PELCO

by Schneider Electric

VideoXpert Plates v 1.0 ALPR

User Manual

C6618M-A | 04/19

Contents

Introduction

VideoXpert Plates ALPR is the Pelco license plate recognition application developed for the most demanding traffic scenarios using the VideoXpert Plates ALPR Optical Character Recognition (OCR) engine.

This user manual will guide you through installation, configuration and publication of results. It also includes some tips on cameras setup and configuration to maximize the ALPR performance and read accuracy.

Main Functions

- Manage one or multiple ALPR cameras from one single application (max 32 per application depending on speed of traffic and resolution of cameras)
- Review real time video while performing ALPR analytics
- Run in visual ‘application’ mode or silently as an operating system (Windows) service
- Switch ALPR analytics between more than one group of cameras
- Supports additional environment cameras (otherwise known as color overview or contextual cameras) associated with the ALPR camera
- Runs in free-flow mode; no external signals are required to trigger the OCR
- OCR optimised for the Pelco Sarix CCTV camera range
- Generic ONVIF and RTSP support for legacy camera connection
- Support for recorded video processing
- Additional analytics are available including: vehicle direction, plate color, and ADR
- Plate reads are saved directly to the hard disk
- Results can be transmitted in real-time through TCP/IP sockets, HTTP-POST XML or JSON
- Plate reads are directly sent in real-time to the Pelco VideoXpert Plates ALPR Core and from there to the Pelco VideoXpert OpsCenter.

License Product Scope

After the product is installed, VideoXpert Plates ALPR activates a default 30-days trial license.

Please note that if the VideoXpert Plates system in installed with VideoXpert Video Management Systems, the license information will not appear in the VideoXpert ToolBox.

To obtain a commercial perpetual license, please contact you authorized Pelco Sales representative.

Operating System and Software Requirements

- Operating system: Microsoft Windows 7 or above, 32 or 64 bits
- Microsoft Visual C++ 2015 Redistributable Package (x86)
- MS Framework 4.5.2
- A valid VideoXpert Plates ALPR license installed (trial or perpetual)

System Requirements or PC Specifications

Computer specifications depend on the type of camera scenarios you are going to manage and the number of cameras to be managed simultaneously from the PC.

RAM Memory Usage

Your system should have at least 0.5 GB RAM available per ALPR camera. This should be taken into consideration when running a significant number of cameras from a single PC, for example, a deployment with 16 ALPR cameras might require at least 8GB RAM.

Computer Processor Requirements

Taking Intel as a benchmark, the processor required depends on the vehicle speed, camera horizontal angle (it should be below 25 degrees) and the camera vertical angle (it should be below 30 degrees).

These rules are valid for most scenarios but there are many cases where these guidelines might not apply such as: ALPR cameras mounted on vehicles, high angled cameras, and cameras monitoring vehicles along tight curves.

- **Access control, low-speed traffic, camera 10 fps or less**:
  Intel 2.0 GHz with maximum 2 ALPR cameras per virtual core (thread)
- **Urban environment, medium-speed traffic, camera 15 fps or less**:
  Intel 2.5 GHz with maximum 1 ALPR cameras per virtual core (thread)
- **Highway environment, high-speed traffic, camera 25 fps or less**:
  Intel 3.0 GHz with maximum 1 ALPR cameras per virtual core (thread)
- **Special high-speed traffic, camera 25-50 fps:**
  Intel 3.5 GHz maximum 1 ALPR camera per physical core

Using this guide, it is possible to achieve many other valid combinations. For example: using an Intel i7 4.0 GHz to manage 4 ALPR cameras per virtual core in an access control environment means that up to 32 ALPR cameras could be processed from one single but powerful PC. The use of the Region of Interest (ROI) feature, described later in this guide, focuses plate detection in a smaller region and will reduce processor utilization.

To manage larger deployments with multiple ALPR cameras, we recommend high-end XEON and i9 architectures.

Licensing

30-days Trial License

Follow the instructions in VideoXpert Plates Installation. This will automatically install a trial license for any number of lanes.

VideoXpert Plates ALPR Software License

Licenses are available in a software format.
Contact Pelco Sales to order a suitable VideoXpert Plates license.

The license for the basic ALPR is priced per camera, so if you have a system with 50 CCTV cameras but 4 of them are designated as ALPR cameras, then a license for 4 lanes is required.

To purchase a license:

1. Contact Pelco Sales to order a suitable VideoXpert Plates license.
2. After the order is processed you will receive a product key via email.

To activate a license on a machine connected to the internet:

1. Go to the VideoXpert Plates License Portal at https://www.pelco.com/support/VideoXpert-plates-activate and enter the product key you received via email.
3. Register to activate your key.
4. Click the “Online Activation” button at the top right of the screen.
5. Download and install the Latest RTE Installer using the link that appears.
6. Follow the instructions to activate your license.

To activate a license on a machine that is offline:

1. Go to the VideoXpert Plates License Portal at https://www.pelco.com/support/VideoXpert-plates-activate, and then enter the product key you received via email.
2. Register to activate your key.
3. Click the “Offline Activation” button at the top right of the screen.
4. Click the link to download RUS (a tool to generate a C2V file) to a USB drive. Note the “Upload C2V” section – you will return to this in a later step.
5. Move the RUS file to the offline machine and install it.
6. Choose “Installation of new production key” and click “Collect Information” in the “Collect Status Information” tab.
7. Save the .c2v. file on your USB drive.
8. Upload the .c2v. file into the “Upload C2V” section in the Pelco License Portal.
7. Download the resulting .v2c. file.
8. Return to the offline machine and use the “Apply License File” to upload the .v2c. file and activate your license.

Virtual Machines

- Trial licenses are not available for a virtual machine environment
- Licenses for virtual machines are only available in USB dongle format

- Once the trial license period expires, is **not** possible to deploy another trial license in the same PC nor to expand the duration of the expired license

We strongly recommend you back up your system before installing a software-based key.

Note that you may also use this program to transfer a bought software license key to another machine by selecting the main tab ‘Transfer License’. A hardware USB key may simply be plugged into another suitable computer to be able to run the software there.

VideoXpert Plates Installation

Run **VideoXpert Plates Installer.exe** to install all the VideoXpert Plates software components onto your PC.

- You must have administrator permission to allow the installer to register the software components. You normally can right-click and then click 'Run as administrator'.
- Ensure that the target installation directory has read/write permission. VideoXpert Plates ALPR saves the configuration files inside its installation directory, so the directory must not be read only.

The package VideoXpert Plates ALPR is made of four different software components that will be installed:

- **VideoXpert Plates ALPR:** The main ALPR program running up to 32 lanes on a PC
- **VideoXpert Plates ALPR Setup:** Setup is where each ALPR camera is added and configured
- **VideoXpert Plates ALPR Manager:** The Database program
  Cameras can be grouped into zones and rules set such as user and vehicle authorizations
- **VideoXpert Plates Plugin:** The VideoXpert Plugin providing the ALPR functionality

VideoXpert Plates ALPR Setup

This program is where users can add ALPR cameras and setup how the plates should be read and interpreted. For example, the user may set the Plate syntax for the country or State where the system is being used, set any crop zones (regions of interest) for that camera, or set the amount of time the program should track a plate before reporting it.

After this scenario has been defined, save it as an '.alpr' file in the VideoXpert Plates config directory for further use by VideoXpert Plates ALPR
*(for example: 'Camera-04.alpr' saved in **C:\Program Files (x86)\VideoXpert Plates\cfg\Camera-04.alpr**).*

At this point you can test how the OCR works in your scenario by pressing the Play Button at the bottom. Basic results (a text file of plates and their associated images) can also be saved to your hard disk. See below for details.

VideoXpert Plates ALPR Setup can only handle one (1) video stream at a time and is intended for setting up each lane (camera) and OCR testing. You must repeat this process for each camera, and then connect them all to VideoXpert Plates ALPR.

VideoXpert Plates ALPR

After all of the ALPR cameras have been setup on this PC and the .alpr files saved, run the program VideoXpert Plates ALPR. All of the ALPR cameras can then can be added to VideoXpert Plates ALPR.
This software is an '.alpr' files launcher and viewer that runs unattended, passing plates to the ALPR Manager and VideoXpert.

For example: If you have 8 ALPR locations (8 ALPR cameras), use **VideoXpert Plates ALPR Setup** to configure the camera scenarios one by one; save the configurations to 8 independent ".alpr" files; and then use VideoXpert Plates ALPR to group, launch, and run the 8 cameras simultaneously.

General Overview of ALPR Camera Scenario Configuration

Achieving high-accuracy rates in ALPR depends on the following factors:

- **Scenario:** Location of the ALPR camera in terms of distance and angles.
  This is the most important factor in achieving high accuracy. The installer should optimize the license plate character height (in pixels) and the perspective and angle of the license plate within the image.
- **Camera configuration:** High quality images increase OCR accuracy with the appropriate use of IR (Infrared), very low or no image compression, correct adjustment of the camera settings (WDR, shutter speed, etc.), the selection of the right video resolution and frame rate, and most importantly, by selecting the correct camera for the scenario.
- **OCR Technology:** The technology behind the OCR is a key a factor in obtaining high read accuracy – but all of the other elements play a major part.
- **OCR Configuration:** The OCR software MUST be configured correctly. No matter how great a camera we use and how advanced the OCR technology is, if the configuration is not correct, plates will simply not be read.

Important
ALPR technology is not Plug and Play and it is important to consider all of these elements together when setting up your system.

Camera Orientation

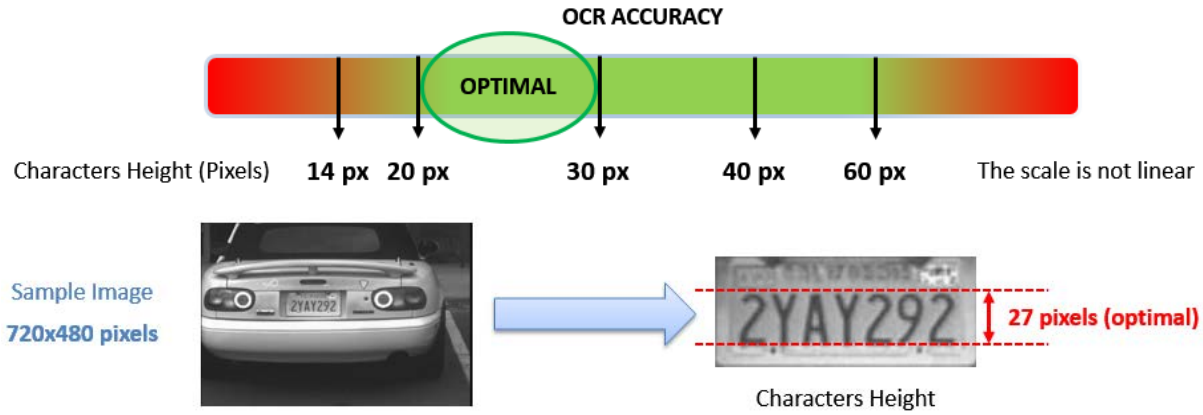
The image orientation is a key factor to achieve the maximum OCR efficiency. It is recommended that you stay below the following thresholds:

Examples of different camera orientations

Accuracy will decrease significantly if these guidelines are not adhered to.

Characters Pixel Height

The most accurate way of measuring the size of the characters on a plate is to use the height of each character. The optimal range is from 20 to 30 pixels high.



By using the VideoXpert Plates ALPR Setup settings, the OCR can be configured to read characters as low as 10 pixels high – or as high as 70+ pixels high, but to maximize reading accuracy and not waste processor time looking for very large plates, you should keep to this 20-30 range.

Image Quality

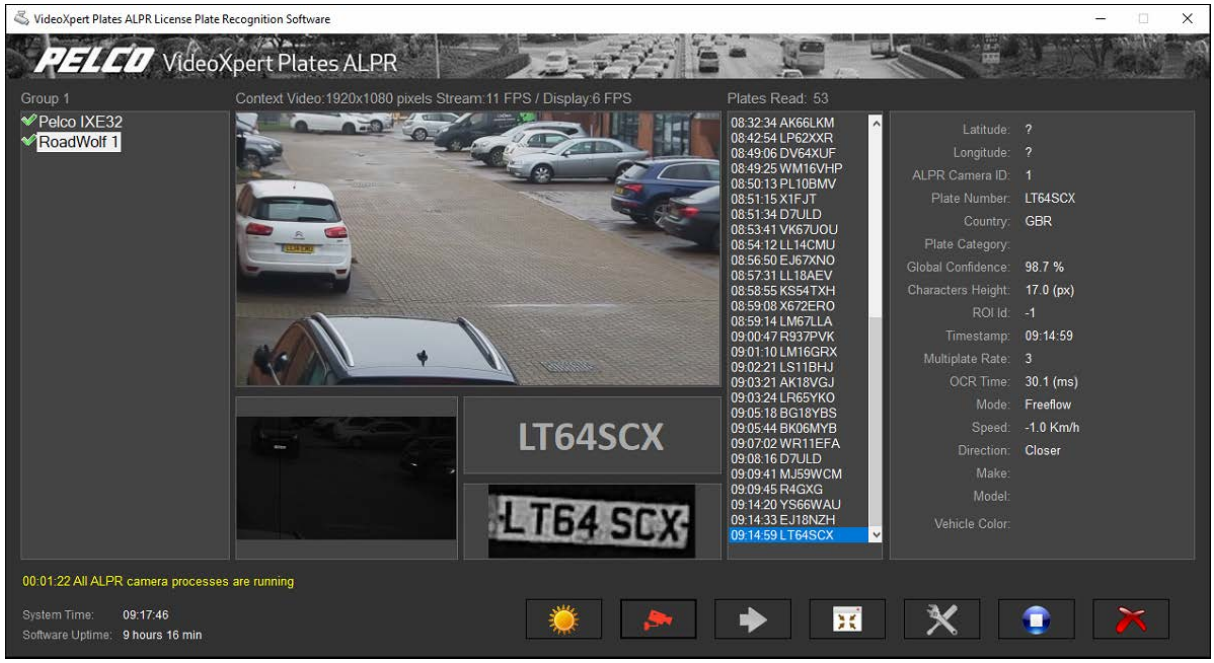
It is extremely important to select the correct camera and configure it correctly to maximize the quality of the image sent to the OCR program. A bad image will result in lower recognition.

