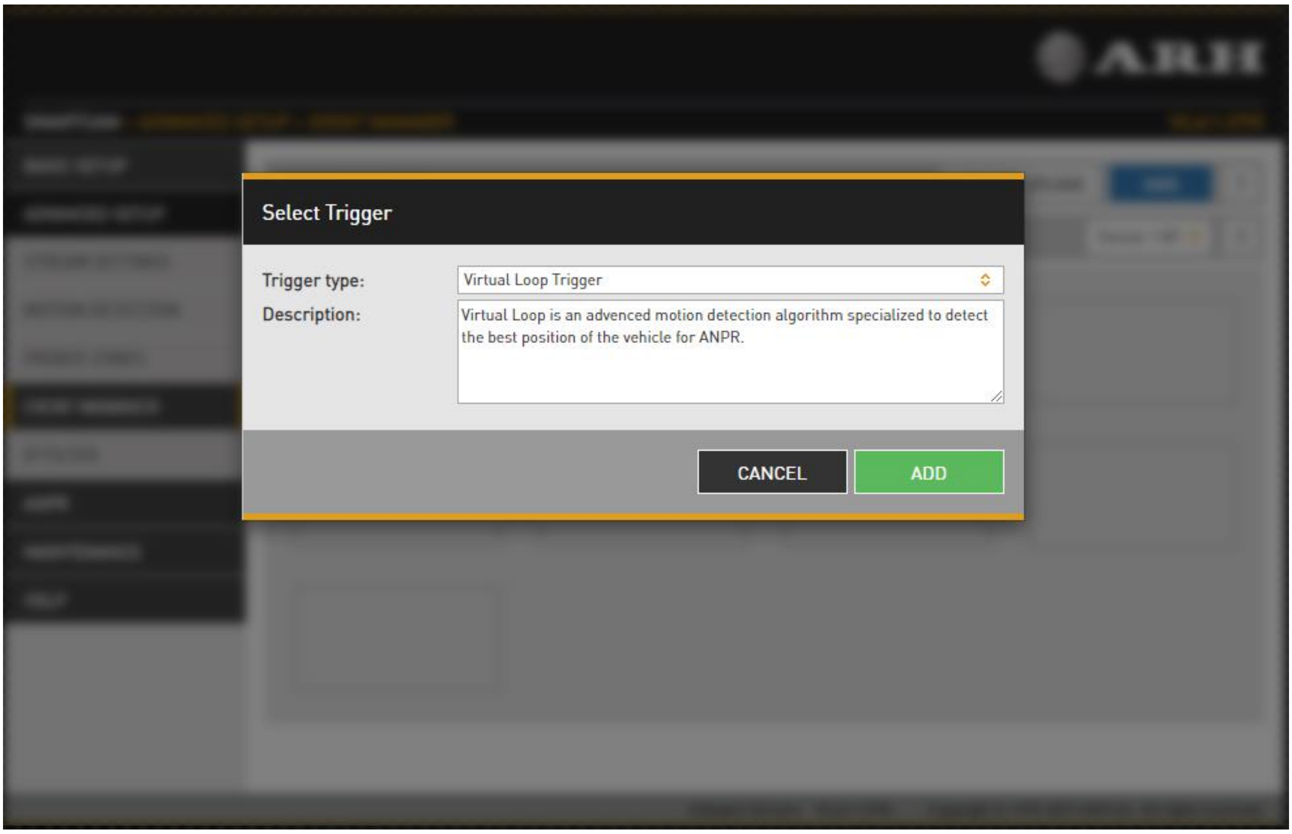
SET VIRTUAL LOOP AS A TRIGGER SOURCE:

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

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


ARH
SMARTCAM > ADVANCED SETUP > EVENT MANAGER
V3.6r1.2494
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
EVENT MANAGER
RESULTS UPLOAD
SAVE
?
PRIMARY SOURCE
Sensor 1 #1
?
+
Software Version: V3.6r1.2494
Copyright © 1993-2018 ARH Inc. All rights reserved.

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



Select Trigger

Trigger type: Virtual Loop Trigger

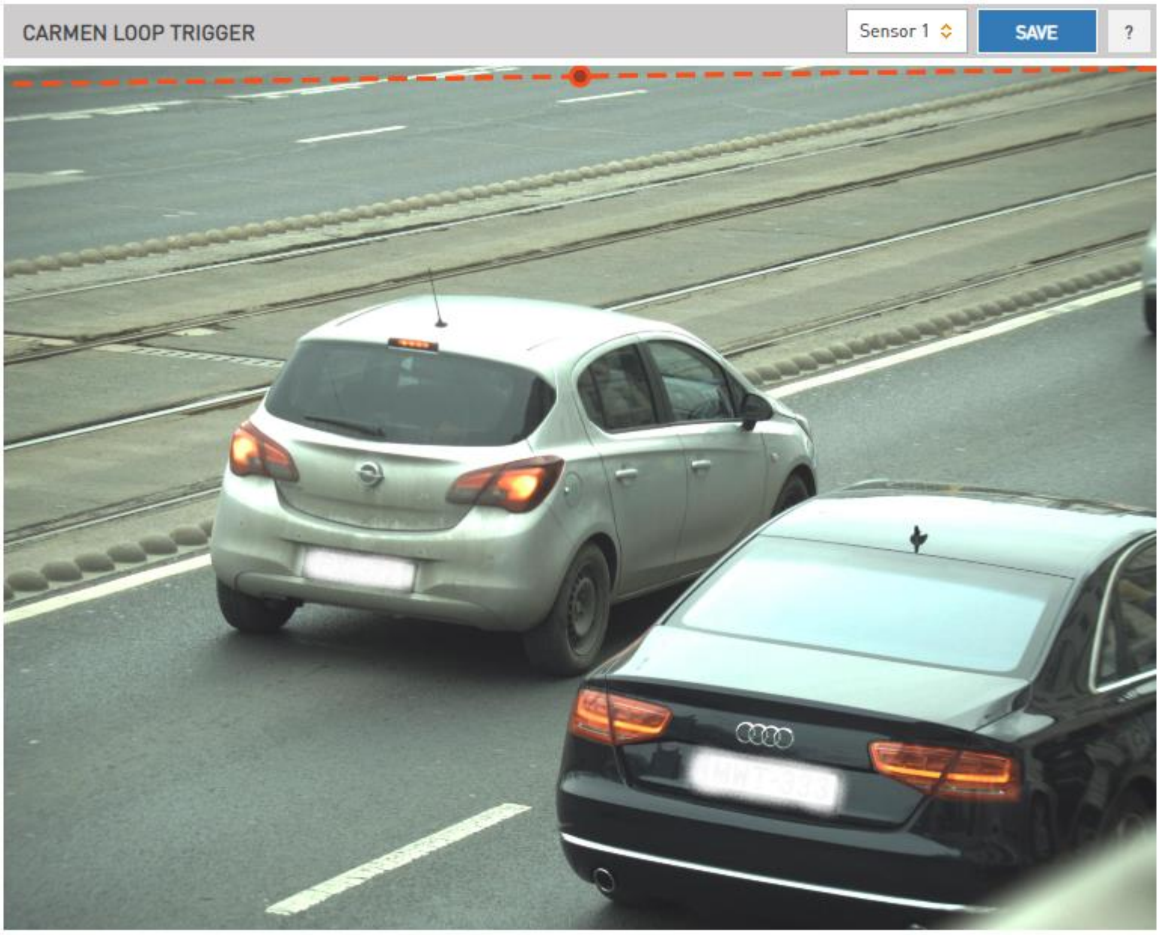
Description: Virtual Loop is an advenced motion detection algorithm specialized to detect the best position of the vehicle for ANPR.

Note

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

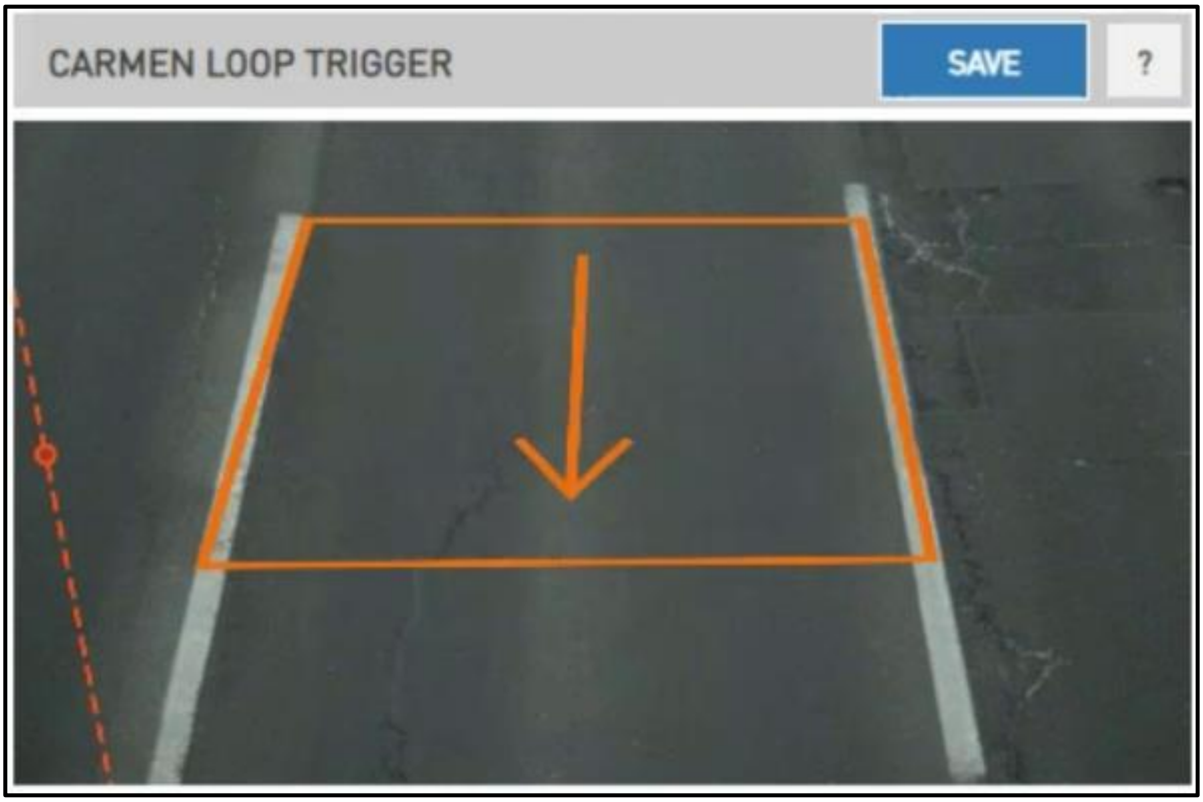
CONFIGURE VIRTUAL LOOP TRIGGER

Configuring the Virtual Loop trigger consists of specifying regions of interest (ROI) both for triggering and ANPR.



To define the ROI, an imaginary loop must be drawn in the image. This is a rectangle in the plane of the road surface. Cars passing through this loop will trigger the Virtual Loop. To draw the rectangle, click the left mouse button to place the first ROI point. Continue by adding 3 more points to complete the rectangle. If the arrow does not point in the direction of cars passing through, it needs to be flipped over by clicking the rectangle. Optionally you can repeat the procedure to place a second ROI for a second lane.

Right click the rectangle to delete the loop and start again.



! Important

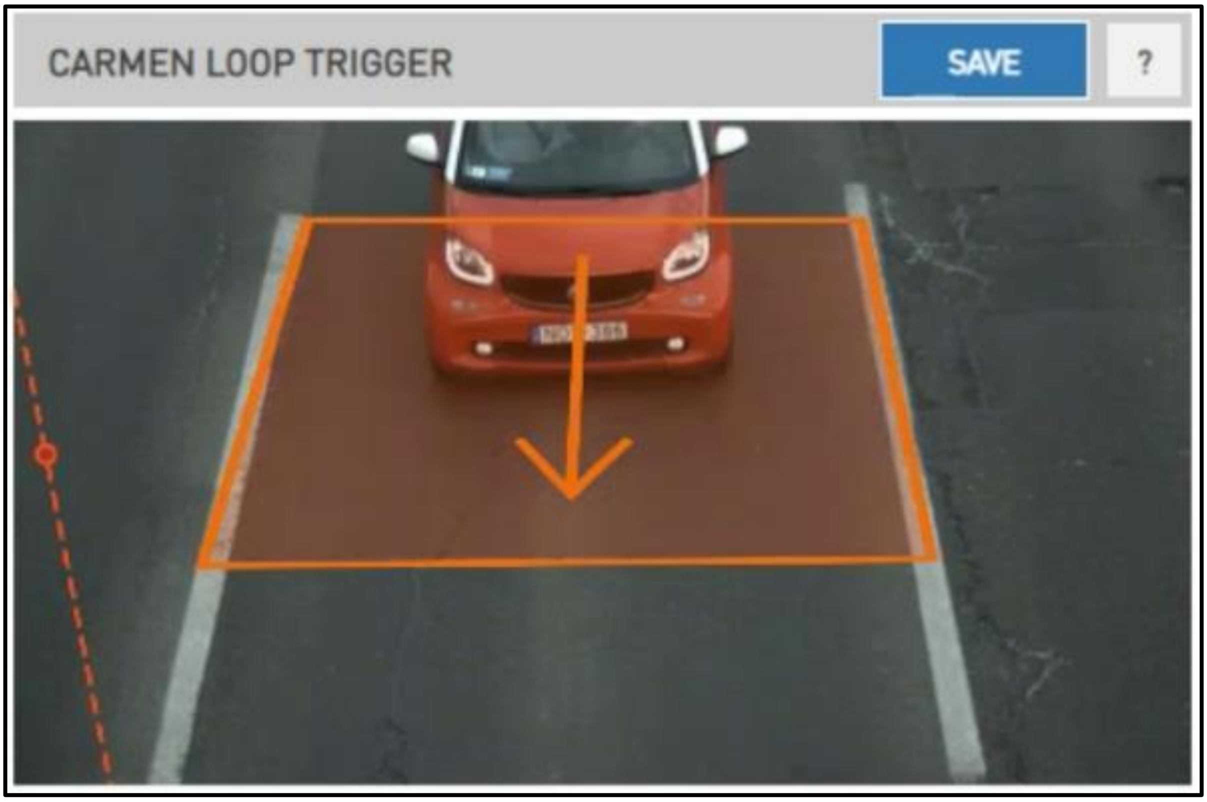
Configure the rectangle so that the license plate is always visible when the vehicle hits the center of the rectangle, as the corresponding frame will be selected for ANPR.

! Important

Always set the lane separator, even if only one ROI is defined.

SET UP ANPR ROI

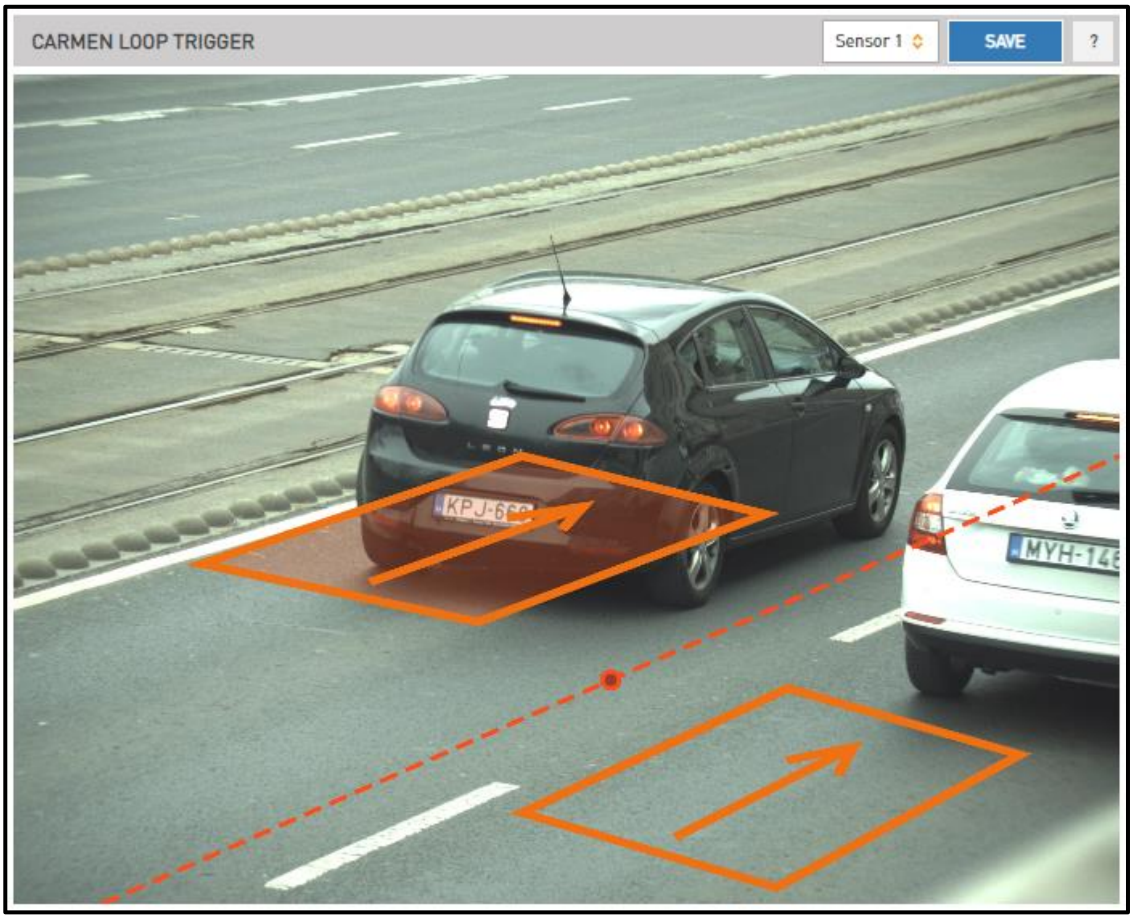
With the loop ROI(s) defined, we need to specify the ANPR ROI, separating the two lanes corresponding to the two loops. Click the right mouse button to place the lane separator. Press and hold the right mouse button, then press and hold the left mouse button to rotate the lane separator. Then release the left mouse button if the lane separator correctly separates the two lines corresponding to the two loops.



