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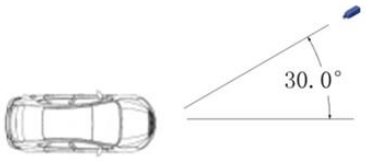
License Plate Capture - Camera Setup

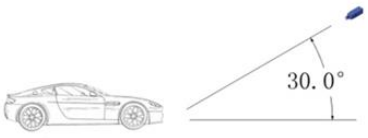
License plate cameras such as the IPLPRB2447MX are dedicated use and as such have specific installation requirements in order to be able to clearly see and record a license plate. These requirements include position and image settings, so that the plate can be seen. The camera text detection is fairly 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

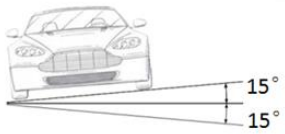
The camera should be positioned within 30° angle offset to the side, 30° angle above and 15° angle parallel to the road. Keep these requirements in mind when determining mounting position of the camera.



The horizontal angle
should be no more than 30°

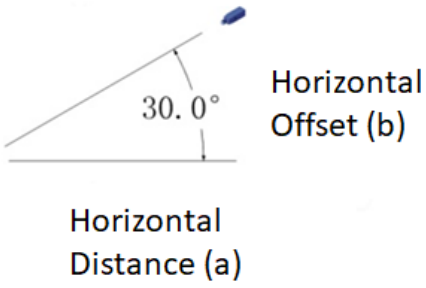


The vertical angle
should be no more than 30°

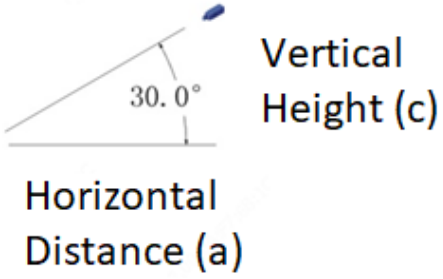


The horizontal tilt angle
should be no more than ±15°

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.

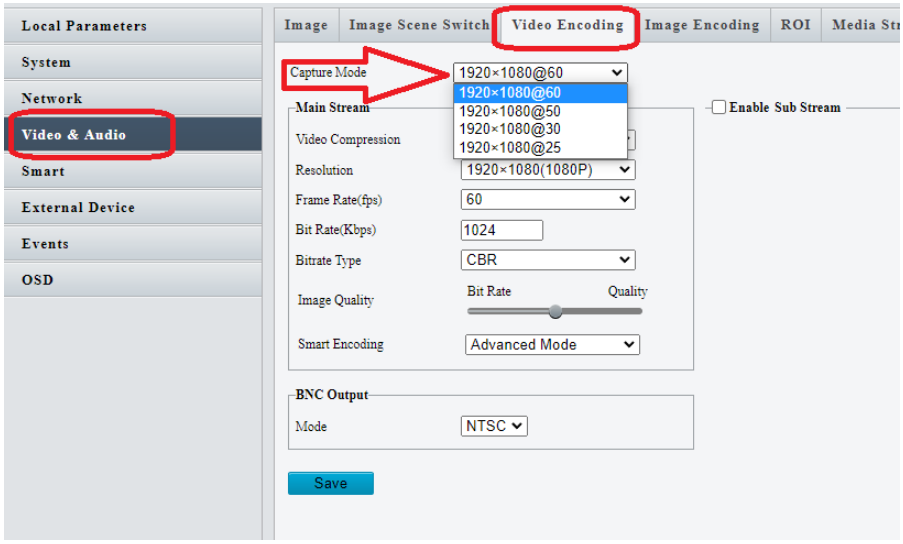
CAMERA SETUP

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.

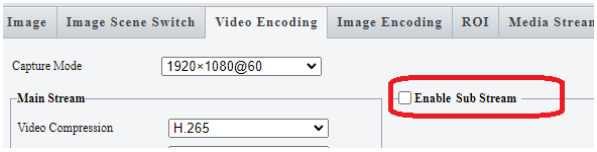
ENCODING

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.