The image quality not only depends on the resolution of the image and correct settings but also the video transmission rate, stream protocol, and image format provided by the decoder and/or video filter technology within the camera.

Low quality images from Malaysian vehicles

Good quality images from Malaysian vehicles

VideoXpert Plates ALPR Setup

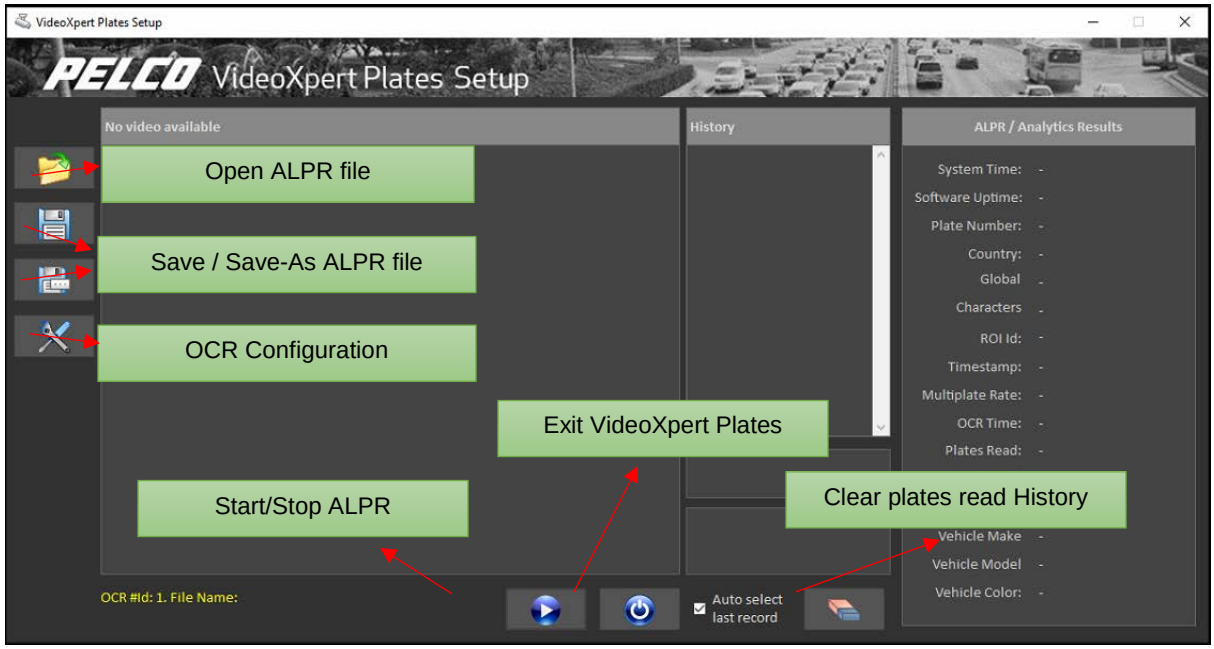


VideoXpert Plates ALPR Setup Main Screen when Running

This is where each ALPR camera is connected and the recognition parameters setup. The above illustration is of a fully configured and running system. At setup this will be blank as displayed in the next illustration.

The Settings icon on the left is used to configure the OCR settings and add a camera (the Tools symbol). These settings can then be saved as an .alpr file in the cfg directory using the Save or Save-As icons above (that is: C:\Program Files (x86)\VideoXpert Plates\cfg).

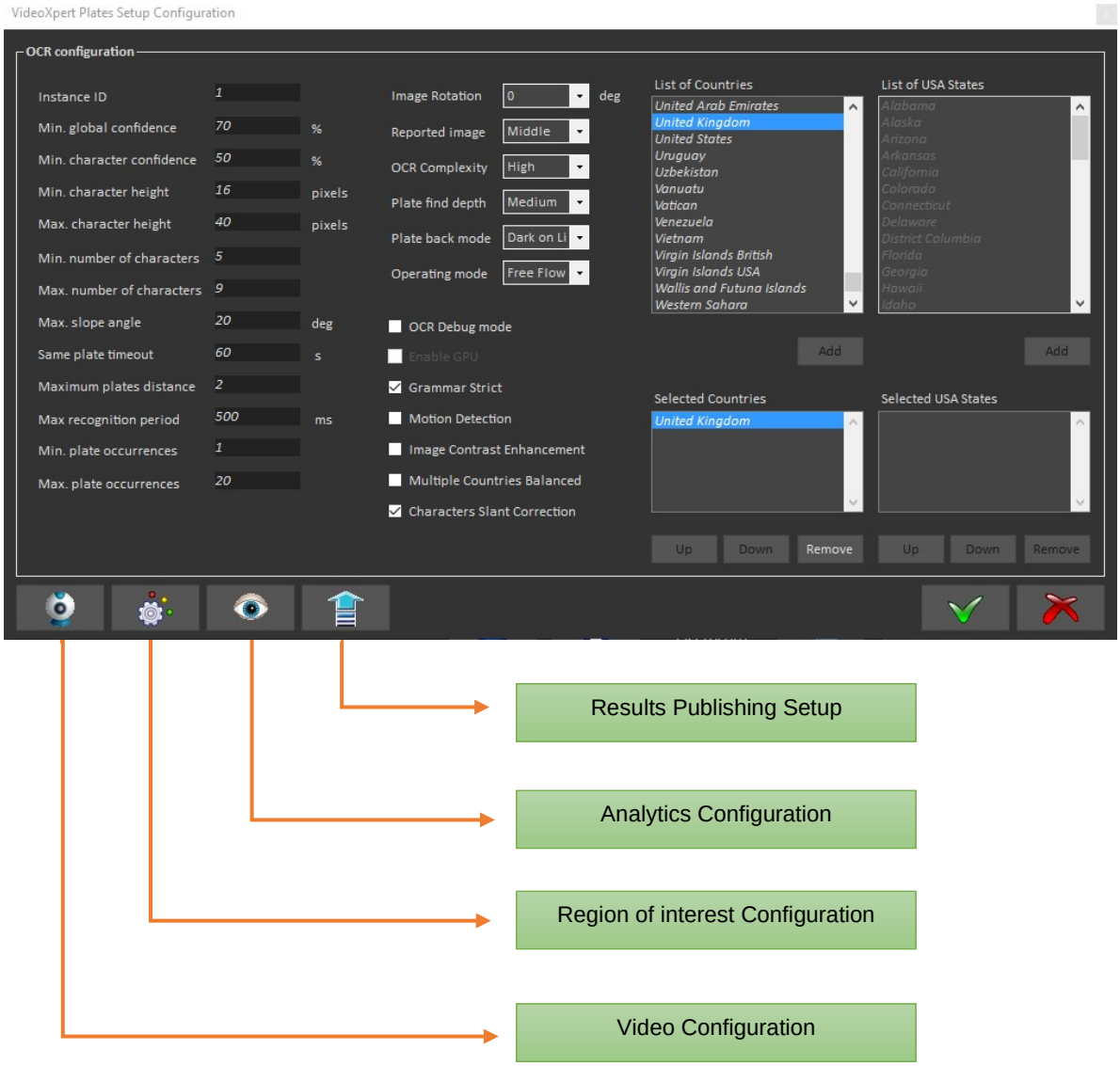
The Open icon re-loads this file for further editing.



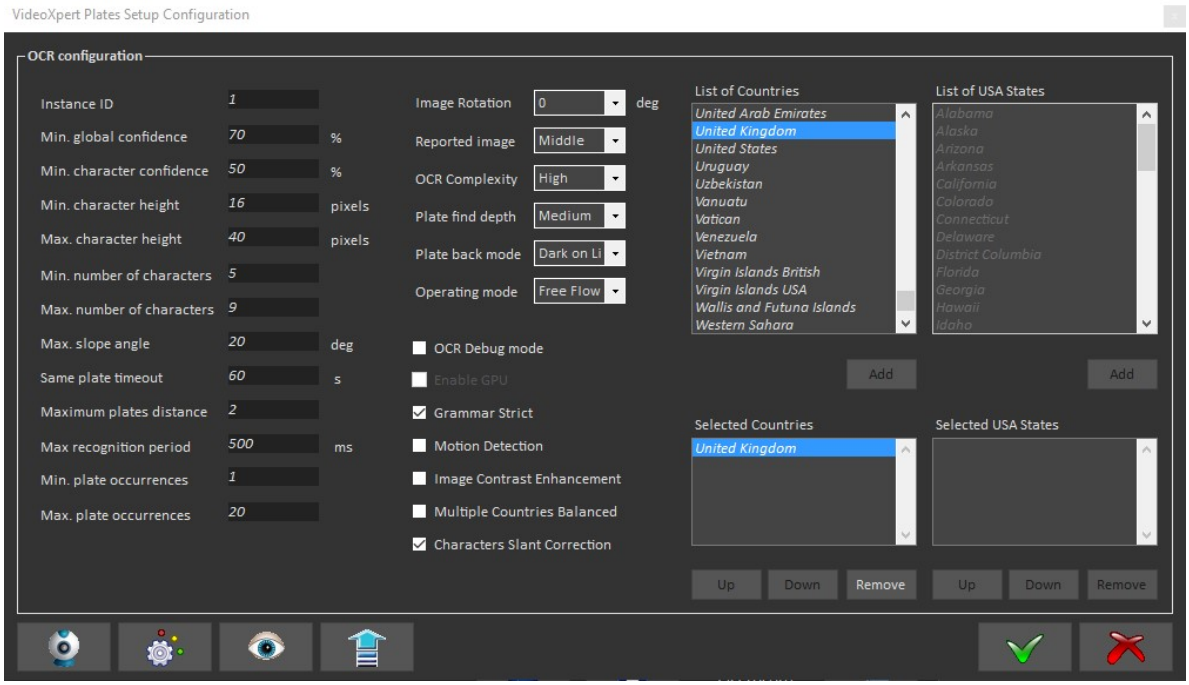
VideoXpert Plates ALPR Setup Main Screen at Start Up

VideoXpert Plates Setup Configuration

The main configuration screen is where all the OCR parameters are setup.
At the bottom of the window the icons take you to the different configuration screens: Video Configuration, Regions of Interest, Analytics and Results Publishing options.



VideoXpert Plates OCR Configuration



Plates ALPR Setup Main Configuration Screen

Note that all the parameters shown here default to normalized values on which to fine tune.

Instance ID (1 or above)

This is the ID (Identifying number) of the ALPR camera and should be set to one (1) or above. In a system with several lanes, each time a camera is setup, it should be given a unique ID. This ID is passed to the VideoXpert Plates Manager and Pelco VideoXpert to differentiate between cameras / lanes. If used with VideoXpert video management systems, the instance ID does not need to match the camera number assigned by VideoXpert.

Confidence

The confidence of each plate character or the entire plate, is expressed as a percentage and is calculated using several factors such as the thickness of the character strokes, the character size, the plate contrast etc. so a large clear plate will produce a high confidence number when read.

Minimum global confidence (percentage)

By setting this parameter you can determine the minimum confidence level the whole plate read must meet to be accepted. The global confidence is the average of all individual characters' confidence.

Minimum character confidence (percentage)

This parameter is set to determine the minimum confidence level a character must meet to be accepted as the intended character.

Tips:

- *In countries with open grammars such as USA keep these values high, 90-80 respectively. For more information, please see the discussion on Grammar later in this manual.*
- *Higher values mean that false positives are less likely, but it also means that a greater number of plates will be filtered out.*

Minimum character height (pixels)

Range (14-70): This is the minimum license plate character height measured in pixels. It is the distance between the top pixel of the character and the bottom one. Take care with angled plates (see below).

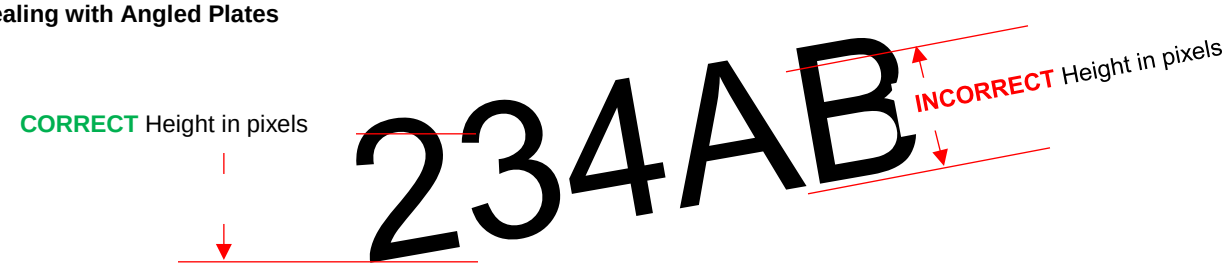
Maximum character height (pixels)

Range (14-70): This is the maximum license plate character height measured in pixels. It must be greater or equal to the minimum character height set previously.

