

AUTOMATIC NUMBER PLATE RECOGNITION

# User Manual

# ANPR demo for videos



The ANPR demo interface displays the following information:

- ANPR result:** MDD8085
- Make:** BENTLEY
- Model:** MULSANNE, CONTINENTAL, BENTAYGA, FLYING SPUR, AZURE, BROOKLANDS
- Color:** WHITE
- Category:** CAR



# ANPR DEMO FOR VIDEOS

## USER MANUAL

Document version: 2022-11-08

### Table of Contents

INTRODUCTION .....	3
MAIN SCREEN .....	4
FILE MENU .....	5
EDIT MENU.....	6
1. TRIGGER CONFIGURATION:.....	6
2. ANPR THREADS:.....	9
3. ANPR SETTINGS:.....	10
4. ANPR PROCESSING PREFERENCES: .....	11
5. LOG SETTINGS.....	13
VIEW .....	13
1. FONTS.....	13
2. RESULT IMAGE .....	14
3. TABLE COLUMNS:.....	15
4. TABLE ROW HEIGHT .....	15
CAMERA MENU .....	16
VIDEO PLAYER MENU .....	17
PROCESS MENU .....	18
HELP MENU .....	18
ANPR RESULT TREE .....	19
ANPR DATA.....	20
DATA LOGGING .....	21
CONTACT INFORMATION.....	22



# INTRODUCTION

The ANPR Demo for Videos (ADI) is an application that was developed by Adaptive Recognition Hungary Inc. to serve as a simple, yet versatile tool for testing, evaluating, and familiarizing oneself with the core features the CARMEN® engine has to offer. This document will describe in detail the features and functionalities available within the demo software.

ADV can operate live (processing a live camera stream) or as a backend process (processing a recorded video stream). The demo supports the following video formats:

- .mjjpg
- .mjjpeg
- .avi
- .mpg
- .mpeg
- .mp4
- .mkv

Not all images are adequate for ANPR processes, the input images (in this case the video frames) have to meet a specific set of criteria in order for the engine to be able to recognize the licenses. Please study the following document to learn more about these requirements: [Imaging for Carmen®](#).

This application can be found in the following folder:

- On Windows: "c:\Program Files\Adaptive Recognition\CARMEN softwares\Demos\ADV\"
- On Linux: "\opt\gx64\ADV\_Demo\"

## ! Important

Please note, that this application is not available for ARM and CenOS6 packages on Linux.

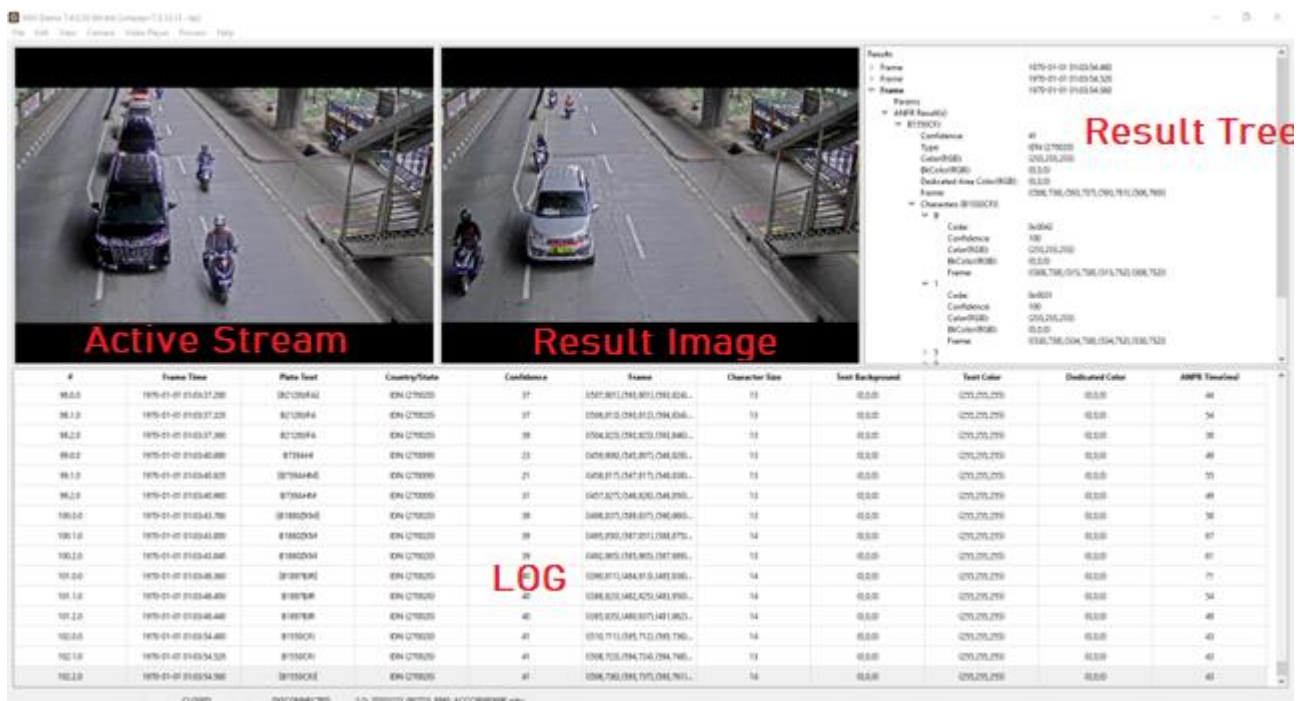
## Note

The application was tested only with MJPEG streams from ParkIT and FreewayCAM cameras. Using third-party cameras as a source may lead to performance issues.