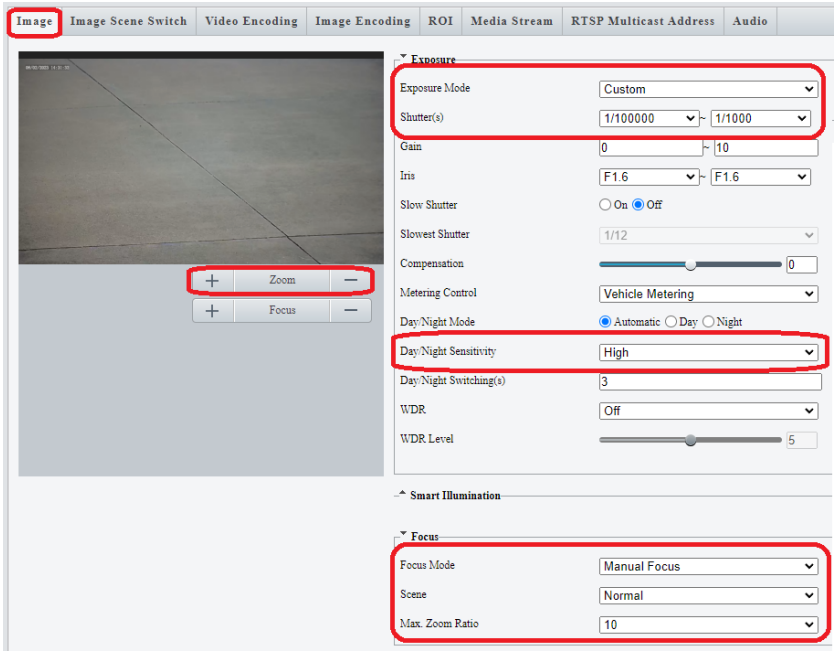
Next, check Enable Sub Stream. Although not required for plate capture it can make remote viewing use less bandwidth.



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.

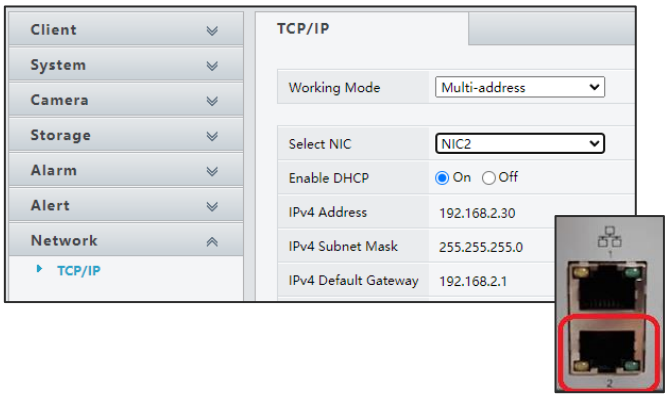
Day/Night Sensitivity in most cases should be set to High

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.

