



ARTECO LPR APP



ARTECO LPR

Plate reading Application for “Hanwha Techwin Open Platform SDK”.

USER MANUAL

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Hanwha Techwin Cameras hardware requirements

The ARTECO LPR application is onboard software capable of reading license plates and transforming images into data. This “app” is designed for Hanwha Techwin cameras and can run on every Wisenet X series Hanwha Techwin camera. Performance may vary depending on the lens and on plate lighting.

The best performance can be obtained with “box” cameras because those allow mounting a suitable lens and can be installed in a custom housing with an appropriate illuminator. As an example we have successfully tested the “box” cameras Hanwha Techwin **XNB-6000 and XNB-8000**.

In addition to “box” cameras, “bullet” cameras may also be used for installations where reading conditions are not critical. We have successfully tested the **XNO-6120RP**.

Be sure the camera the latest firmware 3.20 or higher, otherwise the LPR Application won't run appropriately.

The default conditions considered are for rear license plates, the size of which are equal or greater than front plates. The latter can be also read but zoom must be set in order to get the same size as requested for back plates. If characters are narrow, the aiming angle of the camera must be strictly smaller than the maximum skew angle defined below in the Technical Specifications section.

The WiseNet X series Hanwha Techwin cameras, allows for saving typical presets of parameters for different environmental conditions.

Some example values for most common situations are shown in the following table:

PRESET NAME	MIN SHUTTER	MAX SHUTTER	AGC	SSDR	SSNR
Focus set definition (default)	1/5	1/12000	High	12	12
Focus set in motion	1/30	1/12000	High	12	4
Noise reduction	1/15	1/12000	Medium	12	12
Sharp Video	1/5	1/12000	High	18	12
Focus set in motion + Noise reduction	1/30	1/12000	Medium	12	4
Focus set in motion + Sharp Video	1/30	1/12000	High	18	4

These parameters can be found in the camera browser interface clicking on menu “Setup” → “Video & Audio” → “Camera Setup”:

Brightness	— + 50 (1 ~ 100)
Minimum shutter	1/600
Maximum shutter	1/12000
Prefer shutter	1/600
Anti flicker	Off
SSNR	Off
SSNR 2D Level	12
SSNR 3D Level	12
Lens	DC(Auto)
P-Iris	Auto
P-Iris position	— + 100 (1 ~ 100)
AGC	Off



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For shooting moving license plates it is good to increase the shutter speed and to smooth SSNR and AGC. The optimal features for the LPR software are: well contrasted characters against plate background and minimum character height of 15 pixels.

It is also needed to set "Day & Night" to "B/W". If the plate is properly illuminated we can set the camera as follows:

- Min shutter speed: 1/500, (max: 1/12000)
- SSNR level: OFF
- AGC: Low

If, with the above parameters, the image is too dark then it is better to increase lighting or decrease minimum shutter to 120:

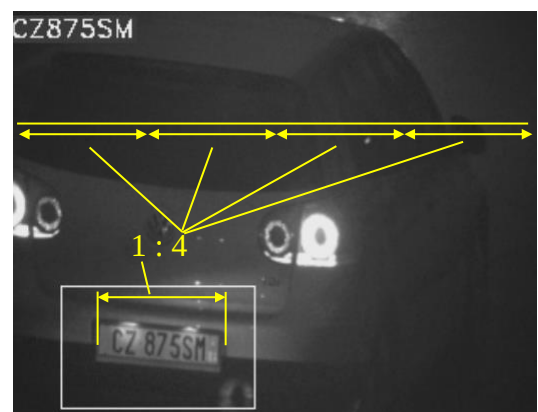
- Min shutter speed: 1/120 (max: 1/12000)
- SSNR level: 4 44 4
- AGC: Medium

For best performance set "SSDR" to Level=1 and D-Range = wide and disable the "Sharpness" feature.

When all the settings are done, click on "Apply" and confirm.

Camera installation

Generally speaking, in order to read a plate of a known Country, the plate width must be about $\frac{1}{4}$ of the image width. The plate image must have good contrast and the camera must be set into b/w.



For instance, you can note the original image in the left frame and the same image successfully read by the ARTECO LPR at right: in the latter the size of the plate is $\frac{1}{4}$ of the image width.

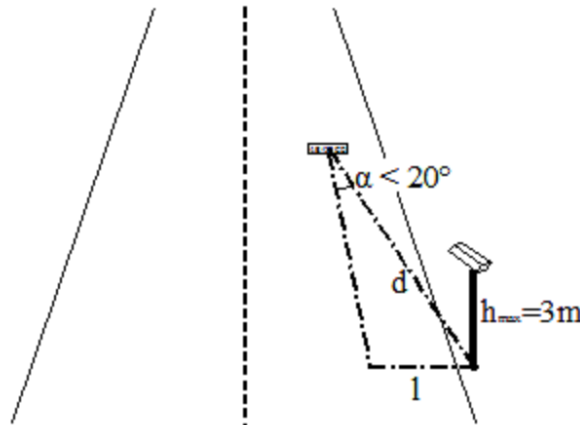
Lens for "box" cameras

The correct plate size can be fitted through a proper lens zooming (often a 5-50mm or 8-80mm, varifocal, autoris, megapixel lens, with IR-correction is suitable), while the contrast can be achieved through a proper light. We have tested successfully a lens made by Fujinon with the above-described properties, model YV3.3x15SR4A-SA2 (15-50mm) and DV10x8SR4A-SA1L (8-80mm)



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The camera angle must be perpendicular (less than 20°) to the plate plane. No plate rotation is permissible and skewing must be minimized as seen by the camera side.



5-50 mm lens - plate distance Vs. Zoom		
MIN-ZOOM	$d = 3.5 \text{ m}$	$l_{\max} = 1 \text{ m}$
MAX-ZOOM	$d = 15 \text{ m}$	$l_{\max} = 3 \text{ m}$

8-80 mm lens - plate distance Vs. Zoom		
MIN-ZOOM	$d = 4 \text{ m}$	$l_{\max} = 1 \text{ m}$
MAX-ZOOM	$d = 25 \text{ m}$	$l_{\max} = 3,5 \text{ m}$

This specification can be accomplished with a combination of “d” and “l” as they are defined in the above figure. For instance, if the plate read point is set at $d=15$ meters away from the lens, then the maximum distance of the camera from the car trajectory must be $l_{\max} = 5,1$ meters, in order for the α angle to be smaller than 20° . For the same reason it is recommended to keep $h_{\max} < 3$ meters from ground.

License Plate lighting and embedded-IR housings for “box” cameras

In order to get the best image from reflecting-background plates, the light source must be mounted as close as possible to the camera lens. The light also allows the camera to read at nighttime and improve the reading at daytime.

An infrared light is preferable to visible light in order to illuminate a license plate in order to avoid driver disturbance or blinding.

An infrared band-pass filter helps the App improve accuracy of plates reading.

All the above features are available in the outdoor housing designed by Arteco for this purpose and suitable for Hanwha Techwin “box” cameras.

For box cameras Arteco can provide an outdoor housing “CAS00-LPR828” with the features detailed as below:

- power supply 110/220Vac
- 10° narrow spotlight light at 850nm
- front lowpass IR filter glass
- internal PSU provides up to 500mA @ 12Vdc for supplying the camera
- Maximum outer external lens diameter: 40mm

The Arteco "CAS00-LPR828" case is able to host only the 1/3 "15-50mm Autoiris Fujinon YV3.3x15SR4A-SA2 lens.



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ARTECO LPR software Installation

SET CORRECTLY THE DATE&TIME ON THE CAMERA BEFORE PROCEEDING.