You can save the settings with the save button.

! Important

Lanes are handled separately, so if configured correctly, the system will deliver a license plate for each lane even when both lanes are occupied/triggered simultaneously.



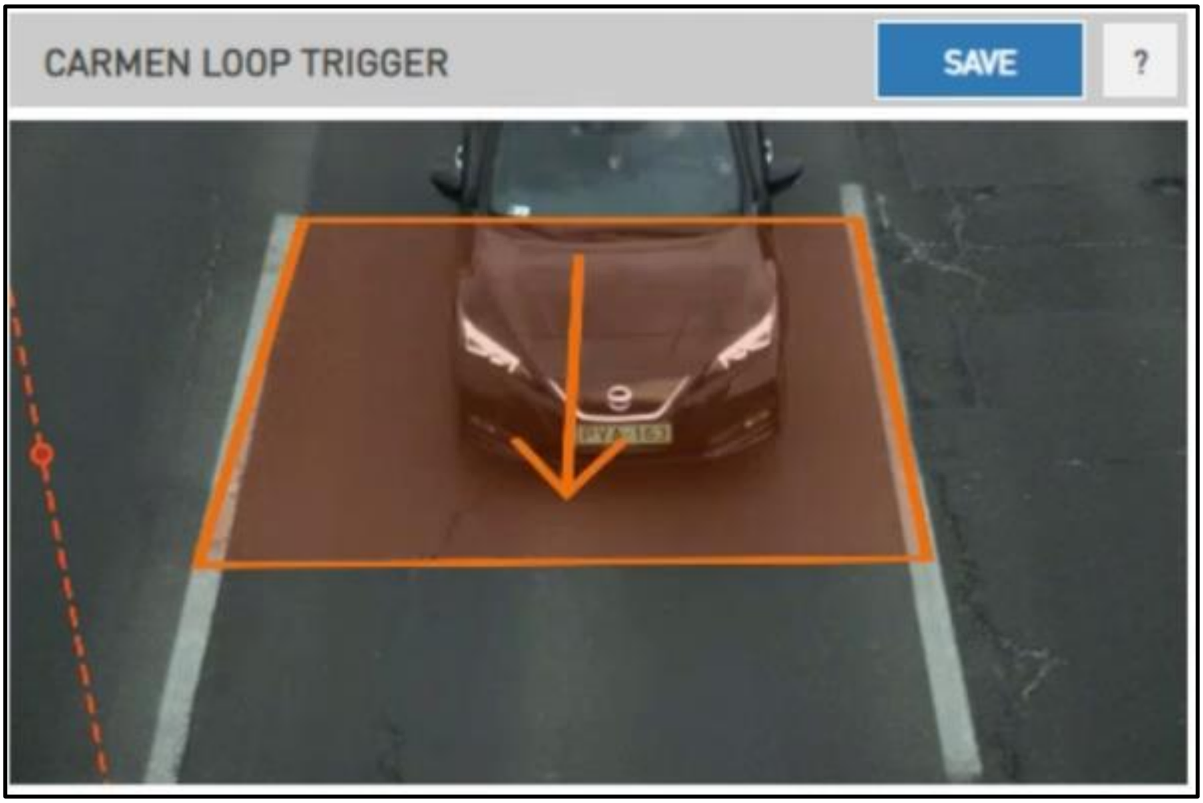
The lane separator can be configured from the keyboard also. Click the image to place the active focus to the image. Press and hold 'Ctrl' to use the following controls:

Key combination	**Description**
Ctrl+Enter	Canvas focus. You can then change the separator lane.
Ctrl+Up/Down/Left/Right	Move the image separator center
Ctrl+Shift+Left/Right	Rotate the lane separator (counter clockwise/clockwise)
Ctrl+Shift+Enter	Center the control point on the lane separator
Ctrl+Shift+Up	Center the control point horizontally
Ctrl+Shift+Down	Center the control point vertically

! Important

ROIs have to be on different sides of the lane separator!

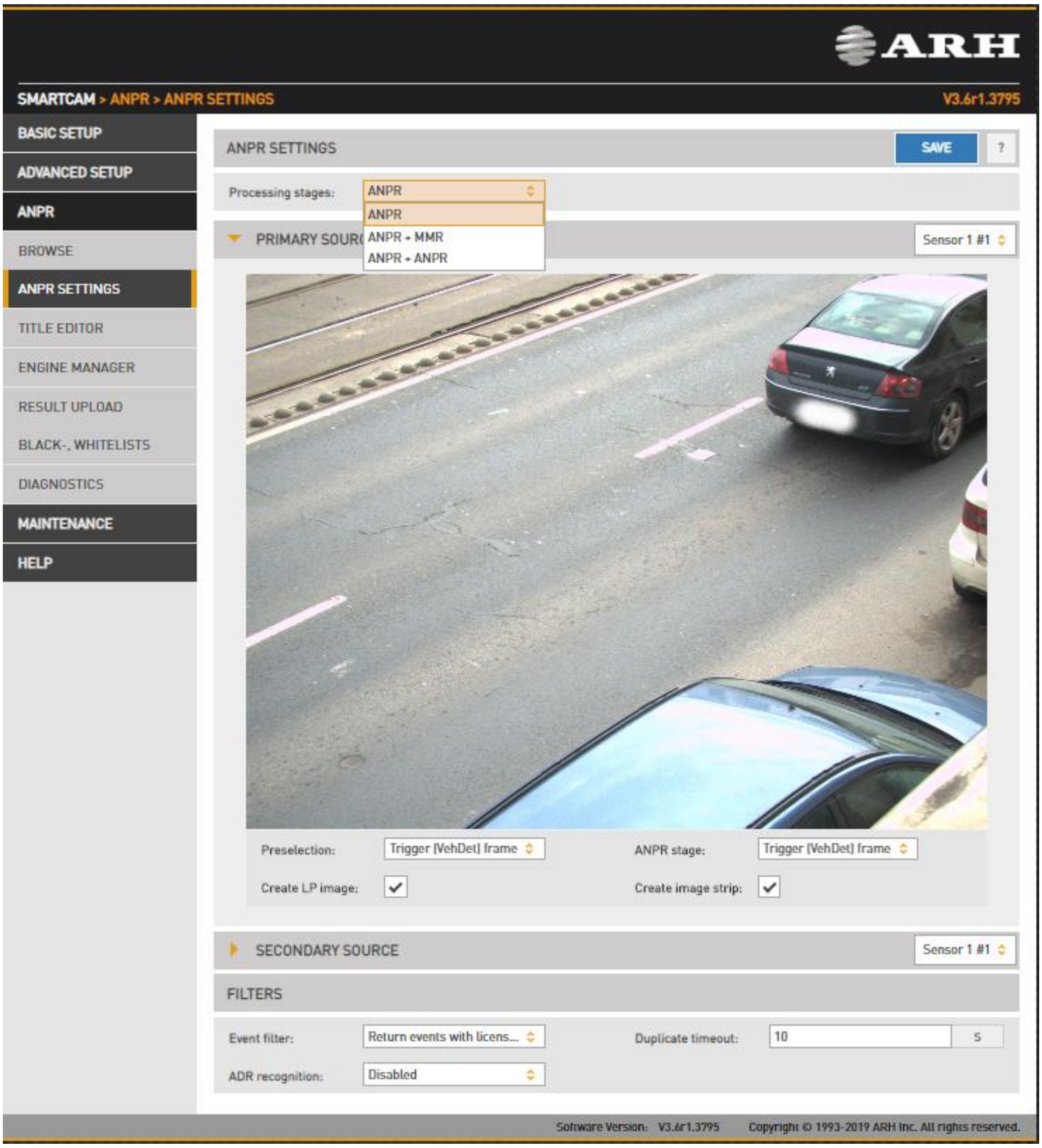
One possible proper setting:



SETTING ANPR TO USE ANPR ROI

In order to use the previously defined ANPR ROI in the license plate recognition process, the **'Preselection engine' property must be set to 'Trigger (vehdet) frame' in the ANPR SETTINGS menu.**

You can save the settings with the save button.


ARH
SMARTCAM > ANPR > ANPR SETTINGS
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
ANPR SETTINGS
SAVE
?
ANPR
ANPR + MMR
ANPR + ANPR
PRIMARY SOURC
Sensor 1 #1
SECONDARY SOURCE
Sensor 1 #1
FILTERS
Software Version: V3.6r1.3795
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Processing stages: ANPR

Preselection: Trigger (VehDet) frame

ANPR stage: Trigger (VehDet) frame

Create LP image: ☑

Create image strip: ☑

Event filter: Return events with licens...

Duplicate timeout: 10 s

ADR recognition: Disabled

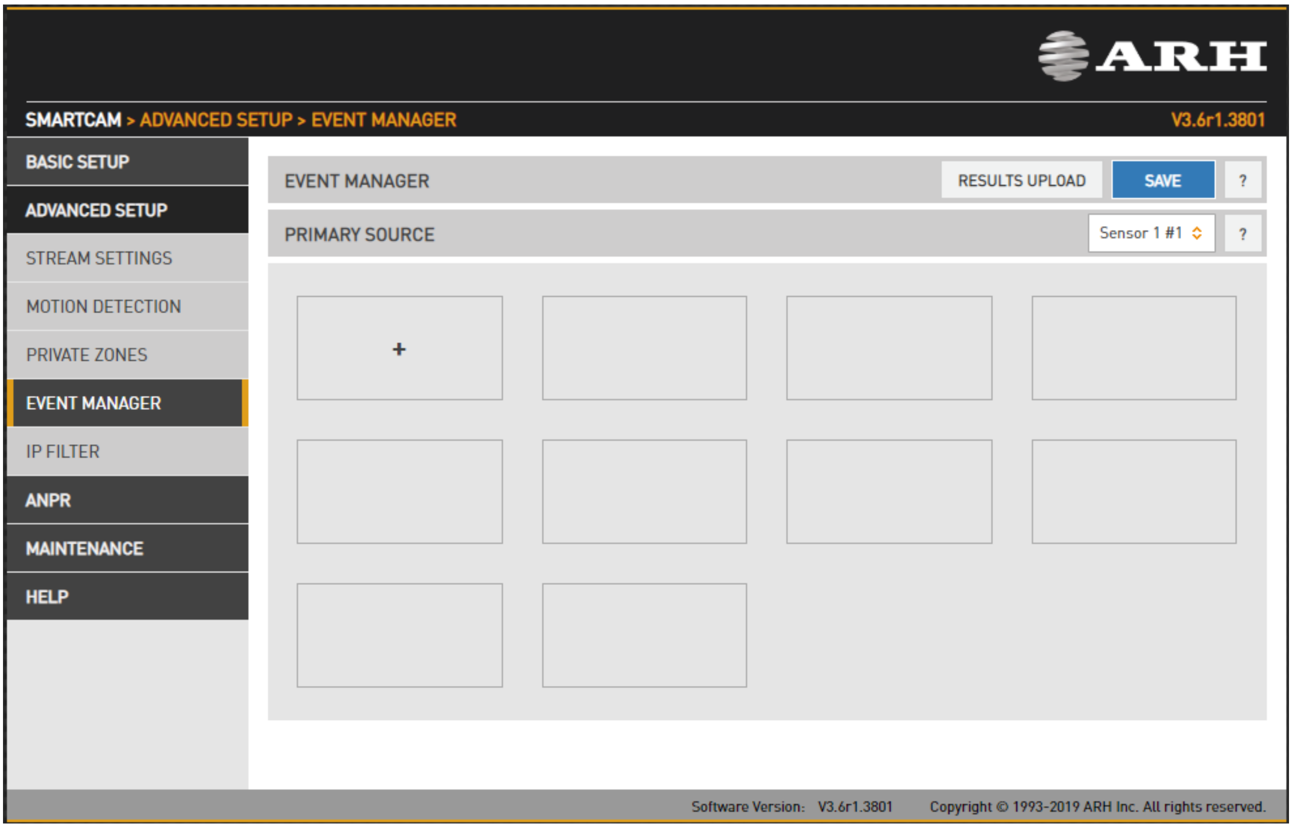
7.1.9. VVQ TRIGGER

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

SET VVQ AS A TRIGGER SOURCE:

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

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


ARH
SMARTCAM > ADVANCED SETUP > EVENT MANAGER
V3.6r1.3801
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
EVENT MANAGER
RESULTS UPLOAD
SAVE
?
PRIMARY SOURCE
Sensor 1 #1
?
+
Software Version: V3.6r1.3801
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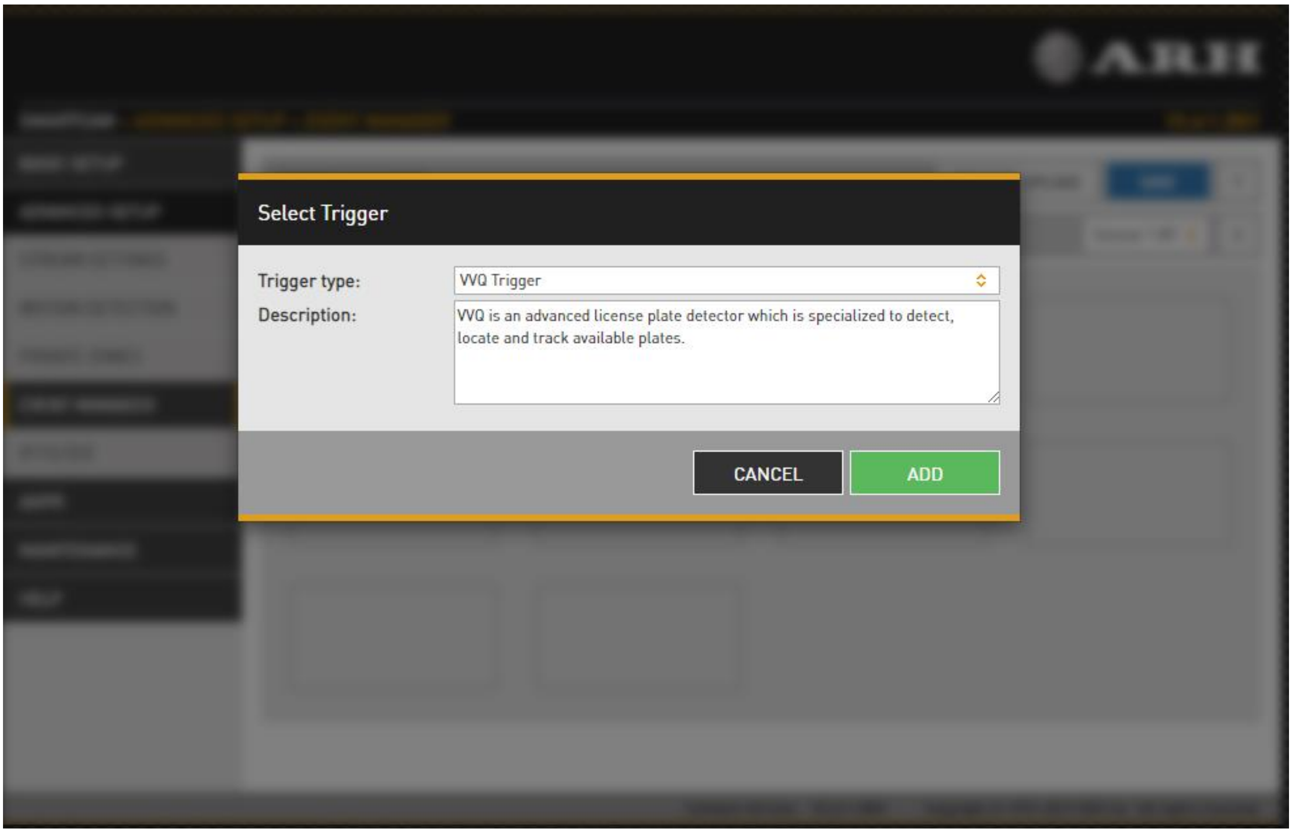
- In the drop-down menu, select the VVQ Trigger, then click Add.



