# LILIN CMX ANPR Software Manual

**Draft**

**Package Contents**

The package contents include:

1. CMX ANPR Installation pack
2. FXMC USB dongle

**System Requirements**

The following is the suggested minimum system configuration to run CMX ANPR:

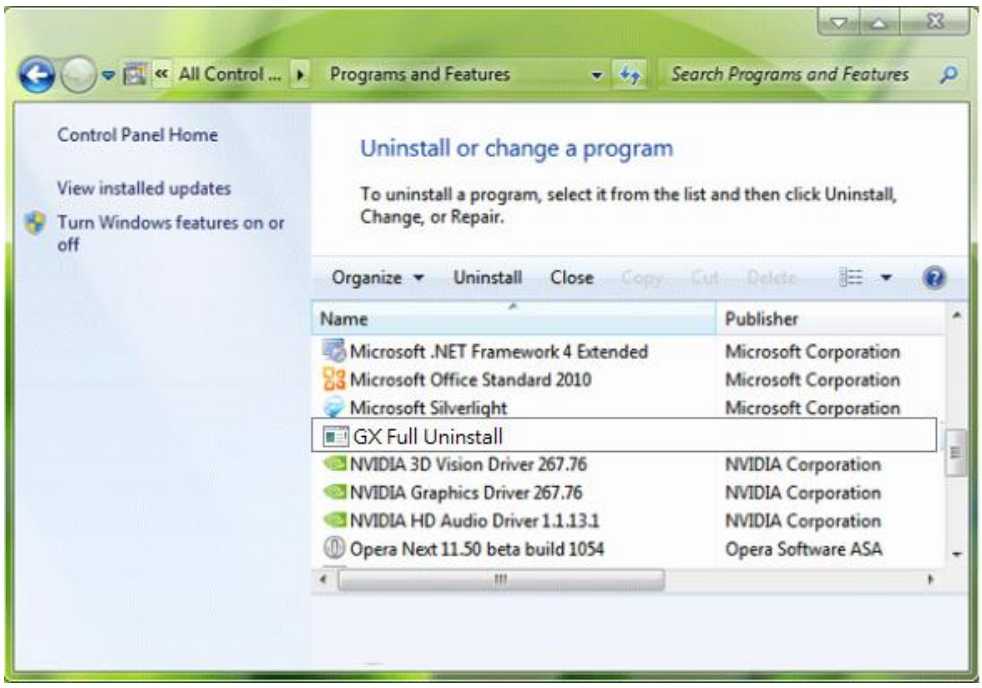
- Intel i3 CPU or higher
- 256 Mbytes of RAM or more
- USB 2.0 port
- Windows XP, Windows Vista (64 bit), Windows 7
- This is a HW protection of the software, the dongle includes the license.

**Installation on Windows Platform**

1. Before installing a new CMX ANPR Installation Software Pack, uninstall any previous version of CMX ANPR Installation Software from your system (if applicable) and reboot your computer.
2. After your operating system has started, insert the CMX ANPR product CD.
3. If CMX ANPR setup does not start automatically, locate D:\setup.exe (assuming D:\ is your CD-ROM drive), and double-click on it.
4. Follow the instructions on the screen, which will guide you through the installation process.

**Uninstall on Windows Platform**

Always uninstall the software from control panel and remove it from GX Full Uninstall from the list.



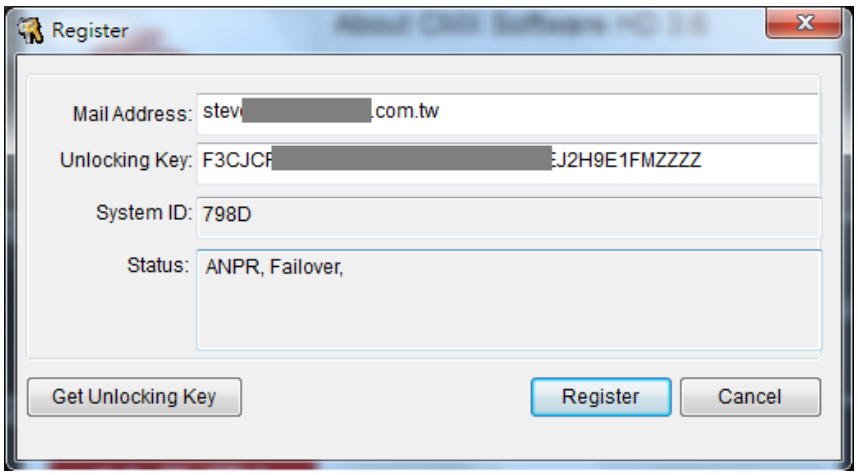

**Before Installation**

Before installation, please have the following software and hardware ready:

(1) CMX Software HD 3.6.1.102 or above product CD or download it from LILIN web site at www.meritlilin.com.
(2) Purchase CMX ANPR from LILIN sales.
(3) Install CMX Software with software license keys.
(4) Install CMX ANPR Driver Installation Pack
(5) ARH USB dongle.

**CMX Installation**

After CMX gets installed, please click on "?" (help) button and click on Register button. Please send an email to your LILIN sales reprehensive with "Mail address", "Unlocking Key", and "System ID". We will provide a new "Mail address", "Unlocking Key", and "System ID". Please enter the newly assigned "Unlocking Key" to get ANPR feature.

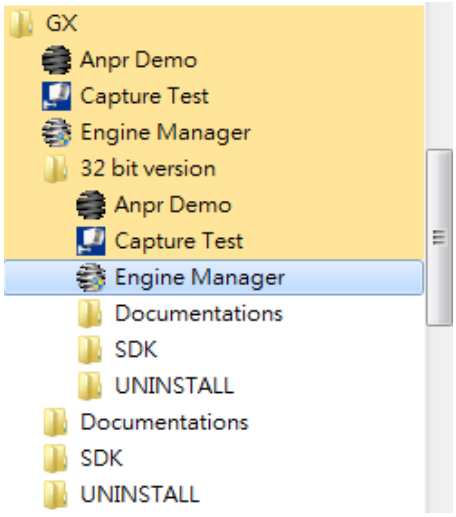

**CMX ANPR Driver Installation**

CMX ANPR Driver is packed inside “CMX ANPR Installation Pack”. Install CMX ANPR Installation pack from the product CD. You can also download “CMX ANPR Installation Pack” from LILIN web site.


During the installation, click “Install 64 bit version” first and click “Install 32 bit version”. Both 64 bit and 32 bit drivers are needed. If your PC is a 32 bit PC, please just install 32 bit driver.