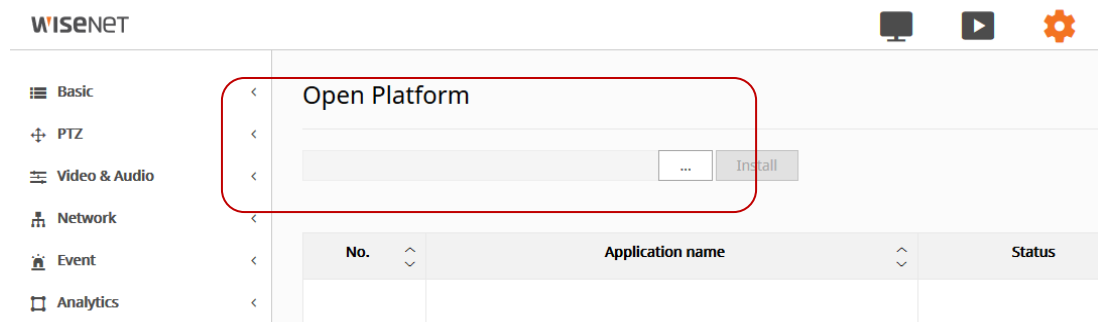
Please update your Hanwha Techwin Wisenet camera to latest available firmware.

Open your web browser and login to in the camera web menu.

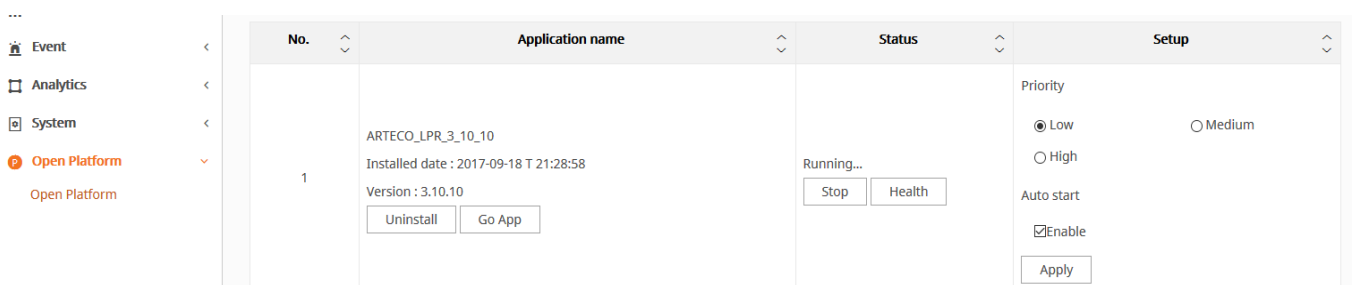
Locate the camera serial number in order to get a license for ARTECO LPR. Go to System → product information and copy the camera S/N then send it to your Artec camera dealer which will reply with an email containing the instructions to install the application and activate the license.

Now you can install the software application ARTECO LPR into your camera.

To do so, go to menu System → Open SDK and browse for your “ARTECO LPR.cap” file as shown below:



Then click Install and wait for the process completion. When done the following page will be displayed:

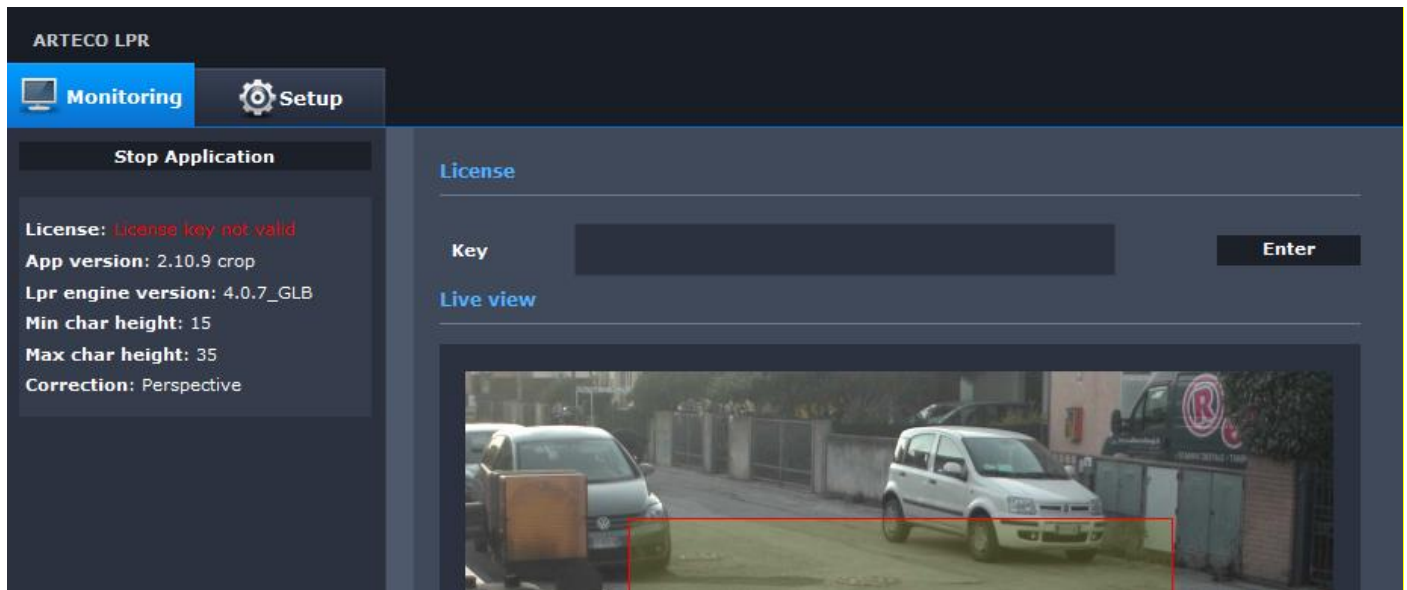




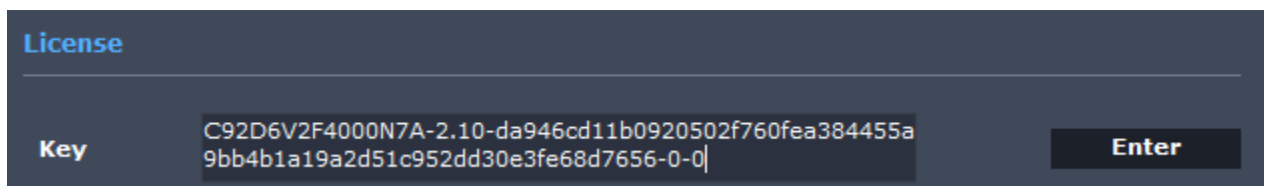
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ARTECO LPR licensing

After installing the App as described in the previous page click on “Go App” and a new page will be opened in your web browser:



Now, paste in the Key box the license string you have received from your dealer, based on your camera' serial number and then click on the “Enter” button.



After that your Arteco LPR application is licensed and you can go through the next steps.



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Hanwha Techwin Techwin camera configurations

Event management settings

To enable the main switches for all the ARTECO LPR events, please go to “Event Setup” menu and enable the checks as described below, then click “Apply” and confirm:

Use	Type	FTP	E-mail	Record	Alarm output 1	Goto preset
☒	▶ Alarm input 1	☐	☐	☐	Off	Off
☐	▶ Time schedule	☐	☐	☐		
☐	▶ Fog detection	☐	☐	☐	Off	Off
☐	▶ Tampering detection	☐	☐	☐	Off	Off
☐	▶ Defocus detection	☐	☐	☐	Off	Off
☐	▶ Motion detection	☐	☐	☐	Off	Off
☐	▶ IVA	☐	☐	☐	Off	Off
☐	▶ Face detection	☐	☐	☐	Off	Off
☐	▶ Audio detection	☐	☐	☐	Off	Off
☐	▶ Sound classification	☐	☐	☐	Off	Off
☐	▶ Network disconnection			☐	Off	Off
☒	▶ App event	☒	☐			

Apply Cancel

This will leave you free to decide which has to work from the App menu.

To allow the Hanwha Techwin camera to manage specifically the email and FTP App event you have to set the following checks (FTP/email) from menu Setup → Event → FTP/Email as shown below:



ARTECO LPR APP

WISENET

Basic < PTZ < Video & Audio < Network < **Event** >

Event setup
Hand over
FTP/E-mail
Storage
Alarm output
Alarm input
Time schedule
Network disconnection
App event

App event

App event ☒ Enable

Event action settings

FTP ☒ Enable

E-mail ☒ Enable

Event activation time

☒ Always ☐ Only scheduled time

Apply Cancel

Please do not enable any FTP sending, unless there is an FTP server enabled to receive images.
After all settings are done, click on “Apply” and confirm.