Tips:

- *In license plates with difference character sizes such as some Middle East plates, the number applies to the largest character set appearing in the plate.*
- *Try to narrow the Min-Max interval to achieve better performance and fewer false positives. You can check with real images and add a margin of error. For example, if the license plate has a height of 25 pixels as it approaches the camera, you should set the min/max values to 18/32 respectively. This will ensure a few reads of a decent size to give a good result.*
- *The optimum character height is between 22 and 24 pixels.*
- *Small characters (below 18 pixels high) increase the probability of a misread because we start to lose details of the character shape, especially if the image quality is not good: 'G' may become 'C', etc.*
- *Large characters above 55 pixels might require considerably more OCR processing time.*

Dealing with Angled Plates

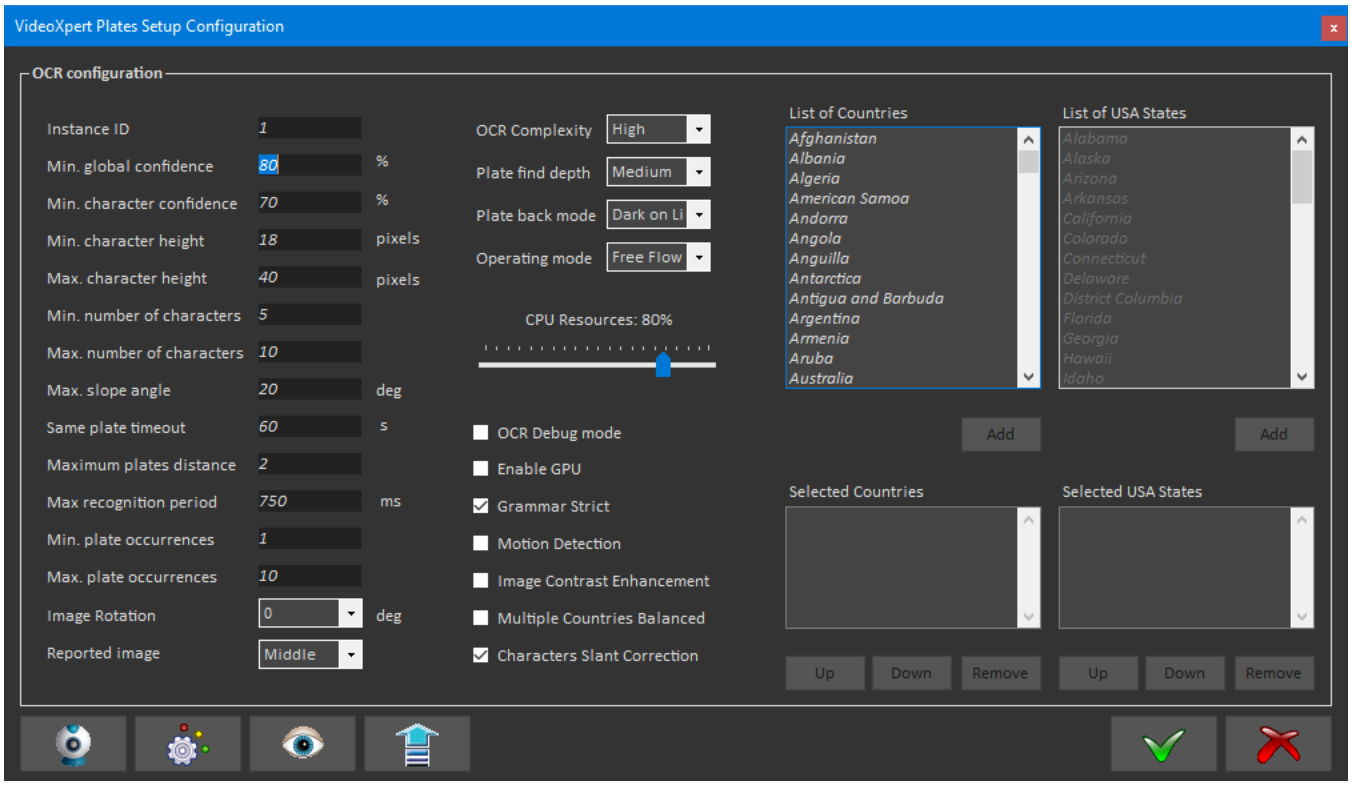


Minimum number of characters

Range (4-12): This is the minimum number of characters that the license plate may have.
(Each country or region has its own rules, some more formal than others. Note that by setting this to a very low number you are increasing the chance of producing a false positive especially in free-flow traffic. This will also increase the processing overhead by looking for more short plates.

Maximum number of characters

Range (4 -12): This is the maximum number of characters the license plate may have. It must be equal or greater than the minimum number of characters.

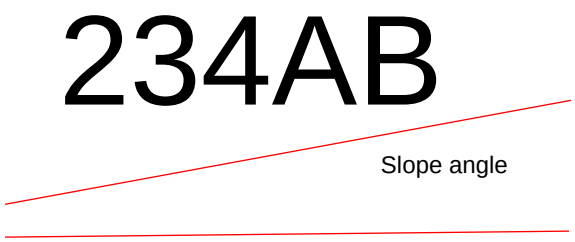


Tips:

- *Set the minimum value one character below the expected minimum value and two above the expected maximum. For instance, if the majority of plates have 6 or 7 characters, set minimum to 5 and maximum to 9.*
- *Set high values of min/max confidences when dealing with short plates of 4-5 characters.*

Maximum slope angle (degrees)

Range (0-30): This is the roll rotation angle of the license plate to the horizontal.



If you know that the plates will be skewed, by setting this parameter higher you can force the engine to look for plate shapes that are more skewed. You should setup your ALPR camera to keep plates as close to the horizontal as possible.

Same plate timeout (seconds)

This is the elapsed time between two reads of the same plate. For example, if we set this value to 10 seconds and there is a vehicle stopped in front of the camera with its plate readable, the ALPR will output a result for the same plate every 10 seconds.

Tips:

- *This value is normally set above 60 seconds.*

Maximum plates distance

This parameter is used to determine what makes a plate different from the previous one read. This is known as the Levenshtein distance. For two identical reads, the Levenshtein distance is zero.

This parameter helps reduce the number of false positives when a license plate is read several times before the result is output and a partial read still represent a valid plate (valid by syntax), especially in countries where the plate does not have a fixed length.

Example: The real plate number is: “AB-4567”

OCR read 1: AB-4567
OCR read 2: AB-456

If the maximum distance is set to “0” (exact match) the ALPR will report 2 plates, but if the distance is set to “1” (or higher), then the ALPR will report plate 1 but not plate 2.
This is because we are specifying that a plate with only one character different from the first read is considered as a read of the same plate (that is, a probable mis-read occurred).

Tips:

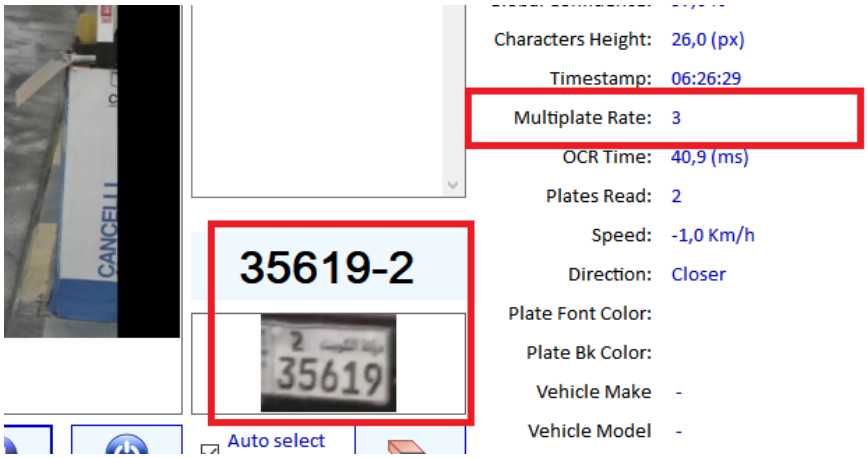
- *Keep this value high when possible (2 by default) in countries where the minimum number of characters in the plate is more than 5.*
- *In countries where you may have 5 or less characters length plates you might want to reduce this value to 1.*

Maximum recognition period (milliseconds)

VideoXpert Plates ALPR normally operates in free-flow. It continuously analyses video frames, and reads and reports plates. It makes a final decision on the plate read after an interval of time - the maximum recognition period.

There is a dedicated time counter for every plate which starts counting after the first read. When it reaches the maximum recognition period, it stops, checks the number of samples read of the same plate, and returns the “best” result. The default value is set to 500 ms (half a second).

We call the number of times the same license plate has been read within the maximum recognition period the **multi-plate rate**. This value is one of the metrics displayed in the main screen after each plate is read and is useful when tuning your system. Several reads of each plate produce better results.



In the image above, the plate number 35619-2 has been read 3 times before being reported.

A good multi-plate rate is very important because:

- It increases the global accuracy.
- It reduces the number of false positives.
- It tells you a lot about the "quality" of your scenario configuration.
- Low multi-plate rates in good scenarios indicates a low CPU usage.

Tips:

- *Try to keep multi-plate rates between 3 and 5.*
- *If the multi-plate is always 1 the risk of missing plates is high. Review your scenario configuration, camera setup, computing resources, or the maximum recognition period set.*
- *If the multi-plate rate is very high, you can decrease the maximum recognition period to produce a result faster.*
- *If the maximum recognition period is 0, you would be emulating a synchronous system, where each vehicle passing is set to trigger a read using an external relay. That is, it will only take one read sample. This triggered method is often used in Tolling where vehicles stop. See 'Operating mode' below.*

Minimum plate occurrences

This is the minimum number of times the plate should be read within the maximum recognition period before reporting—report the result only if the minimum number of occurrences has been met. For example: if set to 2, then only report the plate if two identical reads of the plate candidate have been made.

If the default value is 1, but the scenario is good, the speed of the vehicles is not too high, and you are getting multi-plate rates above 3 on average, increasing this value to 2 might help reduce false positives.

Tips:

- *Set this value to 2 when possible, especially in countries such as the USA to reduce false positives with custom plates.*
- *If you are getting a high multi-plate rate average, then increase this minimum value.*

Maximum plate occurrences

This is the maximum number of times the plate should be read within the maximum recognition period. If this value is reached before the maximum recognition period has elapsed, the ALPR will force the result to be output.

Example:

If the ALPR reads every 100 ms *(10 times per second), ,* and the maximum recognition period is set to 5000 ms (5 seconds) and the maximum plate occurrences is set to 10, the result will be output after about 1 second because the maximum plate occurrences (10) was reached before the 5 second timeout.

Image rotation (degrees)

You may apply a specific 90° rotation to the input image. The default is 0 degrees. Other valid values are 90, 180, and 270 degrees. This can be used if a plate or marking is written vertically on an object or freight container and needs to be read).

Reported image

As described above, VideoXpert Plates ALPR can read the same plate several times within the maximum recognition period. This means there will be several saved images of the plate or vehicle, one for each read.

We can set which one to report: the one associated with the first, middle, or last read.

Tips:

- *If we are reading front plates on approaching traffic, the first image will be the furthest away.*
- *If we are reading rear plates on receding traffic, the first image will be the closest image of the plate or vehicle.*
- *We suggest that you select the middle image to achieve a balance but feel free to experiment.*

ALPR Engine Operation in Stages

The Engine works in several stages before finally reporting a plate. Understanding these stages helps you to setup the ALPR System correctly.

- The first stage is the Plate finder which searches each image for plate candidates before choosing one.
- The Plate reading stage consists of de-skewing and rotating the plate image. A skewed or rotated plate is normalized (transformed into a standard size and rotation). This is followed by the actual OCR (Optical Character Recognition) of the plate and then syntax rules are applied to this plate (so the number zero 0 may be corrected to a letter O for example).
- The final stage is the repetition of this process (the plate trace) as a vehicle moves through the field of view until a final plate is output.

OCR complexity

This is the complexity of the analytics to be applied during the ALPR Engine's stage of plate reading (see above). The default value is "High".

Tips:

- *The higher complexity, the higher the OCR processing time.*
- *Depending on the images received, the difference between the lowest and the highest complexities may represent up to 10% difference in OCR accuracy. (The average is 3-5%.)*
- *If the images are of high quality and the license plates have a good standard shape, the difference between medium and high complexity is irrelevant. You may set "medium" complexity in order to process the plates faster.*
- *Low complexity is only recommended when you have complex scenarios and low computing power available and the preference is for vehicle detection rather than perfect reading.*
- *You are advised to use the appropriate CPU to allow a complexity of at least "medium".*

Plate Find Depth

This is the complexity of the analytics to be applied during the ALPR Engine's stage of plate finding (see above). The default value is "Medium".

The ALPR Engine has up to 12 different Plate Finding levels. It works as follows:

- Low: Apply up to 3 levels. If any potential plate is found before reaching level 3, stop seeking.
- Medium: Apply up to 8 levels. If after reaching level 4 we have a plate or plates, stop seeking, otherwise continue until level 8.
- High complexity: Always apply the 12 different levels and consider all candidates found across all levels.