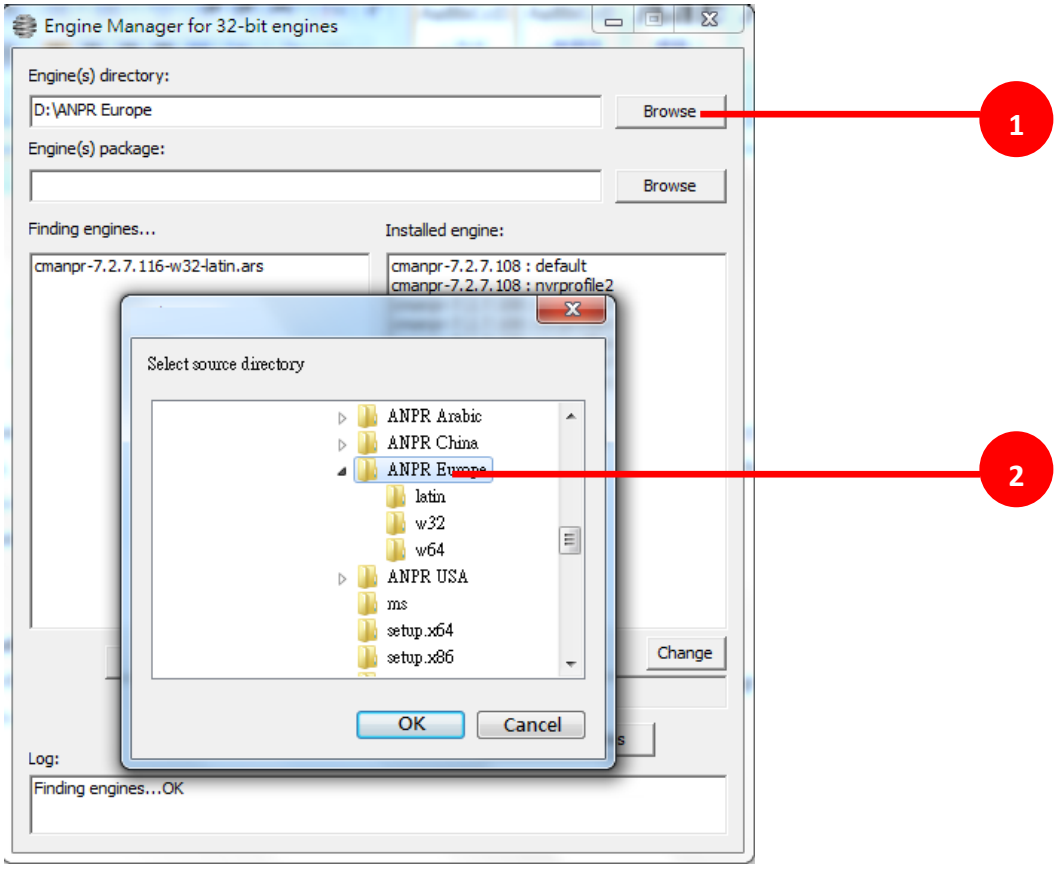
**Select Country Engine for CMX ANPR**

For installation CMX ANPR pack for the country of Arabic, China, Europe, or USA licenses, please click on “Start->Programs->GX->32 bit version->Engine Manager (32 bit version) for Engine Manager. For other regions, skip this step. You can use the default CMX ANPR driver.

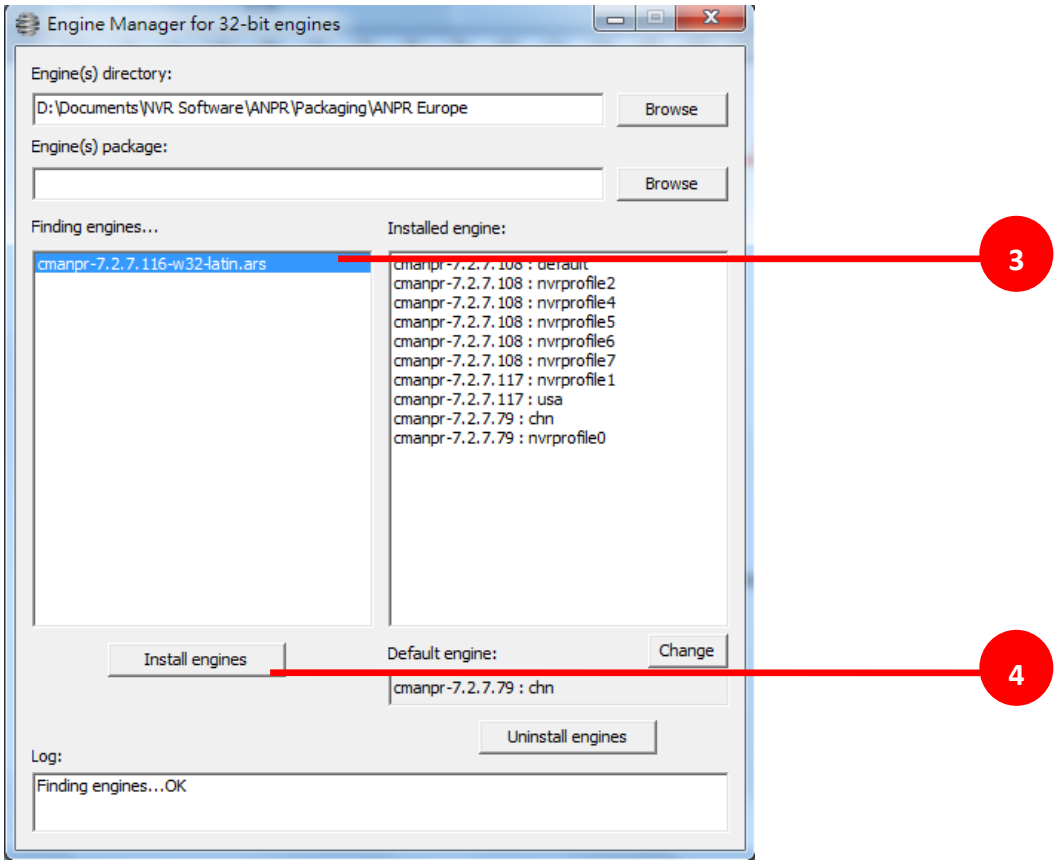



Please use “Engine (s) directory” browse button at Engine Manager to locate “ars” file. Once a directory with “ars” drivers detected, “Finding engines…” list box shows the detected driver package. Select the local CMX ANPR package and click on “Install engines” button to install the engine.