In order to allow the Hanwha Techwin camera to manage specifically the digital OUTPUT App event you have to set the following checks from menu Setup → Event → Alarm Output. Typical settings for access control application are shown below:

WISENET

Basic < PTZ < Video & Audio < Network < **Event** >

Event setup
Hand over
FTP/E-mail
Storage
Alarm output
Alarm input

Alarm output

Alarm output No. 1

Alarm output 1

Type ☒ N.O. (Normal Open) ☐ N.C. (Normal Close)

Mode ☒ Pulse ☐ Active/Inactive

Duration 2 s

Apply Cancel

When all settings are done, click on “Apply” and confirm.

In order to allow the Hanwha Techwin camera to send email notifications you have to set the following parameters from menu Setup → Event → Ftp / Email as shown below:



ARTECO LPR APP

WISENET

Basic

PTZ

Video & Audio

Network

Event

Handover

FTP/E-mail

Storage

Alarm output

Alarm input

Time schedule

Network disconnection

App event

Analytics

System

Open Platform

FTP/E-mail

FTP configuration

Server address

192.168.10.151

ID

administrator

Password

Upload directory

/wisenet-lpr0

Port

21

Passive mode

☒ Enable

Apply

Cancel

E-mail configuration

Server address

smtp.provider.com

Authentication

☒ Enable

TLS

☐ Enable

ID

artecolpr@provider.com

Password

Port

25

Recipient

user@email.com

Sender

Arteco_LPR@arteco.com

Subject

License Plate detected

Message

License Plate detected

When all settings are finalized, click on “Apply” and confirm.

Video profiles

In the video profiles menu you will find a custom profile labelled as “OPENSCKMJPEG” and created automatically by ARTECO LPR App. This profile is used by Arteco LPR App for plate reading and for displaying the plates in the preview web page



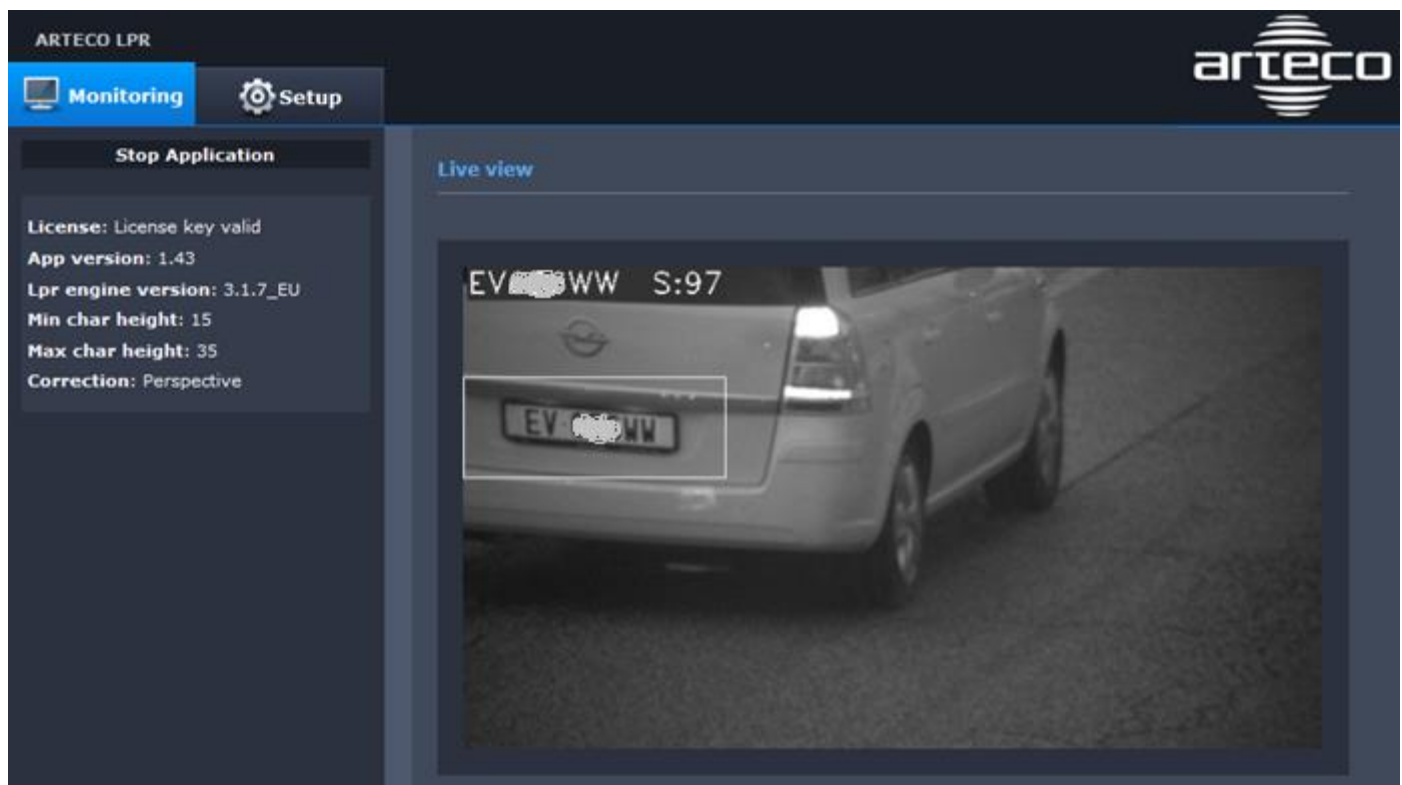
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Access to Arteco LPR pages

Connecting to the Hanwha Techwin IP via Web browser (we suggest Mozilla Firefox), you can watch the ARTECO LPR menu by clicking Setup → System → Open SDK → Go App.

Monitoring menu

In the image below there is a snapshot of the ARTECO LPR display. This page is made of two main menu: "Monitoring" and "Setup".



When a plate is read, the app draw a rectangle surrounding the plate and displays the plate in the image corner as shown above. The number after the plate string is the accuracy score of that reading stated by the software. You can switch on/off the plate reader by clicking on the "Stop Application" main switch.

OCR Menu

After accessing the "Setup" menu, the "OCR" settings will appear as first page.

Before changing the following settings, set lens focus properly, minimize camera rotation and skew, and point the camera to plate perpendicularly ($\pm 20^\circ$).

In the Setup → OCR page a gauge appears at the right side. This tool allows the camera installer to understand if plate is too big or small for optimal reading.

Real time measurements of the actual plate height in pixels drives the gauge indication in order to suggest if the installer should zoom-in (if plate size is too small) or zoom out (as in the above example) if plate size is too big.



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The parameter "MinCharH" means minimum character height [pixel] expected by software, while "MaxCharH" is the maximum character height [pixel] expected by software.

You can change these parameters if your lens cannot reach the plate width as $\frac{1}{4}$ of image width. Minimum acceptable height for a plate character is 15 pixels.

As shown below, by opening the "Correction" drop-down menu you will be allowed to select one of two distortion corrections: Perspective or Rotation. Choose for the dominant image distortion, if any, otherwise select "none" to preserve camera CPU resources.

"Threshold" will allow to cut-out readings which trustiness is weak in order to avoid fake readings. A bright, clear and well sized plate image generate a score = 100. A misreading will fall below 50. A good tradeoff for this threshold is = 70.