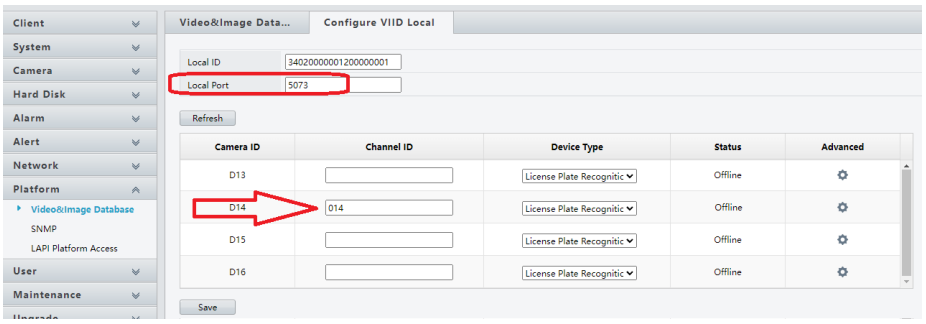


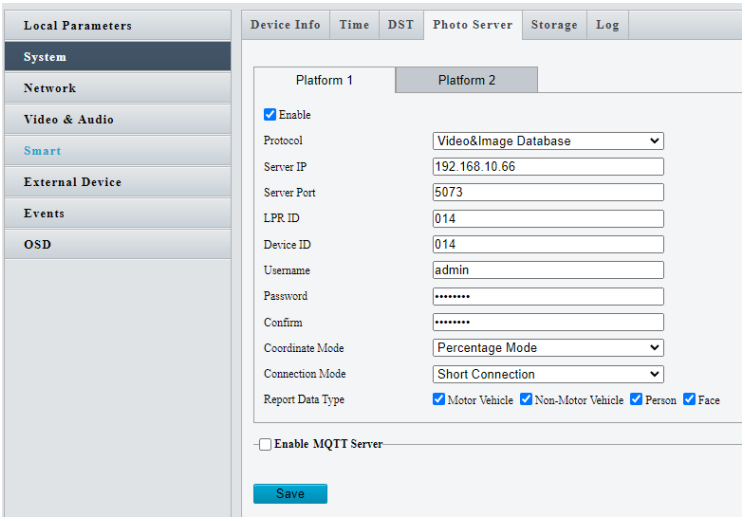
PLATE CAPTURE SETUP - CAMERA

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.

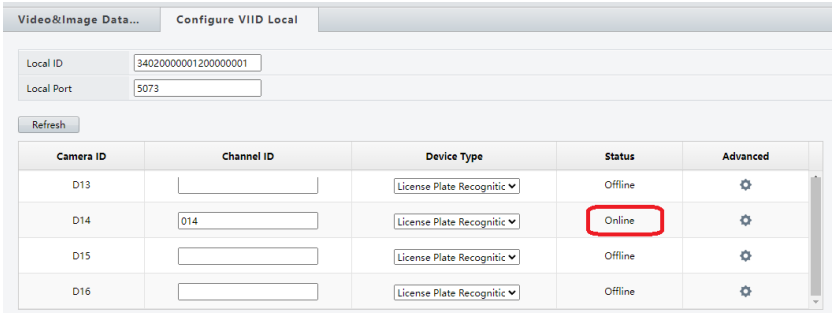
When complete click Save.



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

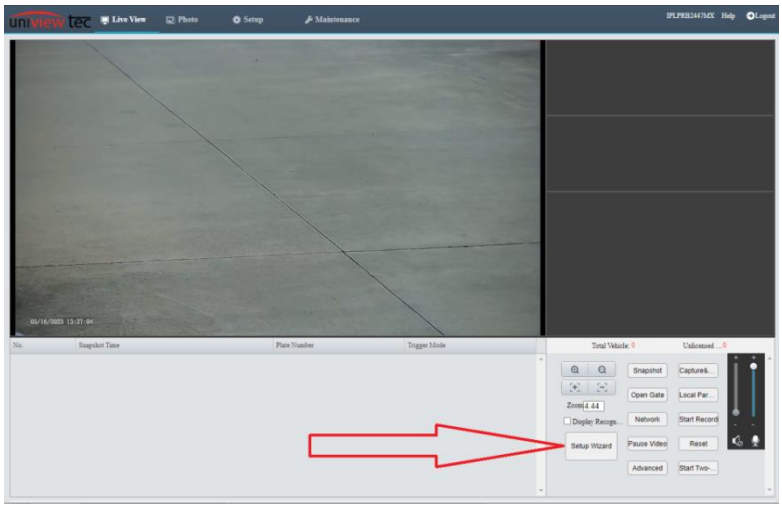
Once linked you will see in the camera page that the Photo Server indicator in the bottom left corner will turn green.