**Step 1:** Browse the driver path.

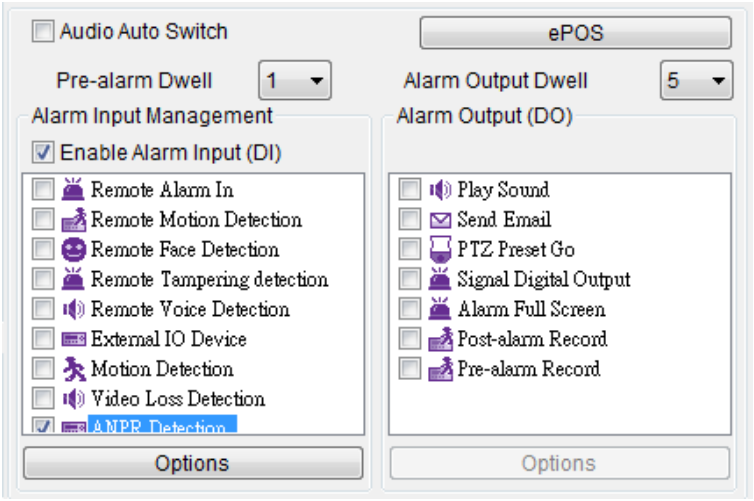


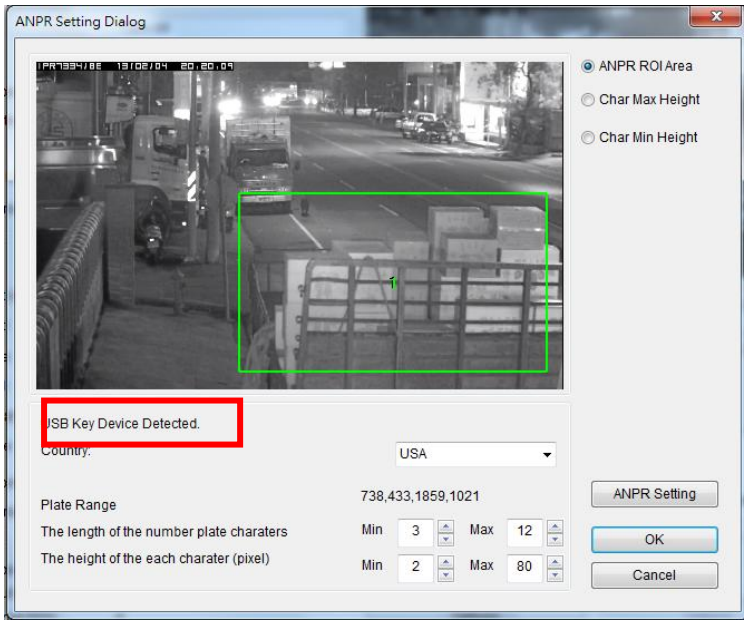

**Step 2:** Select the “Finding Engines” and click on “Install Engines” button.



**Verify the CMX ANPR engine is installed properly**

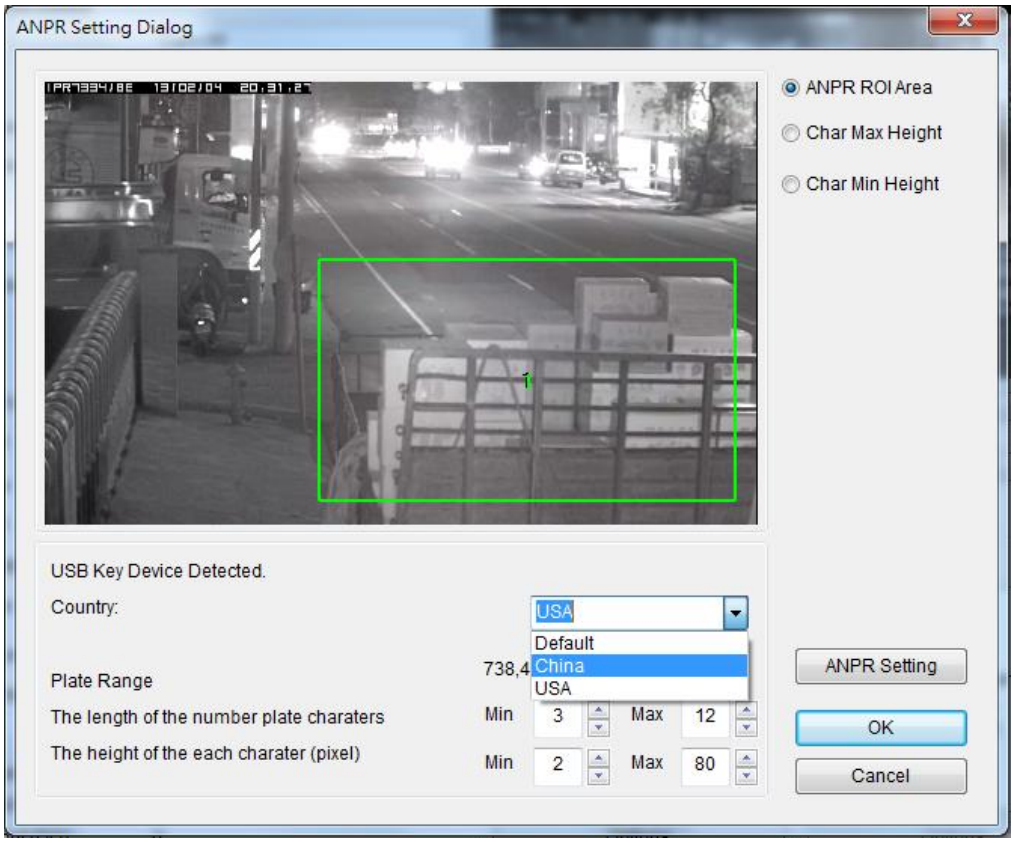
Click on camera Property button, and the ANPR Detection list shows up. Click on Options button. ANPR Setting Dialog box shows up. If the USB dongle and software are properly setup and configure, the “USB Key Device Detected” shows up.



## Chapter 1. CMX ANPR Setup

Click on camera Property button for ANPR Setting Dialog box. The detail settings of the dialog box are described below:




## Chapter 1-1. ANPR ROI Area

It is highly recommended to enable ANPR region of interest (ROI). This can further lower the CPU processing rate. Only the ROI area is detected for ANPR. To enable, simply draw the rectangle on the video. To disable, right mouse click on the video and select Clear menu item. There is only one ROI area that can be set.


**Chapter 1-2. Characters' Min and Max Heights**

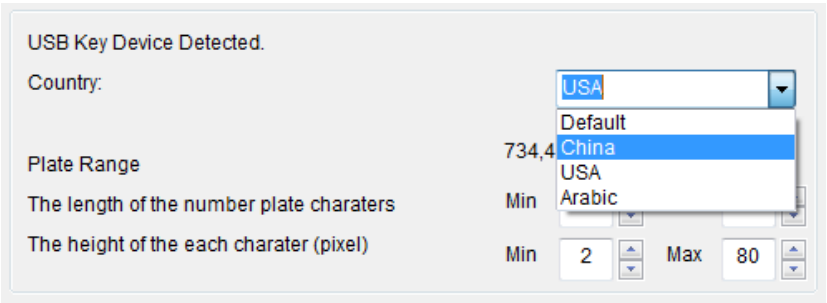
The character minimum and maximum heights can be specified. This can further avoid the logo on a truck or advertisement on a bus to be recognized. The recognition rate can be increased.

**Chapter 1-3. Min and Max Characters' Length of a Plate**

To increate the recognition rate, the minimum and maximum characters' length can be specified.