Trigger type: VVQ Trigger

Description: VVQ is an advanced license plate detector which is specialized to detect, locate and track available plates.

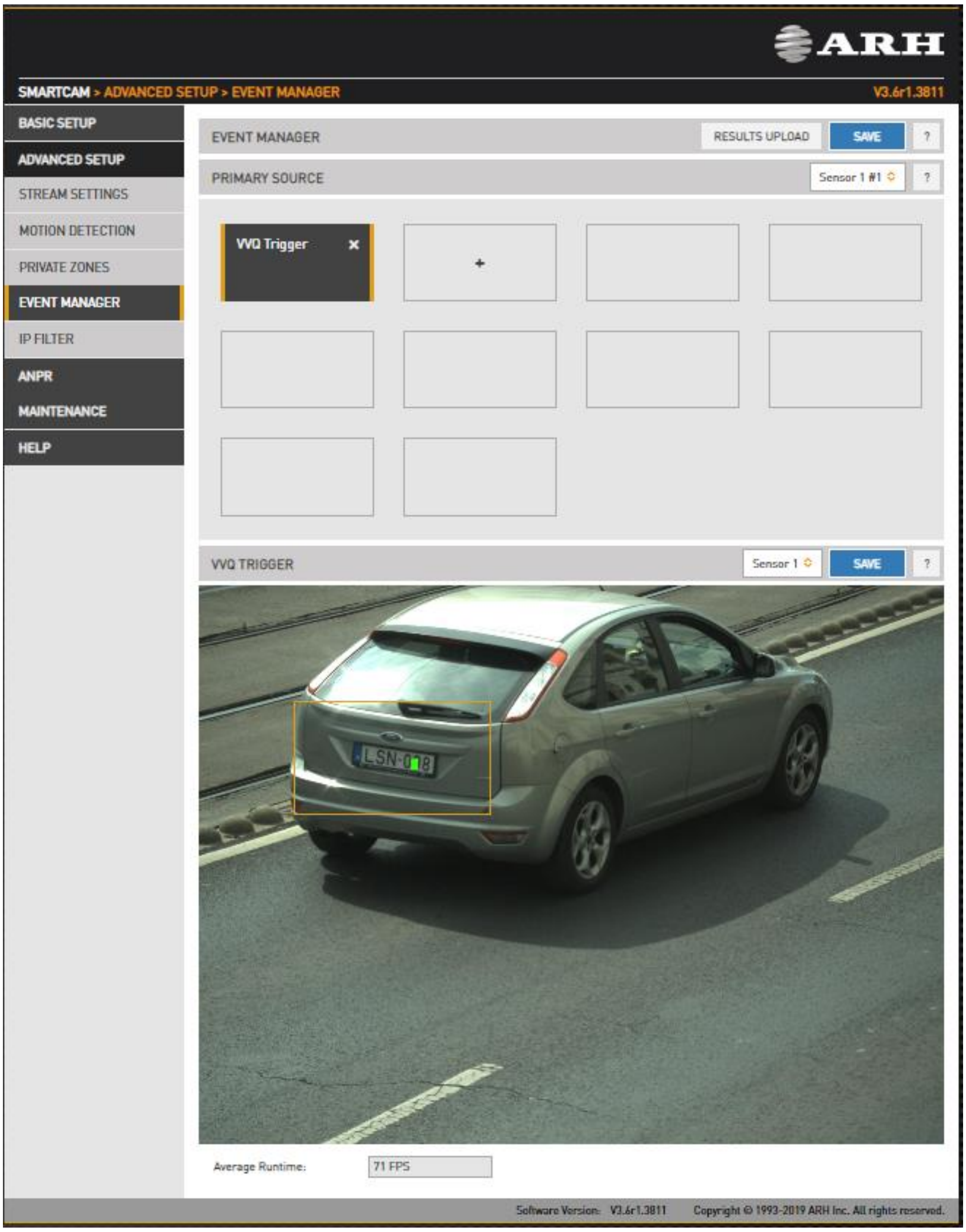
Note

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

CONFIGURE VVQ TRIGGER

After added VVQ 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.


ARH
SMARTCAM > ADVANCED SETUP > EVENT MANAGER
V3.6r1.3811
BASIC SETUP
ADVANCED SETUP
STREAM SETTINGS
MOTION DETECTION
PRIVATE ZONES
EVENT MANAGER
IP FILTER
ANPR
MAINTENANCE
HELP
EVENT MANAGER
RESULTS UPLOAD
SAVE
?
PRIMARY SOURCE
?
VVQ Trigger
+
VVQ TRIGGER
SAVE
?
LSN-018

Primary source: Sensor 1 #1

VVQ Trigger: Sensor 1

Average Runtime: 71 FPS

Software Version: V3.6r1.3811

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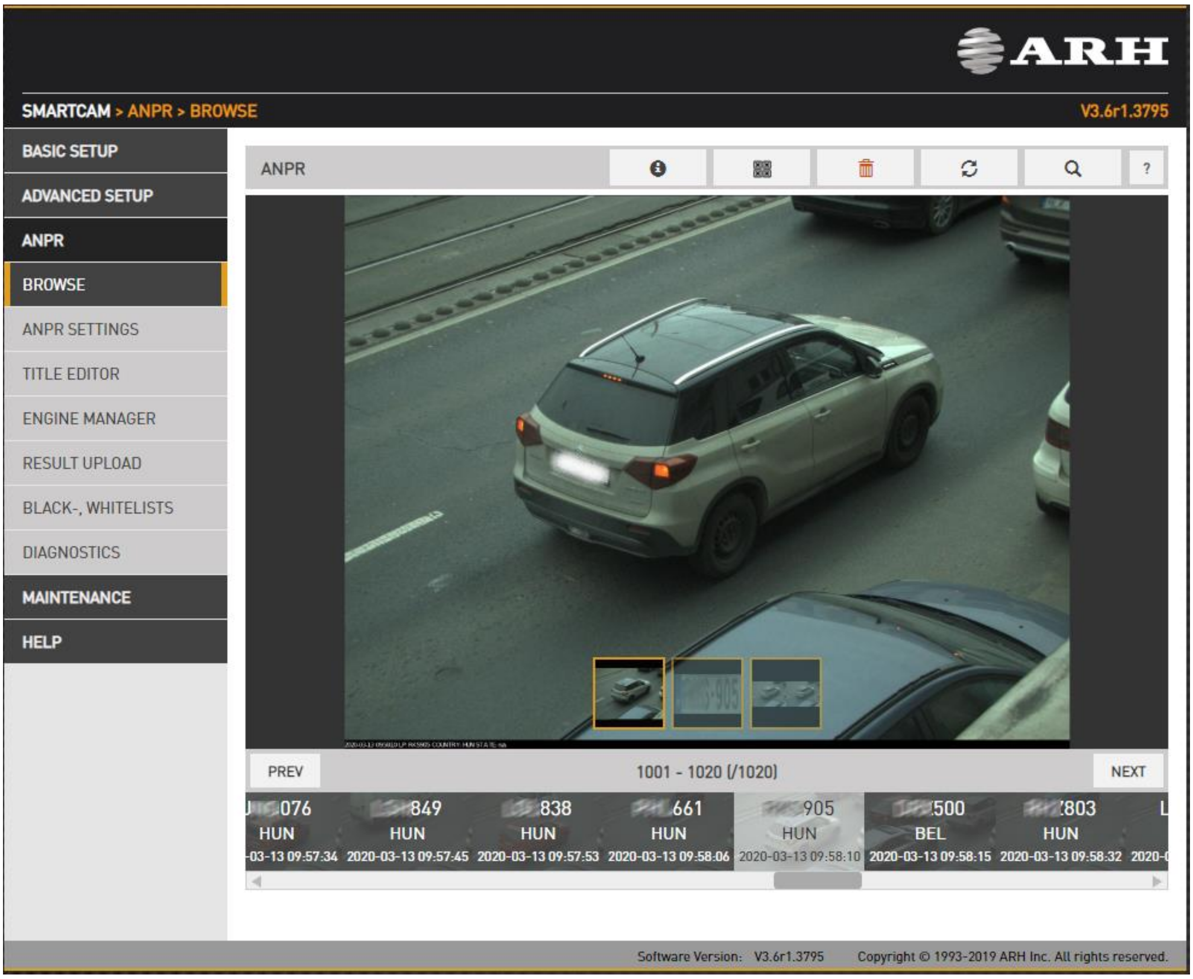
7.2. ANPR

7.2.1. BROWSE

WEB INTERFACE > ANPR > BROWSE


ARH
SMARTCAM > ANPR > BROWSE
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
ANPR
?
PREV
1001 - 1020 (/1020)
NEXT
076 HUN -03-13 09:57:34
849 HUN 2020-03-13 09:57:45
838 HUN 2020-03-13 09:57:53
661 HUN 2020-03-13 09:58:06
905 HUN 2020-03-13 09:58:10
500 BEL 2020-03-13 09:58:15
803 HUN 2020-03-13 09:58:32
Software Version: V3.6r1.3795
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Recorded events are listed on the bottom timeline in ANPR/BROWSE. Use the icons on the top to:

▦ – Select/unselect all records

ℹ – List image data

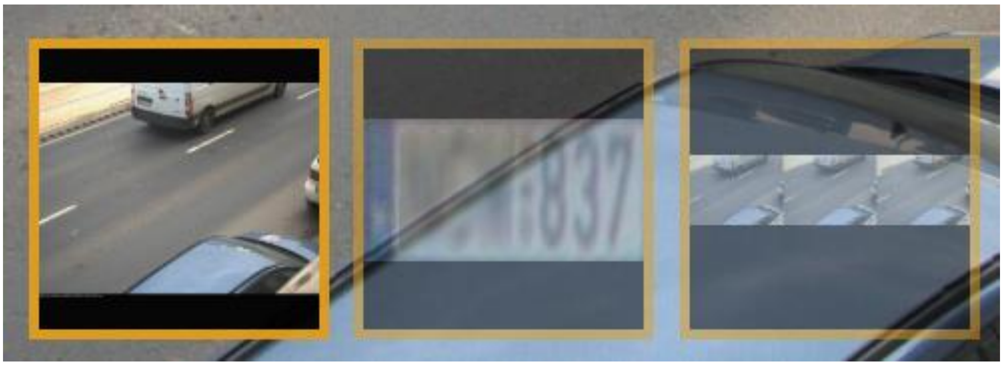
🗑 – Delete record(s)

⟳ – Reload list of entries

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

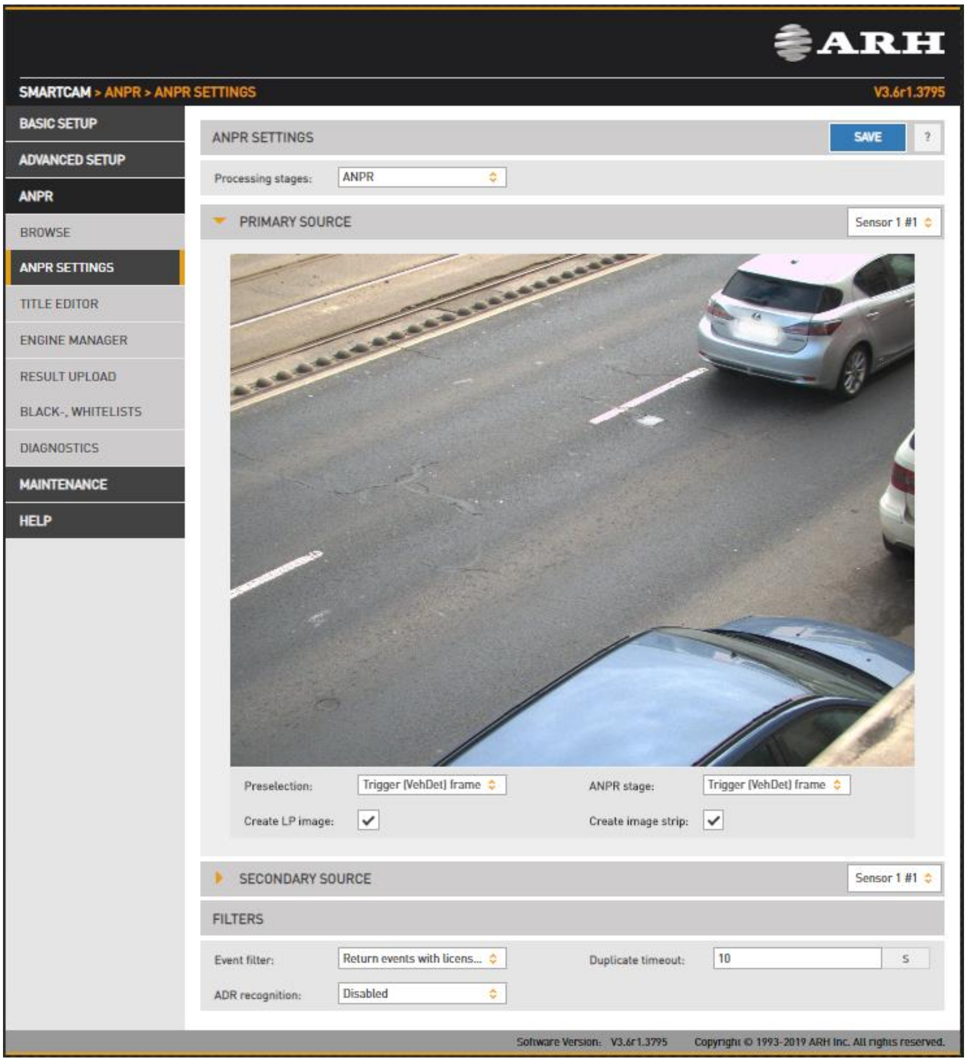
If you hover the mouse over the image, thumbnails will appear in the bottom of the screen, clicking these the main image will switch to:

- 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


ARH
SMARTCAM > ANPR > ANPR SETTINGS
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
ANPR SETTINGS
SAVE
?
PRIMARY SOURCE
SECONDARY SOURCE
FILTERS
Software Version: V3.6r1.3795
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Processing stages: ANPR

Primary source: Sensor 1 #1

Preselection: Trigger (VehDet) frame

ANPR stage: Trigger (VehDet) frame

Create LP image: ☑

Create image strip: ☑

Secondary source: Sensor 1 #1

Event filter: Return events with licens...

