

# ipConfigure, Inc.

## LICENSE PLATE RECOGNITION SETUP AND FIELD INSTALLATION GUIDE



This guide documents the settings and tools needed to successfully deploy LPR with ipConfigure's Enterprise Surveillance Manager.

The following equipment is used and depicted for the purposes of this guide: Windows Server 2008R2 with all pre-install components and ipConfigure Enterprise Surveillance Manager (ESM) 5.3 installed. Axis P1346 loaded with the latest firmware from Axis. Fujinon 3MP 8/80mm lens (part #DV10X8SA-1) installed on the camera for capturing at approximately 65 feet.

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# System Requirements

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The following is the required hardware and software needed to deploy the license plate recognition (LPR) solution from ipConfigure.

1. Server Appliance loaded with Windows Server OS (Versions 2005 and 2008 in either 32 or 64 bit configuration supported)
2. ipConfigure's Enterprise Surveillance Manager (ESM) installed per instructions found at [http://www.ipconfigure.com/support\\_documentation/index.html](http://www.ipconfigure.com/support_documentation/index.html)
3. LPR Supported camera installed (Axis P1346 or P1347)
4. Fujinon 8-80 mm lens and C-Ring (Lens Optional: needed for distances exceeding 35 ft.)

## IDEAL FRAME RATE FOR TRAFFIC SCENARIOS

Based on the different scenarios relative to the FOV and the motion through that FOV, this part defines the best frames per second setting to use.

### **STOP SIGN – completely stopped**

Straight shot (no + or - from center of the camera's FOV):

*5 frames per second, setup in LPR Console utility or ESM Admin UI*

Angle of read (+ or - 5° to 20° from the center of the camera's FOV):

*5 frames per second, setup in LPR Console utility or ESM Admin UI*

### **NOT COMING TO STOP – but motion through the frame**

Straight Shot 5 - 15 mph

*5 frames per second, setup in LPR Console utility or ESM Admin UI*

Straight Shot 16 - 20 mph

*5 frames per second, setup in LPR Console utility or ESM Admin UI*

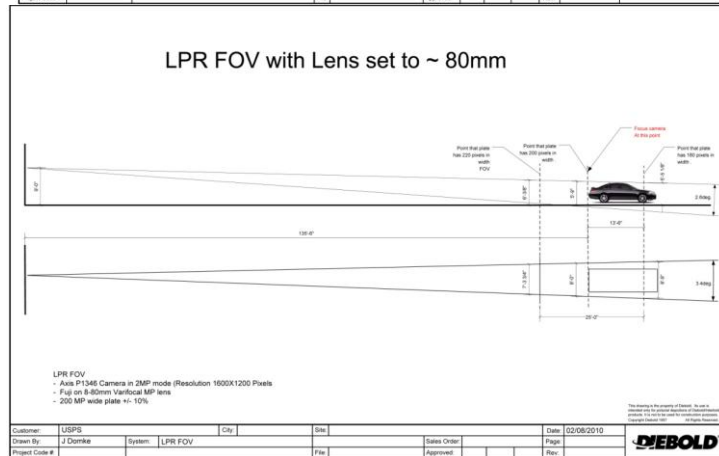
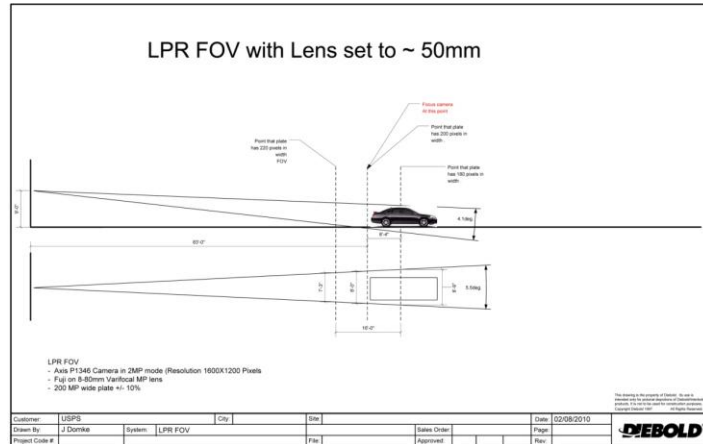
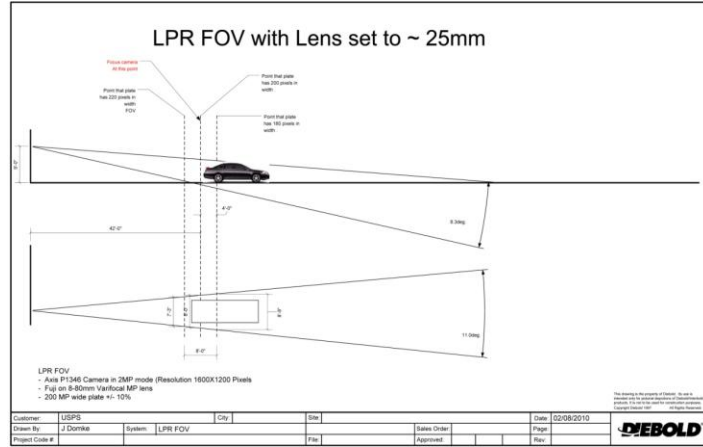
Angle of read & 5 – 15 mph + or - 5° to 20° from the camera's center FOV: *5 frames per second, setup in LPR Console utility or ESM Admin UI*