# MAIN SCREEN

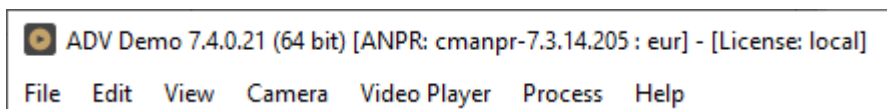
After starting ADV, you will be presented with the main screen of the application. This window is split into four separate sections; the Active Stream, the Result Image, the Result Tree and the Log sections. All four sections provide information in connection with the scanned image. The ADV menu bar consists of seven menu buttons, located in the upper left corner of the program window. The following menus are available:

- File
- Edit
- View
- Camera
- Video Player
- Process
- Help



Quick overview of the main screen

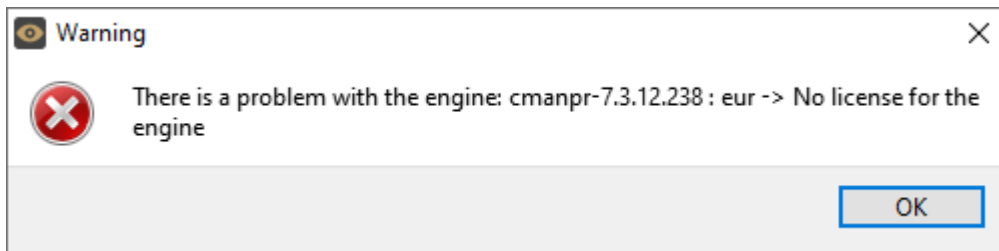
In the title you can see the following information:



**ANPR:** the currently used ANPR engine region and version  
**MMR:** the currently used MMR engine region and version  
**License:** showing where CARMEN® is looking for the licenses (local/network)

**Note**

In case of missing hardware key, the following error message will appear:



The upper part of the screen is divided into three sections:

- **Active Stream:** Section on the left that displays the active video stream.
- **Result Image:** Section in the centre that displays the image corresponding to the row selected in the log.
- **Result Tree:** Section on the right that lists the details for each frame processed. ADV saves all engine parameters for each frame processed. In addition, it also displays an ANPR result tree where it recognized a license plate.

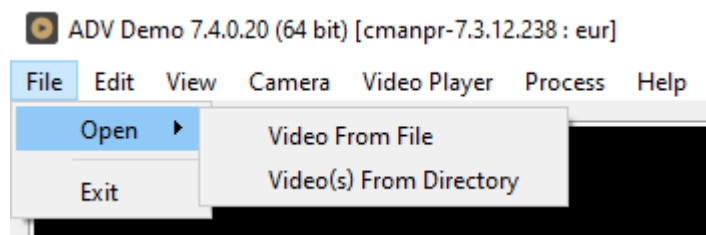
The lower part of the screen contains only one section.

- **Log:** Shows the license plate data for each frame. See a detailed description in the [ANPR Data](#) chapter.

## FILE MENU

Open: displays two options:

- **Video from file:** Select this option to add a single video file (see supported formats above) for ANPR processing.
- **Video(s) From Directory:** Select to add a directory with multiple video files (see supported formats above) for ANPR processing.



**Exit:** Closes the application.

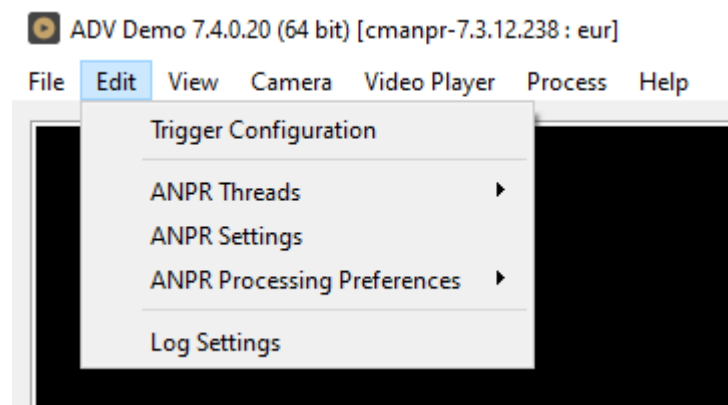
# EDIT MENU

## 1. TRIGGER CONFIGURATION:

### ! Important

Trigger configuration largely depends on camera positioning, whether the camera deployed monitors front or rear license plates and many other factors. As a result, correct trigger configuration will always be custom for every installation.

The trigger signal can automatically identify an observed event (the time interval during which the system encounters a vehicle for ANPR processing). Typically, one event represents a sequence of frames/images of only one vehicle at a time.



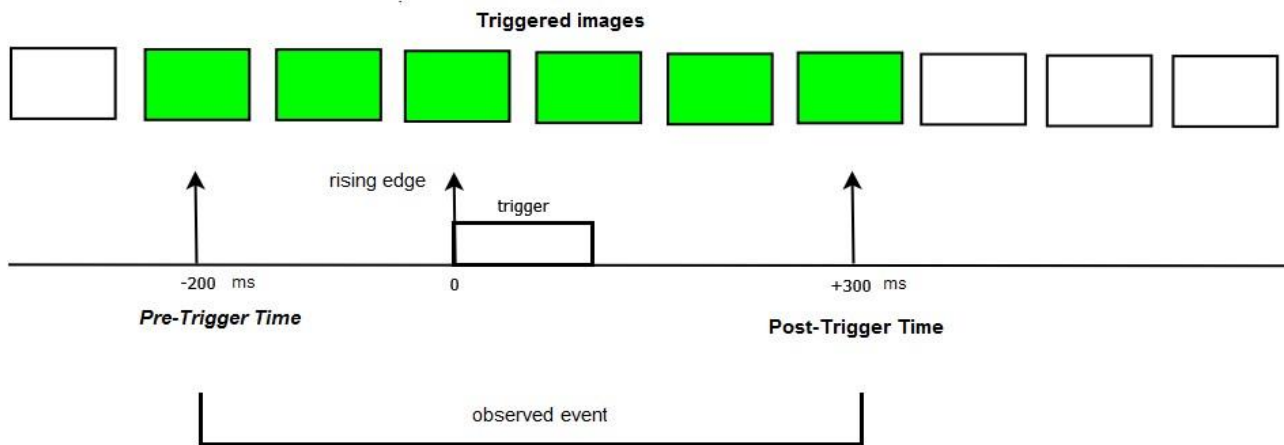
Trigger configuration allows the user to determine a time interval when the system anticipates only those frames from the continuous video frame sequence that are relevant for ANPR. From these relevant images, the engineer must decide what to select as triggered images. Triggered images should be those that were captured at an optimal time (when all of the optical characteristics of the target license plate are in their ideal ranges).