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

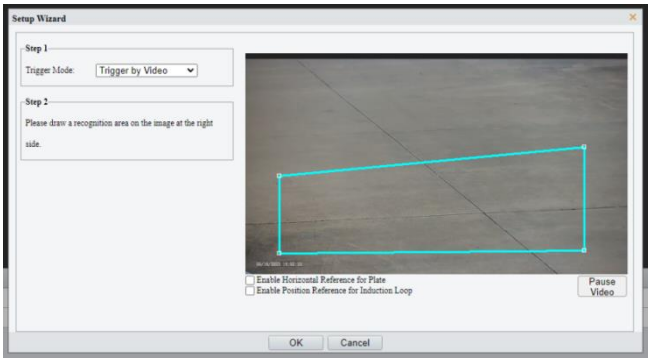


DETECTION SETUP - CAMERA

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

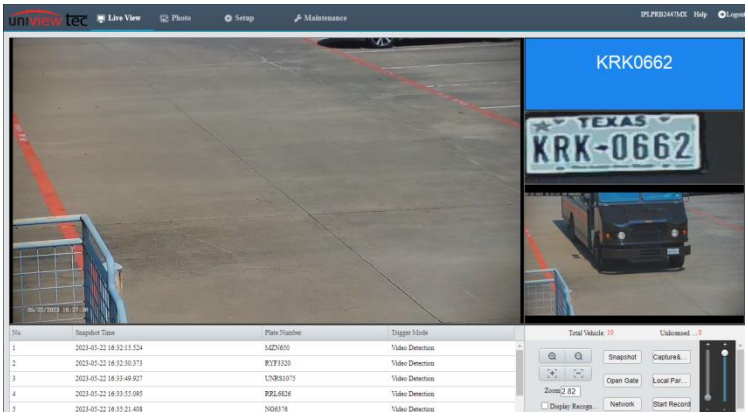


Draw a box for the desired detection area. For best results, the detection area should be relatively small and only the area where the entire plate will be in the field of view. The camera does not need to see the entire plate to trigger so if the detection area is too close to the edge or if there is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

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



DETECTION ACTIONS

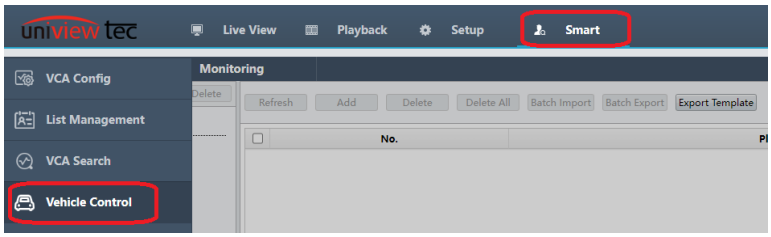
Actions and notifications can be configured remotely in the NVR or locally at the NVR.

Monitoring Actions

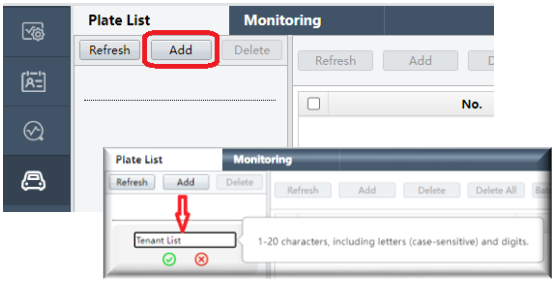
The NVR can be configured to perform actions like start recording, trigger an alarm output or send an email if a captured plate matches or does not match a predetermined list.

Loading Plate Information

To begin setup, go to Vehicle Control under Smart.

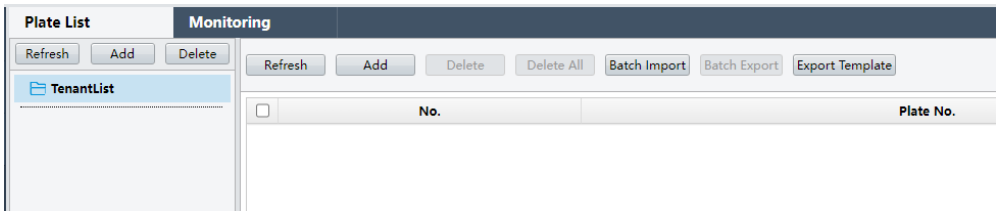


Next go to Plate List. Individual plates can be added or imported in bulk. As well, they can be grouped in a Monitoring List and used to group actions. To add a new Monitoring List click Add in the column. For this example Tenant List was added.

