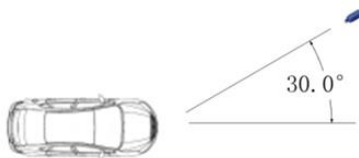


## License Plate Capture - Camera Setup

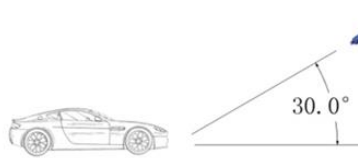
License plate cameras such as the IPLPRB2447MX are dedicated use and as such have specific installation requirements in order to be able to clearly see and record a license plate. These requirements include position and image settings, so that the plate can be seen. The camera text detection is fairly accurate but it also has similar setup requirements. This tec note will cover these requirements as well as how to setup the NVR and camera to capture the plate text. As of the writing of the document the supported NVRs (with the most recent firmware) include the following:  
NR164X / NR324X / NR328X / NR648X / NR6416 / NR12816 / NR12824 / NR25624.

### POSITIONING

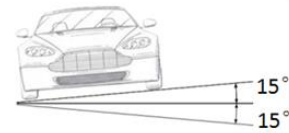
The camera should be positioned within 30° angle offset to the side, 30° angle above and 15° angle parallel to the road. Keep these requirements in mind when determining mounting position of the camera.



The horizontal angle ↺ should be no more than 30°

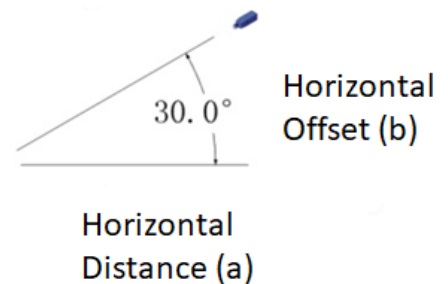


The vertical angle ↴ should be no more than 30°

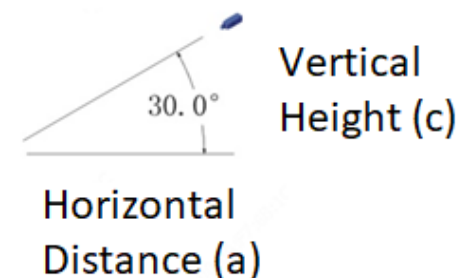


The horizontal tilt angle ↵ should be no more than ±15°

Max Camera Horizontal Offset (b) = Horizontal Distance (a)



Max Camera Vertical Height (c) = Horizontal Distance (a) x 0.5774



For example if a camera will be mounted on a wall 50ft away (a - Horizontal Distance) from the target point of where a car will pass by, it can't be any higher than 28.87ft (c - Vertical Height) or to the side more than 28.87ft (b - Horizontal Offset).

## GENERAL CAMERA SETUP

### FOV

The plate must be large enough in the picture so that it can be captured. Although in general it is recommended to have a plate a minimum of 80 pixels wide to capture the text it is recommended 130 pixels or larger in the picture. A 2M camera is 1920 horizontal pixels and most plates are 12 inches wide so the maximum field of view should be about 14ft 9in wide. The camera has a 4.7mm to 47mm lens to aid in getting the required field of view.

### SHUTTER SPEED and FRAME RATE

The faster an object moves the higher the frame rate and faster the shutter speed needs to be. It is recommended that the camera be set to the highest frame rate of 60 and the exposure shutter speed is set very fast.

**NOTE** - The camera can capture the text on plates up to speeds of 18.6 MPH.

## CAMERA SETUP

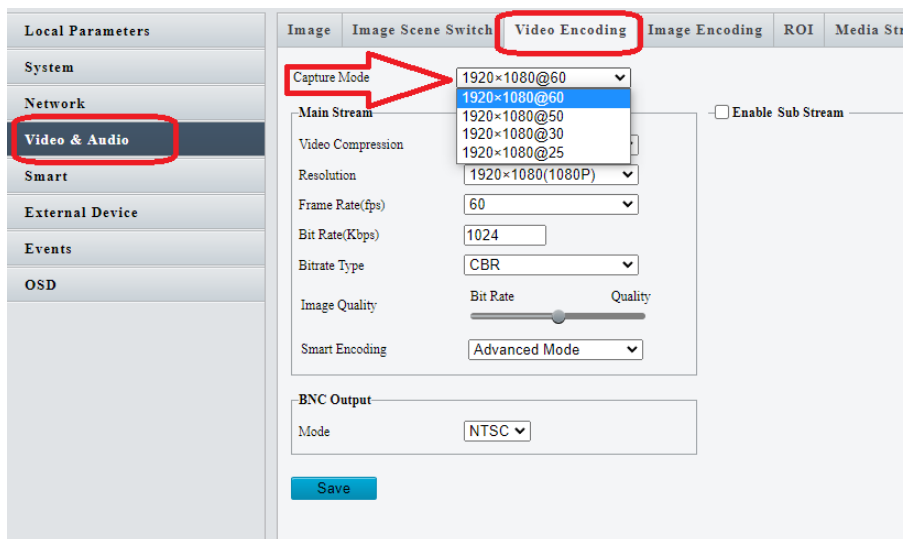
It is recommended to setup the camera prior to setting up the NVR.

To access the camera type the IP address of the camera into the address bar of a compatible browser. You will be prompted to change the camera password. Make a note of the password as it will be needed to properly register the camera with the NVR.

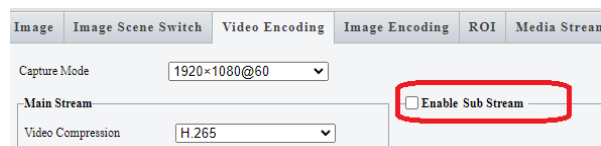
### ENCODING

Once in the camera start with changing the video settings.

Change the Capture Mode to 1920x1080@60. Ensure that Frame Rate has changed to 60.



Next, check Enable Sub Stream. Although not required for plate capture it can make remote viewing use less bandwidth.