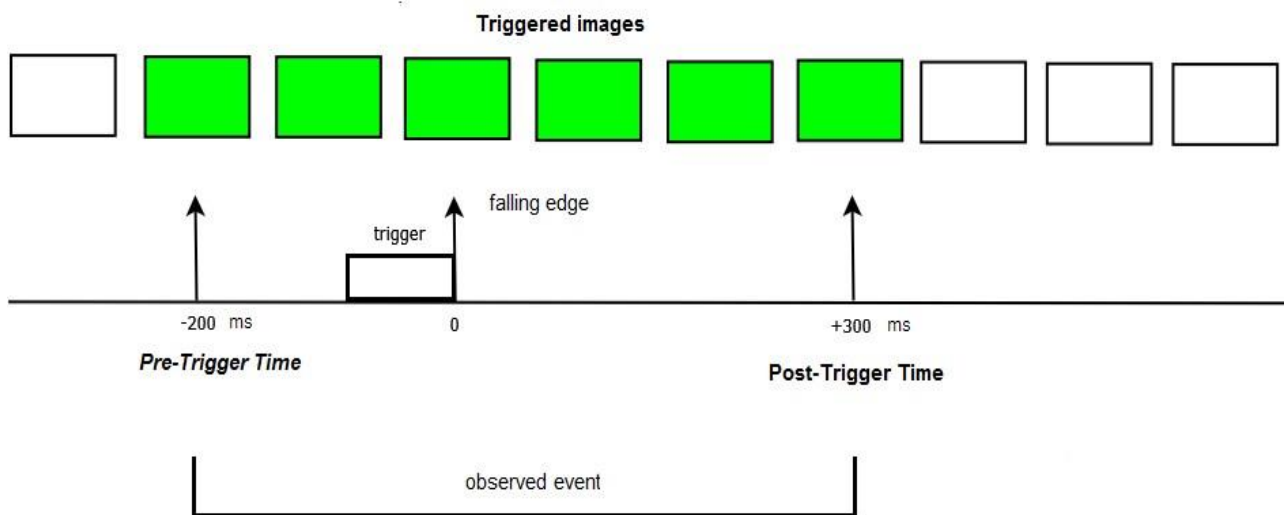
The diagrams below demonstrate how Pre-Trigger Time and Post-Trigger Time are used to define what the triggered images are within an observed event. The application will request the triggered images from the camera for ANPR processing. Since the camera buffers the images internally, even negative offset values of a few seconds (depending on the frame rate) can be set.

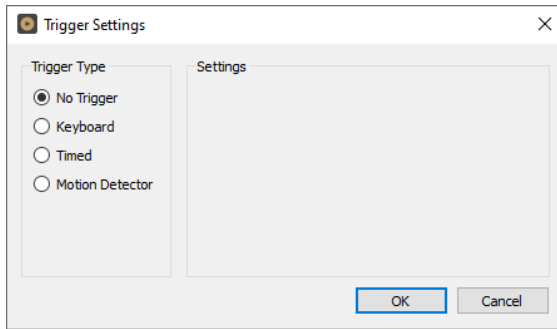
The following examples demonstrate some possible trigger scenarios:

1. Trigger on the rising edge

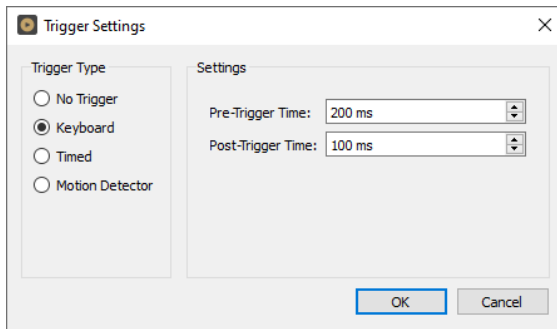


2. Trigger on the falling edge

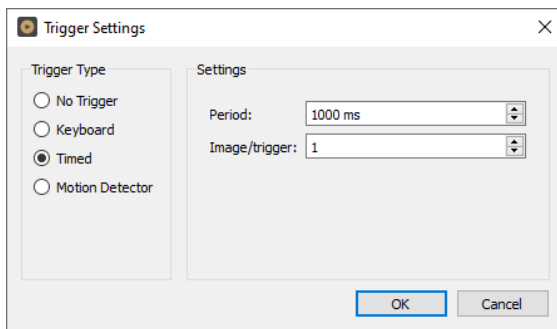




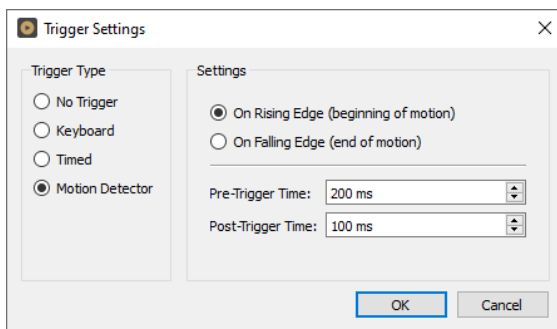
**No Trigger:** The engine processes all incoming frames that are not dropped from the buffer.



**Keyboard:** Generates a manual trigger event when the [F10] button is pressed. The engine processes all images within a specified time interval of the manual trigger (defined in milliseconds by the **Pre-Trigger Time** and **PostTrigger Time** values).