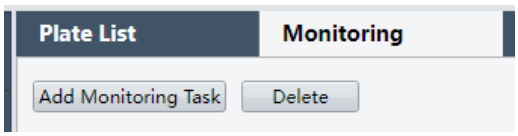


To add individual plates, click on Add above the plate list.

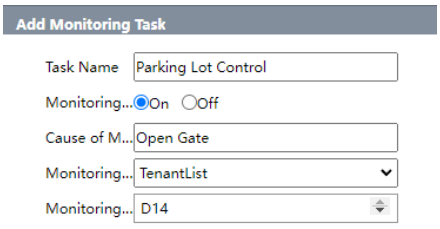
To add many plates at the same time use Batch Import. To see the batching format click on Export Template. Use this exported file to create the file that you will use for importing.



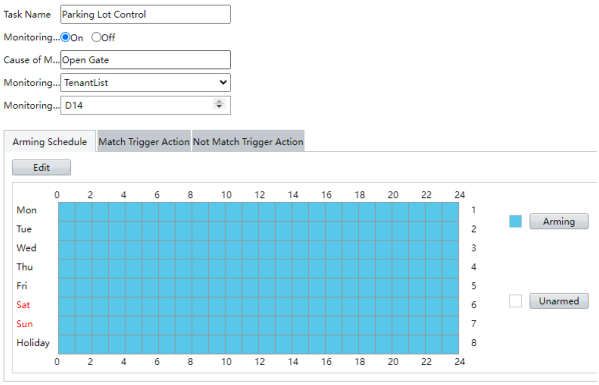
Once plate data has been loaded go to the Monitoring tab and click on Add Monitoring Task to setup the desired actions.



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.

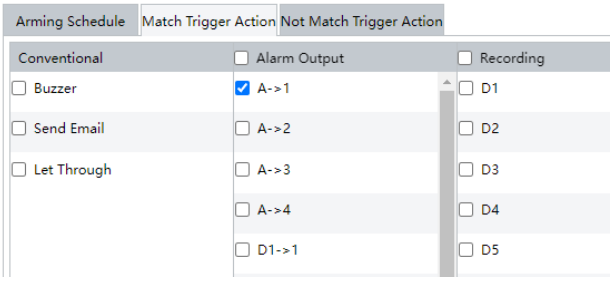


Next setup the Schedule to define when you would like the action to be performed.

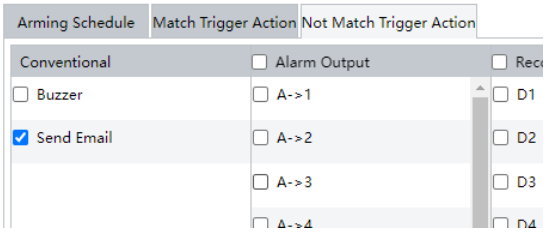


Go to either Match or Not Match tab to setup the desired action.

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.



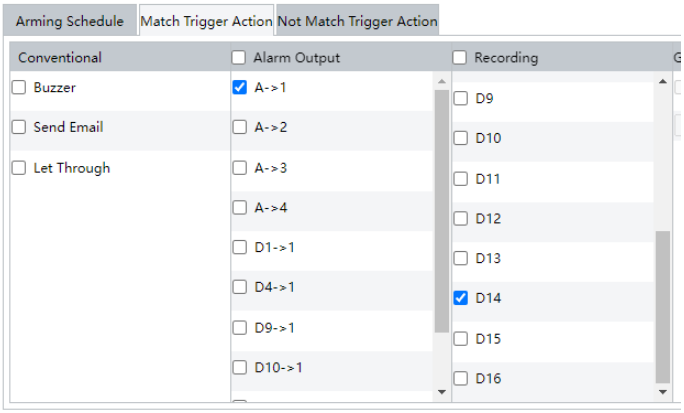
As well on the Not Match it is setup to send an email. The email will contain attachments with an image of the plate and another showing the vehicle.