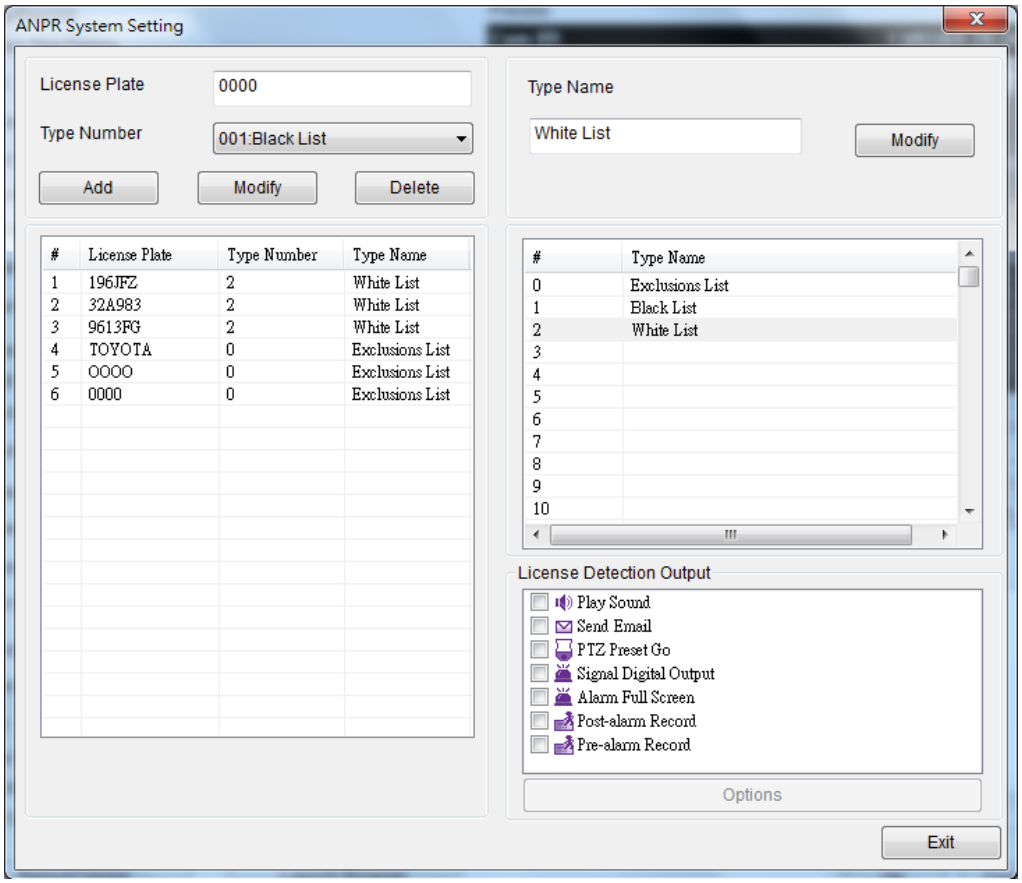
**Chapter 1-4. Country**

After CMX ANPR engine are installed for a country, please the Country codes are shown in the Country drop box. Please select a proper engine for your country.



## Chapter 2. CMX ANPR System Setting

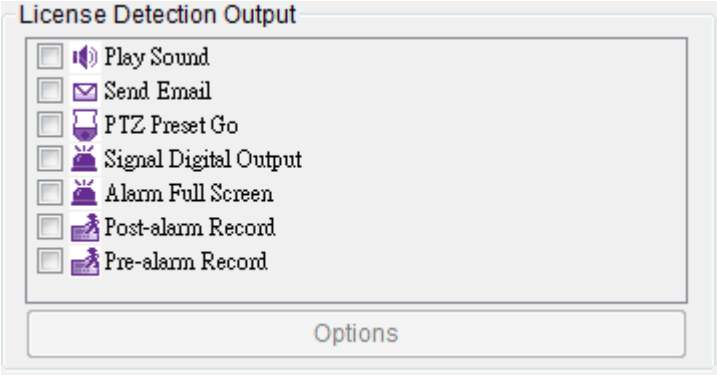

To enable ANPR system setting, click ANPR Setting button. The dialog box is shown below:

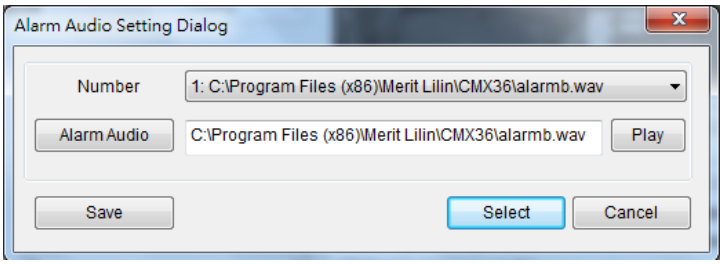



## Chapter 2-1. ANPR Category List

A user is able to create his or her own ANPR categories. Each ANPR type can trigger various outputs such as redirecting alarm output or firing prerecorded audio. The predefined type lists are (1) exclusion list, (2) black list, and (3) white list which are described below:

## Chapter 2-2. License Detection Output




## Chapter 2-3. White List

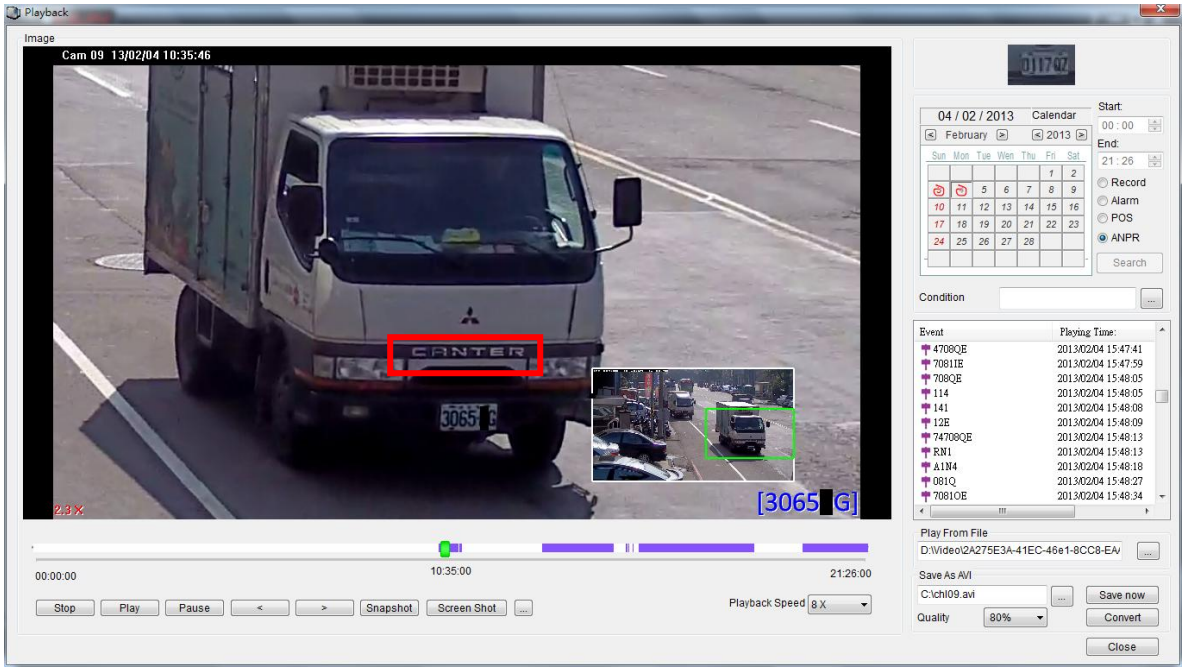
White list can be used to allow a vehicle to enter a facility. Once a plate is detected as in the white list, it can trigger a digital output of an IP camera for gate control.

## Chapter 2-4. Black List

Black list can be used to ban a vehicle to enter a facility. Once a plate is detected as in black list, it can fire pre-recorded audio for warning purpose.