"Plate color" will speed up read time when set properly according to plates you may need to read. Three options are available:

Dark text on light background
Light text on dark background
Both light and dark text

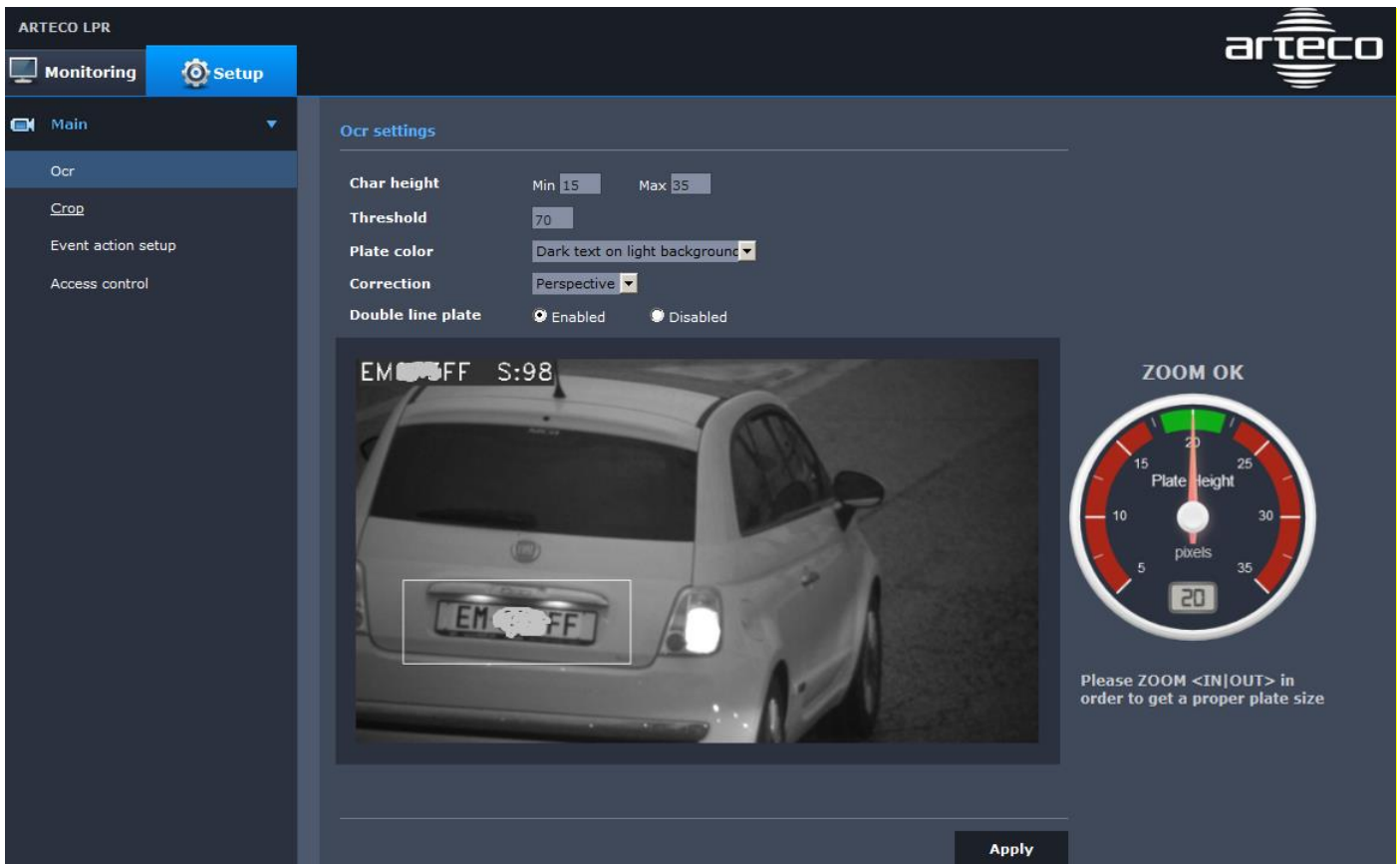
As shown below, by opening the "Correction" drop-down menu you will be allowed to select one of two distortion corrections: Perspective or Rotation. Choose for the dominant image distortion, if any, otherwise select "none" to preserve camera CPU resources.

The "Double line plate" option, if enabled, will allow OCR to read plates split over 2 lines like the following example:





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After changing parameters click on “Apply” and confirm the changes.

Area menu

The App version for Hanwha Techwin box camera provides this menu in order to define active zones for plate readings. You will be able to set more than one (green) area where the software reads plates or define (red) masking areas where ARTECO LPR will not read plates.

This function is often useful when the camera aims to a two way lane and you would not get readings from one of two directions (incoming or outgoing vehicles).

In order to enable this feature select main switch to “On”. Define if you want to draw a “detection” or “non detection” zone and click on “New”.

Click and drag your mouse on the camera image in order to define the area contour and right click with mouse when done.

If you want to remove an area, click on area in order to select it and then hit the button “Delete”.



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ARTECO LPR

Monitoring

Setup

Main

Ocr

Area

Event action setup

Access control

Area

Enable

Area configuration

BC GH S:85



Area

☒ Detection

☐ Non detection

New

Delete

Apply

After changing parameters click on “Apply” and confirm the changes.



ARTECO LPR APPLICATION

Embedded Access Control

A total of 4 lists of plates can be managed within the App.

Each list can contain about 16,000 plates (depending on the standard).

Each list can be activated on a weekly schedule to automatically allow or deny access to up to 4 different groups on a time basis.

It is possible to directly enter the license plates in the relative menu, or to import a text file (eg .txt, .csv, etc.) containing the data separated by commas: "AB123CD, FF54223," .. and so on.

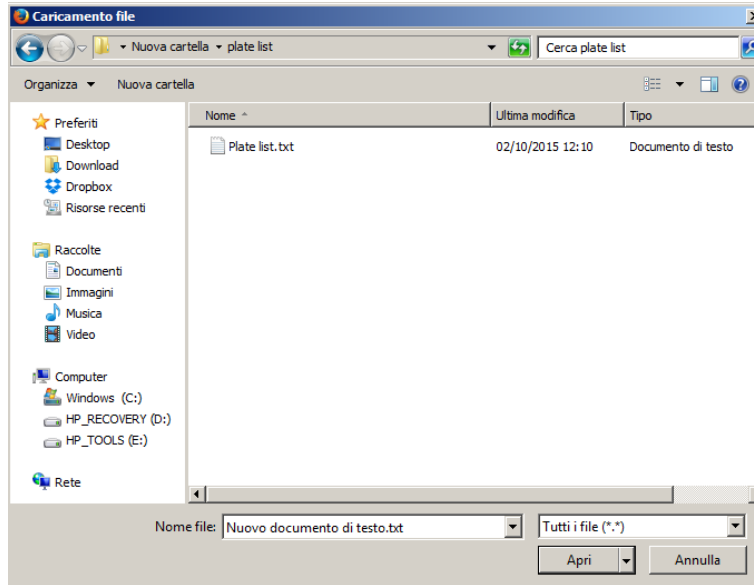
The screenshot shows the 'Plates list 1' configuration screen. The sidebar on the left has 'Monitoring' and 'Setup' tabs. Under 'Setup', there is a 'Main' dropdown menu with options: 'Ocr', 'Area', 'Event action setup', 'Plate List 1' (selected), 'Plate List 2', 'Plate List 3', and 'Plate List 4'. The main area is titled 'Plates list 1' and contains a 'Name' field with the value 'Colla', a 'Type' section with 'Allow' and 'Deny' radio buttons (both unselected), and a large text area containing the license plate 'EA816XR'. Below the text area are four buttons: 'Add', 'Del', 'Clear', and 'Upload'. To the right of the text area is a weekly schedule grid with columns for Sun, Mon, Tue, Wed, Thu, Fri, and Sat, and rows for every 30 minutes from 0:00 to 23:30. The grid shows a blue bar for Monday from 6:30 to 9:30. At the bottom right of the grid are 'Always' and 'Clear' buttons. At the very bottom right is an 'Apply' button.

To upload a List, go to menu camera menu Setup → Access Control and click on "Upload List"

This will open the typical file browser window to upload the file to the camera:



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Click on “Open” to load the file to camera and then enable the Access Control by selecting “On” as pointed out in the previous image.

In addition, a list editing mode is also provided via http / cgi commands, as explained at the end of the manual.

Access control configuration

In this section we are going to define what the camera must do, depending on the lists.

The user can define FTP image sending (to Artec VMS for instance), email sending, TCP data sending (Hanwha Techwin VMS protocol) and digital output trigger “Open Gate”.