**Timed:** The engine processes images according to a preset frequency (defined in milliseconds, up to 60,000ms).



**Motion Detector** (Only applicable to Adaptive Recognition cameras): The application uses the built-in motion detection feature of the camera to create a trigger event. Select either the **On Rising Edge (beginning of motion)** or the **On Falling Edge (end of motion)** option. The first one will capture the images at the beginning of the motion, the second option at the

end of motion. **Pre-Trigger Time** and **Post-Trigger Time** allows you to set a time interval before and after the trigger signal. The engine processes all images captured within this specified interval.



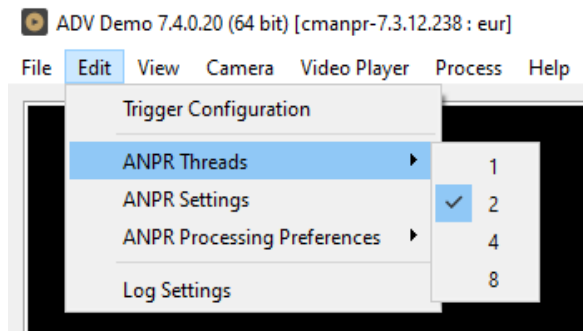
In **No Trigger** and **Timed** modes, the system sends individual images for processing, while in **Keyboard** and **Motion Detector** modes, it sends image packages based on the pre-set time intervals.

#### Note

When developing a final application with an efficient system architecture in mind, it is highly recommended to use a hardware trigger (e.g., inductive loop, infrared gate) in order to identify events. This way the events will only contain relevant frames with useful LPR information.

## 2. ANPR THREADS:

Select the number of simultaneous ANPR processing threads. In order to run multiple processing threads parallel to each other, each thread must have a dedicated CPU core and a CARMEN® software license (NNC hardware key). Multi-core software licenses for parallel processing, are available in dual and quad versions.



Possible values: 1, 2, 4, 8

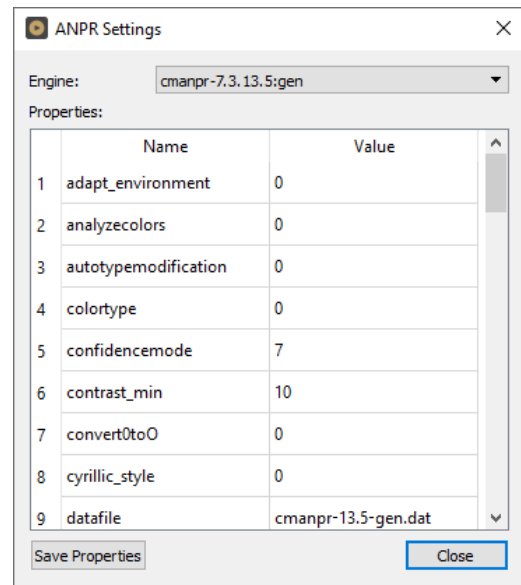
### 3. ANPR SETTINGS:

Contains various configuration options related to the ANPR process. The engine used for processing is also selected here.

By clicking this menu item, the following pop-up window will appear:

**Engine:** Click the drop-down menu to select an engine from the list of installed engines.

**Properties:** Lists the property values for the selected engine. To adjust the pre-set values, click on one of the value fields and then input a desired value. A full description of the engine properties can be found in the [CARMEN® ANPR Reference Manual](#).

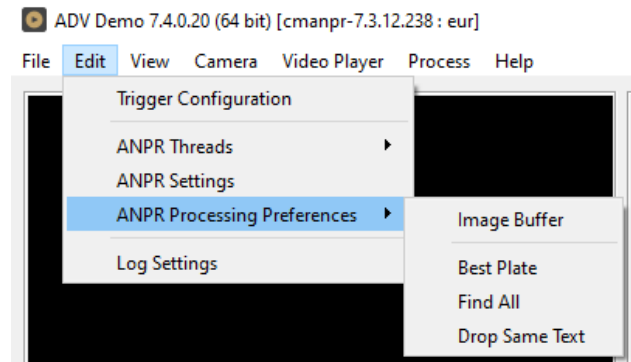


Click on the **[Close]** button to apply your changes. These settings will remain active until the application is closed or until the engine in use is replaced with another one from the drop-down list. When you exit the application, the changes will be lost and the values will revert to the ones saved in the gxsd.dat configuration file.

Clicking on the **[Save Properties]** button will write the current values of each property into the gxsd.dat configuration file. This feature requires write permissions to the gxsd.dat file. The default values of an engine can be reset by reinstalling (uninstalling and installing) it, check it [here](#) how to do that.

## 4. ANPR PROCESSING PREFERENCES:

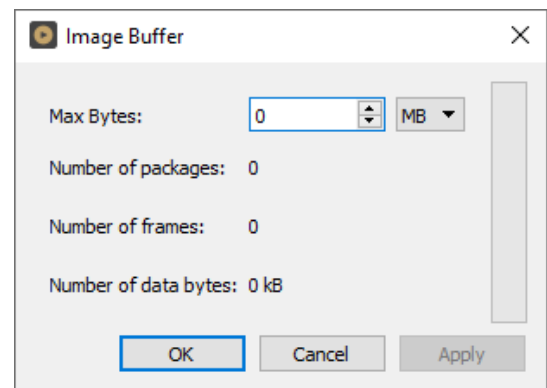
The ANPR Processing Preferences menu item contains three sub-menu items.



### Image Buffer:

**Max Bytes:** Maximum size of the image buffer, specified in kilobytes or megabytes. The size of the image buffer is equal to the sum of all the image sizes in the buffer.

When the image buffer reaches the pre-set value, ADV will start to overwrite the oldest images in the buffer.