Duplicate timeout: 10 s

ADR recognition: Disabled

Processing stages:

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

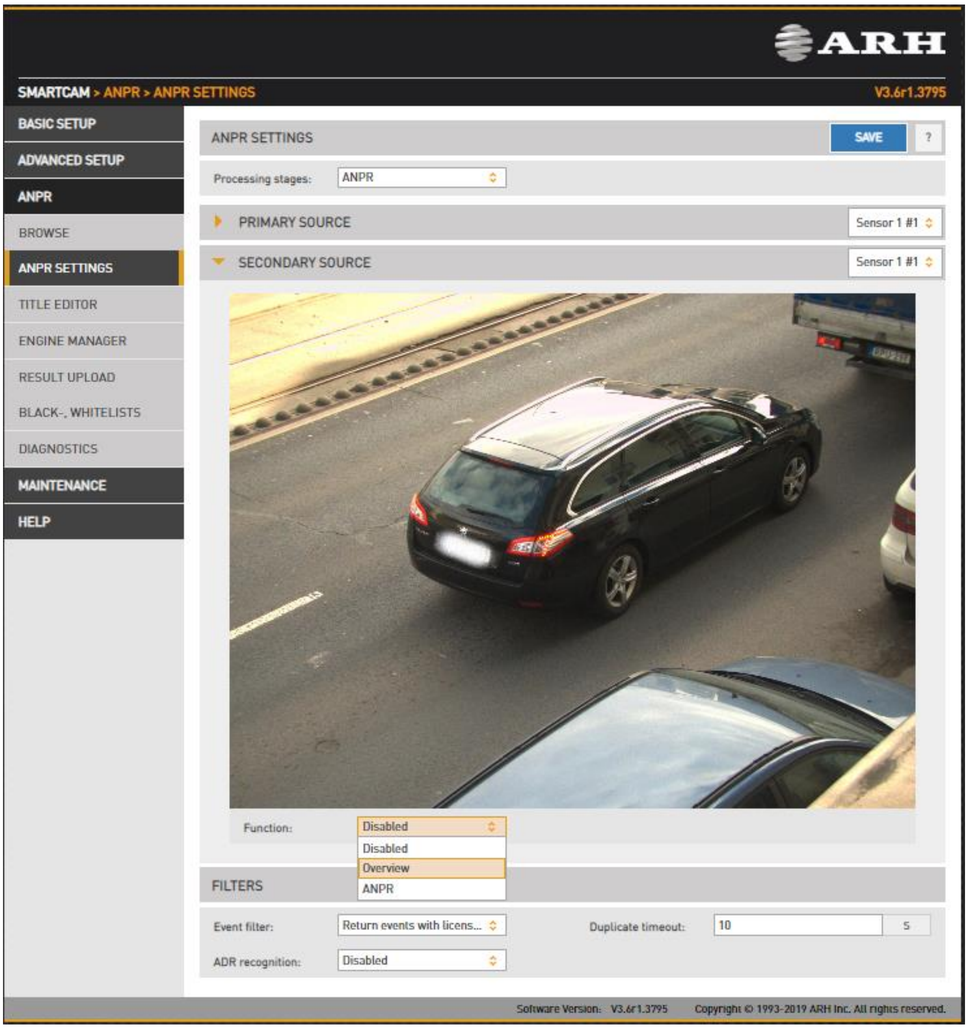
ANPR - A single ANPR stage follows the Preselection stage

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 Preselection stage (See Chapter 7. for a use case).

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 or Virtual Loop 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.


ARH
SMARTCAM > ANPR > ANPR SETTINGS
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
ANPR SETTINGS
SAVE
?
PRIMARY SOURCE
SECONDARY SOURCE
Disabled
Overview
ANPR
FILTERS

Processing stages: ANPR

PRIMARY SOURCE: Sensor 1 #1

SECONDARY SOURCE: Sensor 1 #1

Function: Disabled

Event filter: Return events with licens...

Duplicate timeout: 10 5

ADR recognition: Disabled

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- **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 (vehdet) Frame:** the frame returned by other trigger sources, such as vehicle detection or Virtual Loop

  - **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
  - **Trigger (vehdet) Frame:** the frame returned by other trigger sources, such as vehicle detection or Virtual Loop
    - **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.

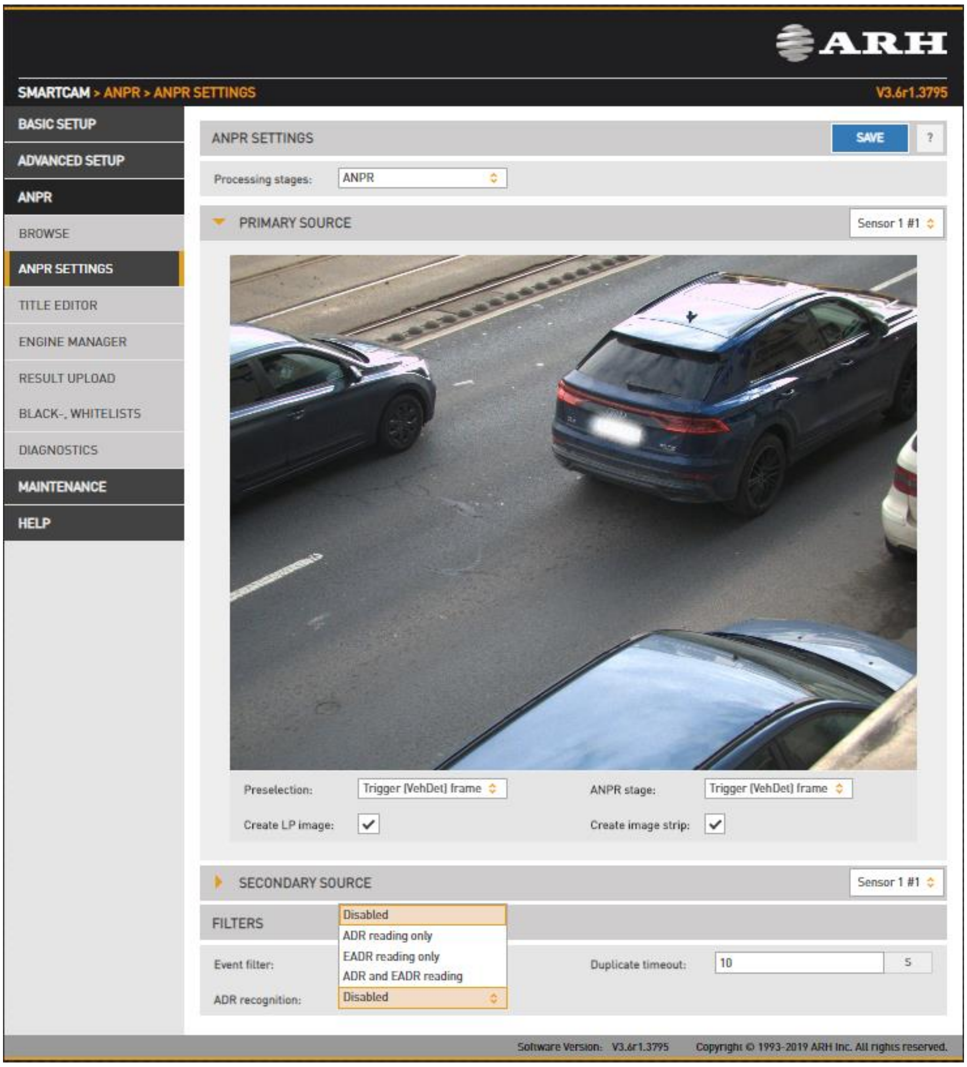
Filtering results can be configured with the following two options:

  - **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.


ARH
SMARTCAM > ANPR > ANPR SETTINGS
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
ANPR SETTINGS
SAVE
?
PRIMARY SOURCE
SECONDARY SOURCE
FILTERS
Disabled
ADR reading only
EADR reading only
ADR and EADR reading

Processing stages: ANPR
Primary source: Sensor 1 #1
Preselection: Trigger (VehDet) frame
ANPR stage: Trigger (VehDet) frame
Create LP image: ☑
Create image strip: ☑
Secondary source: Sensor 1 #1
Event filter:
Duplicate timeout: 10 s
ADR recognition: Disabled

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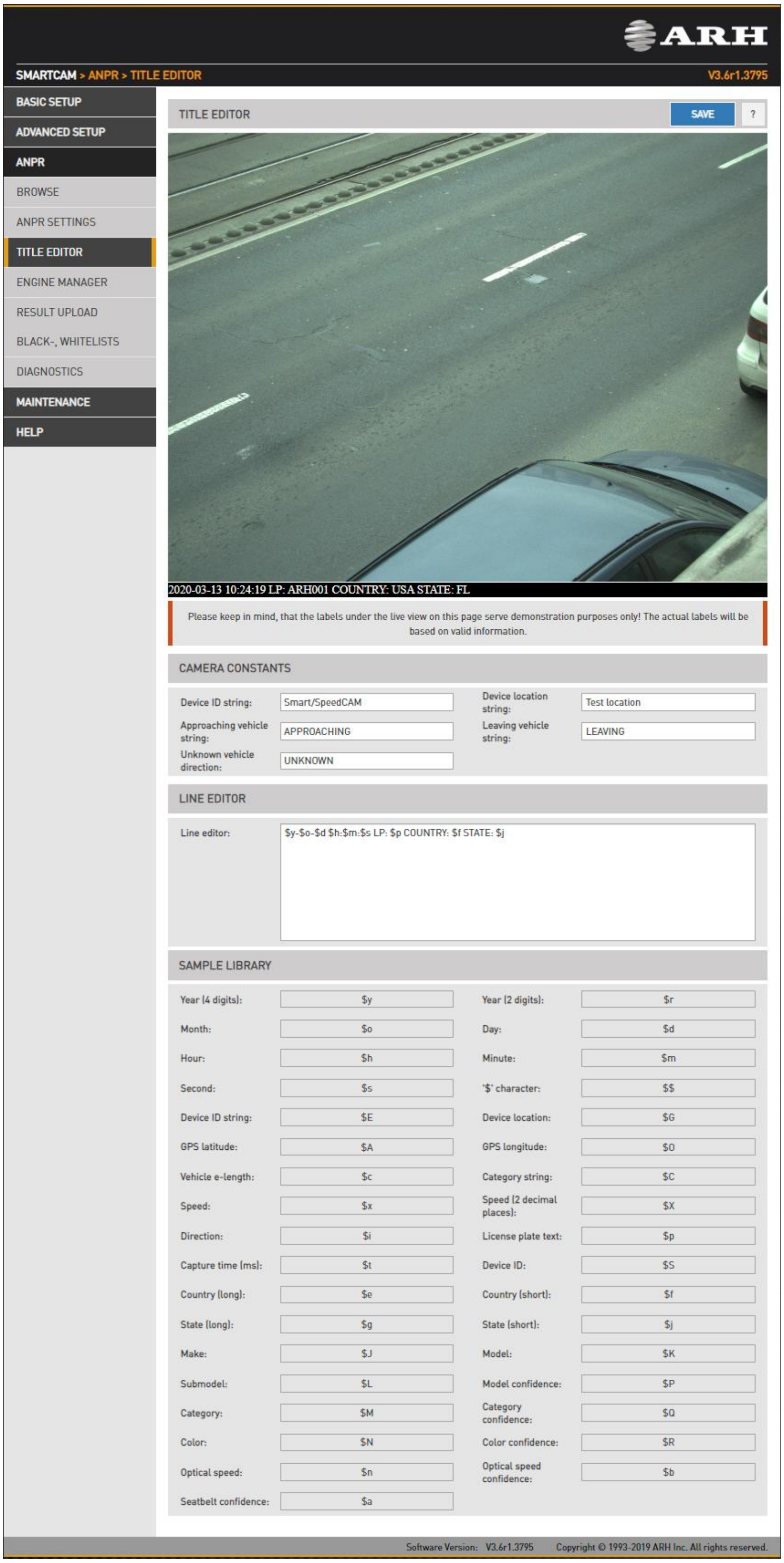
Note

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


ARH
SMARTCAM > ANPR > TITLE EDITOR
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
TITLE EDITOR
SAVE
?

2020-03-13 10:24:19 LP: ARH001 COUNTRY: USA STATE: FL

Please keep in mind, that the labels under the live view on this page serve demonstration purposes only! The actual labels will be based on valid information.

CAMERA CONSTANTS

Device ID string:	Smart/SpeedCAM	Device location string:	Test location
Approaching vehicle string:	APPROACHING	Leaving vehicle string:	LEAVING
Unknown vehicle direction:	UNKNOWN		

LINE EDITOR

Line editor: $y-$o-$d $h:$m:$s LP: $p COUNTRY: $f STATE: $j

SAMPLE LIBRARY

Year (4 digits):	$y	Year (2 digits):	$r
Month:	$o	Day:	$d
Hour:	$h	Minute:	$m
Second:	$s	'$' character:	$$
Device ID string:	$E	Device location:	$G
GPS latitude:	$A	GPS longitude:	$O
Vehicle e-length:	$c	Category string:	$C
Speed:	$x	Speed (2 decimal places):	$X
Direction:	$i	License plate text:	$p
Capture time (ms):	$t	Device ID:	$S
Country (long):	$e	Country (short):	$f
State (long):	$g	State (short):	$j
Make:	$J	Model:	$K
Submodel:	$L	Model confidence:	$P
Category:	$M	Category confidence:	$Q
Color:	$N	Color confidence:	$R
Optical speed:	$n	Optical speed confidence:	$b
Seatbelt confidence:	$a		

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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.

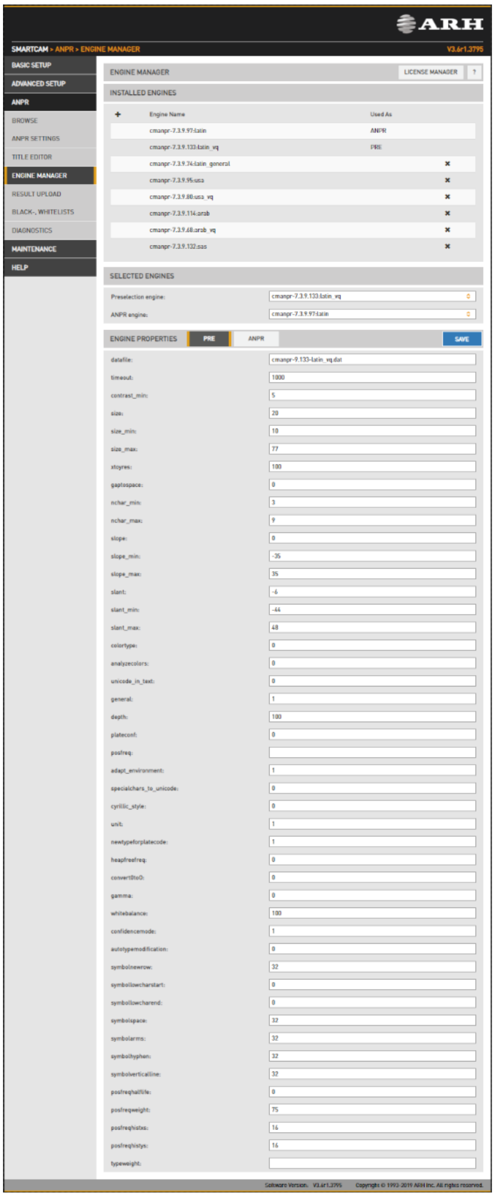
7.2.4. ENGINE MANAGER

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 contact the Carmen ANPR Manual for details.