The combination Actions – Triggers can be defined by setting the table shown in the image below that belongs to APP menu Setup → Event action setup:

Event action setup						
Type	Every Plate	List 1	List 2	List 3	List 4	
> FTP	☒	☐	☐	☐	☐	
> Mail	☐	☐	☐	☐	☐	
> TCP	☐	☐	☐	☐	☐	
> Open Gate	☐	☐	☐	☐	☐	



ARTECO LPR APPLICATION

The screenshot shows a web-based configuration interface for the ARTECO LPR application. It is divided into two main sections: "Settings" and "TCP". The "Settings" section is highlighted with a red rounded rectangle and contains four rows of configuration options: "Event filter" with a checkbox for "Filter consecutives matches of same plate"; "Filter management" with a checkbox for "Reset filter after" followed by a text input field containing "0" and the unit "seconds"; "Match accuracy" with the text "Allow maximum mismatch chars" followed by a text input field containing "0"; and "Email" with a checked checkbox for "Maximum" followed by a text input field containing "1", the text "emails every", another text input field containing "3", and the unit "minutes". The "TCP" section below it contains a "Protocol" dropdown menu set to "Samsung NVR" and an "Address / port" field showing "192.168.10.77" and "7001". An "Apply" button is located at the bottom right of the interface.

In the sub-menu “Settings” the user can define some features for access control:

Event Filter: if checked it triggers the defined actions once, after the first match and until the plate read will match the same plate in the list. This function is aimed to avoid multiple triggers to the gate, while a vehicle is stopped and its plate is read continuously by the camera.

Filter Management: enabling this feature you will reset the previous filter after the defined “seconds” so as to re-trigger the defined actions. This function is aimed to re-open the gate again, after the gate recloses and the vehicle did not pass through in time within gate open time window.

Match Accuracy: this parameter sets the number of possible mismatched characters tolerance in order to trigger the defined actions, despite there not being a complete plate reading match. It can be useful in order to allow entrance even in case of small read errors.

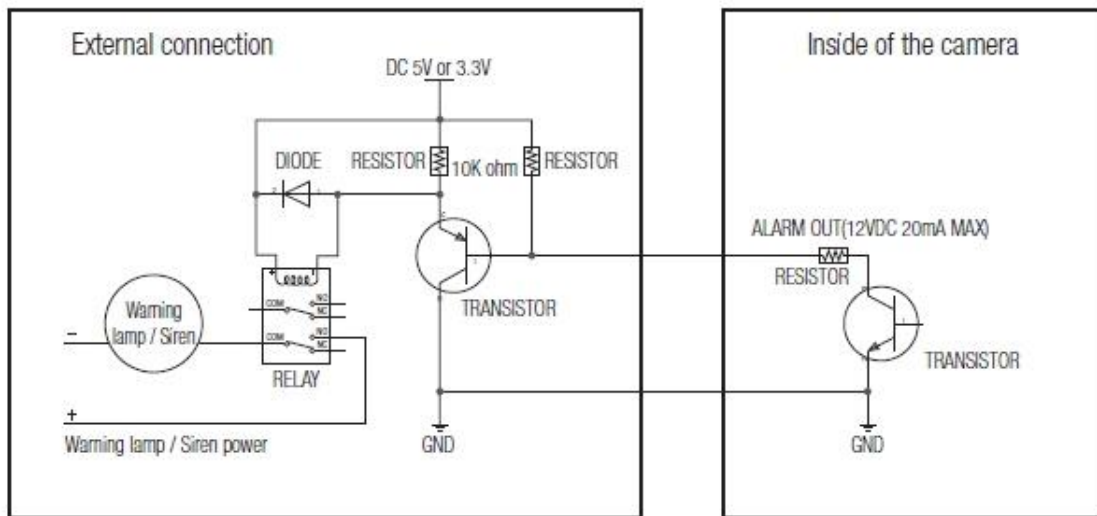
Email: this filter allow you to limit the frequency of email sent in a defined time interval. This is useful in order to save triggering SMTP mail server anti-spam filters.

Access control configuration

Hanwha Techwin Ip cameras provide at least one digital output “open collector” type. This means you cannot just load this output with an uncontrolled current. Most of the connections between the camera and a generic “load” (like a gate open control) can be implemented by putting a DC relay between the camera and the electric load. The relay coil must adsorb 20mA maximum and it is recommended to be powered at 3.3 to 5Vdc. You may read the connection scheme in the camera user manual which we reported below



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For more information about wire connections to camera output, please refer to the camera user manual.



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Connecting ARTECO LPR to “Arteco NEXT” VEMS

Arteco NEXT is the VMS provided by Arteco. In order to manage a license plate archive you can use Arteco NEXT. To do so, it is required to save the credentials displayed in the Arteco interface and apply the credentials to camera menu.

The screenshot displays the Arteco LPR application interface. On the left, a video feed shows a car with a license plate. Below the feed are tabs for 'Native', 'MPEG-4', 'H.264', 'MJPEG', and '3rd Stream (*)'. The '3rd Stream (*)' tab is selected, showing settings for 'Live Profile' (3rd Stream), 'Encoder' (Native H.264), 'Resolution' (800 x 450), 'Frame Rate' (4), and 'Quality' (1). There are also checkboxes for 'Enable Live Audio' and 'Default Profile'. On the right, the 'SAMSUNG' camera configuration section is visible. It includes fields for 'SAMSUNG-LPR', 'Enable Camera' (checked), 'IP Address' (192 . 168 . 10 . 102), 'User' (admin), 'Password' (masked), 'Protocol' (UDP), and 'Source'. Below these are settings for 'Native Encoder' (H264), 'Native Res.' (800 x 450), and 'Native Fps' (4). Further down are 'Substream Res.' (1.98 MEGAPIXEL) and 'Acquisition Fps' (4). The 'Enable 3rd Stream' checkbox is checked, with '3rd Stream Res' (800 x 450) and '3rd Stream Fps' (4) settings. The 'Audio Stream' is set to 'Off'. At the bottom right, the 'FTP Path' is '/samsung-lpr2', 'FTP User' is 'administrator', and 'FTP Password' is masked. These three fields are circled in red.

The parameters surrounded by red area must be used in order to configure the FTP client of Hanwha Techwin camera as described below.

In order to transmit the license plates data from Hanwha Techwin camera into “Arteco NEXT” you have to configure the Hanwha Techwin Setup → FTP/E-mail menu accordingly with the Arteco-Server address, path and credentials as reported in above image. The image below gives an example on how to configure these parameters in the Hanwha Techwin camera:



ARTECO LPR APPLICATION

iPOLiS NETWORK CAMERA WEBVIEWER

SAMSUNG SAMSUNG TECHWIN

Monitoring Playback **Setup** ADMIN Status

Basic

- Video profile
- User
- Date & Time
- IP & Port
- Event setup

Video & Audio

Network

Event

FTP / E-mail

FTP configuration

Server address: 192.168.10.151

ID: administrator

Password:

Upload directory: /samsung-lpr2

Port: 21

Passive mode: ☒ On ☐ Off

Apply

E-mail configuration

After changing parameters click on “Apply” to confirm the changes.

In order to enable the APP to transmit plates over FTP please open Setup → Event action setup and enable FTP for “Plate detected” in order to receive all the plates read from the app.

ARTECO LPR

Monitoring **Setup**

Main

- Ocr
- Area
- Event action setup**
- Access control

Event action setup

Type	Disabled	Plate detected	List match	List no match
FTP	☐	☒	☐	☐
Mail	☐	☐	☐	☐
TCP	☐	☐	☐	☐
Open gate	☐	☐	☐	☐

Settings

Event filter ☐ Filter consecutives matches of same plate

Filter management ☐ Reset filter after 0 seconds

Match accuracy Allow maximum mismatch chars 0

Email ☒ Maximum 1 emails every 3 minutes

TCP

Protocol Samsung NVR

Address / port 192.168.10.77 : 7001

Apply

Please do not enable any FTP event unless there is an FTP server enabled to receive images.