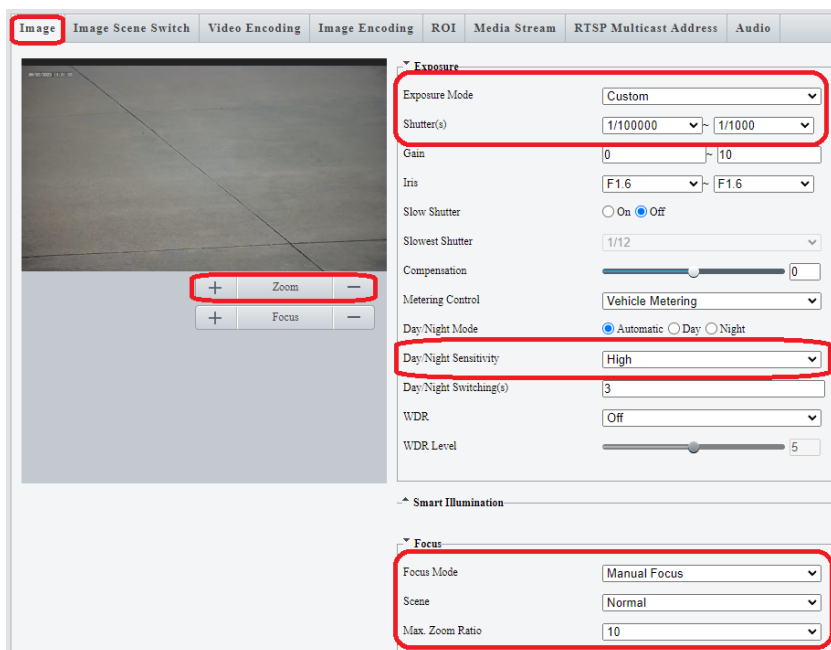
Once complete click Save at the bottom of the page.

## IMAGE

As previously stated, the Image and Exposure settings will need to be adjusted.

Zoom the image into the scene using the “+” button as far as possible to ensure that a license plate takes up as much as possible of the field of view.

Change the Exposure Mode to Custom. Next change the Shutter speed to as fast as possible. The higher shutter speed will make the image darker but also decreases the blurriness of the moving object. Typically a shutter speed range of 1/100000 - 1/1000 is a good starting point.



Day/Night Sensitivity in most cases should be set to High

Focus should be on Manual because it is common for Auto to cause a slight blurriness issue as a camera adjusts during darker times of the day.

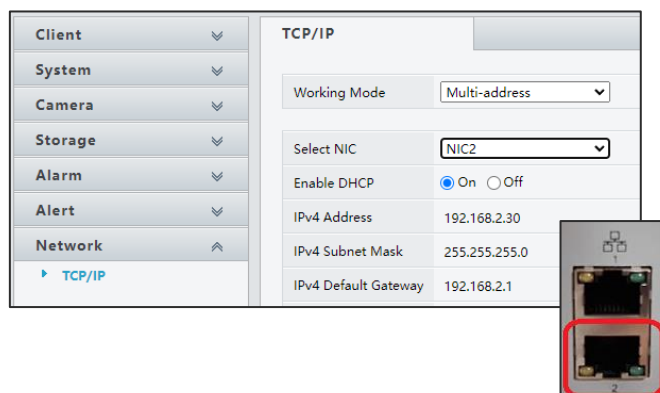
## PLATE CAPTURE SETUP - NVR

Access the NVR menu. Add the LPR camera to the NVR as you would normally register a camera.

Take note of the network where the camera is connected; you will need the NVR IP address when setting up the camera.

This address can be found in the NVR menu in TCP/IP under Network.

For Example if the camera is connected to a switch that is connected to the Ethernet 2 port of the NVR the NIC2 IPv4 Address is needed.



Next, in the NVR settings go to Platform, then Video & Image Database and click on Configure VIID Local tab. Record the Local Port as you will need it when setting up the camera.

Type a unique number in Channel ID and record it as it will be needed in the camera setup. In this example we used 014 which is similar to the cameras channel ID D14 on the NVR. Click Save at the bottom of the page.

Camera ID	Channel ID	Device Type	Status	Advanced
D13		License Plate Recognitic	Offline	⚙
D14	014	License Plate Recognitic	Offline	⚙
D15		License Plate Recognitic	Offline	⚙
D16		License Plate Recognitic	Offline	⚙

## PLATE CAPTURE SETUP - CAMERA

Access the camera menu. Go to Setup, then System and click on the Photo Server tab. Go to the Platform 1 page.

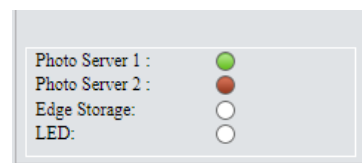
From the information that you noted earlier...

Enter the NVR IP in Server IP.  
Enter the Local Port number in Server Port.  
Enter the Channel ID in Device ID.  
Enter the NVR username in Username.  
Enter the NVR password in Password and Confirm.

When complete click Save.

It might take up to five minutes for the NVR and camera to link.

Once linked you will see in the camera page that the Photo Server indicator in the bottom left corner will turn green.

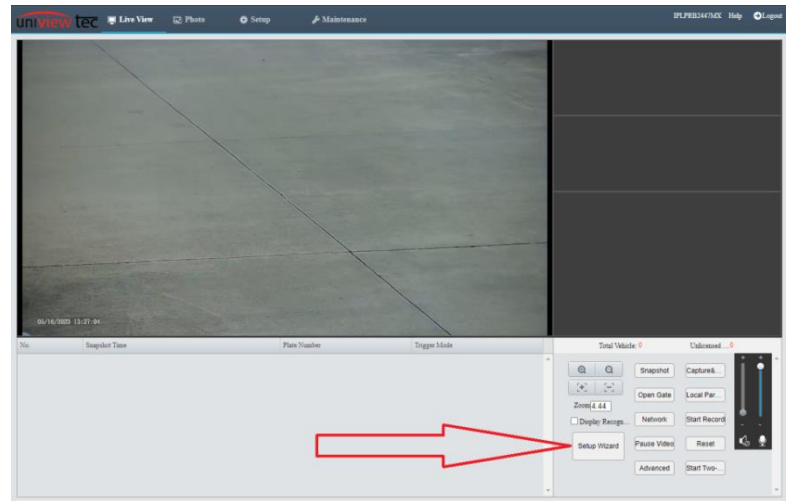


As well in the NVR, on the Configure VIID Local page that the camera status will show Online.

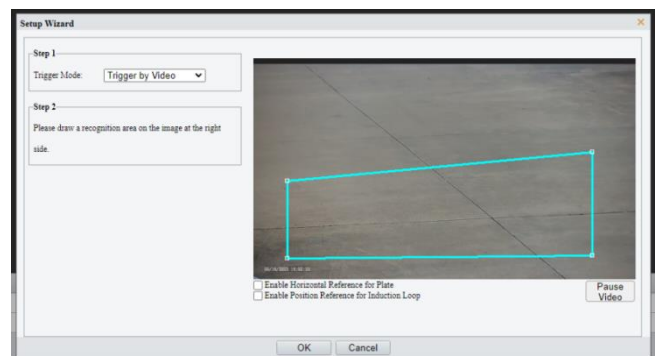
Camera ID	Channel ID	Device Type	Status	Advanced
D13		License Plate Recognitic	Offline	⚙
D14	014	License Plate Recognitic	Online	⚙
D15		License Plate Recognitic	Offline	⚙
D16		License Plate Recognitic	Offline	⚙

## DETECTION SETUP - CAMERA

In the camera go to Live View. Click on Setup Wizard.