Tips:

- *Always use Medium level unless you're losing vehicles because lack of CPU capacity*
- *Level High is not normally recommended. It uses a lot of processing time and does not really make much difference compared to Medium. This level is very good, however, for containers code recognition.*

Plate back mode

This indicates the contrast between the plate text color and its background (dark on light, light on dark, or both)

Example of dark text on a light background

Example of light text on a dark background

Set "both" to read both types of plates (in locations such as the USA, Singapore, etc.).
Most countries' plates normally are "dark text on a light background". Do not set "both" unnecessarily, because it will decrease the OCR performance.

Operating mode

- Free-flow: the ALPR continuously searches for plates without needing any external triggers.
- Triggered (or Signaled): the ALPR requires an external trigger in order to read a plate. This can be generated from a beam being broken or a pressure pad, for example. It is often used at Toll booths or when used with under-vehicle scanning or radiation detection where the external equipment knows when a vehicle is present and can instruct the Engine to attempt to read a plate.

Note: This version only works in free-flow mode

CPU Resources (1-100%, Default = 80%)
This parameter manages the behavior of the OCR analytics by controlling the amount of CPU utilization (processing power). It is important to set this value correctly in extreme scenarios or when running multiple ALPR instances (multiple ALPR cameras) on the same computer.

This parameter effects:

- Performance capability: Any PC has limited resources. When this value is set to 100%, the ANPR analytics will use an entire virtual core, processing at the highest speed permitted by the CPU clock frequency. In high traffic speed scenarios or PCs with slower processors, you might need to increase this value because it directly affects the OCR processing speed.
- Parallelization capability: In many cases the processing speed is not a concern. You might have a fast CPU managing less-demanding scenarios (such as parking or access control), but need to operate many ALPR cameras from the same PC. Reducing the CPU Resources parameter will increase the number of ALPR cameras in exchange for reduced performance in terms of frame rate. The individual plate read OCR accuracy is unaffected.

The CPU Resources parameter controls the tradeoff between performance (OCR speed) and number of ALPR instances that can run concurrently on a PC.

Note: Many ALPR systems run 24/7, so it is important to set this parameter sensibly in order to avoid losing CPU cycles and having a high CPU load at all times.

Note: The ALPR performance is determined by the CPU clock frequency and the maximum of ALPR instances (cameras) is determined by the PC's number of virtual cores. Decrease the CPU Resources parameter to increase the number of ALPR instances that can run in parallel. However, if you run more ALPR cameras than there are virtual cores in the PC, decrease this parameter.

The key factor is the amount of time the system has to read the license plate. If the system has two seconds to read the plate, then it makes no sense to setup the OCR to process ten times per second because it will waste CPU cycles. In this case, setting an IP camera to output at 5 FPS and decreasing the CPU Resources parameter to 40%-50% will do the same job as 80%+ but much more efficiently. This will allow the system to process more ALPR cameras on the same PC.

OCR debug mode

This is used for debugging purposes in case of any unexpected errors. Do not activate without supervision from the Pelco support team.

Enable GPU

The OCR engine can be set to utilize a compatible NVIDIA GPU to perform its analytics

Note: This feature is not enabled in this version

Grammar

Often referred to as Syntax, these are the rules that many countries apply to their plates. For example, in the UK the current format is AA99 AAA, where A is an alphabetic character and 9 is a digit. Within this there are also other rules (such as no letter Q in the first 2 characters).

This is useful when trying to interpret a plate, for example, that is captured as OO1O OOO. Different counties and US States might interpret 0 as either the number zero or the letter O. Applying the country rule will help to determine the correct interpretation of the characters. Without using any grammar rules, there are 128 different combinations of the example plate, because a 1 can be interpreted as the letter I and O as either a letter O or the number zero.
In this case, applying the grammar rule for the UK, the plate is interpreted as the letters OO followed by the number 10 followed by three letters OOO.

Grammar strict

Default is ON. If grammar strict is set to ON and the read plate grammar (or syntax) does not match any country defined in the countries list (see below), then the plate will **not** be reported. If it is set to OFF and it has an unknown plate syntax, then it **will** be reported, and the country result will be set to 'UNKNOWN'.

Tips:

- *Setting this option to OFF might increase considerably the number of false positives in free-flow (asynchronous mode). To minimize the impact of this, use a fast CPU to be able to set the minimum number of occurrences to values like 2 or 3.*
- *You can turn this OFF when working in Triggered mode.*
- *We recommend keep this option set to ON.*

Motion Detection

Default is OFF. When set to ON the engine will only look for plates if motion is detected in the video stream. This can help reduce processor overhead.

Image Contrast Enhancement

Default is OFF. Turn this ON when you're working with very low contrast images and native grayscale images (and not an ALPR camera with IR bandpass filter). Under normal conditions, set Image Contrast Enhancement to OFF.

Multiple Countries Balanced

Default is OFF. This option only applies when more than one country is defined in the selected countries list. If the flag is OFF the OCR will select the first country matching the plate grammar, otherwise it will compare candidates with all the countries in the list selecting the best option according to its internal algorithms.

Keep this set to OFF unless the probability of having plates from different countries is high.

Example: If you define FRANCE and SPAIN in the countries list, and the ALPR system is in Paris, the probability of having a French plate vs Spanish plate is much higher, so keep this option set to OFF.
If however the ALPR system is operating near the French-Spanish border, then the probability of having a plate from either France or Spain is equal, so set this option to ON.

Characters Slant correction

Default is ON. When set, the OCR corrects the projection (perspective) and the slope angle. Never turn this OFF unless the plate is perfectly level and head on to the camera (the plates are already almost perfect rectangles).

List of Countries

You may select up to 8 countries to apply the proper grammar rules. This is very important to differentiate between “O” and “0” and “I” and “1”.

Set the countries in order of preference or likelihood to be seen when plates are read. Normally the first country should be the one where the ALPR system is operating. If the plate grammar does not match any specified country the plate might not be reported (see grammar strict option).

Tips:

- *Add the appropriate countries. (If you are in the UK do not add Singapore.)*
- *The OCR applies rules based on grammar structure and not font types or plate features.*
- *Do not operate with no countries selected.*

List of USA states

Set the Country to USA and then select up to five (5) US states to apply the proper grammar rules. As in the countries list above, the order of preference should be set according to the likelihood of seeing plates from each State.

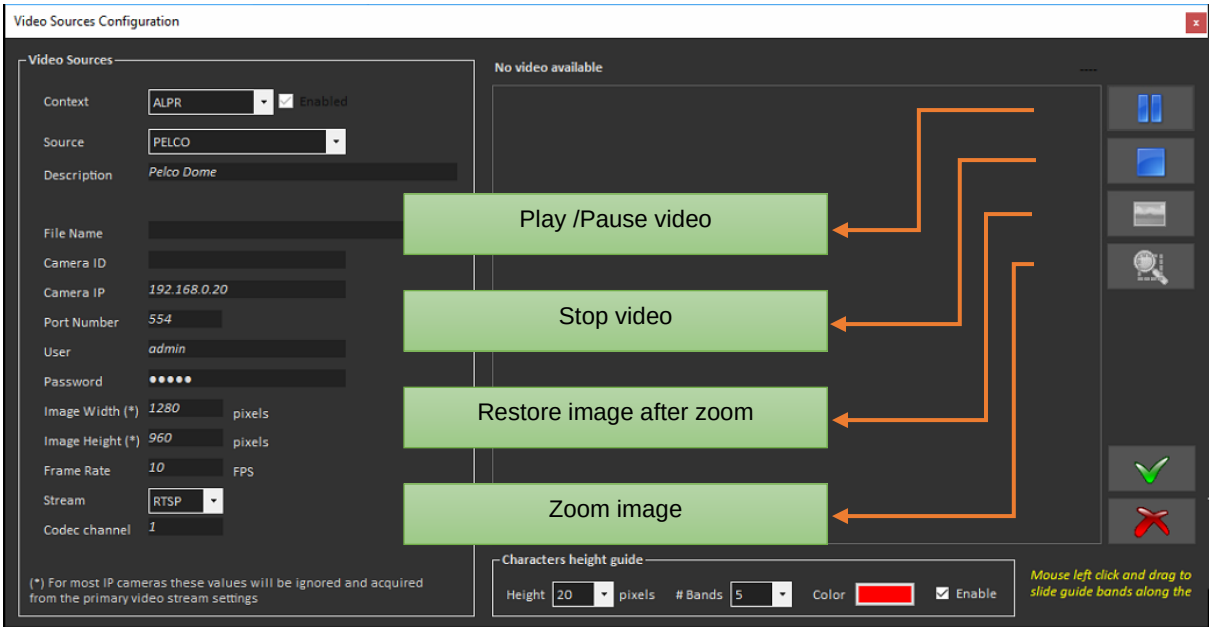
This option applies only when USA is defined in the list of countries. Setting a state of preference helps the OCR to narrow the search and manage probabilities more efficiently.

As opposed to the list of countries, if the plate grammar does not match the State rules, the license plate result will be reported anyway.

Important note: This does not affect the number of states the system will capture. For example, if you are in New York and have the grammar rules set for New York, New Jersey, Connecticut, Pennsylvania, and Massachusetts, and a vehicle with Vermont plates drives past the camera, the Vermont plate will be detected and captured; however, the grammar will not be applied.

Video Configuration

This is where the video source used by the OCR and, optionally, the video contextual (or environment camera) linked to the ALPR sensor are added and setup for each lane.



Video Configuration Screen

Background to ALPR & Environment Cameras

Some cameras used for ALPR have only one lens and can be set to Color (day-mode), night-mode, or auto switching between Color and night-mode. However some professional ALPR cameras have twin lenses. In this case, a monochrome one illuminated by IR (Infrared) and a second Color contextual or Environment camera which is usually zoomed out a little, will show the vehicle and hopefully the occupants contextually against a background. This can help to legally prove where a vehicle was when captured.

Alternatively, you can use a separate second Color camera and configure it as the Environment camera for another unit that has been optimized to read plates.
Note that using two cameras like this on a network can produce unsatisfactory results because the video latency can cause the cameras to be slightly out of sync.

Context

Select either ALPR or ENVIRONMENT according to what type of camera you are configuring.

Source

This is where the Video source—the camera that is being used for ALPR (or the Environment camera)—is selected. . It can be classified into different groups:

- IP cameras: IP based cameras
- USB or non-IP cameras
- Video file: Media clip or Graph Studio file
- Generic RTSP streams

In addition to Pelco cameras, the camera list includes several third-party cameras that have been tested with this software. Select the correct camera.

If the camera you are using is not in this list then select GENERIC and enter the correct IP address of the camera's RTSP stream, port number, user name and password (if used) for your camera.

For example, for a global shutter IP camera enter:

Camera IP	rtsp://192.168.0.10:554/cam0_0
Port	554
User	root
Password	root or whatever has been set.

Select VIDEO FILE if you wish to process a recorded video clip and attempt to read-off the plates seen.

Depending on the type of video camera selected, some text boxes will be enabled or disabled.

Description

Enter a description for your camera (for example: Front Entrance).

File name

If a recoded file of traffic is to be processed select the file here. The video source can be a media clip.

If an older analogue camera is being used with a video frame grabber, then enter the Video Graph File (.grf) generated by Graph Studio that uses the DirectShow filters of a frame grabber (video analog acquisition).

Camera ID

Non-IP cameras by certain manufacturers such as IDS or Basler.

Camera IP

When selecting an IP camera from video source, set the camera's IP address.

In case of using a GENERIC video source, enter an RTSP or ONVIF connection string as follows.

RTSP, RTMP, HTTP, TCP, UDP, MSSH Protocols

- [protocol]://[user:password]@[IP address or host name]/[URL params]
- Example: rtsp://root:admin@192.168.1.30/axis-media/media.amp?videocodec=h264&audio=0 (or see example above)

ONVIF RTSP streams

- RTSP stream of the first ONVIF media profile (default)
  - onvif://[onvifuser]:[onvifpassword]@[IP address or host name]:[onvif HTTP port]
  - Example: onvif://user:pass@192.168.2.55:8080
- RTSP stream selected by the index of the ONVIF media profile
  - The index of the media profile must be in the 0..n-1 range
  - onvif://[onvifuser]:[onvifpassword]@[IP address or host name]:[onvif HTTP port]/[index of the onvif profile]
  - Example: onvif://user:pass@192.168.2.55:8080/1
- RTSP stream selected by the name of the ONVIF media profile
  - This is the name of the media profile as it has been configured in the IP camera settings
  - onvif://[onvifuser]:[onvifpassword]@[IP address or host name]:[onvif HTTP port]/[name of the onvif media profile]
  - Example: supposing the name of the profile is "high quality" it would be onvif://user:pass@192.168.2.55:8080/high quality

Note: When using the RTSP stream, it is advisable to turn off the audio stream by setting the audio stream enabled to 0 > audiostreamenabled=0

Non-managed IP camera parameters

Port number, user, password, image width, image width and height.

Most IP cameras will ignore these values; the settings from the camera's primary stream will be used. (When using most Axis cameras, the resolution CAN be changed here)

Frame Rate

The maximum frame rate to be used.

IMPORTANT: The camera will normally allow you to set up a target frame rate to output images (for example: 20). If the Frame rate is set here to a lower value, then OCR engine will take this value as its maximum operational frame rate.

Example: If the camera is operating at 20 FPS and the OCR engine can operate at 10 FPS (100 ms frame analysis period – depending on processor power) and we set this parameter to 5 FPS, the OCR engine will operate 5 FPS maximum.

This value will represent the maximum frequency of our OCR analytics cycle.

Stream

Can be either MJPEG or RTSP. Not all IP cameras will have MJPEG available, so it is recommended to use RTSP by default.