## Chapter 2-5. Exclusion List

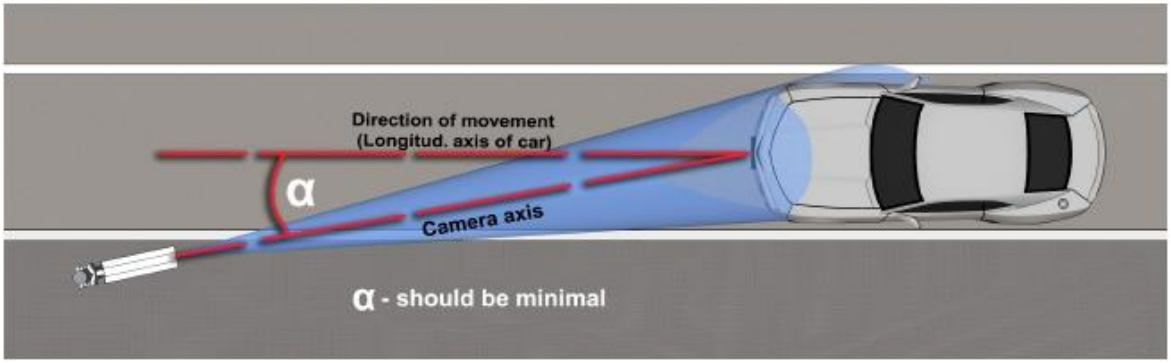
The logo of a vehicle might contain characters can might be recognized as a number plate. You can add the logo into Exclusion List to eliminate the plate. In the following example, the CANTER brand might be recognized as a plate. Please add CANTER into the exclusion list to avoid the recognition and increase the recognition rate.


Playback
Image
Cam 09 13/02/04 10:35:46
CANTER
[3065 G]
2.3 X
04 / 02 / 2013
Calendar
February
2013
Start:
00 : 00
End:
21 : 26
Record
Alarm
POS
ANPR
Search
Condition
Event
Playing Time:
4708QE 2013/02/04 15:47:41
7081IE 2013/02/04 15:47:59
708QE 2013/02/04 15:48:05
114 2013/02/04 15:48:05
141 2013/02/04 15:48:08
12E 2013/02/04 15:48:09
74708QE 2013/02/04 15:48:13
RN1 2013/02/04 15:48:13
A1N4 2013/02/04 15:48:18
081Q 2013/02/04 15:48:27
7081OE 2013/02/04 15:48:34
00:00:00
10:35:00
21:26:00
Stop
Play
Pause
Snapshot
Screen Shot
Playback Speed
8 X
Play From File
D:\Video\2A275E3A-41EC-46e1-8CC8-EA
Save As AVI
C:\ch109.avi
Save now
Quality
80%
Convert
Close

## Chapter 3. ANPR Camera Requirements

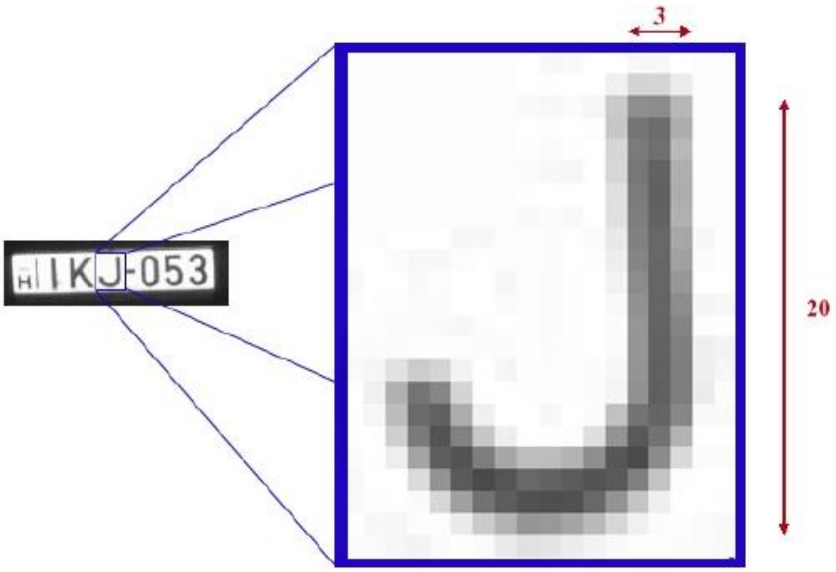
### Chapter 3-1. Recommended Camera Position

A good ANPR engine can read the plates from images taken in various conditions. However if you want to achieve over 95% recognition rate with short recognition times, you have to calculate the position of the camera accurately. The best position is if the angle between the camera axis and the direction of the vehicle movement is minimal (see below).




The distance between the camera and plate is also important. If the camera is too far from the plate, the characters may not be large enough for recognizing them. In this case zoom-in until you reach the proper size. If the distance is too short it may happen that a part of the plate is over the camera's field of view (when the vehicle is near to the side of the lane or the plate is not at the middle of the vehicle).

From the point of ANPR/LPR the most important is the size of the characters on the image. For English characters it is recommended to have at least 16 pixel average character height, for Arabic or other special characters it is recommended to have 20 pixel height (because they are more calligraphic than the Latin characters). Too large characters are also not suitable for ANPR, therefore try to avoid settings where the character size is greater than 50 pixels in height. A line width of a character on the image should be at least 2 pixels.




**Proper character sizes (in pixels) on the sample image**

### Chapter 3-2. Image Requirements

In order to expect the most accurate result from the CMX ANPR software, the processed images should contain a plate:

- with reasonable good spatial resolution (on the license plate the minimum character height is 16 pixels for Latin and 20 pixels for Arabic characters, 2 pixels line-width on the image),
- with reasonable good sharpness,
- with reasonable high contrast,
- under reasonable good lighting conditions, and
- in a reasonable good position and angle of view.

Although, 'reasonable' is not an exact definition, still it has a well understandable meaning. Here are some problematic images:

| Problematic ANPR images | Good ANPR plate images |
|---|---|
|  <br>Low contrast<br>Minimum 20 grayscale difference is | • with good sharpness<br>• with good spatial resolution<br>• with high contrast<br>• under good lighting conditions<br>• in a good position and angle of view |

required between the background and the characters of the plate.


Overexposure


Low spatial resolution
(too small characters on the plate) The required minimum character size is 16 (20 for Arabic characters) pixels height and 2 pixels line-width on the image.


High distortion


Blurred image


Interlaced




**Chapter 3-3. Recommended LILIN Cameras**

LILIN's 700TVL cameras with LILIN video encoder VS212 can be used for ANPR purpose. LILIN's iMEGAPRO range full HD IP cameras can be used for full HD ANPR purpose. The following models are recommended for ANPR application.