Draw a box for the desired detection area. For best results, the detection area should be relatively small and only the area where the entire plate will be in the field of view. The camera does not need to see the entire plate to trigger so if the detection area is too close to the edge or if there is an obstruction then you might be unable to capture the entire plate.

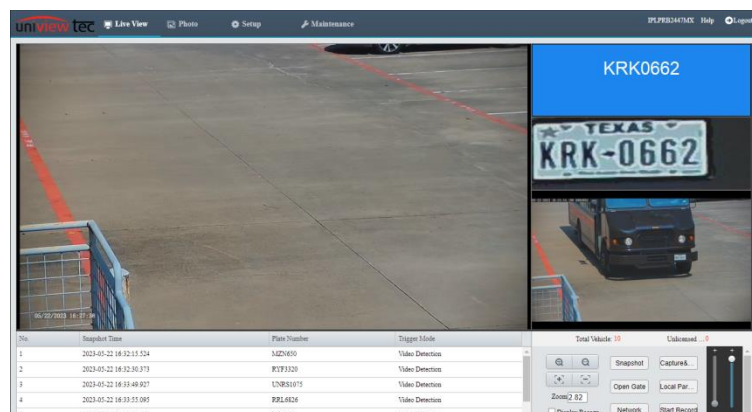


This is an example of the camera triggering too soon when the detection box was drawn for the entire camera view. Only part of the plate was detected because the entire plate was not in the field of view.



Camera ID : D14  
Time : 2023-05-12 03:36:42 PM  
Plate No. : KR17

Detection can be checked when looking at the Live View and the current settings can be evaluated and adjusted as needed.



## DETECTION ACTIONS

Actions and notifications can be configured remotely in the NVR or locally at the NVR.

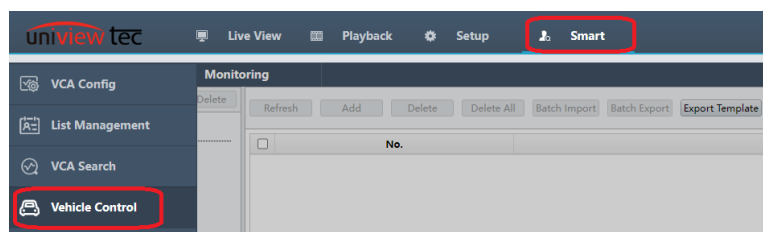
### Monitoring Actions

The NVR can be configured to perform actions like start recording, trigger an alarm output or send an email if a captured plate matches or does not match a predetermined list.

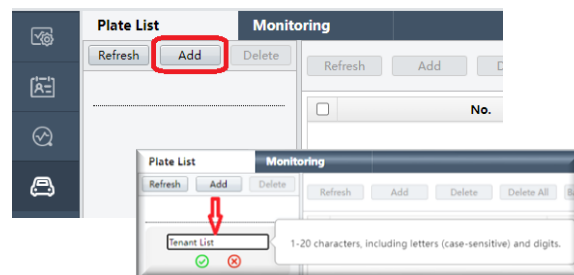
### Loading Plate Information

For Monitoring Actions to function a Plate List must be created and at least one plate entered. The list could be authorized or unauthorized vehicles. As well it could be just one bogus plate (NONE1234) so all plates will be recoded as not matching.

To begin setup, go to Vehicle Control under Smart.

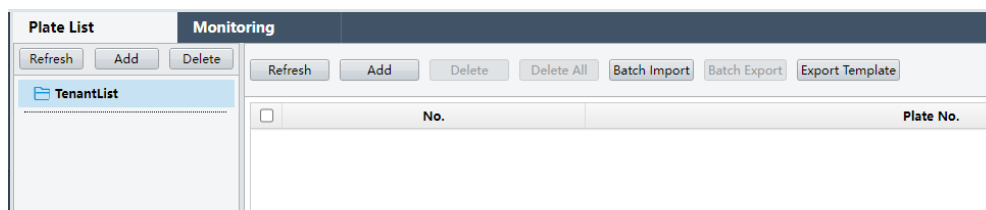


Next go to Plate List. Individual plates can be added or imported in bulk. As well, they can be grouped in a Monitoring List and used to group actions. To add a new Monitoring List click Add in the column. For this example Tenant List was added.

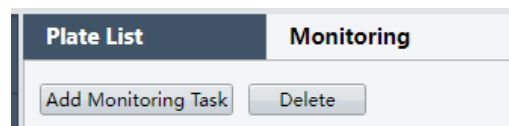


To add individual plates, click on Add above the plate list.

To add many plates at the same time use Batch Import. To see the batching format click on Export Template. Use this exported file to create the file that you will use for importing.



Once plate data has been loaded go to the Monitoring tab and click on Add Monitoring Task to setup the desired actions.



It is recommended to make Task Name and Cause of Monitoring describe what you want to do. For example the Task Name could be what you are doing such as Parking Lot Control. Cause of Monitoring could be the desired action such as Open Gate. The Monitoring Task can be manually turned On or Off. Monitoring List is the group of plates. Monitoring Channels is the camera that is sending the plate information.

Next setup the Schedule to define when you would like the action to be performed.

Go to either Match or Not Match tab to setup the desired action.

For this example on the Match tab, an alarm output (A1 on the NVR) has been selected. This alarm output could be connected to an input on a vehicle control gate.

As well on the Not Match it is setup to send an email. The email will contain attachments with an image of the plate and another showing the vehicle.

## RECORDING SETTINGS

Also in Monitoring, the LPR camera MUST be selected in Recording. Otherwise the event will not be recorded.

It is recommended to select it in both Match as well as Not Match so that all plates are recorded.

Arming Schedule	Match Trigger Action	Not Match Trigger Action
Conventional	<input checked="" type="checkbox"/> Alarm Output	<input type="checkbox"/> Recording
<input type="checkbox"/> Buzzer	<input checked="" type="checkbox"/> A->1	<input type="checkbox"/> D9
<input type="checkbox"/> Send Email	<input type="checkbox"/> A->2	<input type="checkbox"/> D10
<input type="checkbox"/> Let Through	<input type="checkbox"/> A->3	<input type="checkbox"/> D11
	<input type="checkbox"/> A->4	<input type="checkbox"/> D12
	<input type="checkbox"/> D1->1	<input type="checkbox"/> D13
	<input type="checkbox"/> D4->1	<input checked="" type="checkbox"/> D14
	<input type="checkbox"/> D9->1	<input type="checkbox"/> D15
	<input type="checkbox"/> D10->1	<input type="checkbox"/> D16

Note: Ensure that NVR recording settings are set appropriately for your desired recording method. It is recommended to have the NVR recording setup for Normal, which includes continuous, event, motion and alarm recording. As a minimum it is recommended to setup Event recording to ensure video playback of all plates.