ARH
SMARTCAM > ANPR > ENGINE MANAGER
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
ENGINE MANAGER
LICENSE MANAGER
?
INSTALLED ENGINES

+	Engine Name	Used As	
	cmanpr-7.3.9.97:latin	ANPR	
	cmanpr-7.3.9.133:latin_vq	PRE	
	cmanpr-7.3.9.74:latin_general		✖
	cmanpr-7.3.9.95:usa		✖
	cmanpr-7.3.9.80:usa_vq		✖
	cmanpr-7.3.9.114:arab		✖
	cmanpr-7.3.9.68:arab_vq		✖
	cmanpr-7.3.9.132:sas		✖

SELECTED ENGINES

Preselection engine: cmanpr-7.3.9.133:latin_vq
ANPR engine: cmanpr-7.3.9.97:latin

ENGINE PROPERTIES
PRE
ANPR
SAVE

datafile: cmanpr-9.133-latin_vq.dat
timeout: 1000
contrast_min: 5
size: 20
size_min: 10
size_max: 77
xtoyres: 100
gaptospace: 0
nchar_min: 3
nchar_max: 9
slope: 0
slope_min: -35
slope_max: 35
slant: -6
slant_min: -44
slant_max: 48
colortype: 0
analyzecolors: 0
unicode_in_text: 0
general: 1
depth: 100
plateconf: 0
posfreq:
adapt_environment: 1
specialchars_to_unicode: 0
cyrillic_style: 0
unit: 1
newtypeforplatecode: 1
heapfreefreq: 0
convert0toO: 0
gamma: 0
whitebalance: 100
confidencemode: 1
autotypemodification: 0
symbolnewrow: 32
symbollowcharstart: 0
symbollowcharend: 0
symbolspace: 32
symbolarms: 32
symbolhyphen: 32
symbolverticalline: 32
posfreqhalflife: 0
posfreqweight: 75
posfreqhistxs: 16
posfreqhistys: 16
typeweight:

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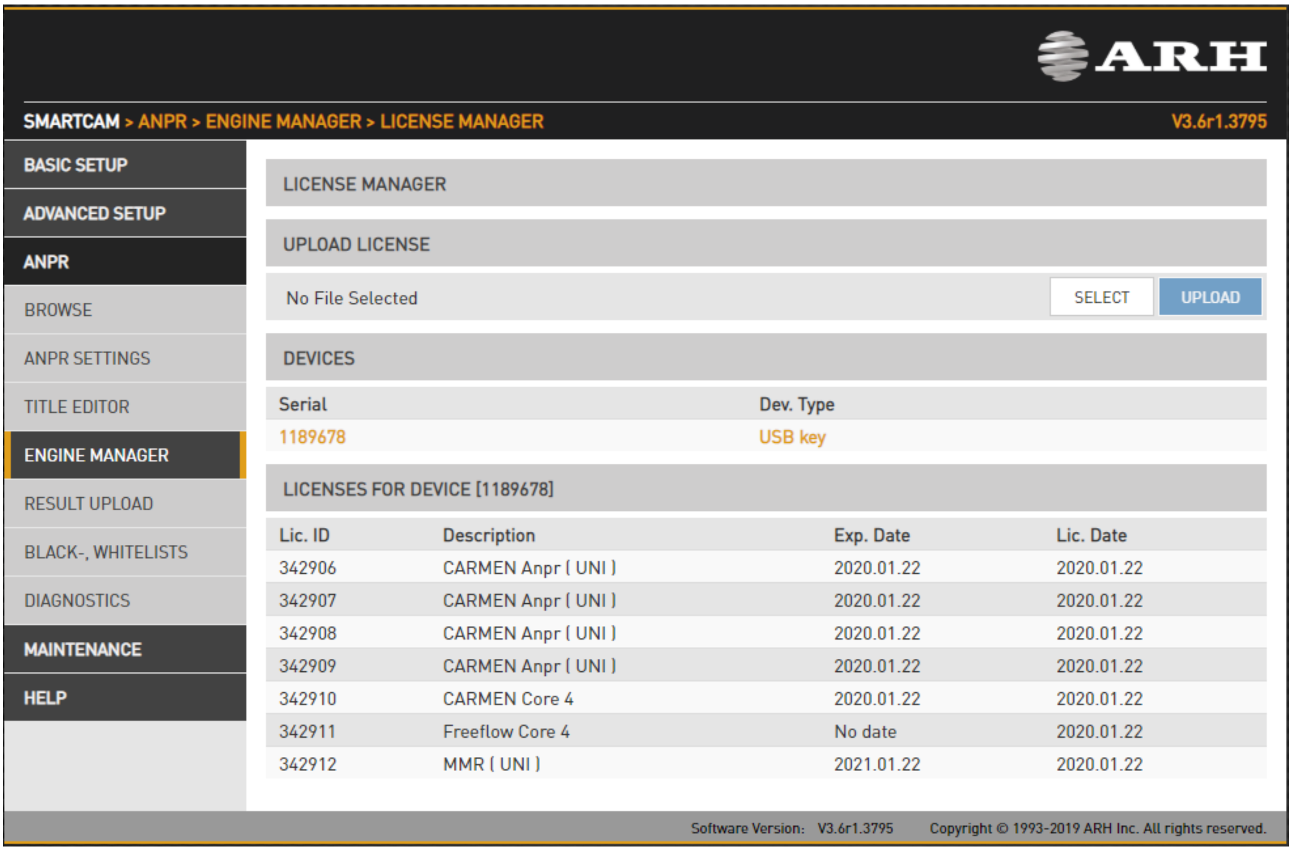
Hardware Key Licenses currently available in the device are listed in the **License Manager** section. Additional licenses (sold separately) can be installed in the **Upload License** menu.

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!


ARH
SMARTCAM > ANPR > ENGINE MANAGER > LICENSE MANAGER
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
LICENSE MANAGER
UPLOAD LICENSE
SELECT
UPLOAD
DEVICES
LICENSES FOR DEVICE [1189678]

No File Selected

Serial	Dev. Type
1189678	USB key

Lic. ID	Description	Exp. Date	Lic. Date
342906	CARMEN Anpr (UNI)	2020.01.22	2020.01.22
342907	CARMEN Anpr (UNI)	2020.01.22	2020.01.22
342908	CARMEN Anpr (UNI)	2020.01.22	2020.01.22
342909	CARMEN Anpr (UNI)	2020.01.22	2020.01.22
342910	CARMEN Core 4	2020.01.22	2020.01.22
342911	Freeflow Core 4	No date	2020.01.22
342912	MMR (UNI)	2021.01.22	2020.01.22

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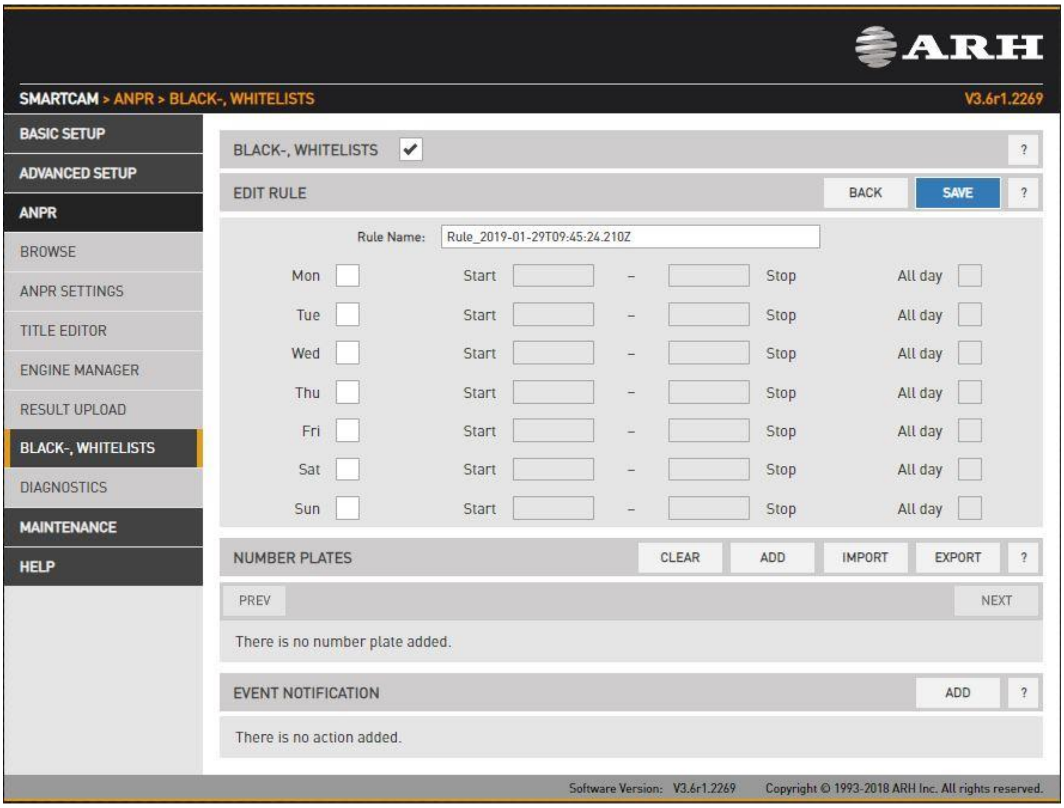
7.2.5. BLACK/WHITE LISTS

WEB INTERFACE > ANPR > BLACK/WHITE LISTS


ARH
SMARTCAM > ANPR > BLACK-, WHITELISTS
V3.6r1.2269
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
BLACK-, WHITELISTS ☑
?
EDIT RULE
BACK
SAVE
Mon ☐ Start – Stop All day ☐
Tue ☐ Start – Stop All day ☐
Wed ☐ Start – Stop All day ☐
Thu ☐ Start – Stop All day ☐
Fri ☐ Start – Stop All day ☐
Sat ☐ Start – Stop All day ☐
Sun ☐ Start – Stop All day ☐
NUMBER PLATES
CLEAR
ADD
IMPORT
EXPORT
PREV
NEXT
EVENT NOTIFICATION
ADD

Rule Name: Rule_2019-01-29T09:45:24.210Z

There is no number plate added.

There is no action added.

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The purpose of this feature is to execute tasks upon reading a certain license plate.
To enable the Black/White List feature use the check box.

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 Black/White List 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.

7.2.6. 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.

7.2.7. TIME SETTINGS

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

7.2.8. 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.

7.2.9. EVENT NOTIFICATIONS

You can add multiple tasks to a rule, each will be executed if the conditions are satisfied. 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**.

7.2.10. EXAMPLES

7.2.11. BLACKLIST FOR STOLEN OR WANTED CARS

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. WHITELIST FOR OPENING GATE

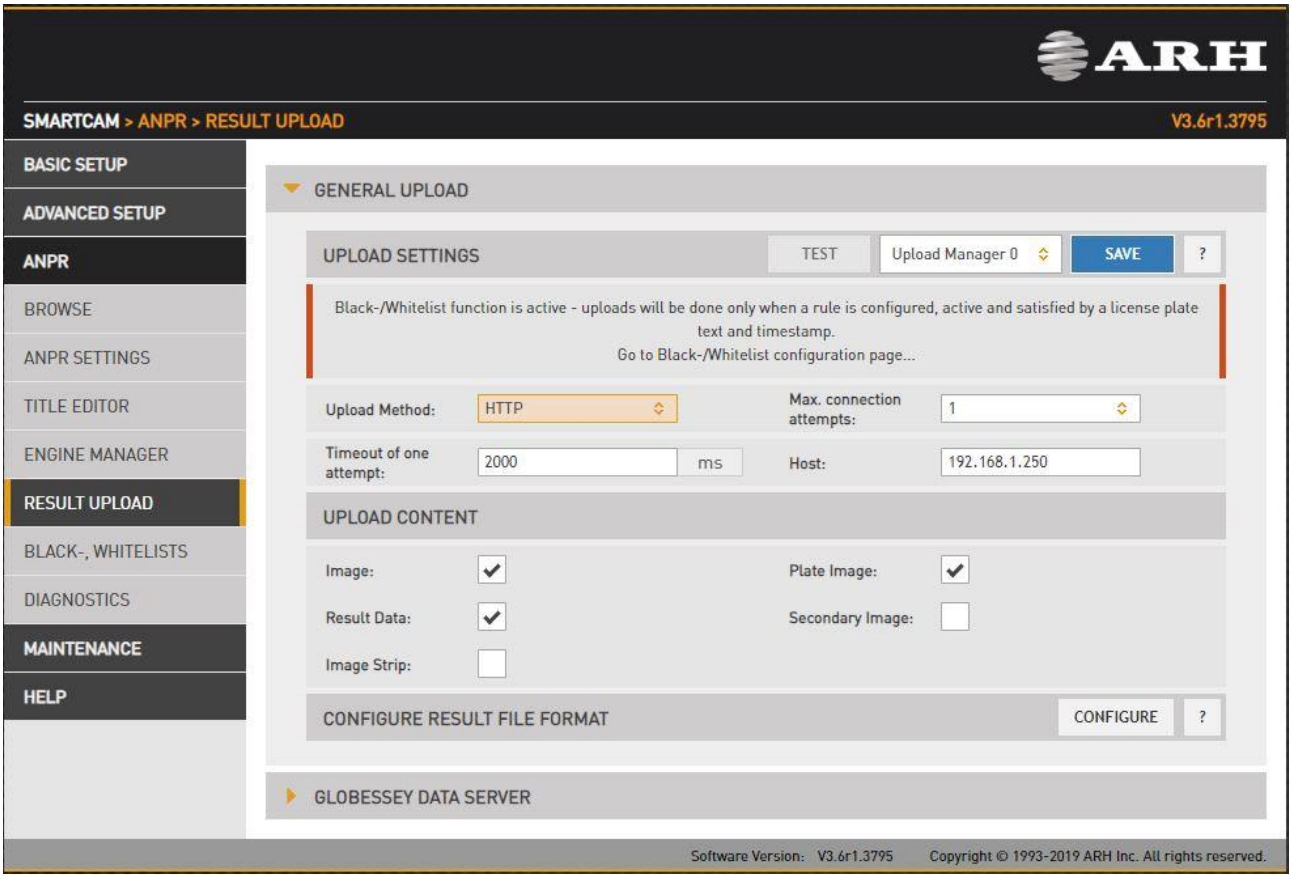
Create a rule, select workdays and add the license plates and an Exec/GPIO type Event Notification. GP output will be triggered when a plate on the list has been read.

7.2.13. WHITELIST ON TOLL ROAD

Create a 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. RESULT UPLOAD

WEB INTERFACE > ANPR > RESULT UPLOAD


ARH
SMARTCAM > ANPR > RESULT UPLOAD
V3.6r1.3795
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
GENERAL UPLOAD
UPLOAD SETTINGS
TEST
Upload Manager 0
SAVE
?
UPLOAD CONTENT
CONFIGURE RESULT FILE FORMAT
CONFIGURE
?
GLOBESSEY DATA SERVER

Black-/Whitelist function is active - uploads will be done only when a rule is configured, active and satisfied by a license plate text and timestamp.
Go to Black-/Whitelist configuration page...

Upload Method: HTTP
Max. connection attempts: 1
Timeout of one attempt: 2000 ms
Host: 192.168.1.250

Image: ☑
Plate Image: ☑
Result Data: ☑
Secondary Image: ☐
Image Strip: ☐

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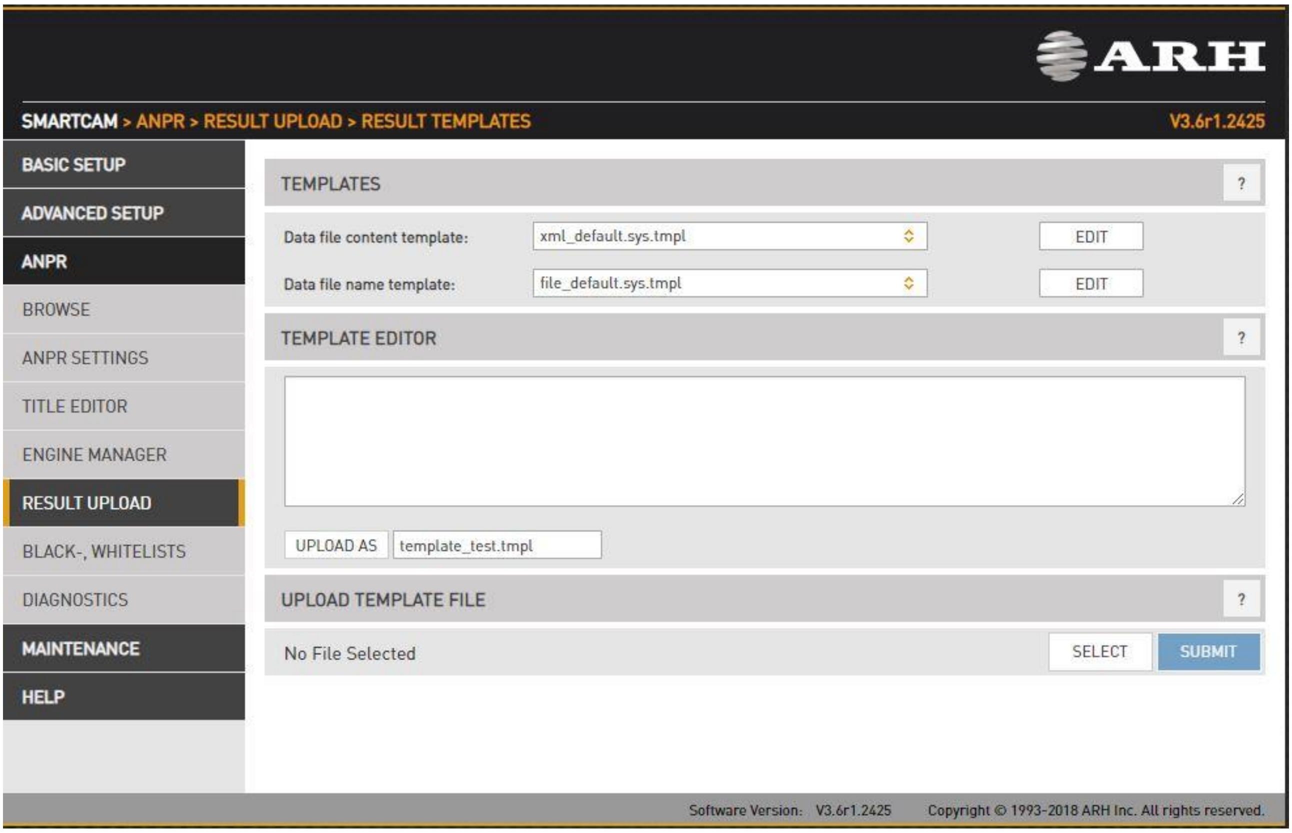
Recognition results can be uploaded using the HTTP, FTP or SFTP protocol.