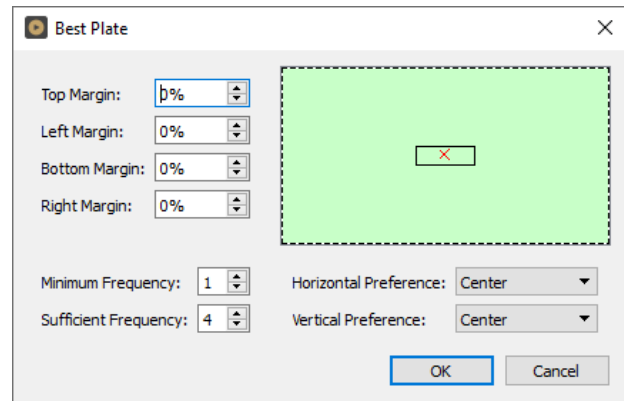


## Best Plate:

This is an algorithm that aids the selection of the best possible results.

ADV anticipates plates in the Plate Area marked with green on the sample frame. You can adjust the Plate Area by configuring the **Top Margin, Left Margin, Bottom Margin, and Right Margin** fields.

The Target Area (rectangle marked with an X) is used to identify the part of the frame that is most likely to contain an optimal license plate image.



**Minimum Frequency:** The minimum number of identical license plate recognitions within the image package of a single event.

**Sufficient Frequency:** The number of identical license plate recognitions required to stop additional image processing within the image package of a single event.

**Horizontal Preference:** Moves the target area horizontally.

**Vertical Preference:** Moves the Target Area vertically.

ADV will not consider a result for final selection if any of the following applies:

5. The plate is not within the margins
6. Minimum Frequency criteria is not fulfilled

From the remaining results, the application will select a final result by finding the frame that is closest to the Target Area (frame centre point closest to "X").

## Find All:

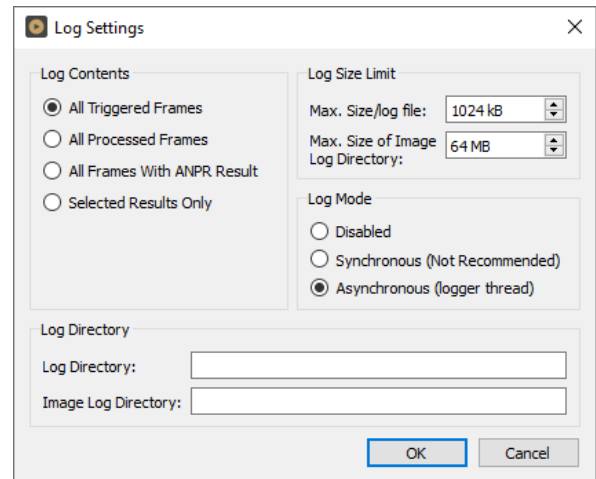
If checked, the system searches for all license plates on the image.

## Drop Same Text:

If checked, the system will not provide a result when there was an identical license plate text in the previous 20 seconds.

## 5. LOG SETTINGS

Allows you to specify the contents, size, and path of the log as well as the corresponding images.



## VIEW

### 1. FONTS

#### Set Tree Font...

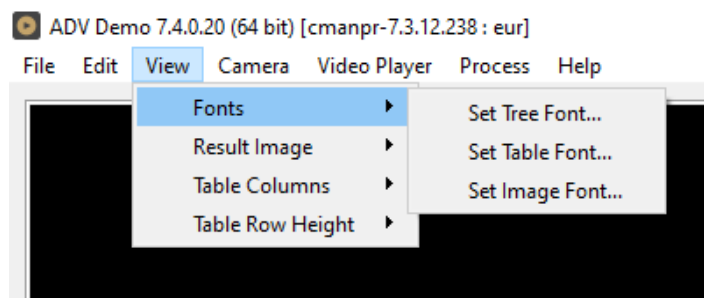
Change the font used to display the Result Tree (the detailed ANPR data found in the upper right corner of the main screen).

#### Set Table Fonts...

Change the font used to display the Log (the table of results in the lower part of the ADV screen).

#### Set Image Font...

Select the font used to display the license plate text displayed in the image.



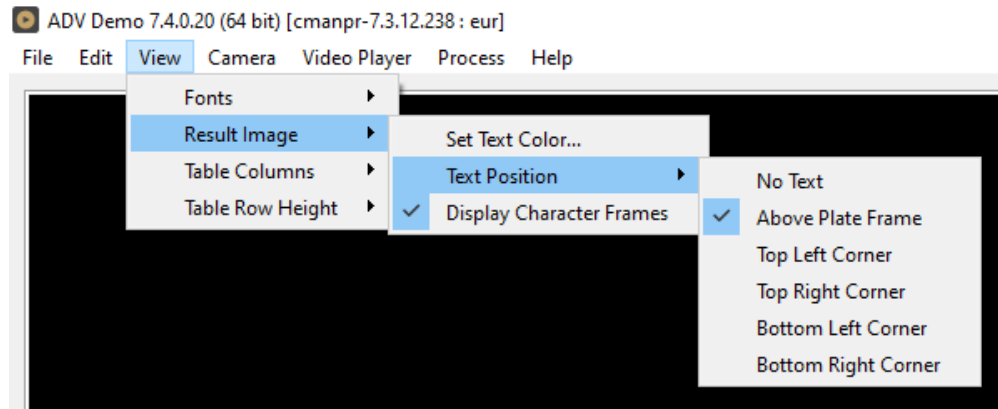
## 2. RESULT IMAGE

### Set Text Color:

Select the color of text displayed in the image.

### Text position:

Adjust the position of the text displayed in the image.