Codec channel

This Indicates the stream channel from which to acquire the video. Most IP cameras have 2 or 3 streams which can be set to different resolutions. You might use one stream to send to a remote VMS system and another for the ALPR processing.

For Pelco and most other IP cameras this value can be set to 1, 2 or 3. (It adds these numbers to the RTSP parameters.)

The default value is set to -1 – which selects the default stream from the camera (that is, stream 1).

For example, for a rolling shutter color IP camera enter:

Camera IP rtsp://192.168.0.11/1/stream1
Port 554
User admin
Password admin1357 or whatever has been set.After setting up and previewing this camera, if you have an associated Environment camera then select ENVIRONMENT in the Context box and repeat the setup.
Remember to select 'Enabled' next to the Context box.

To complete our example for a generic camera with two lenses (IR & color overview):

Press the Play icon to test, and if working correctly, click the green tick (bottom right) to save the settings configured so far. In the main menu save again using the green tick noting the Instance ID.

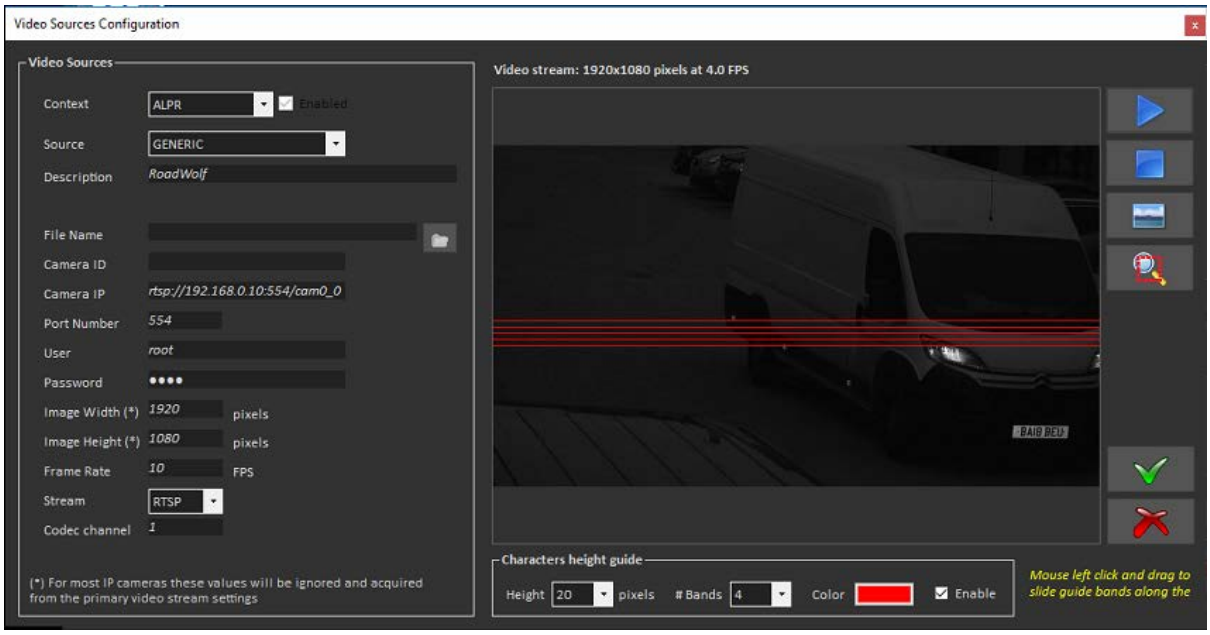
Select the 'Save As' icon on the left to save your configuration to the VideoXpert Plates cfg directory using a meaningful name.

Calculation of the Average License Plate Characters Height

One of the key tasks during ALPR configuration is to estimate the average license plate character height in pixels to set up a valid range for the OCR to work on. The correct range will help to achieve better performance and higher accuracy.

Sometimes it is hard to estimate this height just by watching the live video screen, furthermore, it's even harder to verify that the character height is optimal, not too small, not too big.

The program fortunately contains a visual tool that will help the user to quickly and easily get a good estimate of the height range of the plates seen in the live video.



Calculation of the average height in pixels of the license plate characters

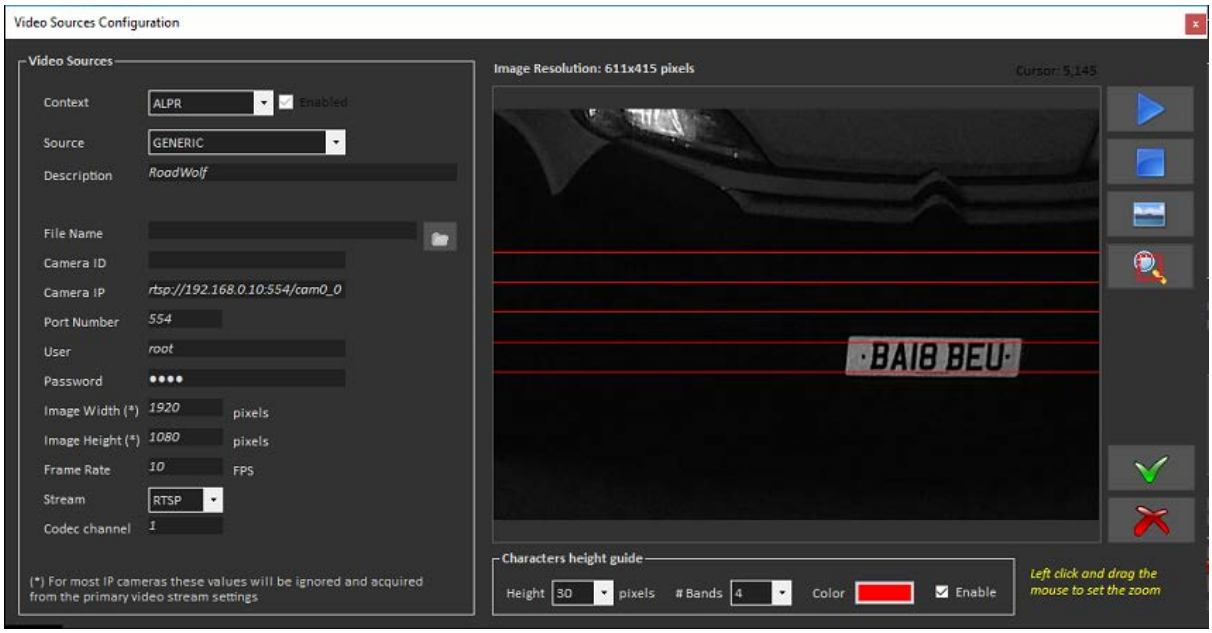
In the "Characters height guide" we can configure the spacing of the calibration stripes:

- Height: The gap between any 2 lines, in pixels
- Bands: The number of lines to display. (This helps you estimate more accurately.)
- Color: The color of the lines may be changed for clarity.
- Enable: Turn the calibration stripes on or off.

1. Click the triangular Play icon to play the live video and press PAUSE when you have a vehicle in the frame with the license plate clearly visible.

2. Move the mouse and hold the left button to slide the red horizontal lines up and down over the frame. The separation between any two stripes is equal to the height defined in the "Characters height guide" section at the bottom of the screen, in pixels.
   (Here we have set the number on bands to 4 and the height between each band to 20)

3. Use the Zoom icon  to define an area around the plate and zoom into that area.



Use the separation of the red stripes to estimate the height of the characters

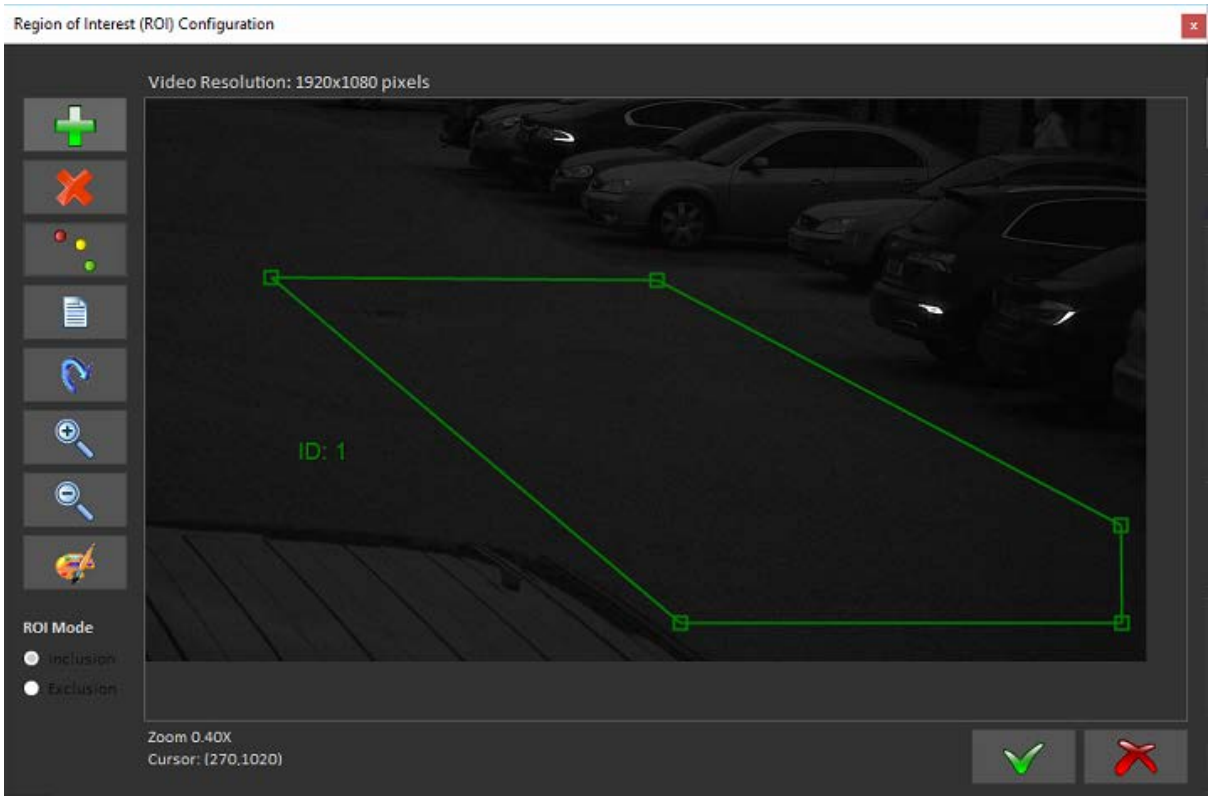
We can now change the height and/or number of bands and then slide the bands up and down to accurately determine the height of each character. In this case, after zooming in we can clearly see that the height of the characters takes up just under one gap separation - which would be around 30 pixels high. Optimum recognition occurs at a character height of between 20 and 30 pixels. In the example above, our height has been measured towards the end of the vehicle's track down the screen, so the height range will be around 20-30 as the vehicle approaches, which is ideal.

Region of Interest Configuration

This functionality requires the video source to be setup and working.

The Region of Interest (ROI), sometimes known as the Crop Zone, is used to define an area within the video frame where the OCR analytics takes place. The user can define a polygon and choose whether the area to look for plates in Inside or Outside this region. The user can then set multiple regions in complex situations, although this is rare.

Using an ROI can decrease OCR processing time and reduce false positives.
If the camera is looking across a large stretch of road as in the example below, the ROI can be used to limit the OCR to the area near to the camera, thus easing the processor load. If a plate-shaped window or road sign for example is within the camera's field of view and keeps getting mistaken for a license plate, then these false positives can be eliminated by creating a crop zone to exclude this part of the image. Each ROI must be given a unique numeric Identifier, for example '1'.
Note that the whole license plate must be in or out the ROI to pass the test.



Region of Interest Configuration Screen

The **ROI Mode** determines the behavior of the ROI, it can be set to either include or exclude the area around it. You cannot mix both types for logic reasons.