- **Upload Method:** The protocol used
- **Max. connection attempts**: In case of failure this is the number of repeated upload attempts
- **Content:** The content of the upload (image, data, plate image)
- **Timeout of one attempt:** The maximal duration of an upload attempt
- **Host:** Upload target host
- **Remote directory*:** The directory that the files should be uploaded to
- **Username and Password*:** User credentials

*: only present in FTP, SFTP configuration

Upload Content: The data and images will be uploaded

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


ARH
SMARTCAM > ANPR > RESULT UPLOAD > RESULT TEMPLATES
V3.6r1.2425
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
TEMPLATES
?
EDIT
EDIT
TEMPLATE EDITOR
?
UPLOAD TEMPLATE FILE
?
SELECT
SUBMIT

Data file content template: xml_default.sys.tmpl

Data file name template: file_default.sys.tmpl

UPLOAD AS template_test.tmpl

No File Selected

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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...

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"

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));

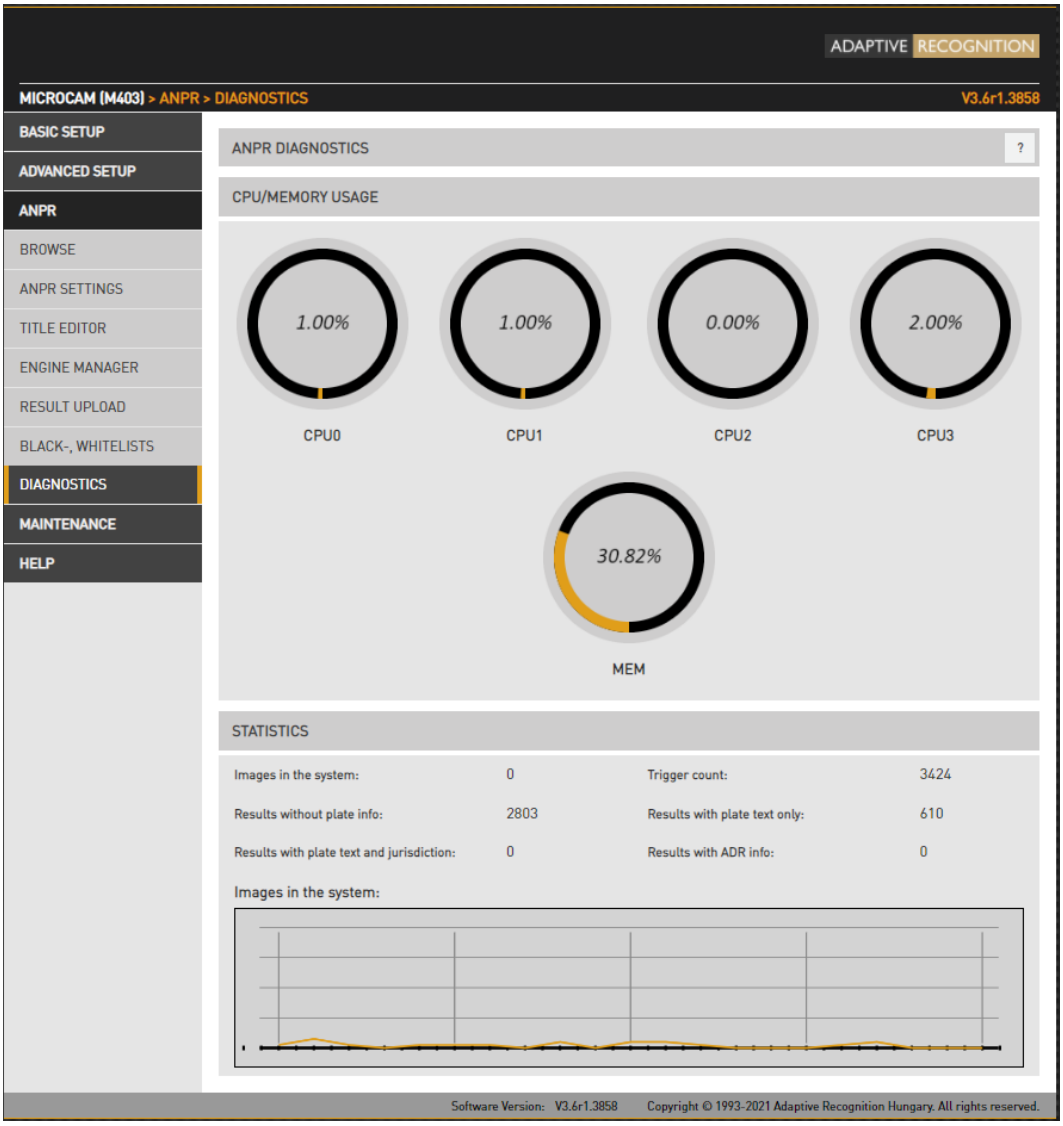
will evaluate as

();a$a,DATA

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

7.2.15. DIAGNOSTICS

WEB INTERFACE > ANPR > DIAGNOSTICS


ADAPTIVE RECOGNITION
MICROCAM (M403) > ANPR > DIAGNOSTICS
V3.6r1.3858
BASIC SETUP
ADVANCED SETUP
ANPR
BROWSE
ANPR SETTINGS
TITLE EDITOR
ENGINE MANAGER
RESULT UPLOAD
BLACK-, WHITELISTS
DIAGNOSTICS
MAINTENANCE
HELP
ANPR DIAGNOSTICS
?
CPU/MEMORY USAGE
1.00%
CPU0
1.00%
CPU1
0.00%
CPU2
2.00%
CPU3
30.82%
MEM
STATISTICS
Images in the system:

Images in the system: 0

Trigger count: 3424

Results without plate info: 2803

Results with plate text only: 610

Results with plate text and jurisdiction: 0

Results with ADR info: 0

Software Version: V3.6r1.3858

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Use this tool to monitor system workload.

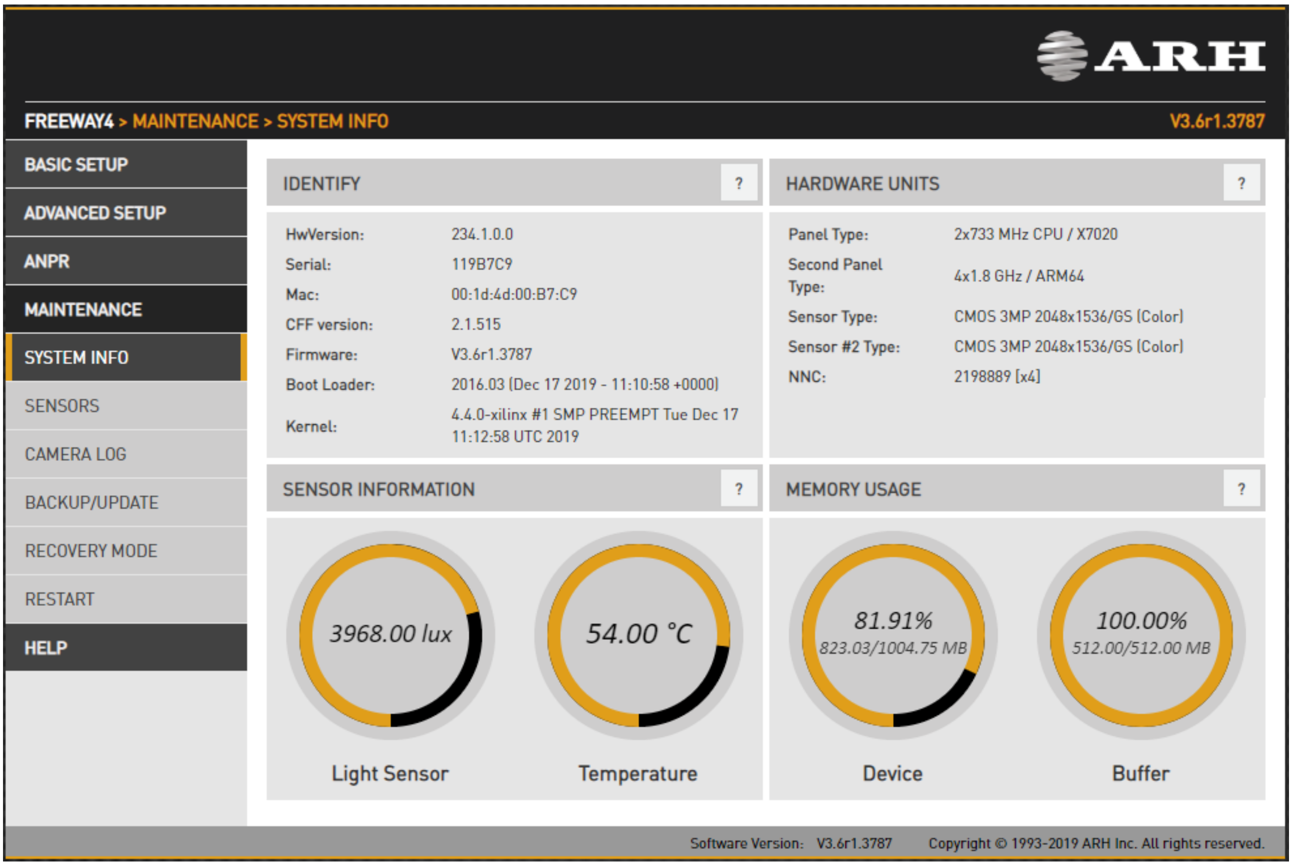
The results in **statistics** will inform you about current and recent specific tasks like:

- **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


ARH
FREEWAY4 > MAINTENANCE > SYSTEM INFO
V3.6r1.3787
BASIC SETUP
ADVANCED SETUP
ANPR
MAINTENANCE
SYSTEM INFO
SENSORS
CAMERA LOG
BACKUP/UPDATE
RECOVERY MODE
RESTART
HELP
?
?
?
?

IDENTIFY

HwVersion: 234.1.0.0
Serial: 119B7C9
Mac: 00:1d:4d:00:B7:C9
CFF version: 2.1.515
Firmware: V3.6r1.3787
Boot Loader: 2016.03 (Dec 17 2019 - 11:10:58 +0000)
Kernel: 4.4.0-xilinx #1 SMP PREEMPT Tue Dec 17 11:12:58 UTC 2019

HARDWARE UNITS

Panel Type: 2x733 MHz CPU / X7020
Second Panel Type: 4x1.8 GHz / ARM64
Sensor Type: CMOS 3MP 2048x1536/GS (Color)
Sensor #2 Type: CMOS 3MP 2048x1536/GS (Color)
NNC: 2198889 [x4]

SENSOR INFORMATION

Light Sensor: 3968.00 lux
Temperature: 54.00 °C

MEMORY USAGE

Device: 81.91% 823.03/1004.75 MB
Buffer: 100.00% 512.00/512.00 MB

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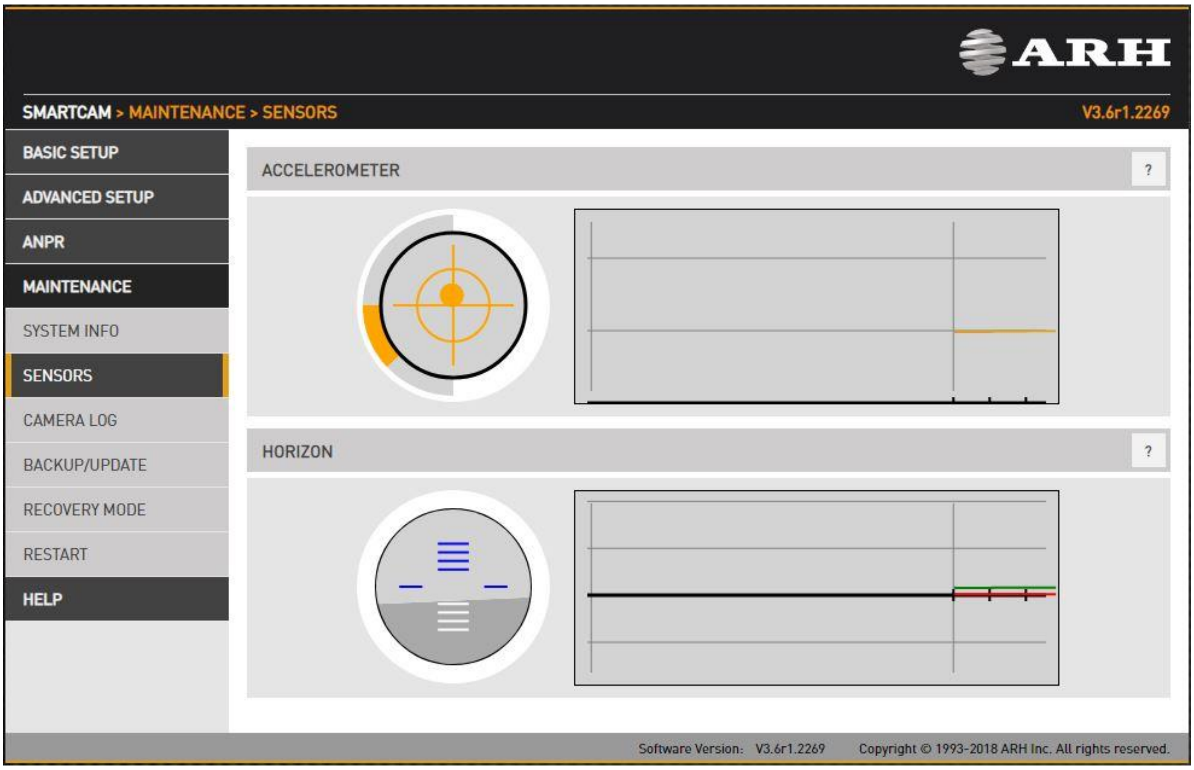
The most important details about the device are listed here.

- **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


ARH
SMARTCAM > MAINTENANCE > SENSORS
V3.6r1.2269
BASIC SETUP
ADVANCED SETUP
ANPR
MAINTENANCE
SYSTEM INFO
SENSORS
CAMERA LOG
BACKUP/UPDATE
RECOVERY MODE
RESTART
HELP
ACCELEROMETER
?
HORIZON
?
Software Version: V3.6r1.2269
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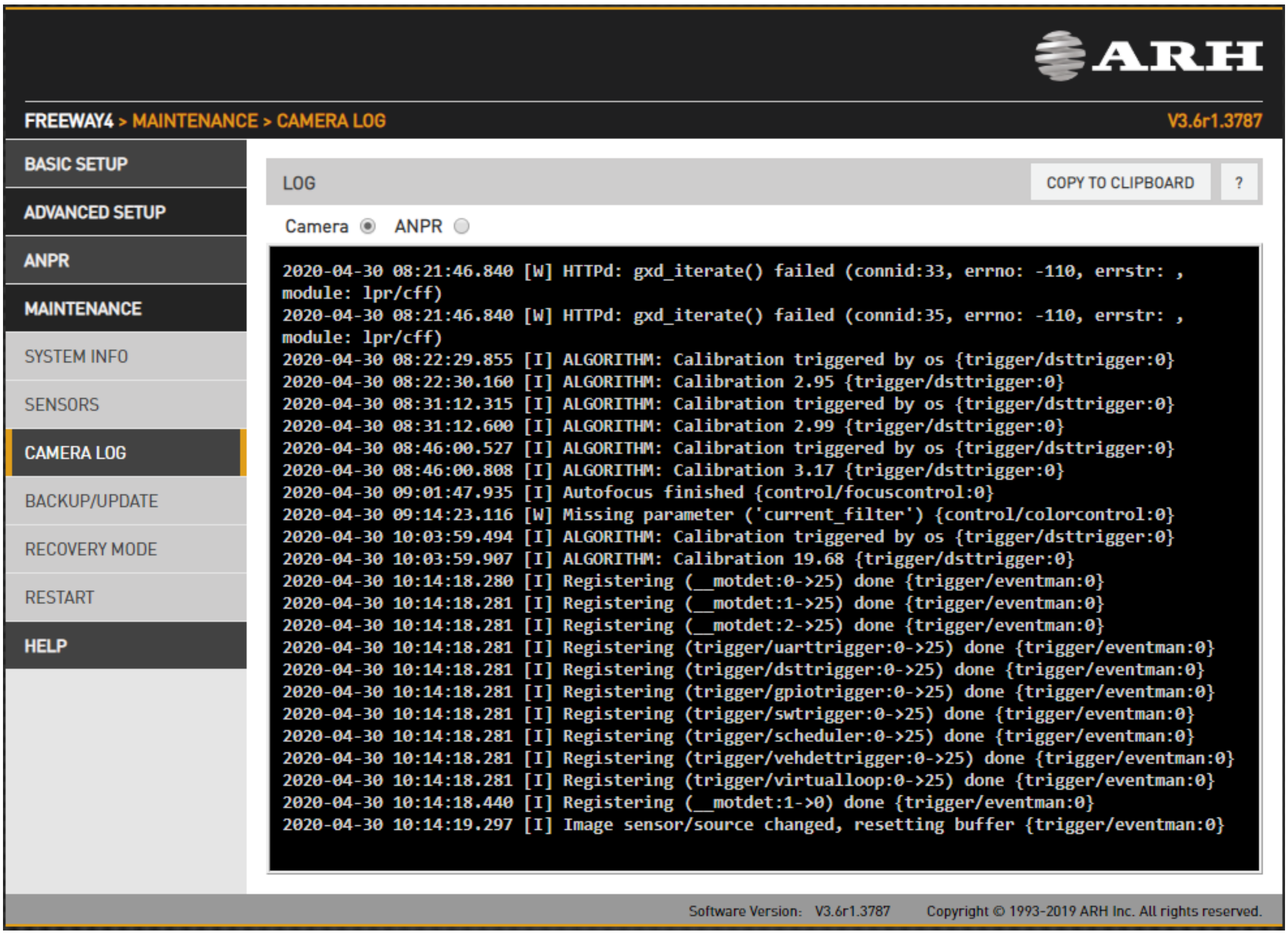
The built-in accelerometer may provide help aligning the camera.