### Possible values:

Result text will not be displayed in the image:  No text

Result text will be displayed as indicated by sub-menu item:

- Above Plate Frame
- Top Left Corner
- Top Right Corner
- Bottom Left Corner
- Bottom Right Corner

### Display Character Frames:

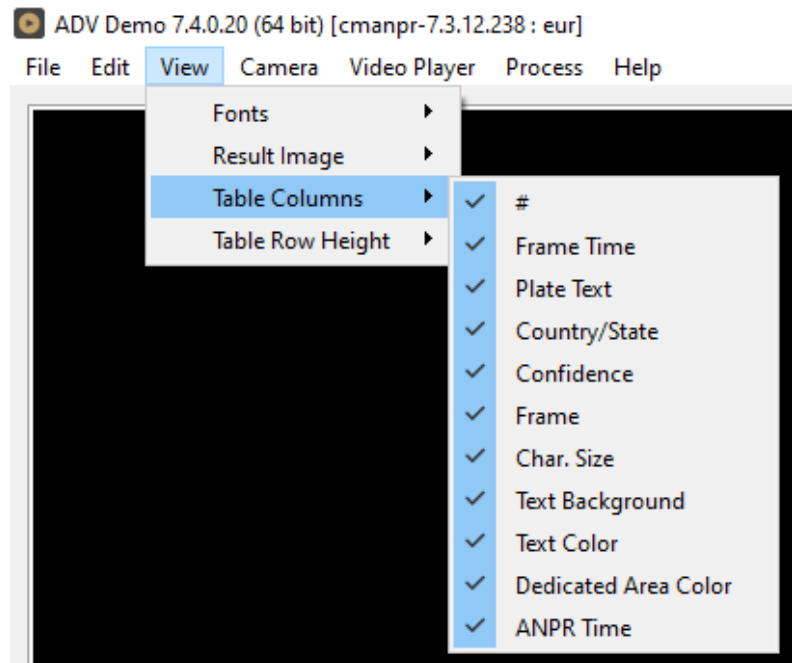
Display a frame around each license plate character found in the image. Possible values: on, off



### 3. TABLE COLUMNS:

Select the columns that should be displayed in the header of the Log.

- # (sequence number of frame)
- Frame Time
- Plate Text
- Country/State
- Confidence
- Frame
- Char.Size
- Text Background
- Text Color
- Dedicated Area Color
- ANPR Time

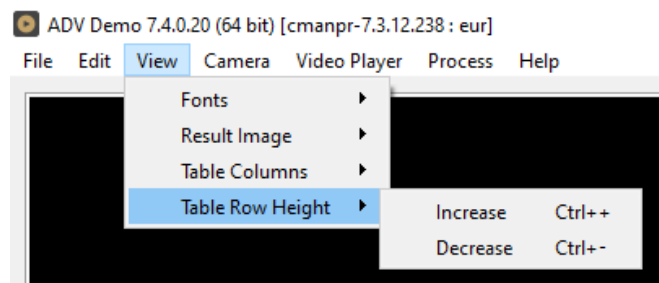


### 4. TABLE ROW HEIGHT

Adjusts the row height of the Log by clicking on **Increase** or **Decrease**.

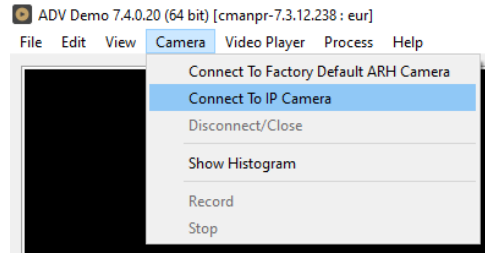
Hotkeys for Increase: **Ctrl + +**

Hotkeys for Decrease: **Ctrl + -**



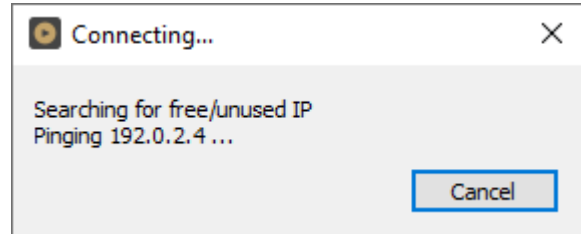
# CAMERA MENU

By clicking this menu item, the following pop-up window will appear:



## Connect To New Adaptive Recognition Camera:

The default factory IP address of new Adaptive Recognition cameras is set to 192.0.2.3 with the 255.255.255.0 netmask. Clicking on this menu item will start a scanning process that will look for this type of IP cameras in the default subnet.



**! Important**

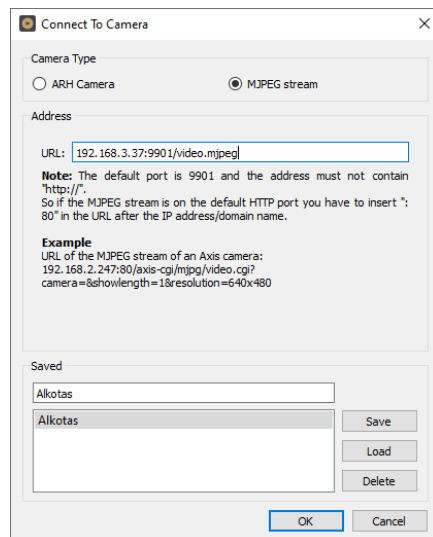
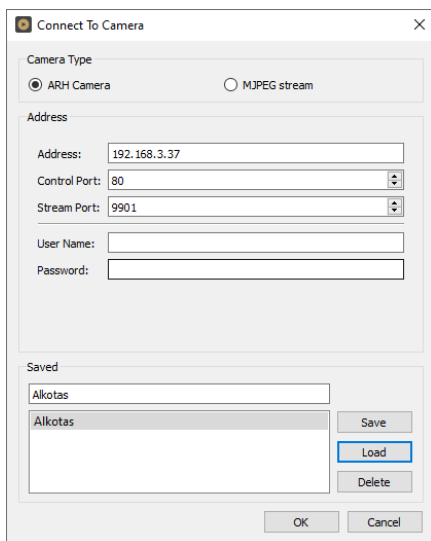
You must set up the network adapter with the same subnet range as the factory default IP subnet of the ARH cameras. Please avoid IP address conflicts by selecting a number different from the camera's default "3" in the last section of the IP address.

## Connect To IP Camera:

Allows user to connect to a camera on the network.

**Note**

The stream URL of the cameras are different by manufacturers! Please visit your camera's manual to get more information about its stream link (only "mjpeg" stream is allowed). Authentication on the cameras may also change this URL address.



**Disconnect/Close:**

Disconnects the camera and closes the session.