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.



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.

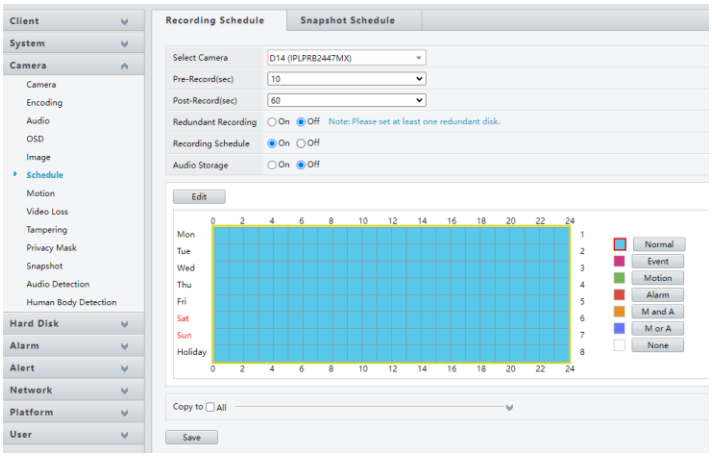
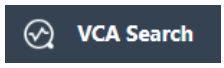


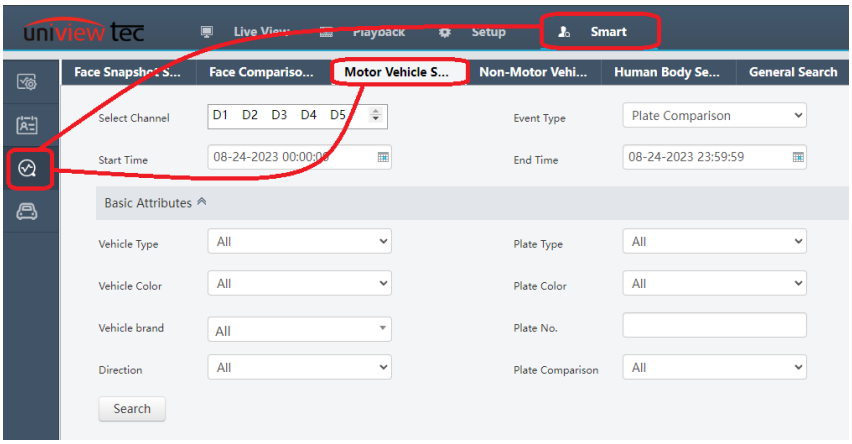
PLATE SEARCH

Plate Search using Browser

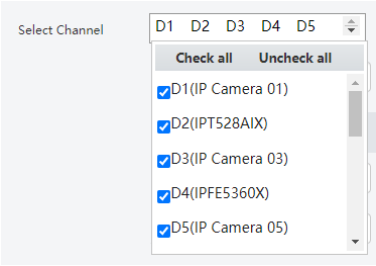
Click on Smart and then on VCA Search.



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.