Analogue 700TVL CCD Cameras
Box camera: CMG108
IR outdoor: CMR728X, CMR738

Full HD iMEGAPRO IP Cameras

Box camera: IPG1022 and IPG1032 with ADL 10~50mm lens

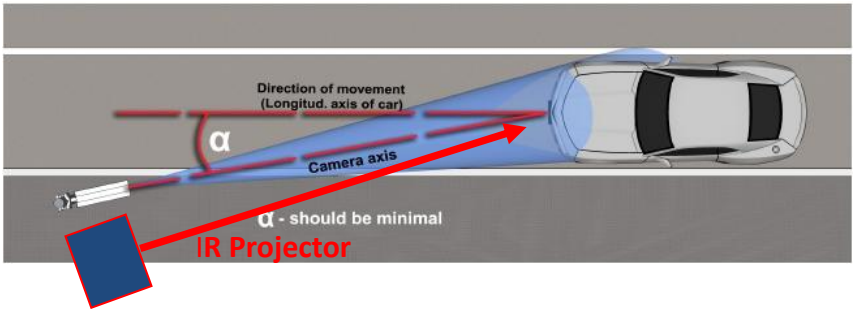
IR outdoor: IPR7334, IPR7338, IPR434, IPR438

**LILIN IPR7334 / IPR7338**

**LILIN IPG1022 / IPR1032**

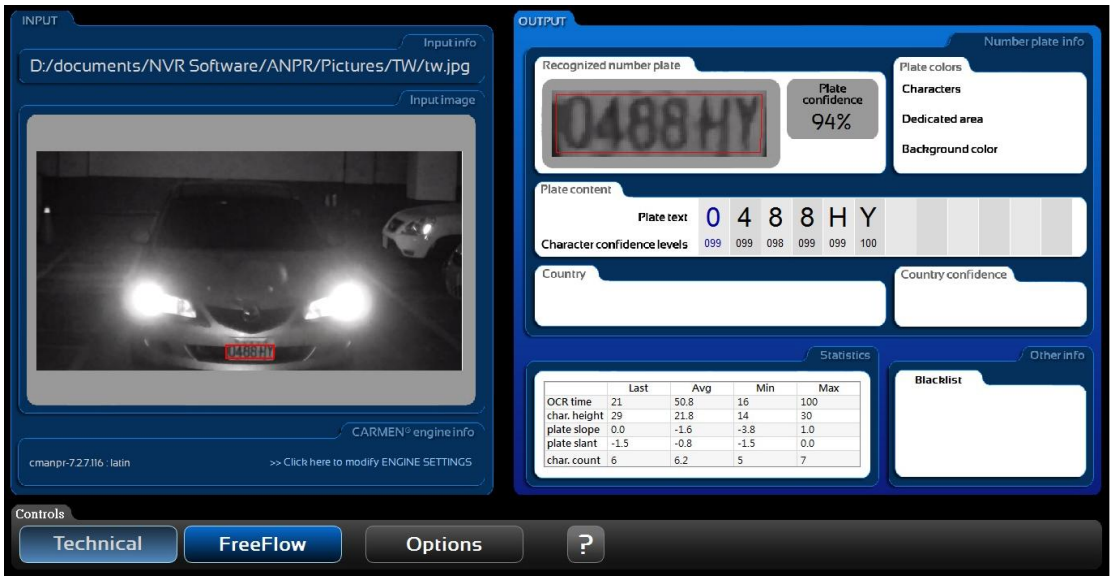
IR Illuminator

If IR mode (black/white) is required for the ANPR application, LILIN's IR projector can provide supplement light source for suppressing the head lights at night.




**IM05108/05308/05608**

**IPR7338ESX at no Light Environment with IR on**




**IPR7338ESX Recognition Statistics**

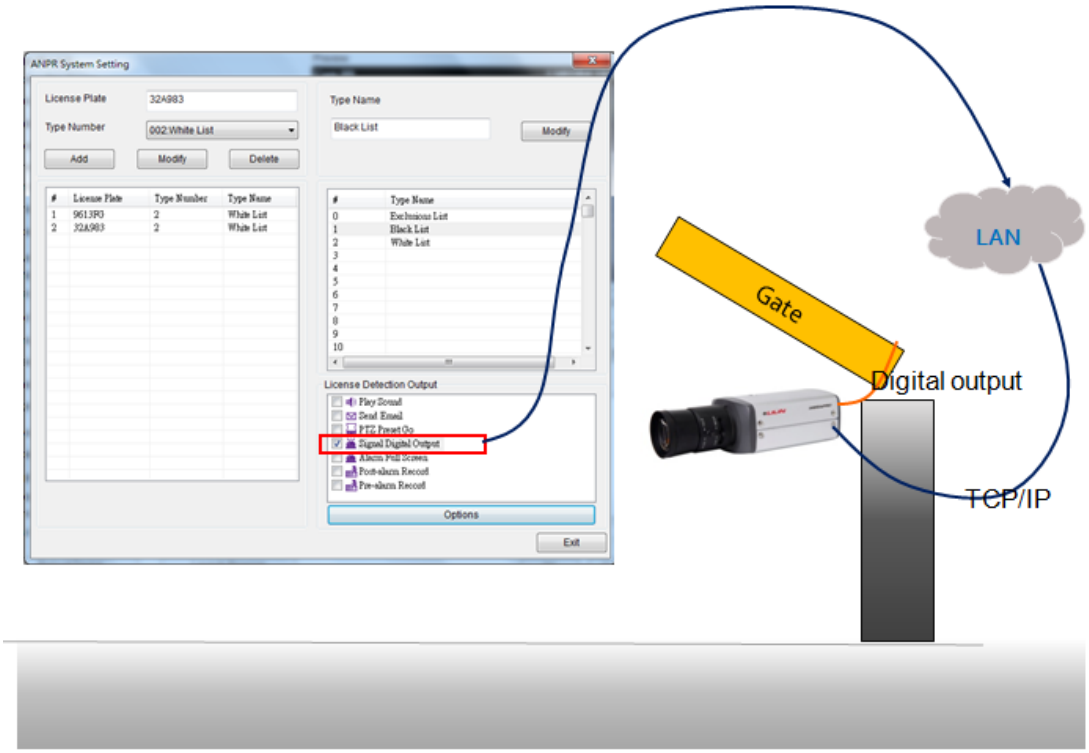
## Chapter 3-5. General Camera Setup Techniques

LILIN iMEGAPRO range cameras have two sets of digital signal processor (DSP) settings. The settings can be fine turned for handling head lights at night.

| | Daytime | Nighttime |
|---|---|---|
| WDR | Recommend to be On | Must be Off |
| Back Light Compensation | Recommend to be On | Must be Off |
| Shutter Min & Max | 1/8000~1/50 | Speed 60Km/h: 1/240~120 |
| Auto Gain Control | Set it to default | Set it to default |
| 3DNR | Recommend to be 2 | Keep it minimal |
| Sense Up | Do not care | Must be Off |

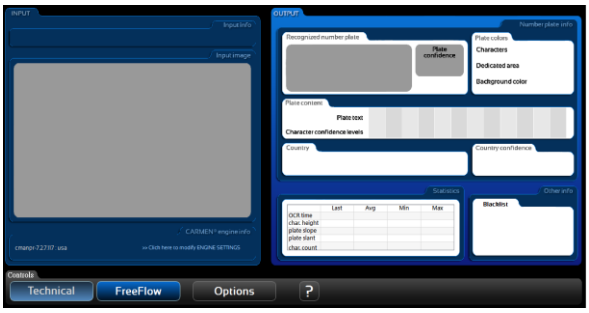
## Chapter 3-6. CMX ANPR Alarm Output and Gate Control

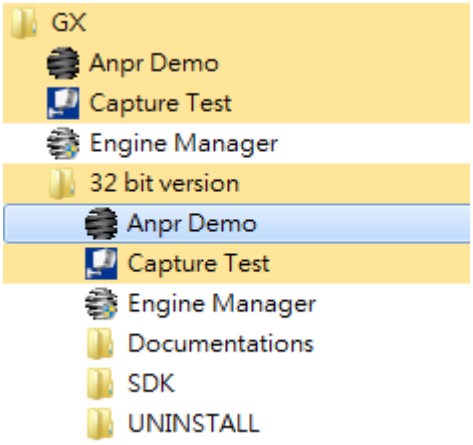
Each license category can be assigned for it License Detection Output. Digital output of an IP camera can be triggered for opening the gate control via the dry contact of the IP camera. The system diagram is show below:




## Chapter 4. CMX ANPR Engines' Samples

Sample of different country plates are shown below: A user can use Anpr Demo program to test the license plate.