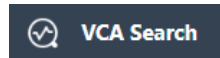
Client	Recording Schedule	Snapshot Schedule
System	Select Camera: D14 (PLPRB2447MX)	
Camera	Pre-Record(sec): 10	
Encoding	Post-Record(sec): 60	
Audio	Redundant Recording: <input type="radio"/> On <input checked="" type="radio"/> Off	
OSD	Recording Schedule: <input checked="" type="radio"/> On <input type="radio"/> Off	
Image	Audio Storage: <input type="radio"/> On <input checked="" type="radio"/> Off	
Schedule	<div> <div> <div>Mon</div> <div>Tue</div> <div>Wed</div> <div>Thu</div> <div>Fri</div> <div>Sat</div> <div>Sun</div> <div>Holiday</div> </div> <div> <div>0</div> <div>2</div> <div>4</div> <div>6</div> <div>8</div> <div>10</div> <div>12</div> <div>14</div> <div>16</div> <div>18</div> <div>20</div> <div>22</div> <div>24</div> </div> <div> <div>1</div> <div>2</div> <div>3</div> <div>4</div> <div>5</div> <div>6</div> <div>7</div> <div>8</div> </div> </div> <div> <input checked="" type="checkbox"/> Normal  <input type="checkbox"/> Event  <input type="checkbox"/> Motion  <input type="checkbox"/> Alarm  <input type="checkbox"/> M and A  <input type="checkbox"/> M or A  <input type="checkbox"/> None         </div>	
Hard Disk	Copy to: <input type="checkbox"/> All	
Alarm	Save	
Alert		
Network		
Platform		
User		



## PLATE SEARCH

### Plate Search using Browser

Click on Smart and then on VCA Search.



Next click on the tab Motor Vehicle Search.

Click on the drop down by Select Channel and select the LPR cameras that you want to search.

Click on the dropdown beside Event Type. Select Plate Comparison.

Change the Start Time and End Time to the desired time range.

Plate No. is used when looking for a specific plate. Type the desired plate in this field.

Plate Comparison is used when Vehicle Control has been setup. Click on the drop down for Match or Not Match to see which plates have been detected that either matched or did not match the preloaded plates.

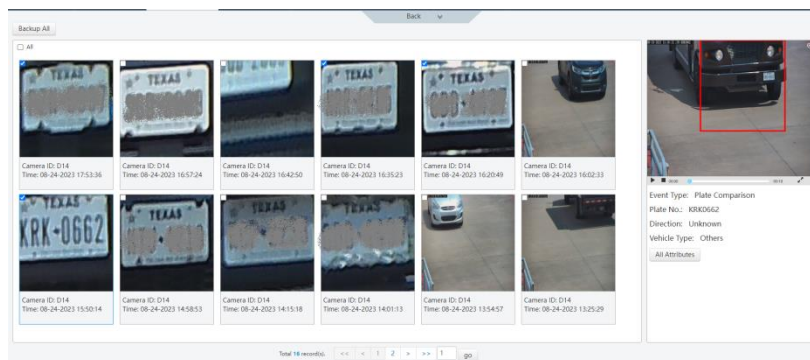
Once the search parameters have been entered click Search.

Note – As of the writing of this document the other search fields are not supported.





Here is an example of search results.

Noncommercial plates have been obscured.

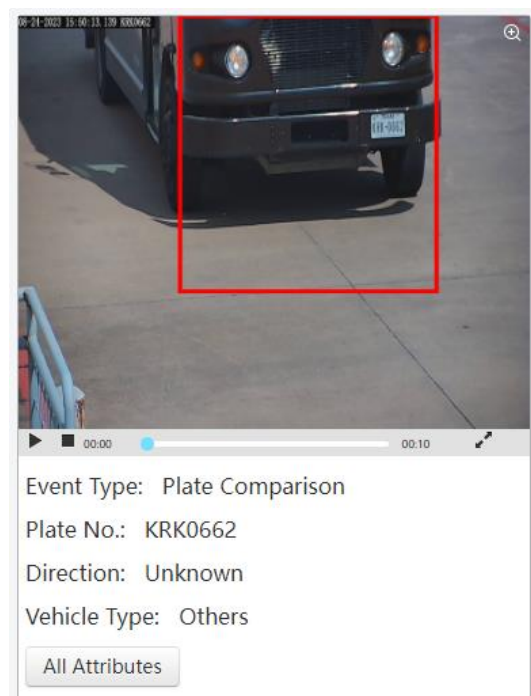
Click on the plate image in search results to have additional information displayed to the right.



In the expanded information window the following is found.

- The plate number is displayed.
- The image has an icon  in the upper right corner which will magnify the picture. Left click to close it.
- At the bottom of the image are controls to play , stop  or  bring up the video full screen. To close the full screen press the Esc key.

Note - As of the writing of this document All Attributes is not supported.

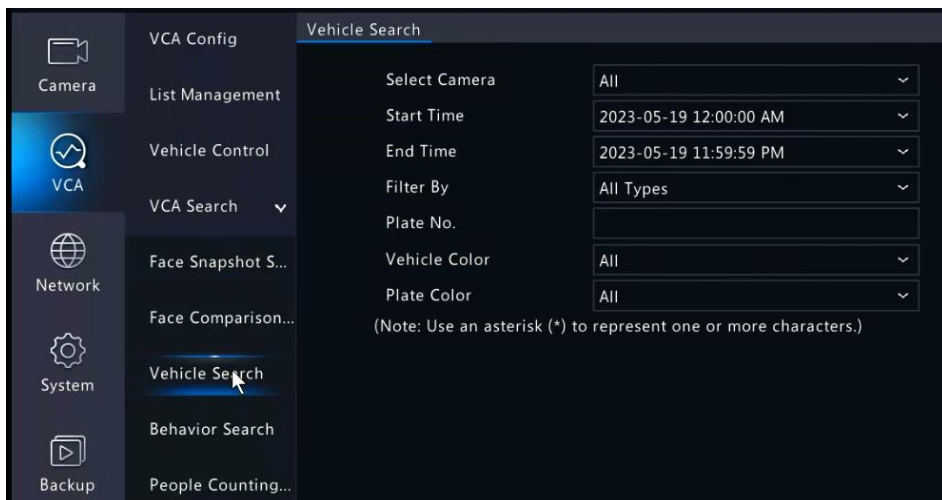


## Plate Search at the NVR

At the NVR go to Menu. Then go to VCA and click on Vehicle Search.

Just like the browser enter your search criteria.