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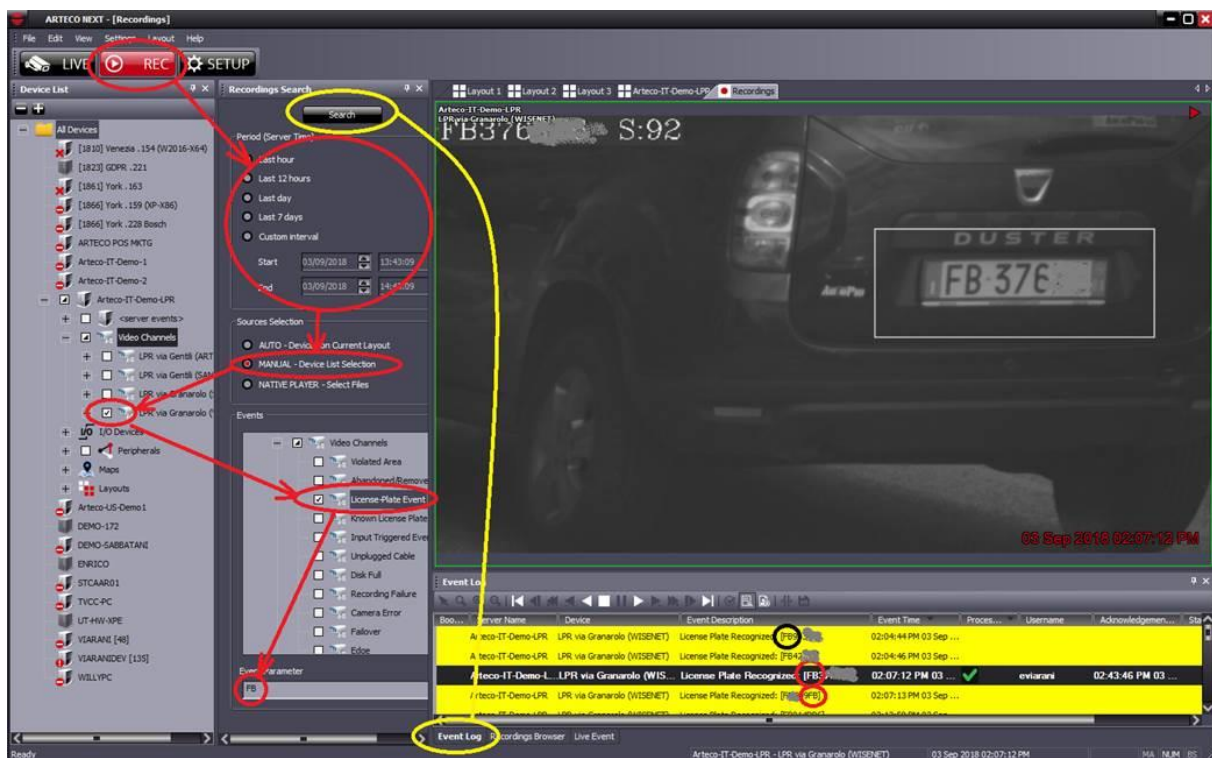
Below, on the left video frame you will see live video, while in the right frame you will see the snapshot, with the immediate possibility to export it in a standard format file.



QUERY SECTION

You can query detailed searches across multiple cameras/servers. To do so you can follow the steps below:

1. Go to REC environment
2. Select query time range
3. Choose the "Manual" Source selection and choose the camera from the device tree
4. Check "license plate event" among "Video channels" event types
5. Type the plate string (even incomplete)
6. Hit "Search" and select "Event Log" tab at the bottom
7. Browse among query results by clicking log rows to display plate pictures





ARTECO LPR APPLICATION

Connecting Arteco LPR to Hanwha Techwin NVR

Network Video Recorders manufactured by Hanwha Techwin Techwin can be used in order to record and manage a plate archive.

To do so, you have to configure the camera with Arteco LPR app installed in the Hanwha Techwin NVR and follow the steps below described.

NVR configuration

After configuring the camera in the NVR, it is required to set a plate text “listener” for that camera. In the NVR menu go to Setup → Device → Text → Device and configure the fields surrounded by red as pointed out below.

No.	Device	Use check	CH	Port	Encoding type
1	Platelab	Use	CH 1	7001	US-ASCII
2	Plate Gr	Use	CH 2	7002	US-ASCII
3	TEXT 03	Not Use	None	7003	US-ASCII
4	TEXT 04	Not Use	None	7004	US-ASCII
5	TEXT 05	Not Use	None	7005	US-ASCII
6	TEXT 06	Not Use	None	7006	US-ASCII
7	TEXT 07	Not Use	None	7007	US-ASCII
8	TEXT 08	Not Use	None	7008	US-ASCII
9	TEXT 09	Not Use	None	7009	US-ASCII
10	TEXT 10	Not Use	None	7010	US-ASCII
11	TEXT 11	Not Use	None	7011	US-ASCII
12	TEXT 12	Not Use	None	7012	US-ASCII
13	TEXT 13	Not Use	None	7013	US-ASCII
14	TEXT 14	Not Use	None	7014	US-ASCII
15	TEXT 15	Not Use	None	7015	US-ASCII
16	TEXT 16	Not Use	None	7016	US-ASCII

Set a name for the Device and select “Use check” = Use. Take note of the related port for that camera in the column “Port” (in the example above, the port is 7002).

Clicking on table row, a new configuration page will be opened in order to set the parameters of plate information accepted by the NVR. In the interface of picture below the camera has name “Plate Gr” and the check “Use of a device” = Use.

This interface displays the NVR incoming port (“7002” for camera #2) and the information “Encoding type” = US-ASCII. This information has a starting character = “!” and ending character = “#” that must be configured as described below.



ARTECO LPR APPLICATION

Modify the text device

No. 2

Device Name

Use of a device ☒ Use ☐ Not Use

CH ☐ All CHs

1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16

Port

Encoding type

Start

End

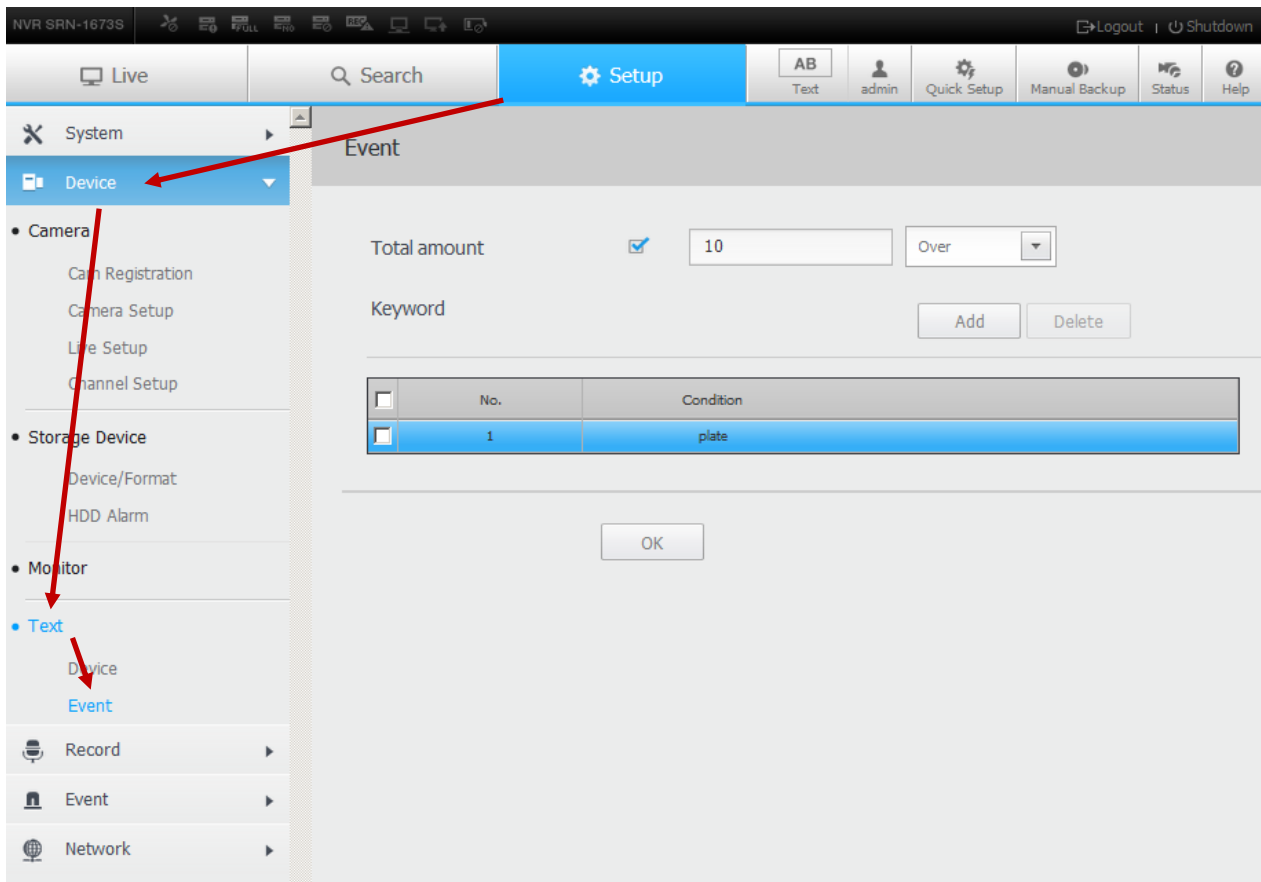
OK Cancel

Click on "OK" in order to save these settings.