To use Anpr Demo program, select GX->32 bit version->Anpr Demo program. The software can be used for (1) testing JPEG image taken by a camera for night, (2) testing the country/state/province codes for a region, (3) testing recognition for a JPEG image in terms of resolution and performance.

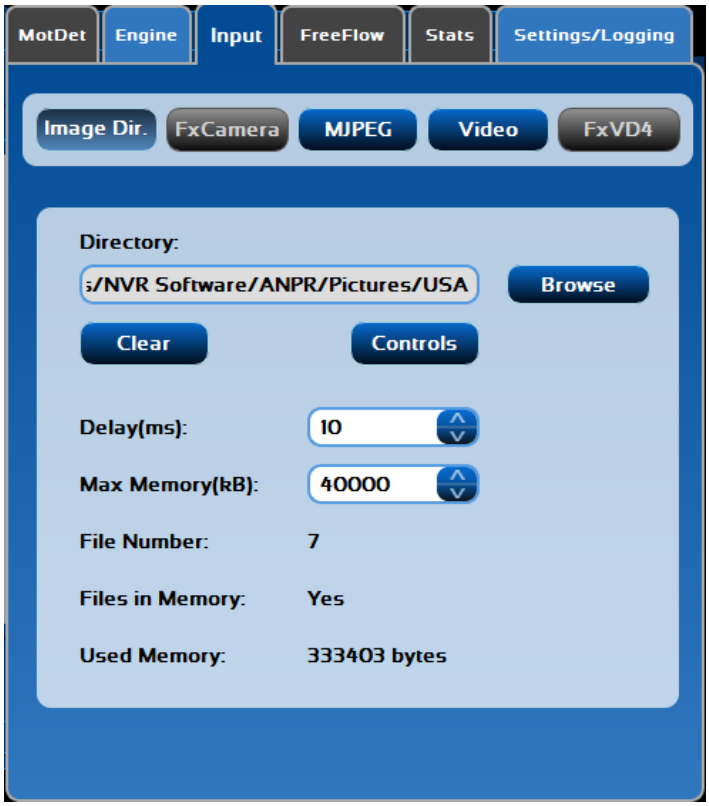

Step1: Click on Options button to enable or disable Options dialog box.

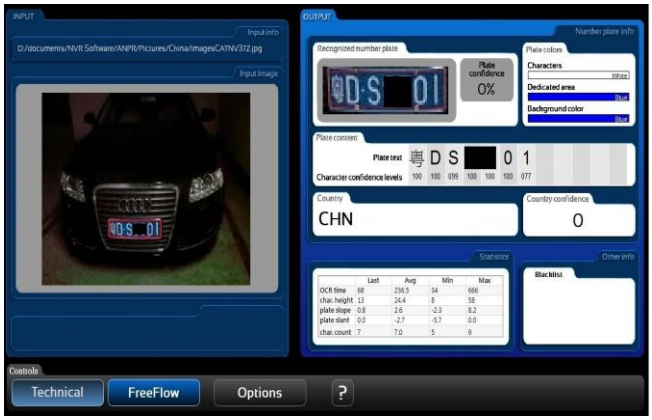

Step 2: Click on Controls button to enable or disable Controls panel.

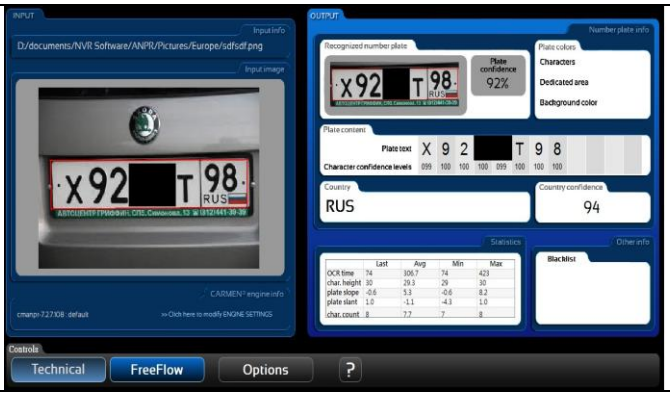

Step 3: Click on Browse button to the directory of the license plate directory.

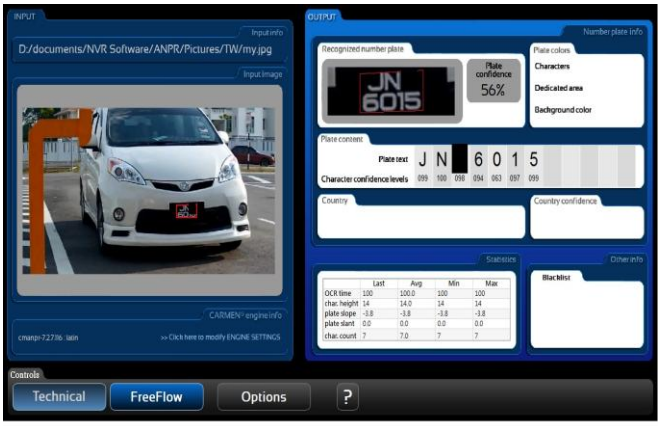
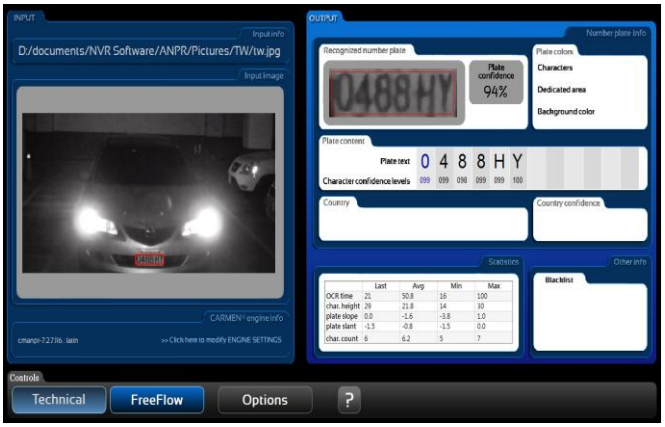
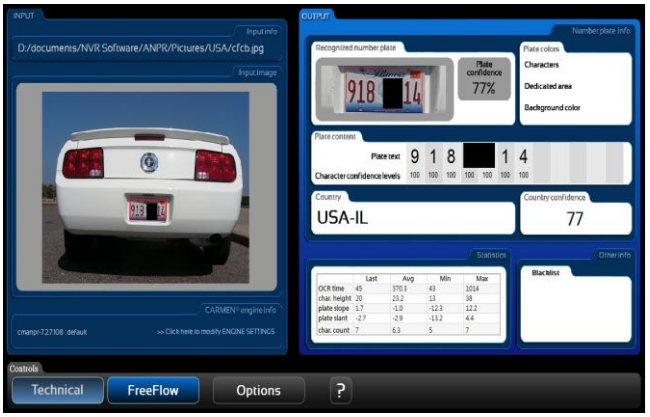

Step 4: Click o Prev and Next buttons to perform recognition.