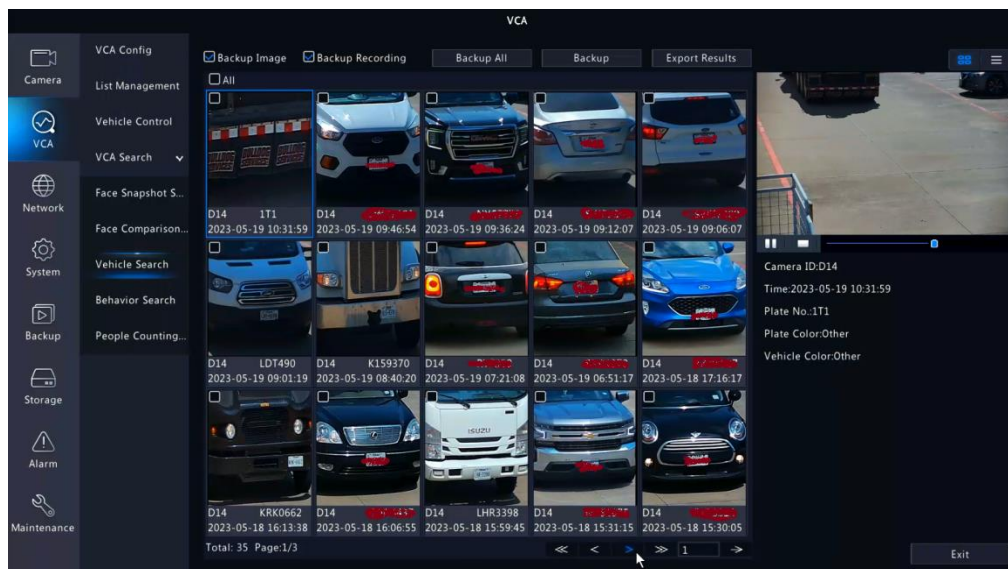
Click Search at the bottom of the screen.



An example of search results.

Note that in the window to the right side you can playback video of when the plate was captured.

Non commercial plates have been obscured.



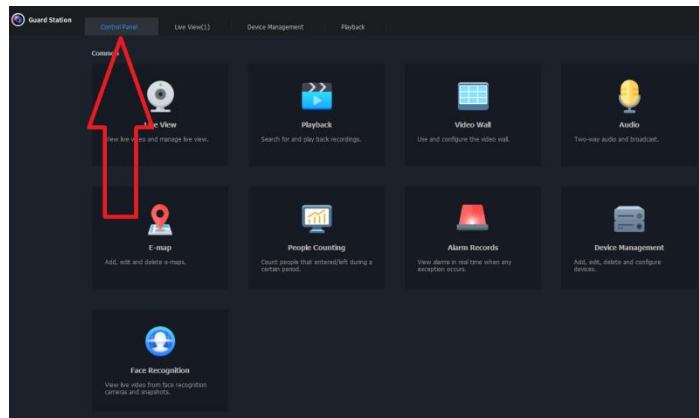
## GUARD STATION REMOTE SOFTWARE

With Guard Station remote software the license plate information can be displayed and searched.

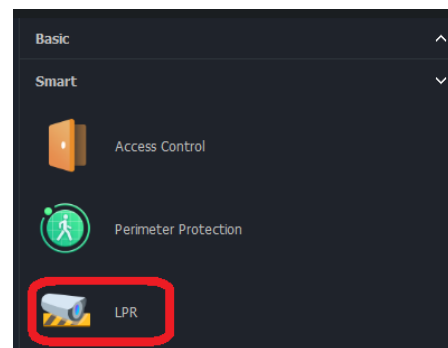
**Note - Guard Station version B1130.3.12.3.121104 or above is required.**

Open Guard Station. If the NVR is not listed, add it in device management.

Click on the Control Panel tab.

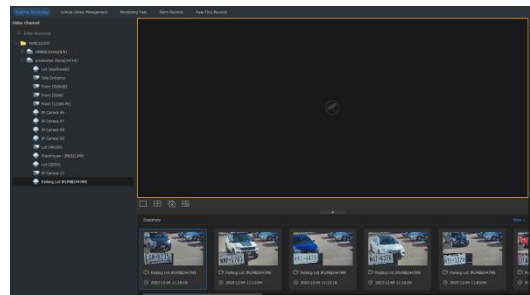


Look for Smart on the right side. Click on LPR. It might be necessary to click on Smart to open the list containing LPR.



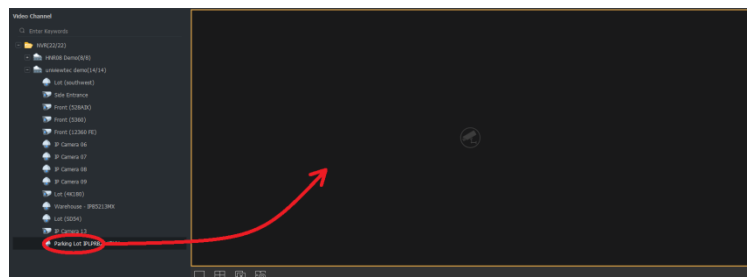
### Realtime Monitoring

Here you can observe in real time the status of passing vehicles. The pictures and information at the bottom of the screen is only displayed when Guard Station is running.



### Live View

If live view is desired locate the camera in the camera list on the left. Then drag and drop it onto the camera grid to the right.

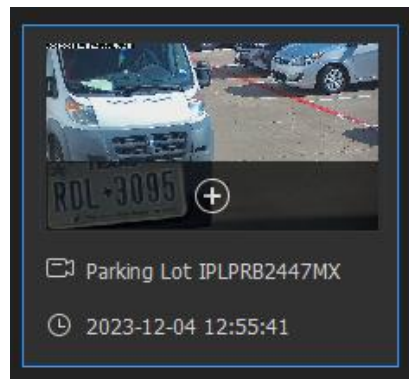


### Quick Add

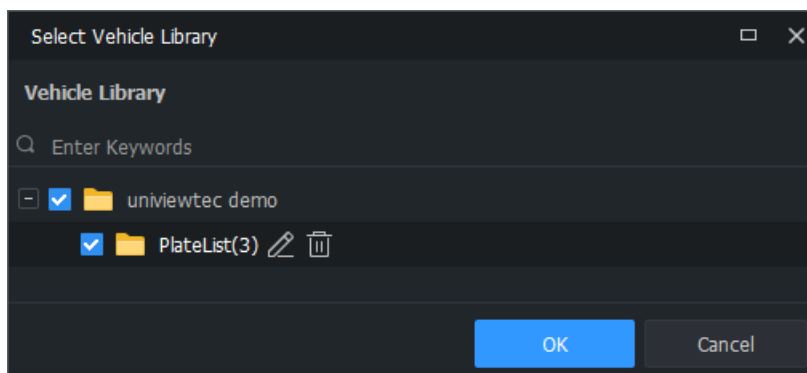
Vehicle plates displayed at the bottom of the screen can quickly be added to the Vehicle Library.

Putting the mouse cursor over one of the images will bring up a plus icon over the vehicle image.