- Inclusion: The OCR will apply the analytics only inside the polygon defining the ROI
- Exclusion: The OCR will apply the analytics only outside the polygon defining the ROI


Add a new region of interest and save a region ID (numeric)


Remove all ROIs


Remove existing region of interest


Zoom In

Move ROI polygons points

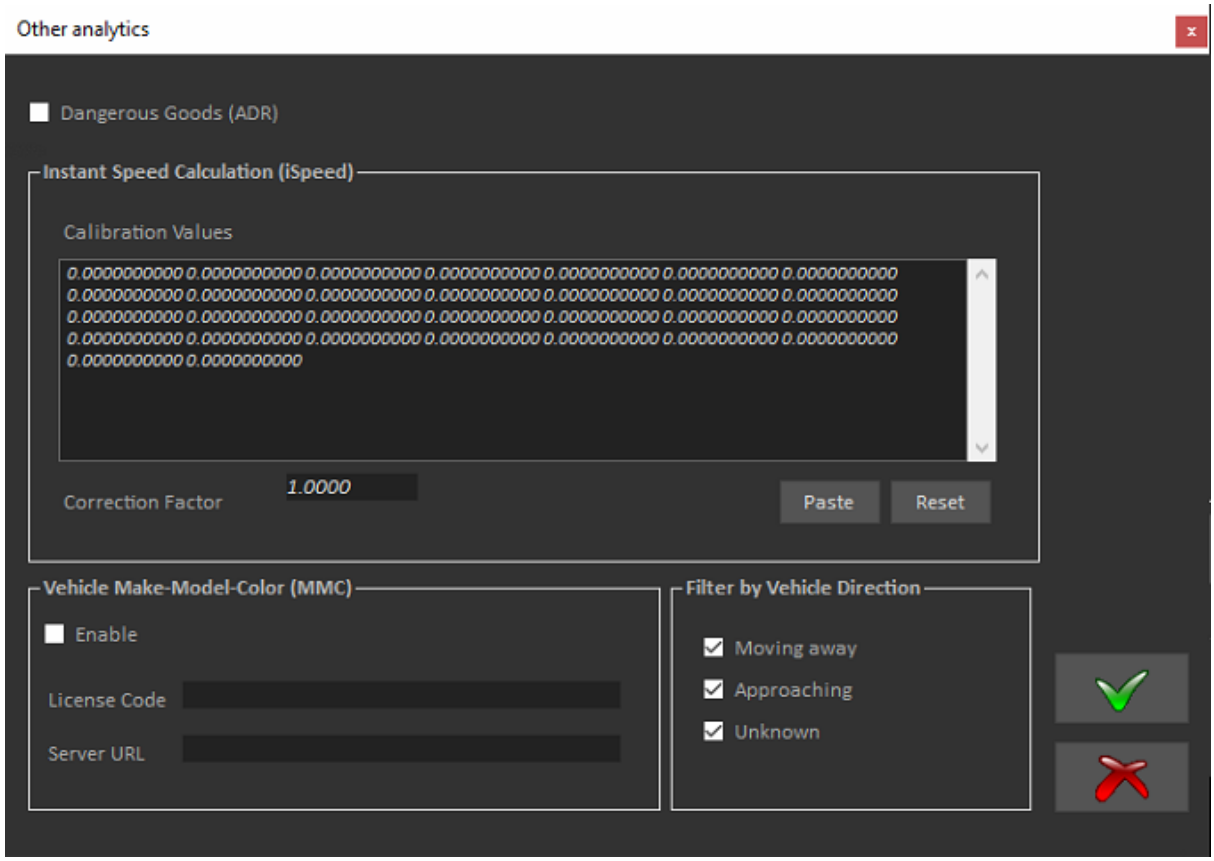
Zoom Out

Edit ROI ID

Change Polygon Color

Other Analytics Configuration

VideoXpert Plates ALPR includes some additional analytics in addition to the OCR. Please note, other analytics including Dangerous Goods Plates (ADR), Vehicle Instant Speed Calculation, and Vehicle Make-Model-Color Reporting **are currently not available**, although they are shown in the screen.



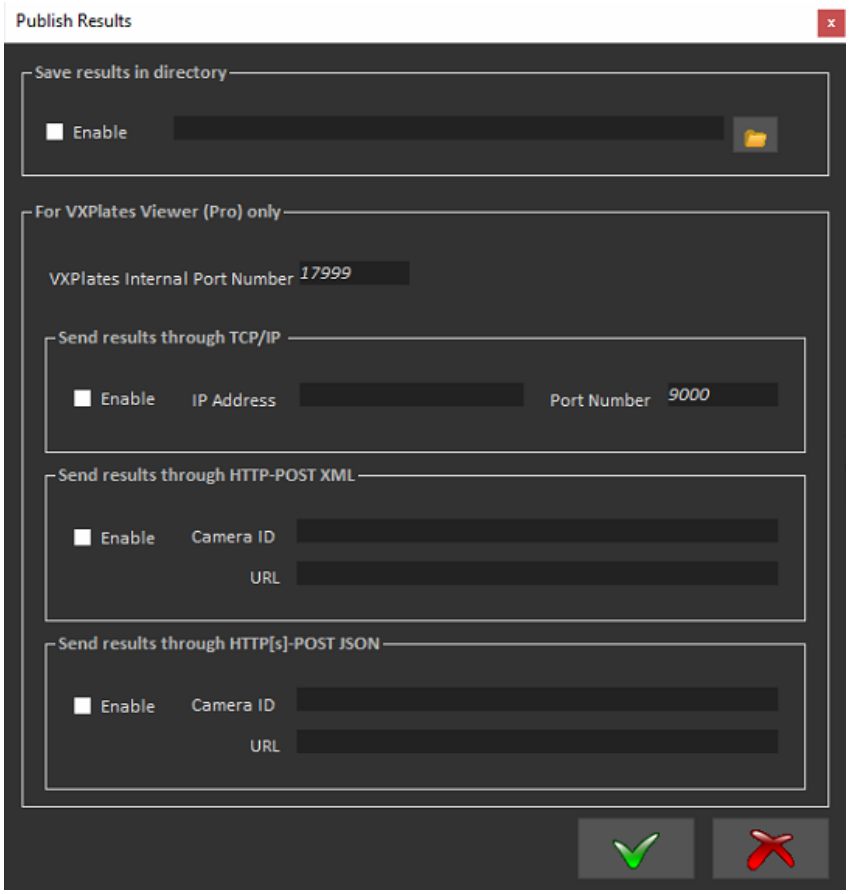
Additional Analytics Configuration Screen

The **Vehicle Direction Filter** is part of the OCR package and can be enabled here.

Filter by vehicle direction causes the ALPR Engine to report only the license plates from vehicles matching the direction of travel defined by the filter. By default, this filter is inactive.

Results Publishing Configuration Screen

This menu allows the user to configure the software to publish the plate reads in real time, saving or sending the reads to other software or locations.
Note that this is for each lane setup and there is no need to set any of these outputs up if you just want to send plates to the main VideoXpert Plates ALPR program (next section) – and on to VideoXpert.



Results Publishing Configuration Screen

In addition to transmitting plates remotely you can use '**Save results in a directory'** to record all plate reads and associated images. Select a directory using the Folder icon. This can be useful if you want to perform testing using VideoXpert Plates ALPR Setup and verify the results later.

The program creates a daily folder which contains the images from the camera (Plate patch, Image from the ALPR camera, and the Image from the Color Environment camera if present). In addition, there is a .csv file of all the reads which contains additional data for each plate, including Confidence, Plate Height, and Country.

Internal Port Number

Set a port number to allow VideoXpert Plates ALPR intercommunication (that is, between each lane and the main VideoXpert Plates ALPR Viewer).

Results publishing

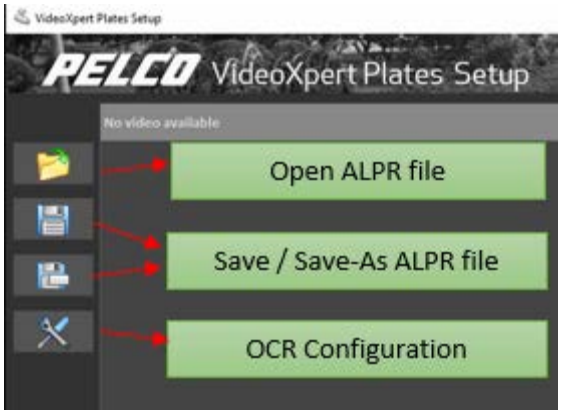
The VideoXpert Plates ALPR Viewer provides several mechanisms to allow third party integration and allows external programs to receive results in real time from VideoXpert Plates ALPR. Because this software is an application, not an SDK, VideoXpert Plates ALPR can publish results as follows:

- **TCP/IP Sockets**: Each result is encoded and send to the server **Port Number** as specified here.
- **HTTP-POST XML**: Each result is formatted in XML and sent to the specified URL.
- **HTTP(s)-POST JSON**. Each result is formatted in JSON and sent to the specified URL.

See the ALPR Results Integration section later in this manual for more details on configuring these outputs.

Saving the VideoXpert Plates ALPR Configuration

After setting all of the parameters for a camera, you must save them as an .alpr file in the cfg folder (for example: *C:\Program Files (x86)\VideoXpert Plates\cfg*) using the **Save** or **Save-As** icons as shown below.:
Choose an appropriate file name such as ‘Camera 1’ or ‘Front Gate’.

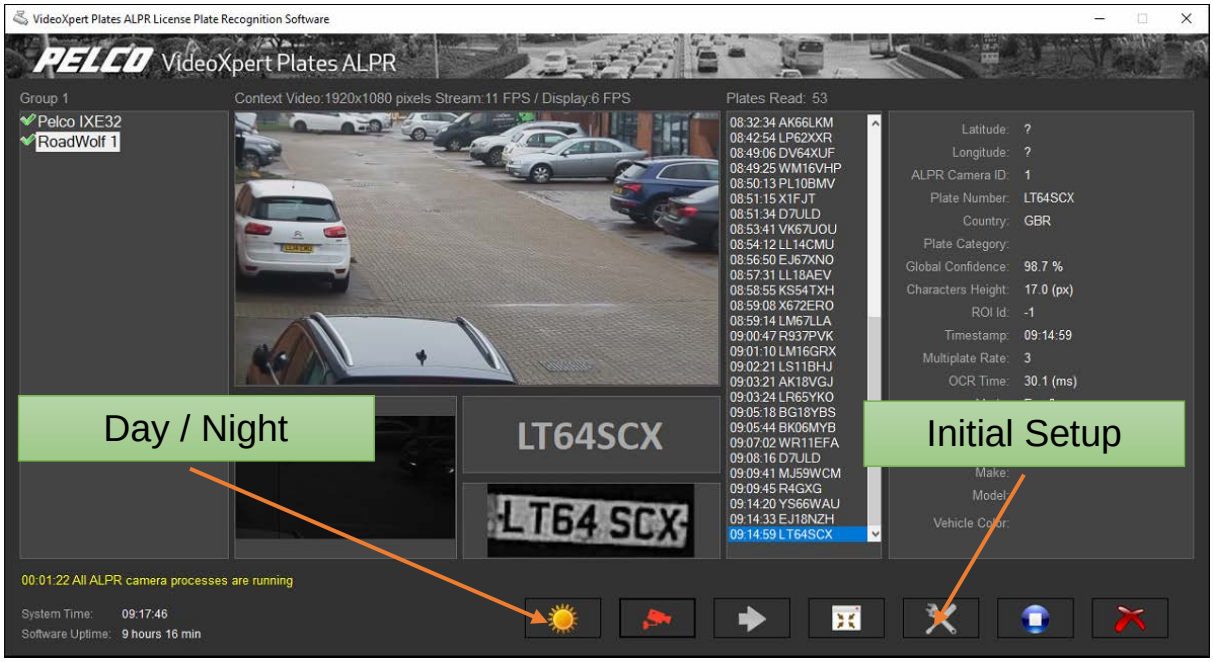


Repeat this configuration process for every camera you wish to add to your ALPR system.

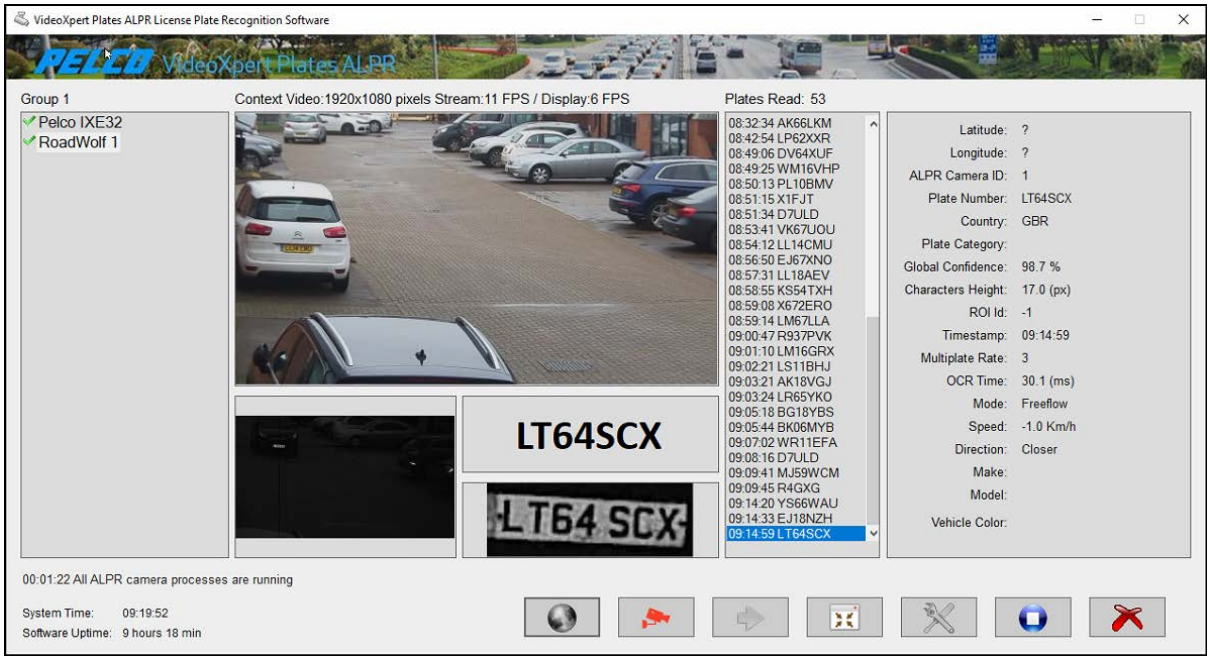
After all the cameras are setup and their respective configuration files saved, exit the program and load the **VideoXpert Plates ALPR** program to link all the cameras together to create our ALPR system by loading these files one by one. *(Note the .alpr files will then be converted to .txt files)*

VideoXpert Plates ALPR Viewer

VideoXpert Plates ALPR, also known as the VideoXpert Plates ALPR Viewer, is the software that brings together and runs one or more ALPR cameras (or lanes) that have been configured by VideoXpert Plates ALPR Setup. The application operates unattended and requires no user interaction other than the initial setup, which is where you select which ALPR files to run.