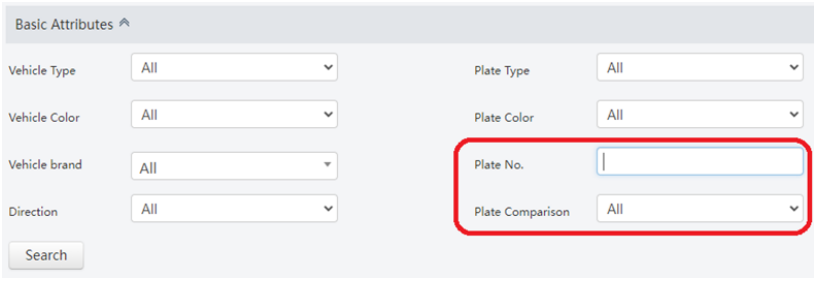


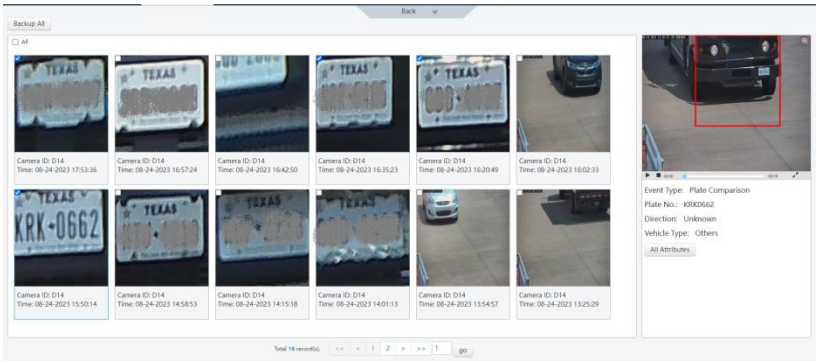
Plate Comparison is used when Vehicle Control has been setup. Click on the drop down for Match or Not Match to see which plates have been detected that either matched or did not match the preloaded plates.

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.

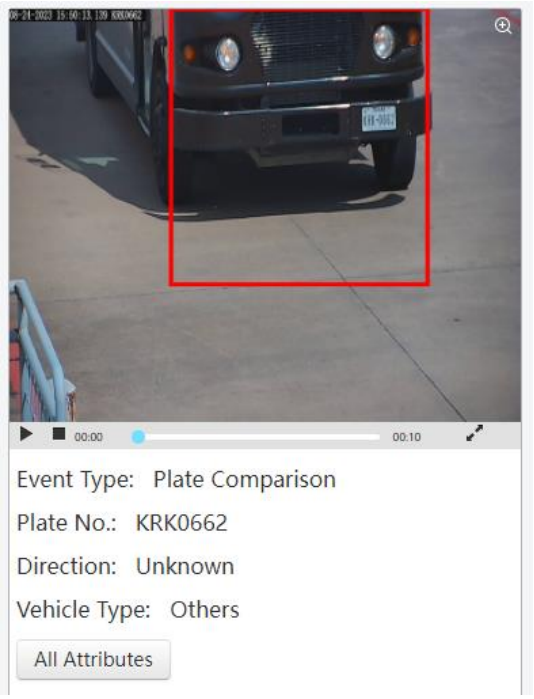
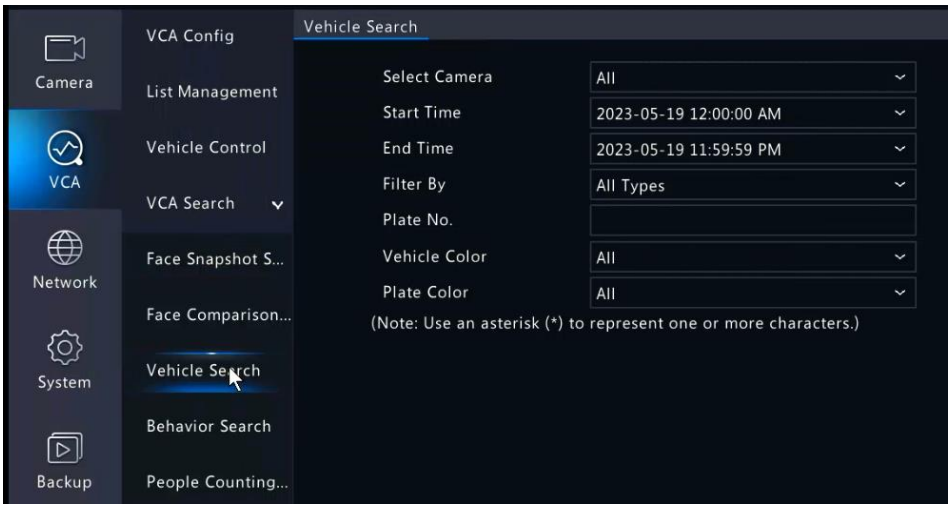


Plate Search at the NVR

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 widow to the right side you can playback video of when the plate was captured.

Non commercial plates have been obscrued.