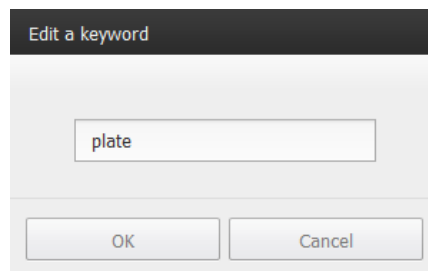
Now, in order to setup NVR for plate queries, go to Setup → Device → Text → Event, click on camera row displayed in the image below:



ARTECO LPR APPLICATION



A new window will open and you will be allowed to define the keyword to be used for plate queries. As example we suggest to use “plate” as in the picture below:



For both pages click on “OK” in order to save these settings.



ARTECO LPR APPLICATION

In order to set a proper pre-event timing go to Setup → Device → Record → Record Setup → NVR and set the Pre-event time = 10 sec as in the picture below. Doing so the NVR will begin to play the video recordings related to a plate query, right before the plate will enter in the camera field of view.

The screenshot shows the Arteco LPR Application Setup interface. The 'Setup' tab is active, and the 'Record' menu is expanded, showing 'Record Setup' and 'NVR'. The 'Record Setup' table is displayed, showing settings for 14 channels. The 'Pre' column for channel 5 is highlighted with a red box and labeled '10 sec'.

CH	Standard	Event	Frame		Limit	Event		Audio
			FULL	KEY		Pre	Post	
1	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
2	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
3	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
4	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
5	FULL	FULL	-	-	6.2 M	10 sec	1 min	ON
6	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
7	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
8	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
9	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
10	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
11	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
12	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
13	FULL	FULL	-	-	6.2 M	OFF	1 min	ON
14	FULL	FULL	-	-	6.2 M	OFF	1 min	ON



ARTECO LPR APPLICATION

ARTECO LPR configuration on Hanwha Techwin cameras

In order to enable the APP to send events to NVR, you have to go in the menu Setup → Event action setup and enable TCP for “Plate detected” event in order to receive all the plates read in the NVR.

The screenshot shows the ARTECO LPR application interface. The left sidebar contains the following menu items: Monitoring, Setup, Main, Ocr, Area, Event action setup, and Access control. The 'Setup' menu is selected, and the 'Event action setup' option is highlighted. The main content area displays the 'Event action setup' configuration page. It includes a table for event actions and a settings section.

Type	Disabled	Plate detected	List match	List no match
> FTP	☐	☒	☐	☐
> Mail	☐	☐	☐	☐
> TCP	☐	☒	☐	☐
> Open gate	☐	☐	☐	☐

Settings

Event filter ☐ Filter consecutives matches of same plate

Filter management ☐ Reset filter after 0 seconds

Match accuracy Allow maximum mismatch chars 0

Email ☒ Maximum 1 emails every 3 minutes

TCP

Protocol Samsung NVR

Address / port 192.168.10.77 : 7002

Apply

Also set in TCP menu the “Hanwha Techwin NVR” protocol and set the same port provided from NVR in the page Setup → Device → Text → Device.

After changing parameters click on “Apply” and confirm the changes.



ARTECO LPR APPLICATION

NVR live display

When all previous settings are done, you will be able to receive plate readings in the Live display page of Hanwha Techwin NVR by enabling the “Text AB” menu as in the picture below.

In order to select which device plates you want to display, just click on the appropriate checks of “Text” menu as pointed out in the image below in the top right column.

The screenshot displays the Arteco LPR application interface. The top navigation bar includes 'Live', 'Search', and 'Setup' tabs. The 'Live' tab is active, showing a grid of camera feeds. The top right corner has a menu with 'AB' (Text) highlighted. The 'Text' menu is open, showing options like 'All Items', 'PlateLab', and 'Plate Gr'. The bottom right corner shows a list of plate data with timestamps.

Plate	Time
Plate Gr PLATE: B2077HE	15:51:45
PlateLab PLATE: 282CA	15:51:44
Plate Gr PLATE: EW510FC	15:51:43
Plate Gr PLATE: XA815DW	15:51:42
PlateLab PLATE: 282CA	15:51:41
Plate Gr PLATE: BV295SL	15:51:40
Plate Gr PLATE: B651MM	15:51:39
PlateLab PLATE: VC282CA	15:51:38

Plate data will flow and scroll in the right column, as the camera will send them to the NVR.

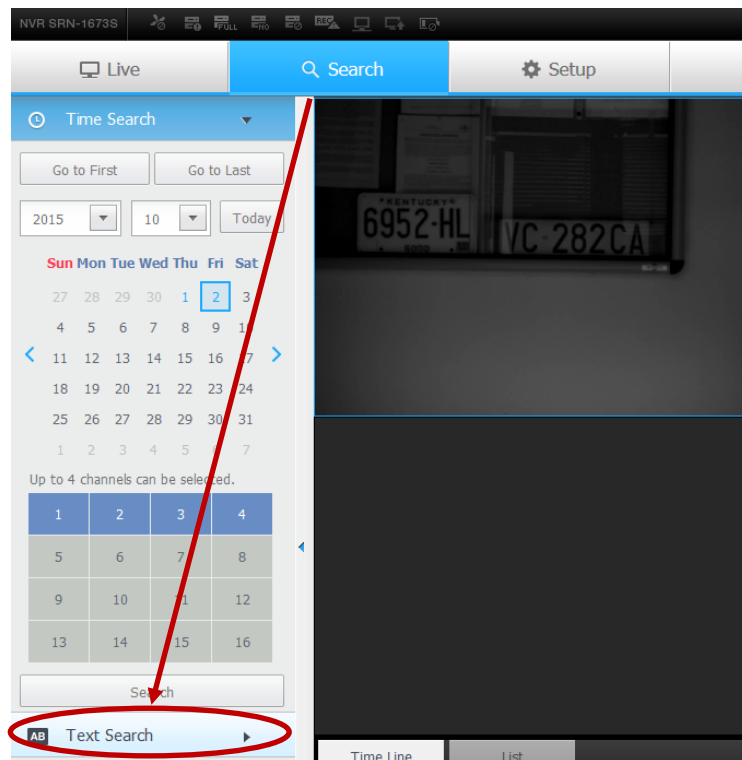


ARTECO LPR APPLICATION

NVR plate search queries

In order to retrieve a recorded plate, you need to know at least a part of the plate, "DE" for instance, and the NVR will return all plates fully or partially matching that string "DE", allowing you to play the related recorded video.

Go to menu Search → Text Search and click on "Text Search" as pointed in picture below:



A new interface will open and you will be able to type the string of the plate you want to retrieve as represented in the image below.

Clicking on "Search" will query the plate to the NVR database that will return the list of plates partially or fully matching the string, as shown below.