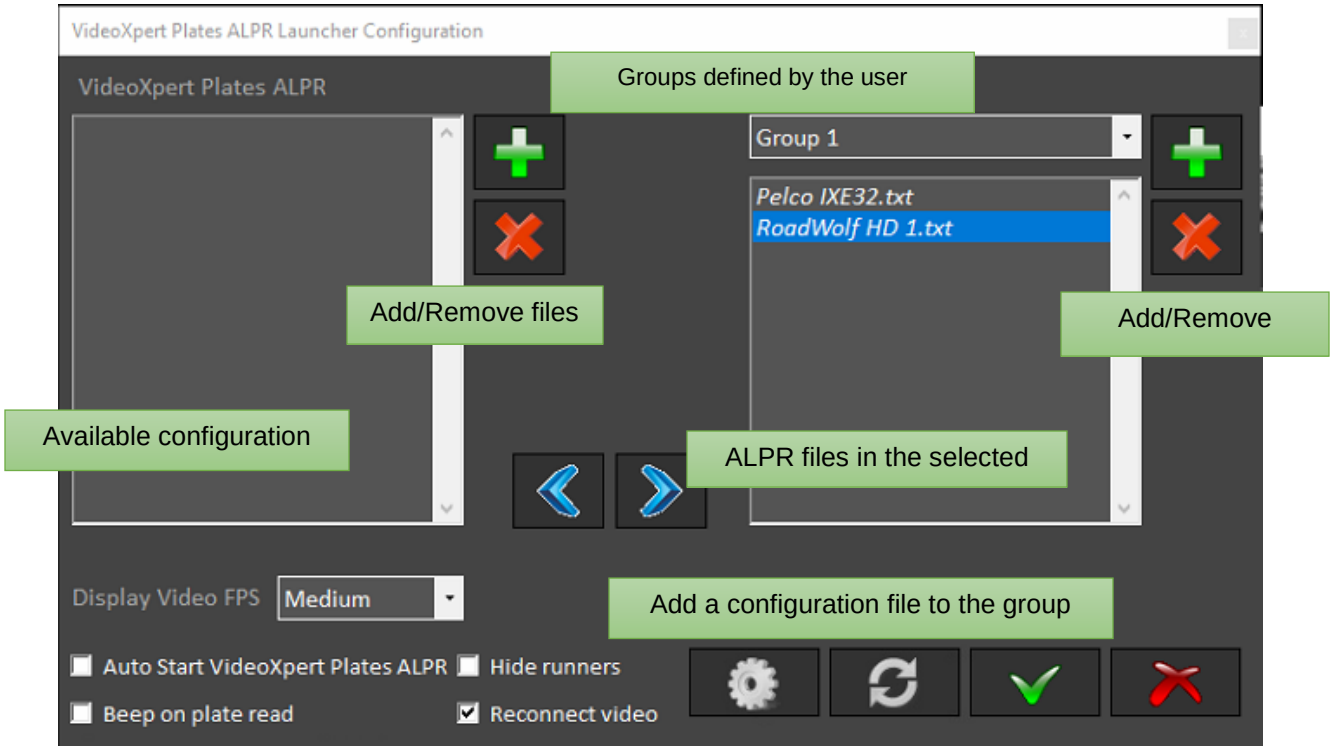
VideoXpert Plates ALPR Main Screen in Night Mode



VideoXpert Plates ALPR Main Screen in Day Mode

Initial Setup

Initial setup normally takes place just once, and here we select the one or more ALPR files configured by VideoXpert Plates ALPR Setup that will become our ALPR system. Note: Run VideoXpert Plates ALPR with Administrative privileges.



Configuration Screen for ALPR Files Selection

VideoXpert Plates ALPR Configuration Files

This is the location where all ALPR files defined by VideoXpert Plates ALPR Setup are located, which corresponds with the “cfg” folder inside VideoXpert Plates ALPR installation directory.

Note that being listed here does not mean a file is going to be processed by VideoXpert Plates ALPR Viewer. You must choose which files to include in the system manually.

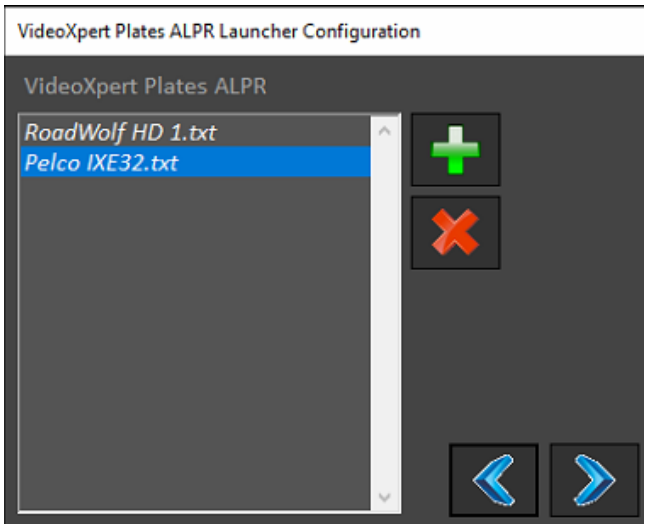
Camera Groups

The way VideoXpert Plates ALPR manages the cameras is by groups. A group is a list of ALPR files and only one group can run at a time, so only the ALPR files of the group run simultaneously. Thus, VideoXpert Plates ALPR manages a list of groups, each one containing a list of ALPR files.

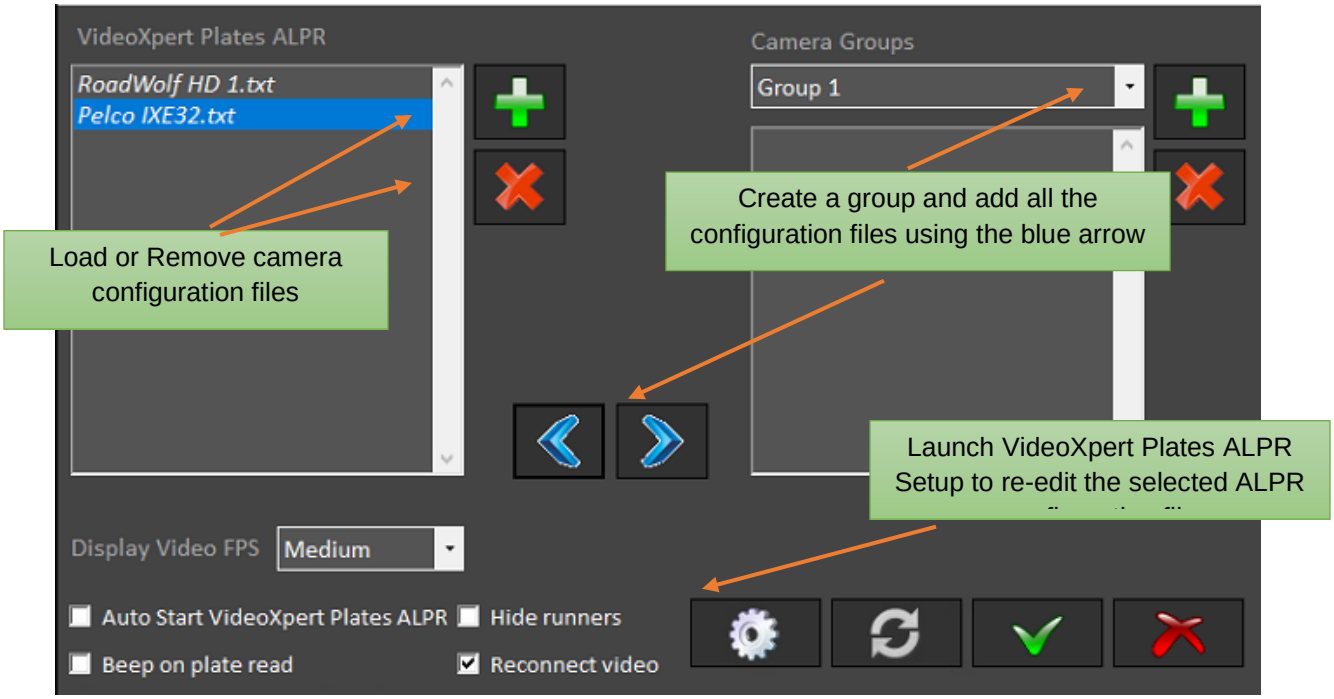
Usually there will be one group containing all our ALPR files. For example, you can have 4 ALPR cameras but only run 2 simultaneously and then switch to the other 2. The multiple groups help you do this; the main screen provides a button (Yellow Right Arrow icon) to cycle and switch between camera groups automatically.

How it works step-by-step

Use the **Plus** Icon on the left to load the configuration files created by VideoXpert Plates ALPR Setup located in the “cfg” folder in the VideoXpert Plates ALPR installation directory. The red Cross Icon removes them. Repeat for all the cameras you want to integrate.



If you do not need to create more than one group, you can press the button to create a default group and automatically add all your files; otherwise, manually create the groups and add the files using the blue arrow buttons.



All groups must contain at least one VideoXpert Plates ALPR File, and all files loaded (in the left window) must be allocated to a group before exiting. If some are not needed, remove them with the red cross icon. They will not be deleted.

Other options

- **Display Video FPS**: This sets the frame rate at which to display the live video on the PC screen. This feature does not affect the ALPR operating frame rate, it is more of a visual or cosmetic feature. Refreshing video frames consumes processor resources and so we recommend setting this to Low.

- **Beep on plate read**: The software will play a beep sound every time the OCR reads a plate.

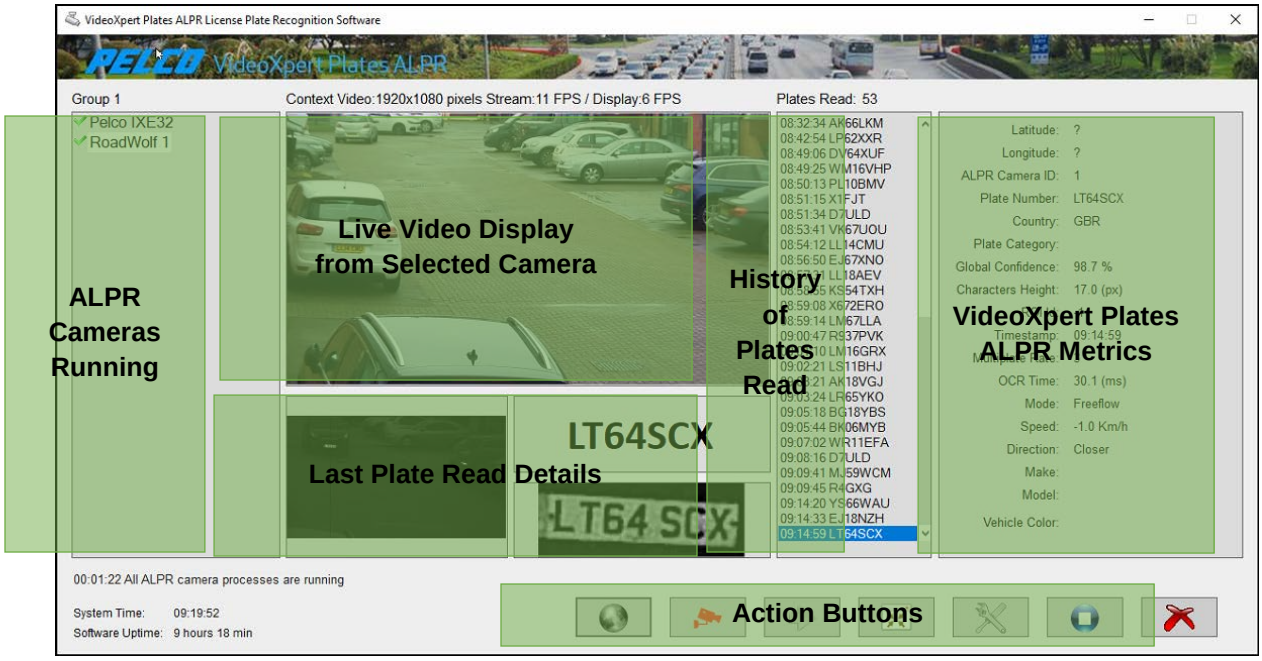
- **Auto Start VideoXpert Plates ALPR:** VideoXpert Plates ALPR will automatically load your configuration at start up and will automatically launch the OCR processes. Note that this option does not launch VideoXpert Plates ALPR after rebooting the computer, it just restarts the selected ALPR files after starting the application. *To auto start VideoXpert Plates ALPR, add the program to the Windows Startup folder.*

- **Hide runners**: Show or hide the console windows in the task bar running the OCR processes.

- **Reconnect video**: Activate or deactivate automatic video reconnection in case of losing the camera connectivity. If this option is disabled, the OCR will stop running if connectivity is lost. If enabled, then when the connectivity is recovered, VideoXpert Plates ALPR will continue running automatically. This option is normally enabled unless the system is configured to process video files (instead of live cameras) and you do not want the ALPR to reload the media clip after finishing.