8.3. CAMERA LOG

WEB INTERFACE > MAINTENANCE > CAMERA LOG

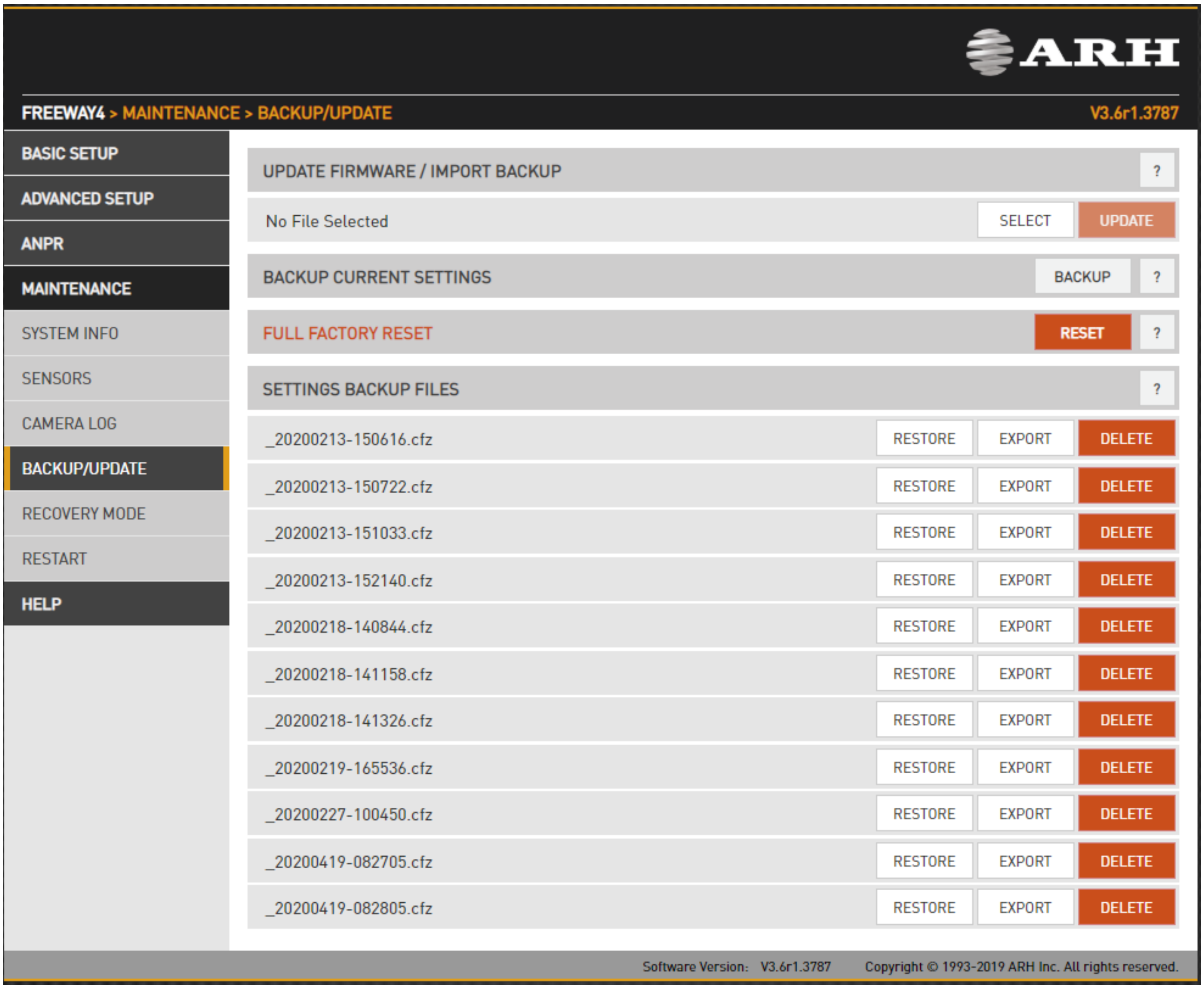

ARH
FREEWAY4 > MAINTENANCE > CAMERA LOG
V3.6r1.3787
BASIC SETUP
ADVANCED SETUP
ANPR
MAINTENANCE
SYSTEM INFO
SENSORS
CAMERA LOG
BACKUP/UPDATE
RECOVERY MODE
RESTART
HELP
LOG
COPY TO CLIPBOARD
?
Camera ● ANPR ○
Software Version: V3.6r1.3787
Copyright © 1993-2019 ARH Inc. All rights reserved.

```
2020-04-30 08:21:46.840 [W] HTTPd: gxd_iterate() failed (connid:33, errno: -110, errstr: ,
module: lpr/cff)
2020-04-30 08:21:46.840 [W] HTTPd: gxd_iterate() failed (connid:35, errno: -110, errstr: ,
module: lpr/cff)
2020-04-30 08:22:29.855 [I] ALGORITHM: Calibration triggered by os {trigger/dsttrigger:0}
2020-04-30 08:22:30.160 [I] ALGORITHM: Calibration 2.95 {trigger/dsttrigger:0}
2020-04-30 08:31:12.315 [I] ALGORITHM: Calibration triggered by os {trigger/dsttrigger:0}
2020-04-30 08:31:12.600 [I] ALGORITHM: Calibration 2.99 {trigger/dsttrigger:0}
2020-04-30 08:46:00.527 [I] ALGORITHM: Calibration triggered by os {trigger/dsttrigger:0}
2020-04-30 08:46:00.808 [I] ALGORITHM: Calibration 3.17 {trigger/dsttrigger:0}
2020-04-30 09:01:47.935 [I] Autofocus finished {control/focuscontrol:0}
2020-04-30 09:14:23.116 [W] Missing parameter ('current_filter') {control/colorcontrol:0}
2020-04-30 10:03:59.494 [I] ALGORITHM: Calibration triggered by os {trigger/dsttrigger:0}
2020-04-30 10:03:59.907 [I] ALGORITHM: Calibration 19.68 {trigger/dsttrigger:0}
2020-04-30 10:14:18.280 [I] Registering (__motdet:0->25) done {trigger/eventman:0}
2020-04-30 10:14:18.281 [I] Registering (__motdet:1->25) done {trigger/eventman:0}
2020-04-30 10:14:18.281 [I] Registering (__motdet:2->25) done {trigger/eventman:0}
2020-04-30 10:14:18.281 [I] Registering (trigger/uarttrigger:0->25) done {trigger/eventman:0}
2020-04-30 10:14:18.281 [I] Registering (trigger/dsttrigger:0->25) done {trigger/eventman:0}
2020-04-30 10:14:18.281 [I] Registering (trigger/gpiotrigger:0->25) done {trigger/eventman:0}
2020-04-30 10:14:18.281 [I] Registering (trigger/swtrigger:0->25) done {trigger/eventman:0}
2020-04-30 10:14:18.281 [I] Registering (trigger/scheduler:0->25) done {trigger/eventman:0}
2020-04-30 10:14:18.281 [I] Registering (trigger/vehdettrigger:0->25) done {trigger/eventman:0}
2020-04-30 10:14:18.281 [I] Registering (trigger/virtualloop:0->25) done {trigger/eventman:0}
2020-04-30 10:14:18.440 [I] Registering (__motdet:1->0) done {trigger/eventman:0}
2020-04-30 10:14:19.297 [I] Image sensor/source changed, resetting buffer {trigger/eventman:0}
```

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. BACKUP/UPDATE

WEB INTERFACE > MAINTENANCE > BACKUP/UPDATE


ARH
FREEWAY4 > MAINTENANCE > BACKUP/UPDATE
V3.6r1.3787
BASIC SETUP
ADVANCED SETUP
ANPR
MAINTENANCE
SYSTEM INFO
SENSORS
CAMERA LOG
BACKUP/UPDATE
RECOVERY MODE
RESTART
HELP
UPDATE FIRMWARE / IMPORT BACKUP
?
No File Selected
SELECT
UPDATE
BACKUP CURRENT SETTINGS
BACKUP
?
FULL FACTORY RESET
RESET
?
SETTINGS BACKUP FILES
?
RESTORE
EXPORT
DELETE

_20200213-150616.cfz
_20200213-150722.cfz
_20200213-151033.cfz
_20200213-152140.cfz
_20200218-140844.cfz
_20200218-141158.cfz
_20200218-141326.cfz
_20200219-165536.cfz
_20200227-100450.cfz
_20200419-082705.cfz
_20200419-082805.cfz

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This menu provides tools to manage camera firmware.

Use UPDATE FIRMWARE to upload a new firmware.

The camera will save a backup file upon each restart, which can be restored Restore, removed Delete or downloaded Export by clicking the appropriate button.

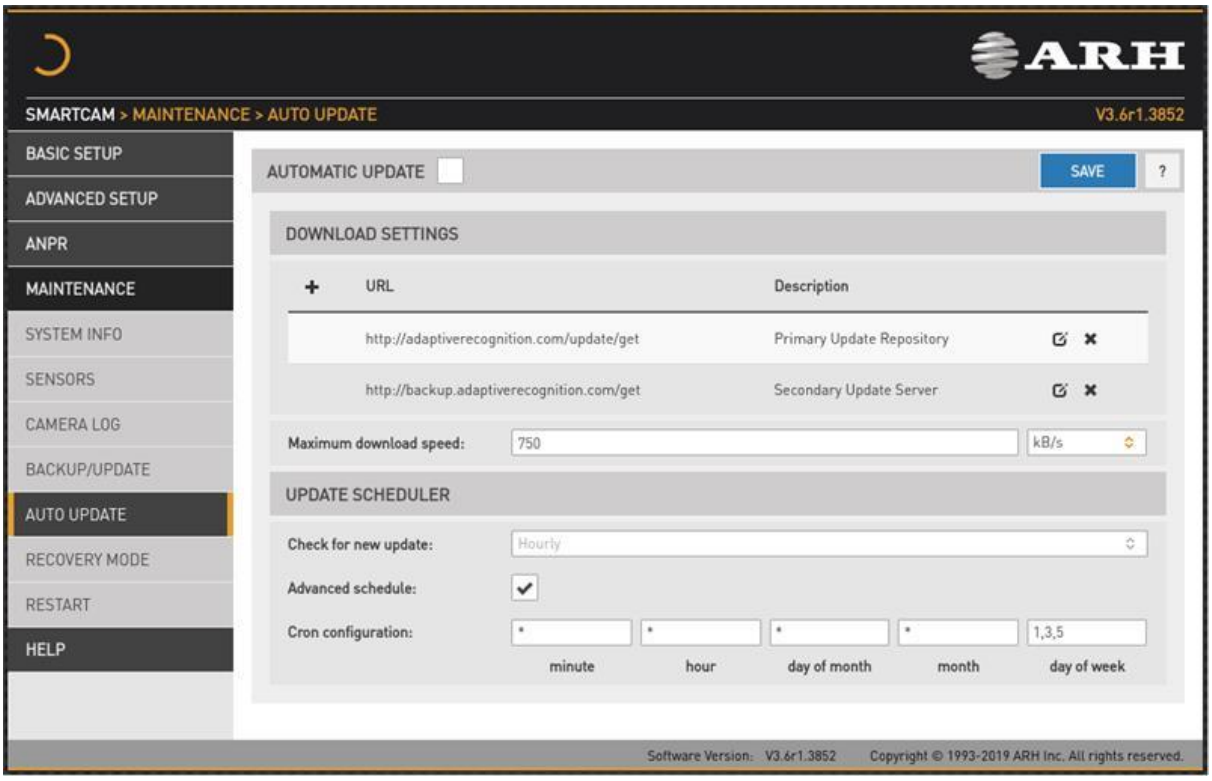
Click FULL FACTORY RESET to return to default settings. The IP address remains unchanged. Use RECOVERY MODE to change the IP address.

8.5. AUTO UPDATE

WEB INTERFACE > MAINTENANCE > AUTO UPDATE

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

1. Check AUTOMATIC UPDATE ☐ column to switch on Auto Update
2. Plus sign + can be used to add a new server. The servers will check camera updates for software.
3. The name/description of the server. Description
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. kB/s
6. If the Advanced schedule: 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 ...)


ARH
SMARTCAM > MAINTENANCE > AUTO UPDATE
V3.6r1.3852
BASIC SETUP
ADVANCED SETUP
ANPR
MAINTENANCE
SYSTEM INFO
SENSORS
CAMERA LOG
BACKUP/UPDATE
AUTO UPDATE
RECOVERY MODE
RESTART
HELP
SAVE
?
DOWNLOAD SETTINGS
UPDATE SCHEDULER

AUTOMATIC UPDATE ☐

+	URL	Description	
	http://adaptiverecognition.com/update/get	Primary Update Repository	✎ ✖
	http://backup.adaptiverecognition.com/get	Secondary Update Server	✎ ✖

Maximum download speed: 750 kB/s

Check for new update: Hourly

Advanced schedule: ☑

Cron configuration:

minute	hour	day of month	month	day of week
*	*	*	*	1,3,5

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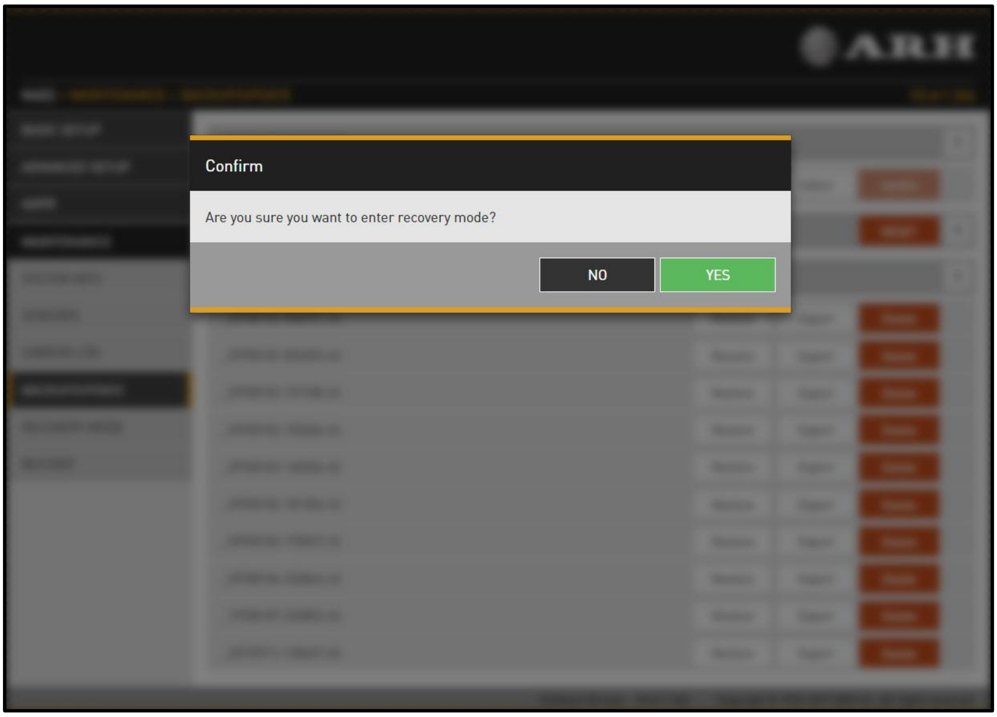
8.6. RESTART & RECOVERY MODE