**Show Histogram:**

Displays the image histogram on the live view image of the camera (Feature only available with Adaptive Recognition cameras).

**Record:**

Allows user to save the MJPEG stream downloaded from the camera (or other URL).

**Stop:**

Stops the recording of the MJPEG stream.

## VIDEO PLAYER MENU

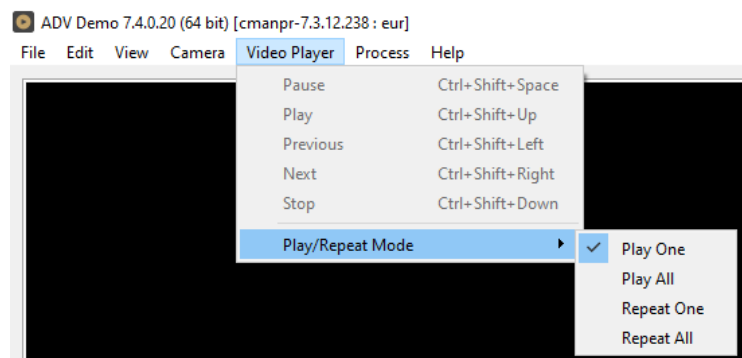
Allows the user to control playback and switch between multiple video streams (if more than one video stream has been loaded).

**Play One:** Playback will stop at the end of the video stream.

**Play All:** Playback continues with the next video stream until the end of the last one.

**Repeat One:** Plays the selected video in an infinite loop.

**Repeat All:** Plays all selected videos in an infinite loop.



## PROCESS MENU

### Start:

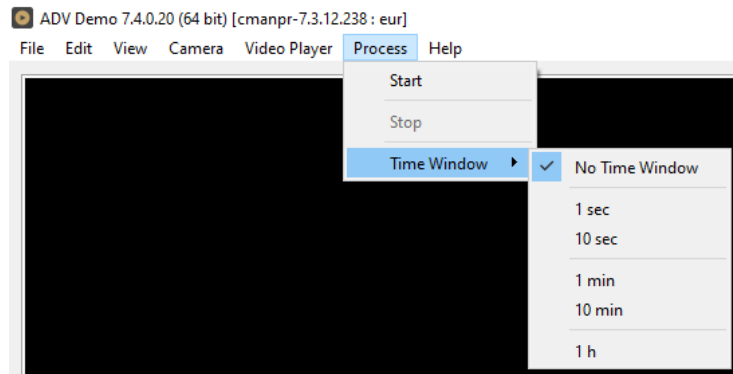
Allows the user to initiate the ANPR process.

### Stop:

Allows the user to manually stop the ANPR process.

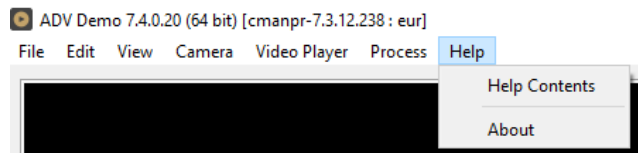
### Time Window:

The ANPR process can also be stopped by setting a timer in the Time Window sub-menu prior to starting the ANPR process.



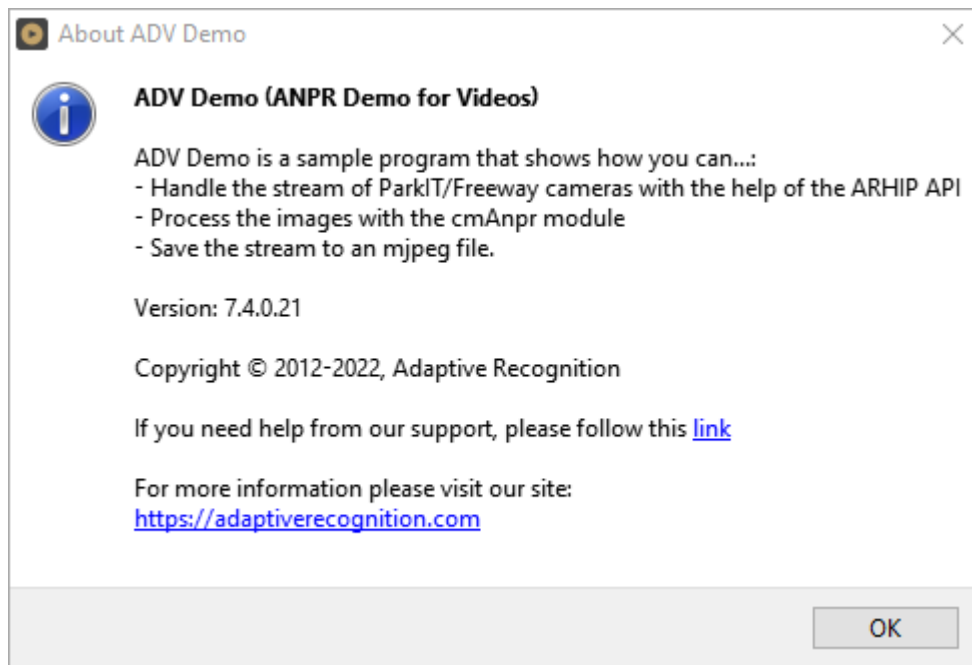
## HELP MENU

By clicking this menu item, the following pop-up window will appear:



**Help Contents:** Opens this User's Manual

**About:** Provides the license, version, and copyright information for the installed application.



# ANPR RESULT TREE

For each selected frame in the **log** section, the **Result Tree** displays all of the corresponding details available.

## FRAME:

Shows date- and timestamp of the processed frame, and contains subheadings called **Params** and **ANPR Results**.

### I. PARAMS:

Parameters contains a list of all the engine property settings.

### II. ANPR RESULT(S):

#### 1. LICENSE PLATE RESULT:

- **Confidence:** Overall confidence level (%) of the plate.
- **Type:** Code containing country/state ID of the plate.
- **Color:** Color of the dedicated area on the license plate.
- **BkColor:** Background color of license plate text.
- **Frame:** Pixel coordinates of the plate corners.