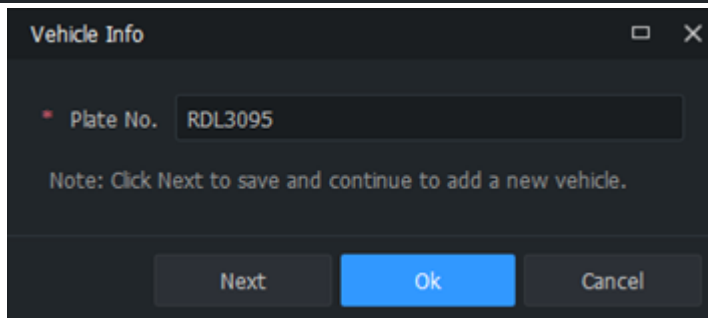
Clicking on the icon will bring up the plate library so it can be added.



Since there can be more than one library, select the desired library.



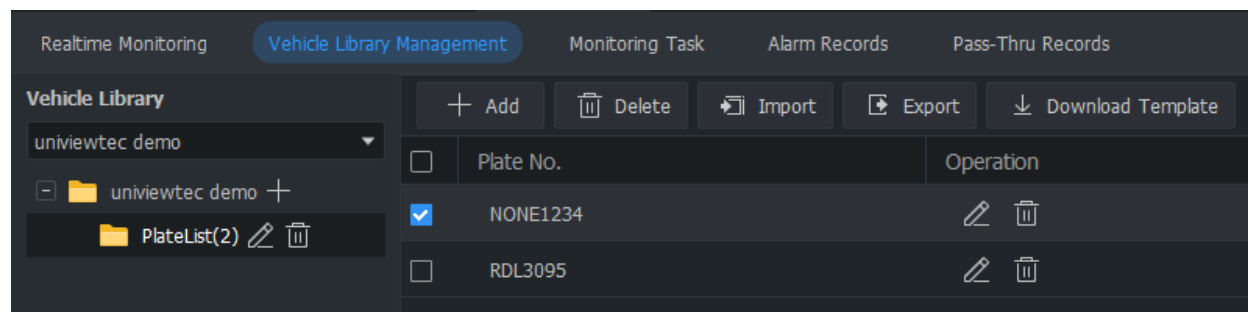
Verify that the plate is correct and then click on Ok to save it to the library. If Next is clicked it will be saved and additional plates can be manually entered.



### Vehicle Library Management

For the NVR to act upon plates captured the NVR must have a Plate List. The list could be authorized or unauthorized vehicles. As well it could be just one bogus plate (NONE1234) so all plates will be recoded as not matching. The list can be created or edited in Vehicle Library Management.

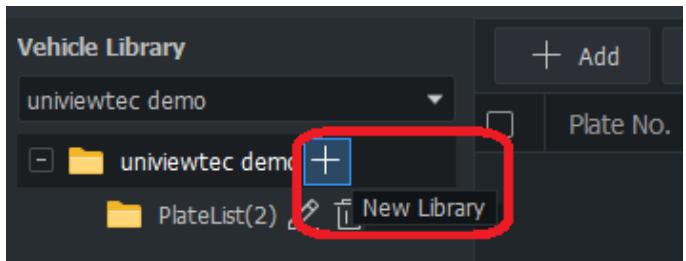
Note – Monitoring Task must also be setup or video of the event might not be recorded.



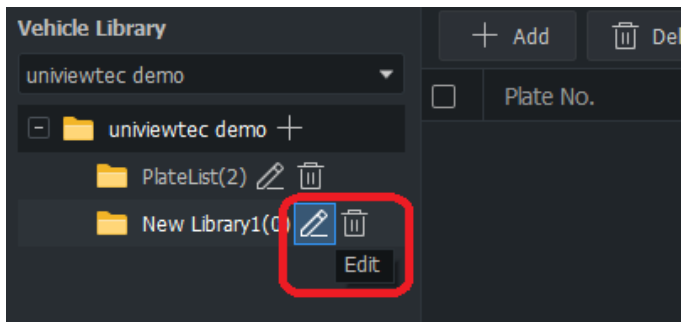
## New Library

There must be at least one library created.  
Libraries can be used to group license plates.

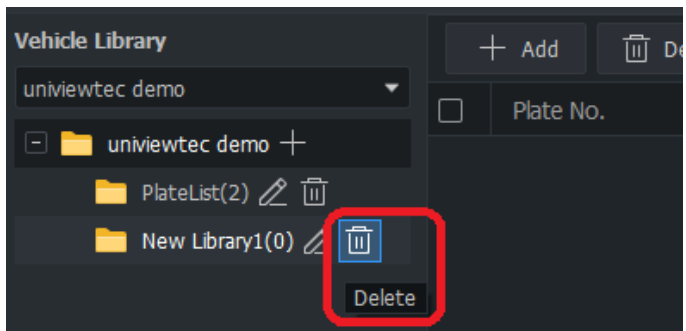
To create a new license plate library click on the plus icon beside the NVR name.



To edit the library name click on the pencil icon beside the library.

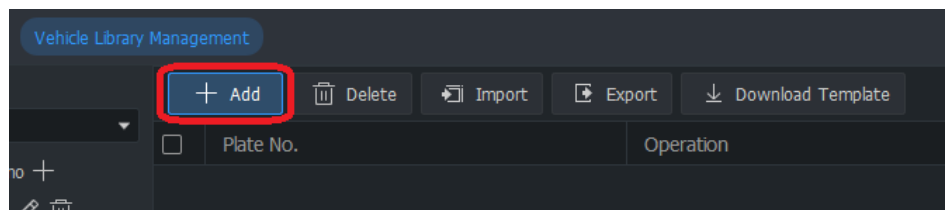


To delete a library click on the trashcan icon beside the library.

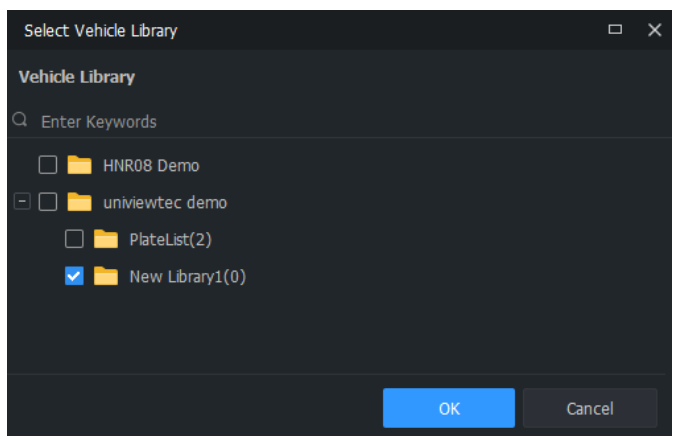


## Add

To add a plate to a library click on the Add icon.