Main Screen

After setting up the ALPR files groups, launch VideoXpert Plates ALPR from the main screen



VideoXpert Plates ALPR Viewer Main Screen Components

Main Screen Components

- **ALPR Cameras running**: This window displays the list of the cameras in the active group. The name corresponds with the camera description we setup in VideoXpert Plates ALPR Setup.
- **Video Live Display**: This window shows the live video stream from either the ALPR or environment camera selected from the ALPR cameras list on the left. You can see the display frame rate from VideoXpert Plates ALPR configuration screen described in the previous sections.
  Use the camera icon at the bottom to switch between ALPR and Environment cameras (if available).
- **Plates Read History**: This shows the 100 most-recent plates and timestamps read by the currently selected camera.
- **Last Plate Read Details:** Details including the full image of the last plate read, the cropped plate from the image (the Plate Patch) and the interpreted plate characters are displayed here. The image displayed corresponds to the one defined by the ***Reported Image*** parameter. See the OCR Configuration section previously.
- **VideoXpert Plates ALPR Metrics**: The program displays various metrics from the ALPR Engine. Most of these metrics correspond to the last plate read.
- **Action Buttons**: The main Action Buttons along the bottom of the display perform the actions described in the Action buttons section, below.

Action buttons

Toggle between Day/Night view (lighter or darker screen theme)

Toggle display between the ALPR and corresponding Environment camera (if available)

Stops the running ALPR camera group and switches to next one (if multiple groups have been setup)

Minimizes the main screen into a very small window with very little info display.
This also saves processor overhead.

VideoXpert Plates ALPR Viewer Configuration. The cameras should be stopped first.

Start/Stop VideoXpert Plates ALPR

Exit VideoXpert Plates ALPR

VideoXpert Plates ALPR Results Integration

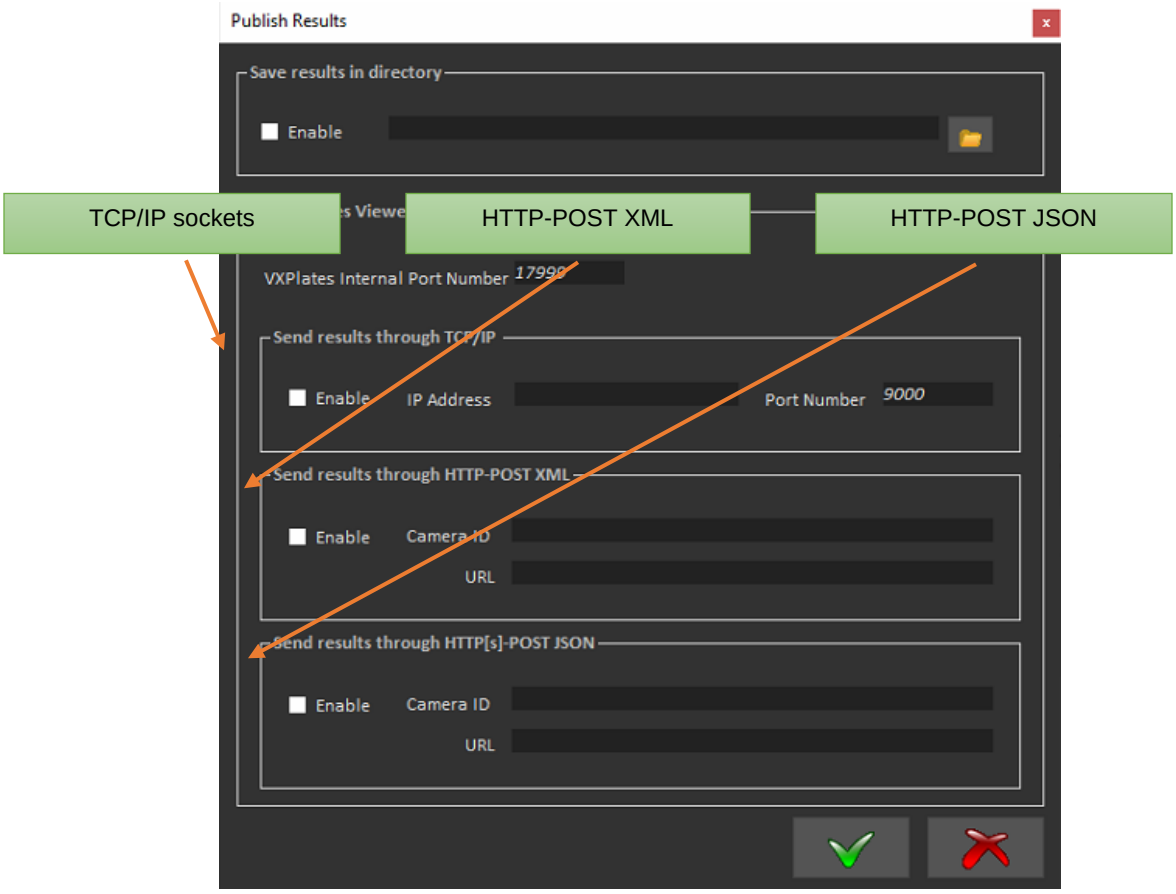
VideoXpert Plates ALPR can publish real time results in various ways:

- TCP/IP Sockets
- HTTP-POST XML
- HTTP-POST JSON

VideoXpert Plates ALPR publishes a result every time it reads a license plate. To receive data from VideoXpert Plates ALPR, enable the appropriate method.

All methods are:

- Multiplatform independent
- Programming language independent
- Support local or remote integration



Configuration Screen to setup the appropriate results publishing method

TCP/IP Sockets

Enter the IP address of the host machine receiving the results, and enter the port number.
You will have to “listen” to the same port number.

IMPORTANT: Multiple ALPR instances (cameras) can publish to the same port number. The message (results) includes the camera ID to identify the message sender or ALPR source (for example: the camera).

From a software perspective, you must open a “listener” on the port number and wait for results. VideoXpert Plates ALPR opens a connection for every new message, transmits the information, and then closes the connection.

.NET integration

In case of using a .NET platform, we provide an easy-to-use Class Library (Assembly), named **VideoXpert Plates ALPRRemotePlatesParser.dll,** that can do this job for you.

Visual Basic .NET example

1. Declare the main class of the class library.

```
Imports VideoXpert Plates ALPRRemotePlateParser

Private _server As AlprResultsServer = Nothing
```

2. Instance the main class, and provide 2 callbacks to receive plate results and any possible errors from the library. Next start the server and provide the same port number defined in the VideoXpert Plates ALPR Setup configuration.

```
_server = New AlprResultsServer(AddressOf Me.OnNewPlate, AddressOf Me.OnAlprServerError)
_server.Start(port_number)
```

3. Shutdown the server when you have finished.

```
_server.Shutdown()
```

Functions callback definition

```
Public Sub OnNewPlate(ByVal alpr_plate As AlprPlateResult)
    ‘ Here you can get all ALPR results contined in ‘alpr_plate’ instance.
    ‘ AlprPlateResult is defined and available in VideoXpert Plates ALPRRemotePlatesParser.dll
End Sub

Public Sub OnAlprServerError(ByVal err_msg As String)
    MsgBox(err_msg, MsgBoxStyle.Exclamation)
End Sub
```

Raw Integration and other platforms

If you are not using .NET, parse the results yourself. This is the format of the data you will get from the socket every time VideoXpert Plates ALPR publishes a result:

- 4 bytes, int32 => 0xCAFEBABE is the start message header identifier (fixed)
- 4 bytes, int32 => 0xBABE10 result message (fixed)
- 4 bytes, int32 => VideoXpert Plates ALPR instance ID, matches the tag InstanceID from VideoXpert Plates ALPR configuration file
- 8 bytes, int64 => Time Stamp, current date in milliseconds
- 4 bytes, int32 => NC1:number of ASCII characters of the plate number
- NC1 bytes, byte => ASCII bytes array
- 4 bytes, int32 => NC2:number of ASCII characters of the plate origin
- NC2 bytes, byte => ASCII bytes array
- 4 bytes, int32 => ROI ID containing the license plate (1…n). 0 value means plate out of any ROI
- 8 bytes, double => Global confidence of plate recognition:]0...100]
- 8 bytes, double => Characters height, in pixels
- NC1 bytes, float => Per character recognition confidence]0…100]
- 8 bytes, double => OCR processing time, in milliseconds
- 4 bytes, int32 => 'x0' coordinate of the plate left-top corner, in pixels
- 4 bytes, int32 => 'y0' coordinate of the plate left-top corner, in pixels
- 4 bytes, int32 => 'x1' coordinate of the plate right-bottom corner, in pixels
- 4 bytes, int32 => 'y1' coordinate of the plate right-bottom corner, in pixels
- 8 bytes, int64 => OCR image timestamp, in milliseconds
- 4 bytes, int32 => SF: size of the OCR image, in bytes
- SF bytes, byte => OCR image data in JPEG format
- 4 bytes, int32 => R1: size of image reserverved data, in bytes
- R1 bytes, byte => reserved data, R1 bytes
- 8 bytes, int64 => Environment image timestamp, in milliseconds
- 4 bytes, int32 => SF: size of the envirnoment image, in bytes
- SF bytes, byte => Environment image data in JPEG format
- 4 bytes, int32 => R2: size of image reserverved data, in bytes
- R1 bytes, byte => reserved data, R2 bytes
- 4 bytes, int32 => vehicle direction, if available: 0=>unknown, 1=>closer, 2=>farther
- 4 bytes, int32 => ALPR multiplate rate
- 4 bytes, int32 => 1: plate reported under SYNCHRO_SIGNALED mode, 0: SYNCHRO_FREE_FLOW mode
- **4 bytes, int32 => 0x42F83988 Header indicating optional data follows**
- ---
- **4 bytes, int32 => 0x50000001 Plate number in wide string format section**
- 4 bytes, int32 => Number of plate characters
- 4 bytes, int32 => NC3: Number of bytes taking the full plate string
- NC3 bytes, byte => Array of bytes representing the string either in UTF8 or UNICODE format
- **4 bytes, int32 => 0x50000002 Hot-List section (*)**
- 4 bytes, int32 => 1:white list. 2: black list
- 4 bytes, int32 => NC4:number of ASCII characters in the message
- NC4 bytes, byte => ASCII bytes array containing the message
- **4 bytes, int32 => 0x50000003 String code section (**)**
- 4 bytes, int32 => String code = 1:plate country region, 2: vehicle color, 3: vehicle make, 4: vehicle model
- 4 bytes, int32 => NC5: number of ASCII characters of the string
- NC5 bytes, byte => ASCII bytes array containing the characters
- 4 bytes, int32 => 0x50000004 GPS section
- 8 bytes, double => Latitude in decimal format

- 4 bytes, int32 => 1:N, 2:S
- 8 bytes, double => Longitude in decimal format
- 4 bytes, int32 => 1:W, 2:E
- ---
- 4 bytes, int32 => 0x42F87D89 is the end message header identifier (fixed)

(*) The hot list block can appear twice, once per list.
(**) The string code block can appear more than once, but each code only can only appear once.

HTTP-POST XML or JSON

XML Connector

VideoXpert Plates ALPR will send an HTTP POST to the webserver configured each time a plate is read. The message Content-type will be “application/xml” and the message body will be the XML object defined in the file “**event.xml**” that you can find in VideoXpert Plates ALPR installation directory. This file can be edited by the user to define the desired XML structure.

JSON connector

VideoXpert Plates ALPR will send a HTTP POST or HTTPS POST to the webserver configured each time a plate is read. The message Content-type will be “application/json” and the message body will be the JSON object defined in the file “**event.json**” at the VideoXpert Plates ALPR installation directory. This file can be edited by the user to define the desired JSON object. The available reserved words are:

Reserved words you can utilize in your ‘event’ configuration file

$timestamp$: Date and time of the read in local time. The string is formatted according to ISO8601 standard (yyyy-MM-ddTHH:mm:sszzz). In example: 2007-11-23T13:18:05-03:00

$plate$: Plate number

$country$: Country of the vehicle using ISO ALPHA-3 Code.

$cameraid$: Unique id for the reader. This id is setup by the user on the configuration.

$confidence$: Global confidence of the plate (0-100).

$processingtime$: Milliseconds that the OCR took to analyze this plate number.

$charheight$: Average height in pixels of the characters in the plate number.

$left$,top,$right$,$bottom$: Pixel coordinates of the top left corner and the bottom right corner of the license plate in the image.

$absoluteleft$,$absolutetop$,$absoluteright$$absolutebottom$: Absolute coordinates (0 .. 1) of the top left corner and the bottom right corner of the license plate in the image.

$width$: Width of the analyzed image.

$height$: Height of the analyzed image.

$region$: Plate region. Countries like UAE or USA will report here the internal region (Dubai, Bahrein, New York …)

$category$: Plate category. Available for Kuwait.

$make$: Vehicle maker.

$model$: Vehicle model.

$vehiclecolor$: Vehicle color.

$direction$: Vehicle direction (UNKNOWN, GETTING_CLOSER, GETTING_FARTHER)

$latitude$, $longitude$: Coordinate of the read formatted in decimal degrees.

$image$: JPEG image encoded in base64 format.

$sizeinbytes$: Size in bytes of the JPEG image when decoded.

Pelco Troubleshooting Contact Information

If the instructions provided fail to solve your problem, contact Pelco Product Support at 1-800-289-9100 (USA and Canada) or +1-559-292-1981 (international) for assistance. Be sure to have the serial number available when calling.

Do not try to repair the unit yourself. Leave maintenance and repairs to qualified technical personnel only.

Pelco by Schneider Electric
625 W. Alluvial, Fresno, California 93711 United States
(800) 289-9100 Tel
(800 289-9150 Fax
+1 (559) 292-1981 International Tel
+1 (559) 348-1120 International Fax
www.pelco.com