ARTECO LPR APPLICATION

NVR SRN-1673S

Logout | Shutdown

Live Search Setup AB Text admin Quick Setup Manual Backup Status Help

Time Search

Text Search

2015 09 24 15 54 38 ~ 2015 09 25 15 54 38

Event Keyword

Search Condition

de

☐ Case Sensitive

☐ Whole Word

Search

CH 02

100

Plate Gr

PLATE, DE, WL

14:29:31

Text item

Overlapped Data 0

2015/9/25 14:29:31

No.	Device	CH	Time	Keyword
14	Plate Gr	2	2015/9/25 14:46:20	de
15	Plate Gr	2	2015/9/25 14:46:19	de
16	Plate Gr	2	2015/9/25 14:29:31	de
17	Plate Gr	2	2015/9/25 13:54:41	de



ARTECO LPR APPLICATION

Configure Arteco LPR for Hanwha WAVE VMS

In order to allow the application to send events, go to the Setup menu -> Event action setup and enable "TCP" for the "Every Plate" event (or one or more lists) in the related box, in order to receive the license plates read in Hanwha's VMS.

Type	Every Plate	List 1	List 2	List 3	List 4
> FTP	☒	☐	☐	☐	☐
> Mail	☐	☐	☐	☐	☐
> TCP	☒	☐	☐	☐	☐
> Open Gate	☐	☐	☐	☐	☐

Settings

Event filter ☒ Filter consecutives matches of same plate

Filter management ☒ Reset filter after 5 seconds

Match accuracy Allow maximum mismatch characters 0

Email ☒ Maximum 1 emails every 3 minutes

TCP

Protocol Wave

Address / port : 7001

Apply

Also set the "Wave" protocol in the TCP menu and set the string to send the plates to the Wave VMS.

This string must be of the form: username:password@serverwaveIPAddress

Example: admin:admin@192.168.1.1

Then indicate the open communication port, as per Wave configuration.

After changing the parameters click on "Apply" and confirm the changes.

Wave side will not need to make special configurations, the system will **automatically** receive the events associated with the camera.



ARTECO LPR APPLICATION

Arteco LPR technical specifications

The following performance are measured for rear plates, the size of which are sometimes bigger than those of front plates.

	UP TO 90 KMH/55 MPH	UP TO 130 KMH/80 MPH
Minimum character height	20 pixels	20 pixels
Maximum plate angle (x+y)	20°	10°
Max tilt	3°	3°
Framerate	> 10 FPS	> 20 FPS
Max distance	5-50mm: Up to 15 meters (cars), up to 12 meters (motorcycles) 8-80 mm: Up to 25 meters (cars), up to 20 meters (motorcycles)	8-80mm only: up to 15 meters (cars), up to 12 meters (motorcycles)
Max height	Up to 4 meters	Up to 2.5 meters

-Max plate rate reading: 1 plate every second

-Match plates file: the App allows to upload a plate list for access control matching; the maximum file size is 16KB (more than 1000 plates)

Supported License Plates Standards

- EUROPE: all countries
- NORTH AMERICA: all countries (implemented and/or tested: Texas, California, Missouri, Florida, New Jersey)
- LATIN&SOUTH AMERICA: all countries (implemented and/or tested: Mexico, Caribbean, Brazil, Argentina)
- ASIA: Indonesia, Mongolia, Philippines
- AFRICA: sub-saharian countries
- OCEANIA: Australia

Special applications:

In order to train camera to new Country plates the camera must be turned into training mode so as to collect and transmit locally via FTP uncompressed images to be sent to Arteco for offline training.

In order to set training mode on please issue the following command to the camera from a web browser:

http://<IP_address>:8080/trainingOn

while, in order to restore normal JPG ftp transmission, issue the following command:

http://<IP_address>:8080/trainingOff



ARTECO LPR APPLICATION

Arteco LPR software integration

FTP image

The camera can transmit read plates snapshots through the system FTP client configurable from http://<IP_addr>/home/setup/event_ftpemail.cgi

The file name format is "20140826113939-DV680JB.jpg" where "20140826" is the date and "113939" is the camera timestamp; "DV680JB" is the decoded plate string.

If no readings occurs the App sends a keep alive image named as "KA.jpg" containing the current image taken at the time of generating the file. The keepalive period if no reading occurs is a file every 10 seconds.

TCP JSON Push

In order to accomplish to different integration needs towards external peripherals we have added two different JSON protocols that allows for network socket notifications through a standard format.

JSON Push Protocol consist of JSON messages sent over a TCP connection to a user defined TCP socket server.

Keepalive and plate-read messages are sent over the "simple" version, while the "full" version notifies also the whole and crop plate images.

From Setup -> Event Action menu you can select Full or Simple JSON packets:

JSON Push Full

JSON Push Simple

The socket server coordinates (address/port) should be inserted in the relative fields of "Event Action Setup Page" as shown below:

A screenshot of a web-based configuration interface for TCP settings. The title "TCP" is at the top left. Below it, there are two rows of configuration fields. The first row is labeled "Protocol" and has a dropdown menu with "JSON Push Full" selected. The second row is labeled "Address / port" and has two input fields: the first contains "82.60.127.5" and the second contains "22222". At the bottom right of the form is a dark button labeled "Apply".

Protocol	JSON Push Full	
Address / port	82.60.127.5	22222

Apply

The Full version message contains more information like the Image of vehicle and the image of plate.

The protocol consists of two messages: KeepAliveEvent and PlateDetectedEvent.

The messages are unidirectional from the Camera (TCP Client) to the TCP Socket Server.

The messages uses the JSON syntax.



ARTECO LPR APPLICATION

KeepAliveEvent

KeepAliveEvent is sent every 10 minutes and is formatted in the following way:

```
{"KeepAliveEvent":{"SerialNumber":"ABCDEF","LicenseValid":"0"}}\n
```

where

SerialNumber is the Serial Number of the camera

LicenseValid is "1" if Application License is Valid "0" if is not Valid.

At the end of message is append a newline character to help socket server size parsing.

PlateDetectedEvent

This event is sent every time a new Plate is detected and it is formatted as follows:

Full Protocol Version:

```
{"PlateDetectedEvent":{"SerialNumber":"ABCDEF","PlateNumber":"AAAAAA","Date":"20161113","Time":"212724","VehicleImage":"XXXXXXXXXXXXXXXXXXXX","PlateImage":"YYYYYYYYYYYYYYYY","MatchListResult":"0"}}\n
```

where

SerialNumber is the Serial Number of the camera

PlateNumber contains the string plate detected in UTF8 encoding

Date is formatted like "yyyymmdd"

Time is formatted like "hhmmss"

VehicleImage is the BASE64 representation of the full image processed by the LPR

PlateImage is the BASE64 representation of the image of the plate

MatchListResult can be:

- "0" (Match list not configured)
- "1" (Plate match one entry in the match list)
- "2" (Plate does not match any entry in the match list)

At the end of message is append a newline character to help socket server size parsing.



ARTECO LPR APPLICATION

Simple Protocol Version:

```
{"PlateDetectedEvent":"SerialNumber":"ABCDEF",  
"PlateNumber":"AAAAAA","Date":"20161113","Time":"212724","MatchListResult":"0"}}\n
```

where:

SerialNumber is the Serial Number of the camera

PlateNumber contains the string plate detected in UTF8 encoding

Date is formatted like "yyyymmdd"

Time is formatted like "hhmmss"

MatchListResult can be:

- "0" (Match list not configured)
- "1" (Plate match one entry in the match list)
- "2" (Plate does not match any entry in the match list)
- At the end of message is append a newline character to help socket server size parsing.

Plate List Management

Add Plate To List

http://x.x.x.x:8080/addPlate?l=Y&n=XXXXXXX

where:

->Y is the list number [1-4]

->XXXXXXX is the plateNumber

return:

On Success: {"result":"OK"}

On Error: {"result":"ERROR"}

Remove Plate From List

http://x.x.x.x:8080/delPlate?l=Y&n=XXXXXXX

where:

->Y is the list number [1-4]

->XXXXXXX is the plateNumber

return:

On Success: {"result":"OK"}

On Error: {"result":"ERROR"}



ARTECO LPR APPLICATION

Clear List

`http://x.x.x.x:8080/clrList?l=Y`

where:

->Y is the list number [1-4]

return:

On Success: {"result": "OK"}

On Error: {"result": "ERROR"}



ARTECO LPR APPLICATION

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Notes