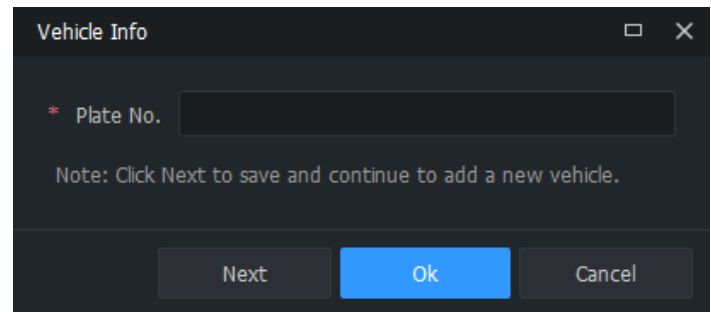
A screen will open and will prompt you to select which library you want to make additions to.



Next a prompt will come up. Type in the license plate.

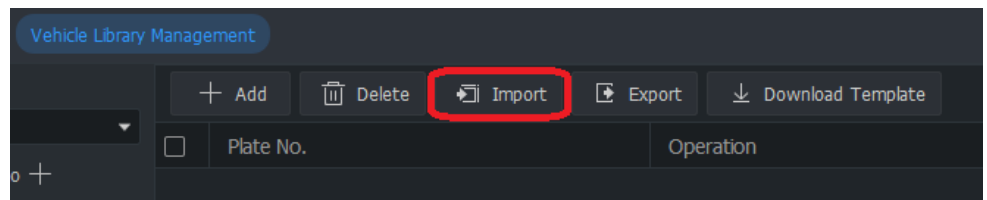
Click Ok to complete adding it to the library.

Click Next to add it to the library and continue adding additional license plates.

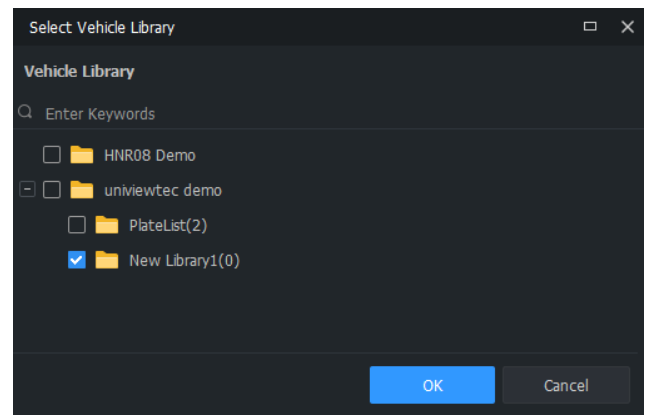


### Import

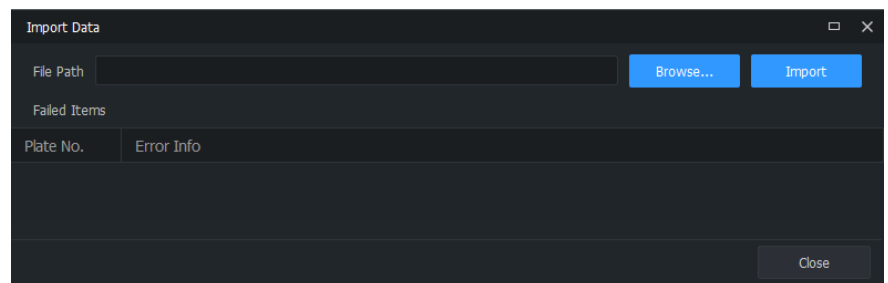
If adding several license plates consider using the Import feature.



After clicking on Import, a screen will open and will prompt you to select which library you want to make additions to.

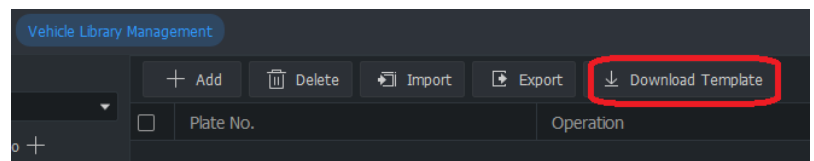


Next you will be prompted to locate (Browse) and Import a CSV file.



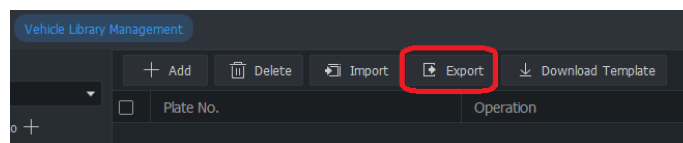
### Download Template

To create a properly formatted CSV file, it is recommended to download the template. It can be used as a base to build the CSV file (with programs such as excel).



## Export

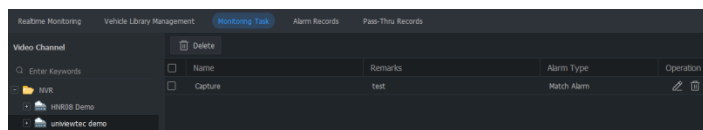
If there is already a library in use and you would like to add or remove several plates, the file can be exported, edited (with programs such as excel) and then imported back into Guard Station.



## Monitoring Task

To make the event searchable a monitoring task must be setup.

This MUST be setup in the NVR menu.



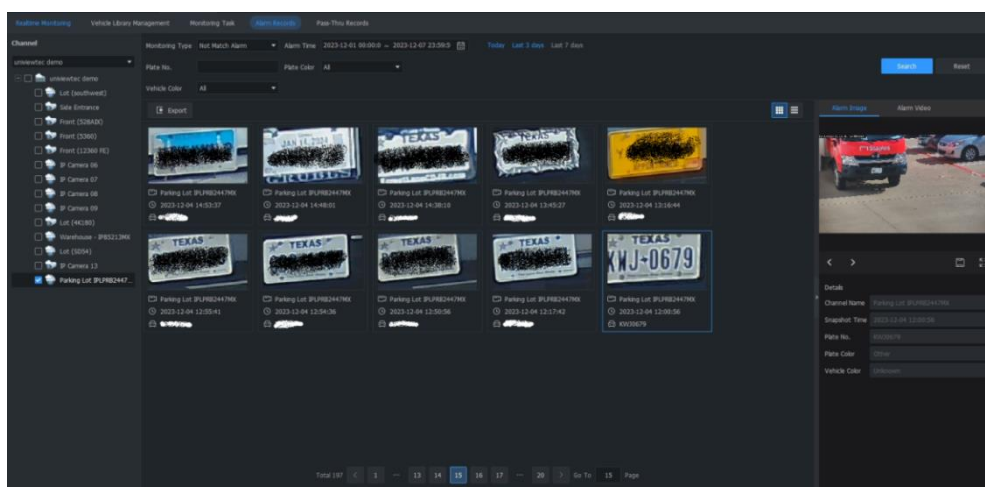
**NOTE – MONITORING TASK** as well as a recording schedule is necessary so that trigger recording can create the clip that is played on the **ALARM** and **PASS-THRU RECORDS** screens.