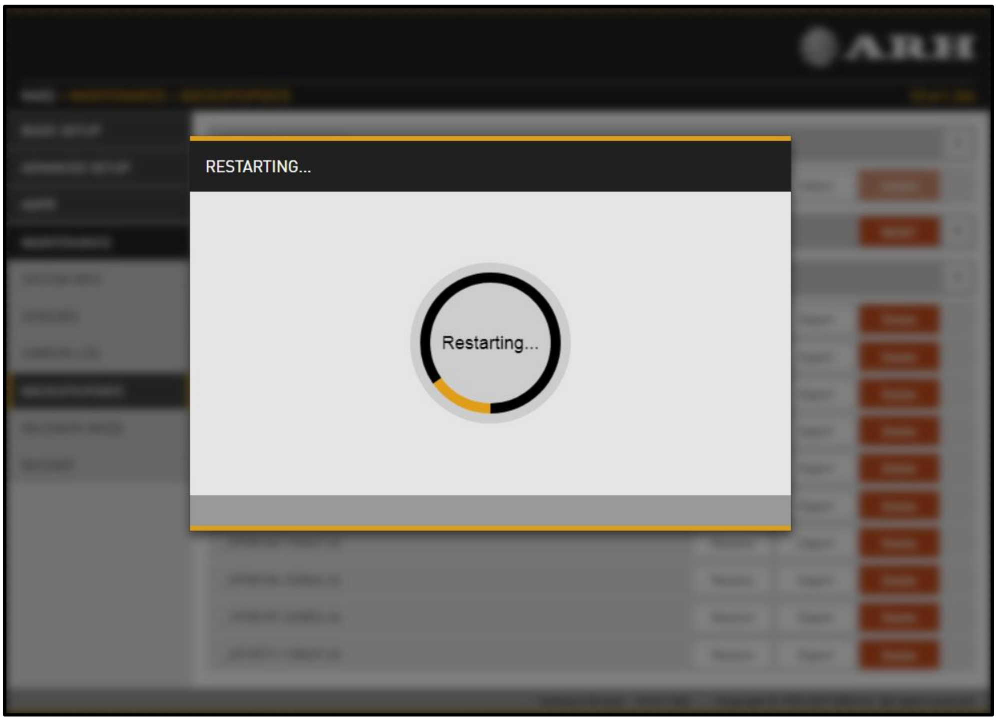
RESTART & RECOVERY MODE

WEB INTERFACE > MAINTENANCE > RECOVERY MODE
WEB INTERFACE > MAINTENANCE > RESTART



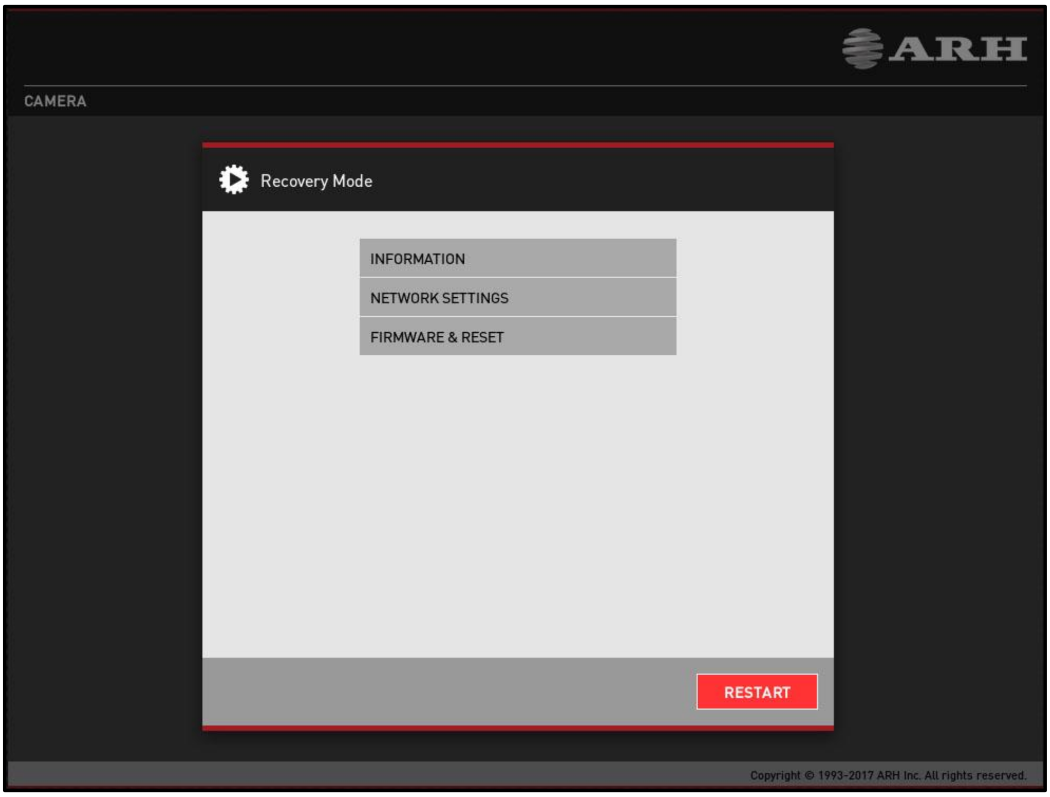
Confirm

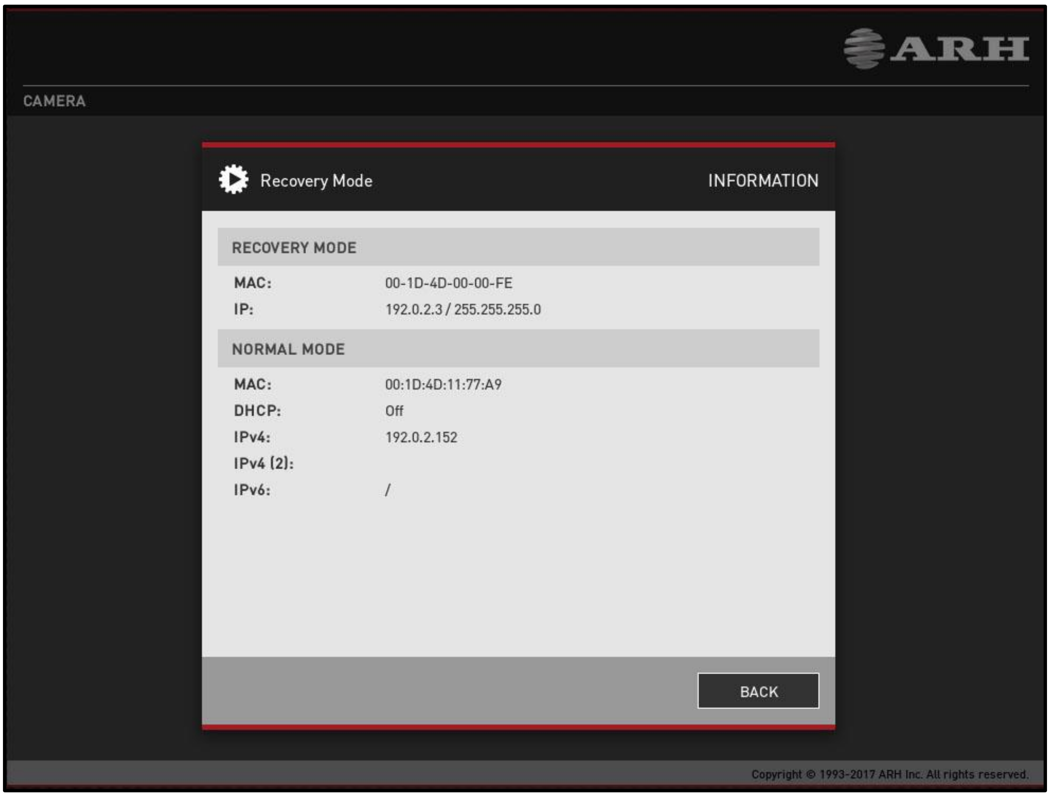
Are you sure you want to enter recovery mode?



RESTARTING...

Restarting...


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

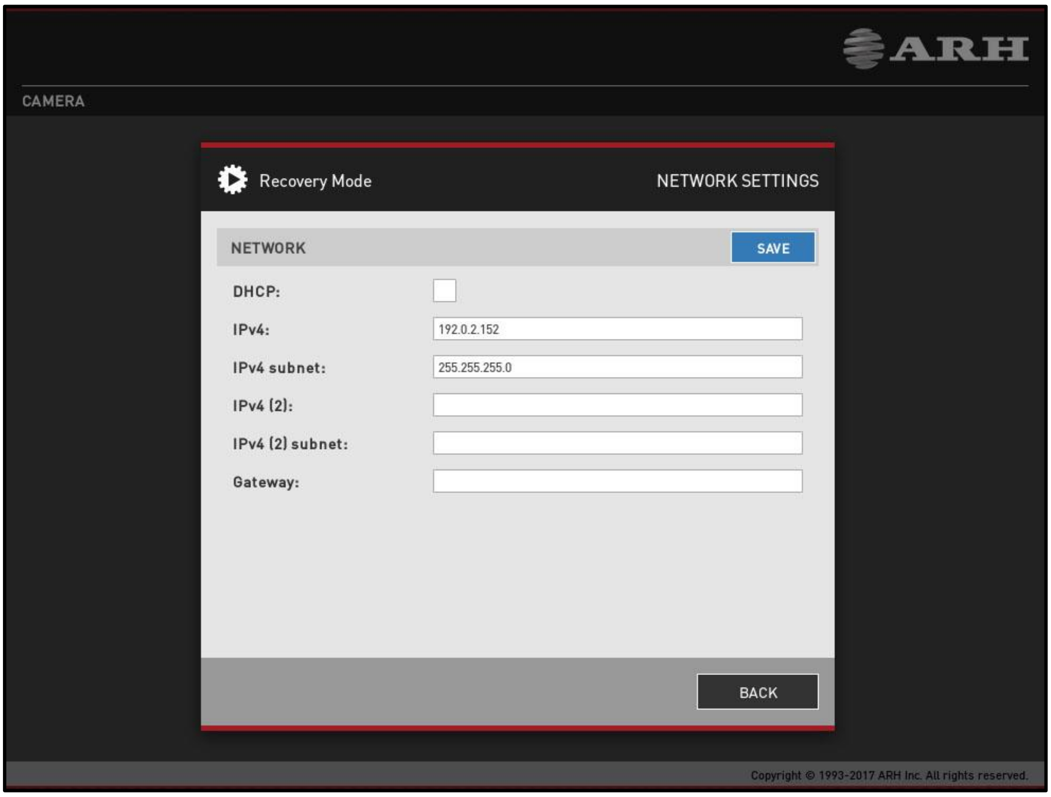

ARH
CAMERA
Recovery Mode
INFORMATION
BACK
Copyright © 1993-2017 ARH Inc. All rights reserved.

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: /


ARH
CAMERA
Recovery Mode
NETWORK SETTINGS
NETWORK
SAVE
BACK
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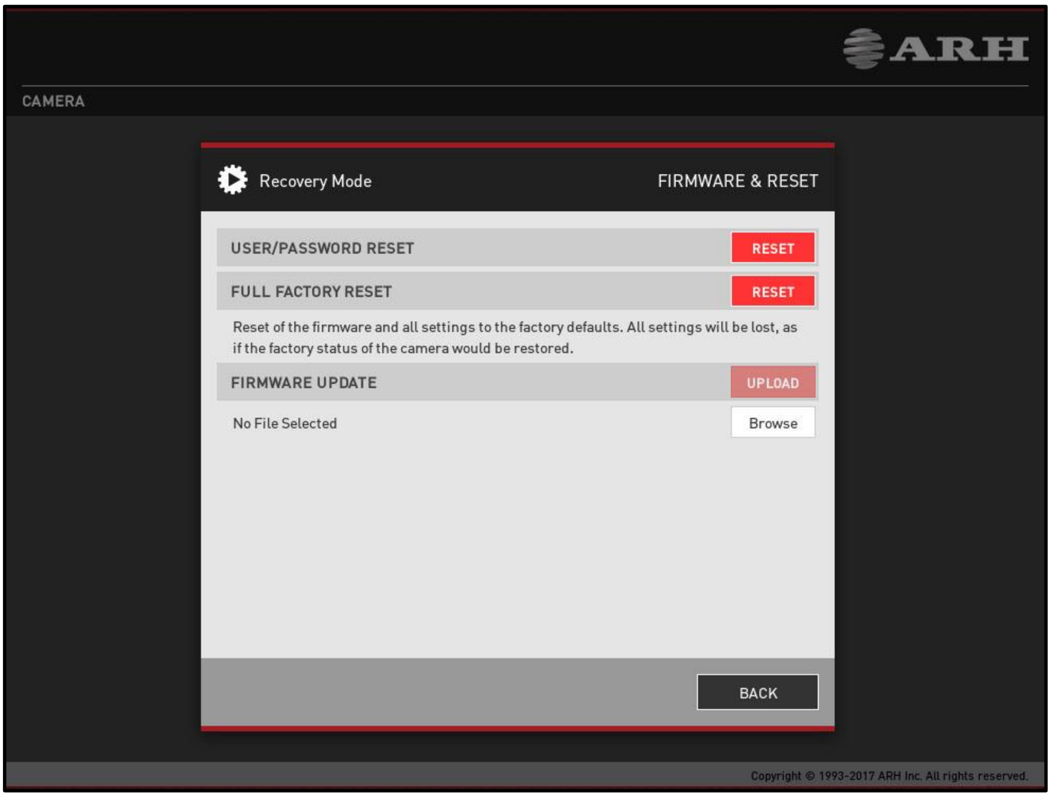
DHCP: ☐
IPv4: 192.0.2.152
IPv4 subnet: 255.255.255.0
IPv4 (2):
IPv4 (2) subnet:
Gateway:


ARH
CAMERA
Recovery Mode
FIRMWARE & RESET
USER/PASSWORD RESET
RESET
FULL FACTORY RESET
RESET
FIRMWARE UPDATE
UPLOAD
Browse
BACK
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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.

No File Selected

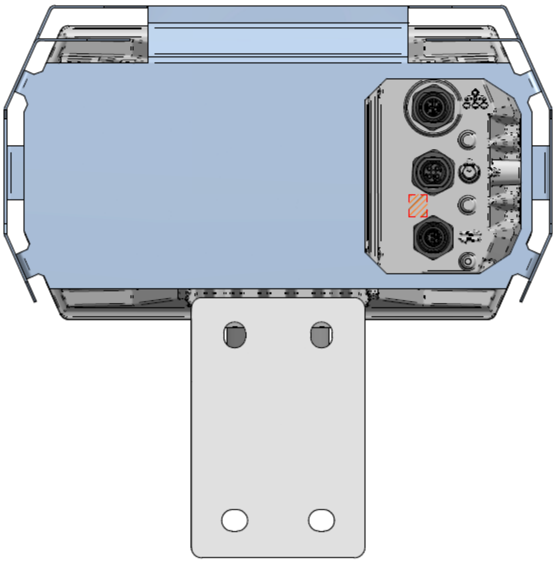
These menu entries restart the camera in normal or in recovery mode. If the web interface is not functional (for example due to a lost IP), Recovery Mode may also be entered applying the magnetic reset procedure.

The **magnetic reset procedure** is as follows:

- Start with a powered off device.
- Place a magnet at the indicated position
- Power on the device (if the magnet is in proper position, the green indicator led on the front of the camera will start flashing very fast)
- Remove the magnet
- Enter the web interface at the 192.0.2.3 (default) IP

Entering Recovery mode to Freeway 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)

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Information regarding hardware, software, manuals and FAQ are easily accessible for customers who previously registered to enter the dedicated ATSS site. Besides offering assistance, the site is also designed to provide maximum protection while managing your business information and technical solutions utilized.

New User
If this is your first online support request, please create an account by clicking on this link.

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.

If you need assistance with login or registration, please contact atsshelp@adaptiverecognition.com for help.