#### 2. CHARACTERS:

Individual details of each character of the final result. Ordered from left to right.

- **Code:** Unicode character ID.
- **Confidence:** Confidence level (%) of the overall plate.
- **Color:** Color of the character.
- **BkColor:** Background color of character.
- **Frame:** Pixel coordinates of the character corners.

#### 3. TIPS:

List of preliminary results from which the engine assembled the final result.

- **Code:** Unicode character ID.
- **Confidence:** Confidence level (%) of the character tip.
- **Color:** Color of the character.
- **BkColor:** Background color of character.
- **Frame:** Pixel coordinates of the character corners

Results	
Frame	2012-11-27 14:26:44.535
Params	
ANPR Result(s)	
ARH001	
Confidence:	89
Type:	0
Color(RGB):	(0,0,0)
BkColor(RGB):	(255,255,255)
Frame:	((322,330),(439,329),(439,358),(322,358))
Characters (ARH001)	
A	
Code:	0x0041
Confidence:	99
Color(RGB):	(0,0,0)
BkColor(RGB):	(255,255,255)
Frame:	((324,331),(338,331),(338,357),(324,358))
R	
H	
0	
0	
1	
Tips	
A	
Code:	0x0041
Confidence:	100
Color(RGB):	(0,0,0)
BkColor(RGB):	(255,255,255)
Frame:	((326,361),(340,361),(340,387),(326,387))
R	
Code:	0x0052
Confidence:	99
Color(RGB):	(0,0,0)
BkColor(RGB):	(255,255,255)
Frame:	((344,361),(358,361),(358,387),(344,387))
H	
Code:	0x0048
Confidence:	99
Color(RGB):	(0,0,0)
BkColor(RGB):	(255,255,255)
Frame:	((362,361),(377,361),(377,387),(362,387))
0	
0	
1	

## ANPR DATA

Results of the ANPR process are displayed in a log found at the bottom part of the screen. The log contains the following data:

- **Frame Time:** Time and date when the image was capture
- **Plate Text:** Alphanumeric license plate text.
- **Country/State** ISO 3166-1 alpha-3 country code.
- **Confidence:** Overall confidence level of the plate.
- **Frame:** Pixel coordinates of the corners of the license plate.
- **Character Size:** Average height of the characters in pixels.
- **Text Background:** Background color of text in RGB t.
- **Text Color :** Character color in RGB.
- **Dedicated Color:** Color of dedicated area in RGB.
- **ANPR Time(ms):** ANPR processing time in milliseconds.

#	Frame Time	Plate Text	Country/State	Confidence	Frame	Character Size	Text Background	Text Color	ANPR Time(ms)
24.0.0	2012-12-04 16:26:23.691	[ARH001]		92	((306,332),(424,329),(425,360),(306,362))	26	(255,255,255)	(0,0,0)	21
23.0.0	2012-12-04 16:26:23.642	[ARH001]		91	((307,332),(422,330),(423,359),(307,361))	25	(255,255,255)	(0,0,0)	18
22.0.0	2012-12-04 16:26:23.592	[ARH001]		92	((307,333),(424,331),(424,360),(308,361))	26	(255,255,255)	(0,0,0)	21
21.0.0	2012-12-04 16:26:23.541	[ARH001]		91	((307,332),(424,331),(424,359),(308,360))	25	(255,255,255)	(0,0,0)	22
29.0.0	2012-12-04 16:26:23.941	[ARH001]		91	((307,332),(424,329),(425,358),(308,361))	26	(255,255,255)	(0,0,0)	20
20.0.0	2012-12-04 16:26:23.491	[ARH001]		92	((307,332),(424,329),(425,360),(308,362))	26	(255,255,255)	(0,0,0)	22
1.0.0	2012-12-04 16:26:22.541	[ARH001]		91	((306,333),(424,329),(424,359),(306,362))	26	(255,255,255)	(0,0,0)	22
18.0.0	2012-12-04 16:26:23.391	[ARH001]		91	((306,333),(424,332),(424,359),(306,361))	26	(255,255,255)	(0,0,0)	17
17.0.0	2012-12-04 16:26:23.342	[ARH001]		93	((306,332),(424,331),(424,360),(306,360))	27	(255,255,255)	(0,0,0)	18
16.0.0	2012-12-04 16:26:23.292	[ARH001]		91	((306,331),(423,331),(423,360),(306,360))	25	(255,255,255)	(0,0,0)	19
15.0.0	2012-12-04 16:26:23.243	[ARH001]		90	((306,331),(423,331),(425,360),(306,360))	25	(255,255,255)	(0,0,0)	18

### Note

The data present in the table above is included in the log file.



## DATA LOGGING

Log entries of the ANPR processes are logged by the application in the CARMEN® installation folder.

Naming format of the log file:

ADV\_yyyy-mm-dd\_hhmm\_sss.log ADV\_Year-Month-Day\_HourMinute\_counter E.g.: ADV\_2021-02-08\_1726\_000.log

If the date changes, then automatic logging continues in a different log file

When saving a log file, a separate anpr file with the same name is also created in the same directory that contains the property settings of the engine being used.

FILE FORMAT:

UTF16 (LE) encoding

Semicolon separated values

First Line: header as follows (see detailed descriptions under [ANPR Data](#))

#,Path; Plate Text;Country/State;Confidence;Frame;Character Size;Text Background;Text Color;Dedicated Color;ANPR Time(ms);

### Note

In case of missing hardware key, the application indicates it in the status bar at the bottom of the screen.



## Contact Information

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Adaptive Recognition Technical Support System ([ATSS](#)) is designed to provide you with the fastest and most proficient assistance to get you back to business quickly.

For further technical information about our products, please visit our official website.

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 the 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 email. If you previously received a confirmation message from ATSS, it contains the embedded link that allows you to enter the support site securely.

If you need assistance with login or registration, please contact [atsshelp@adaptiverecognition.com](mailto:atsshelp@adaptiverecognition.com).