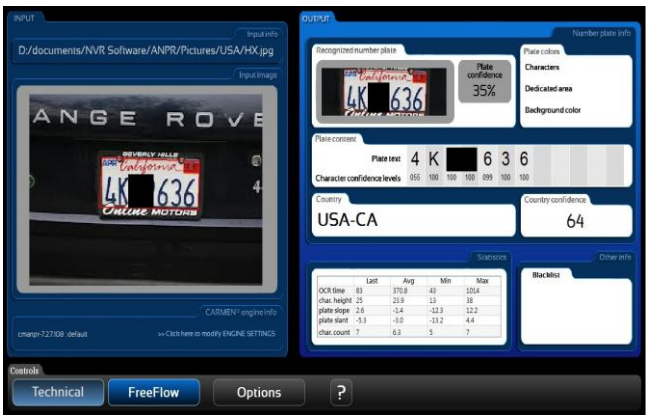
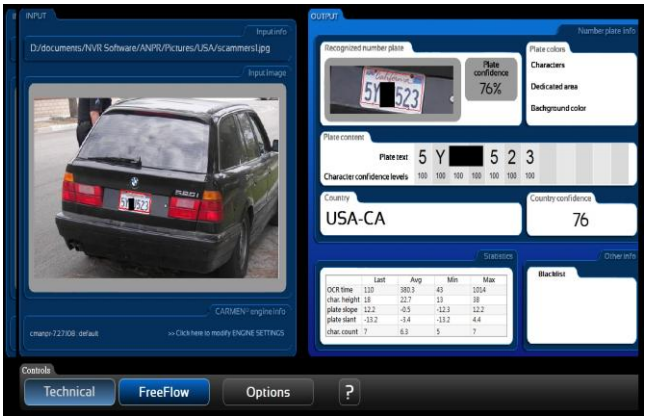
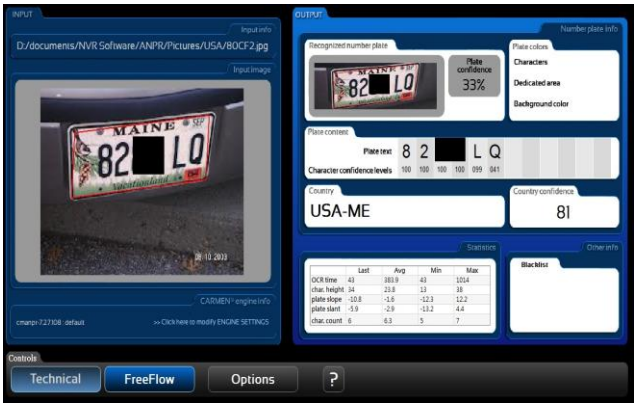
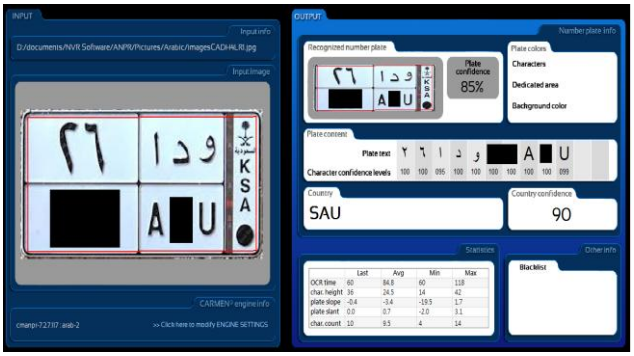

Step 5: Disable Controls and Options button. Double-click on X button to exit the program.




| CMX ANPR engine: China | |
|---|---|
| Country Detected: China<br>Province Detected: Yes |  |
| Country Detected: China<br>Province Detected: Yes |  |
| Country Detected: China<br>Province Detected: Yes |  |
| Country Detected: China<br>Province Detected: Yes |  |

| | |
|---|---|
| Country Detected: China<br>Province Detected: Yes |  |
| **CMX ANPR engine: Europe** | |
| Country Detected: Germany |  |
| Country Detected: UK |  |
| Country Detected: Russia |  |

| | |
|---|---|
| Country Detected: Russia |  |
| **CMX ANPR engine: Default** | |
| Country Detected: None<br>Country: Malaysia |  |
| Country Detected: None<br>Country: Taiwan |  |
| **CMX ANPR engine: USA & Canada** | |
| Country Detected: USA<br>State Detected: Illinois |  |

| | |
|---|---|
| Country Detected: USA<br>State Detected: California |  |
| Country Detected: USA<br>State Detected: California |  |
| Country Detected: USA<br>State Detected: Maine |  |
| Country Detected: Saudi |  |

## CMX ANPR Specification

| | ANPR-FL | ANPR-PK | CMX-LK |
|---|---|---|---|
| | FreeFlow | Parking solutions | CMX license key |
| CMX License Key | Included | Included | |
| Support channels | Up to 8 channels at D1/1080P ** | 2 | |
| Detection speed | 0.2 Second / recognition | 6 seconds / recognition | |
| Support resolutions | Full HD: 1920 * 1080 / HD: 1280 * 768 / D1: 720 * 480 / VGA: 640 * 384 / CIF 320 * 240 | | |
| Multiple lane recognition | Up to 4 plates per image | | |
| Character size | Minimum and maximum pixel highs configurable | | |
| License plate character length | Configurable | | |
| Detection area | User configurable | | |
| Black list | Alarm triggering and plate text recording | | |
| White list | Alarm triggering and plate text recording | | |
| Character length | Configurale | | |
| Exclusion list | Configurale | | |
| Character size | Configurale | | |
| Countries supported | USA and Canada: state detectable<br>Australia: state detectable<br>China: provence detectable<br>Europe: Eurpoe country detectable<br>Australia: Provence detectable<br>Arabic: Arabic country detectable<br>Taiwan and other countries | | |
| Playback | | | |
| Quick search | Yes | | |
| License capture | PIP and OSD text overlay | | |
| Video input | | | |
| Camera source | IP cameras / IP video encoder | | |
| Alarm | | | |
| Alarm management | Alarm popup for full screen, PC sound, redirect IP camera DO,<br>eMail snapshots, redirect a PTZ preset recall | | |
| Event | Various alarm log, video loss, stop recording, schedule, logon, operation log | | |
| Digital output | Controllable via IP cameras | | |
| Alarm recording | Pre-alarm:1~5 seconds and post-alarm: 5~50 seconds | | |
| Database | | | |
| Vehicle information | Name, state/provience, color, and memo | | |
| Backup | | | |
| | AVI conversion with number plate OSD and JPEG snapshots | | |
| System Requirement | | | |
| Access log | Complete access log in database manager | | |
| CPU requirement | Minimum Intel i3 CPU 2.0 GHz or above | | |
| RAM requirement | 4GB memory | | |
| HDD requirement | 20GB free size | | |

** Supporting 1080P resolution image is highly dependent on CPU processing power.