## Alarm Records and Pass-Thru Records

These screens are used to search the vehicle plate capture results.

On the Alarm Records screen, plates can be searched by matching or non-matching.

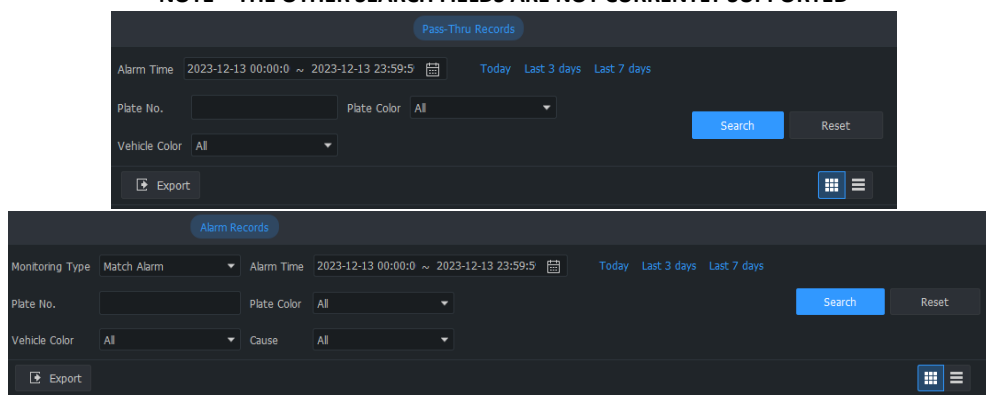
On the Pass-Thru Records screen all plate results are shown.



**NOTE – NON-COMMERCIAL PLATES HAVE BEEN OBSCURED**

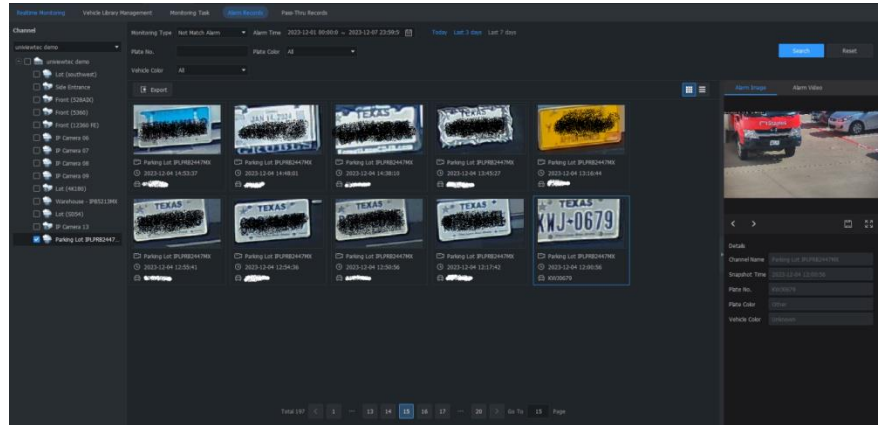
On either screen change the Alarm Time range to the desired time frame that you would like to search. If looking for a specific plate, type it in the Plate No. field. Then click on Search.

**NOTE – THE OTHER SEARCH FIELDS ARE NOT CURRENTLY SUPPORTED**



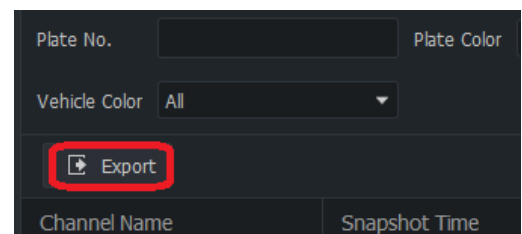


The search results will populate the screen.




If Export is clicked, the Windows save screen will open and prompt you for a saving location.


This will save snapshots and a CSV file of the events. The CSV file contains the plate number, the camera title, time the snapshot was taken as well as the file location of snapshot.

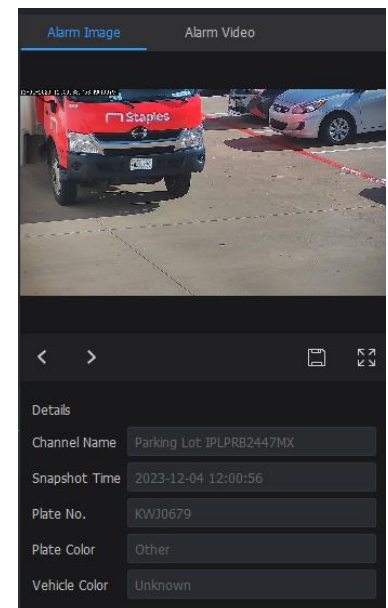


If you click on any search result the window to the right will populate with additional information.

The Alarm Image tab on the side window provides an image and details of the event.

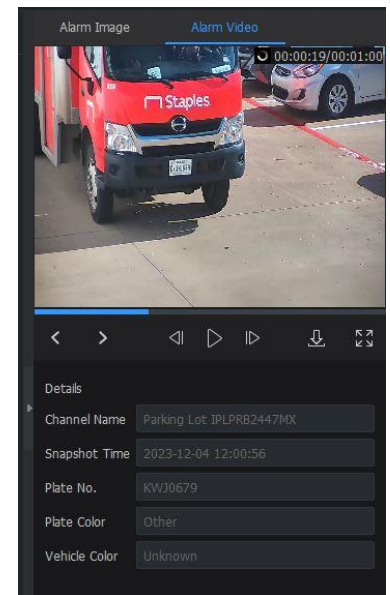
Clicking on the save icon  will save an image to the computer. The saving location and file type is configured in Snapshot under System Configuration in Guard Station.


Clicking in the multi-arrow icon  will bring the image full screen. Press the Esc key on your keyboard to exit.

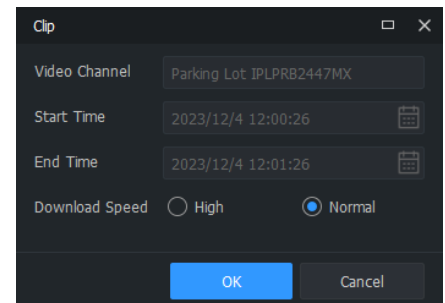


The Alarm Video tab on the side window provides video and details of the event.

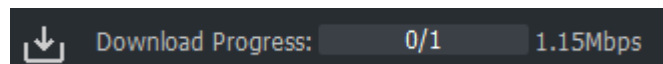
Use the video control icons  to play, pause, frame advance and frame reverse.




Use the download icon  to save a copy of the video. Clicking on the icon will open the save screen. The saving location and file type is configured in Recording under System Configuration in Guard Station.



After clicking OK the download progress will be displayed in the bottom left corner of the main window.



Clicking in the multi-arrow icon  will bring the image full screen. Press the Esc key on your keyboard to exit.