Angle of read & 16 – 20 mph + or - 5° to 20° of camera FOV center: *5 frames per second, setup in LPR Console utility or ESM Admin UI*

Angle of read & 5 – 15 mph + or - 21° to 30° of camera FOV center: *5 frames per second, setup in LPR Console utility or ESM Admin UI*

# Adjusting LPR Camera Field of View (FOV)

Before continuing, it is important to understand FOV and how this relates to the camera and the optimal settings related to distance, height, FOV, depth of field, and width of view. The following diagram will help understand Camera Placement, width and height of FOV and the LPR capture range.



# Axis Camera Settings for Optimized Performance

## Initial Camera Setup

1. Log into your camera by opening up a web browser and typing in the ip address configured for your camera.
2. Verify that the firmware on your camera is the latest by referencing the manufacturer's website and update if necessary. Also, install the optional lens on the camera if using it for further distance reads. For Axis the web address is: <http://www.axis.com/techsup/firmware.php>

## Navigate to Basic Setup | Video Stream

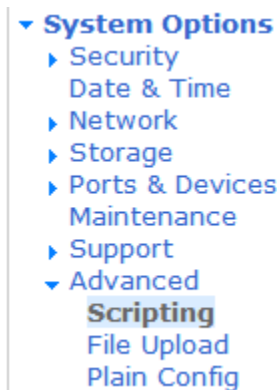
3. The first time you login to the camera you will be asked to apply a **CAPTURE MODE** - we require this to be set to **2 MP 1600x1200 (4:3)**. (Note: If you have to factory default the camera at some point in the future you will need to re-apply this setting).

Once the Capture Mode has been set make the following changes:

The screenshot displays the 'AXIS P1346 Network Camera' web interface. The left sidebar shows a navigation menu with 'Basic Setup' expanded and '4 Video Stream' selected. The main panel is titled 'Video Stream Settings' and has tabs for 'Image', 'Audio', 'H.264', and 'MJPEG'. Under 'Image Appearance', the 'Capture mode' is set to '2 MP 1600x1200 (4:3) @ 30fps'. The 'Resolution' dropdown is set to '1600x1200 (4:3) pixels' (arrow 1). The 'Compression' dropdown is set to '1' (arrow 2). The 'Video Stream' section has 'Maximum frame rate' set to 'Unlimited'. The 'Overlay Settings' section has 'Include date' and 'Include time' checked, and 'Include text' checked with 'LPR - West 43rd Street' entered. The 'Text color' is 'white' and 'Text background color' is 'black'. The 'Place text/date/time at' dropdown is set to 'top'. The 'Preview' section at the bottom has 'View image stream while configuring.' checked, 'Video format' set to 'MJPEG', and 'Save' and 'Reset' buttons. A blue arrow (arrow 3) points to the 'Save' button.

1. Under Image Appearance | *Capture mode* set Resolution to: 1600x1200 (4:3)
2. Set *Compression* level to 1
3. Save these settings

## Navigate to System Options | Advanced | Plain Config



AXIS P1346 Network Camera

[Live View](#) | [Setup](#) | [Help](#)

The plain config page allows direct access to all the configurable parameters supported by the AXIS P1346 Network Camera. This page uses no extra scripts (Javascript or otherwise) and should function correctly in any browser or PDA. Select the parameter group to modify and configure the settings directly.

For help on parameters, please refer to the relevant help page available from the standard setup tools. Select a group of parameters to modify:

ImageSource

### ImageSource

Nbr of sources:

Motion detection:

### ImageSource I0:

Name:

Imaging mode:

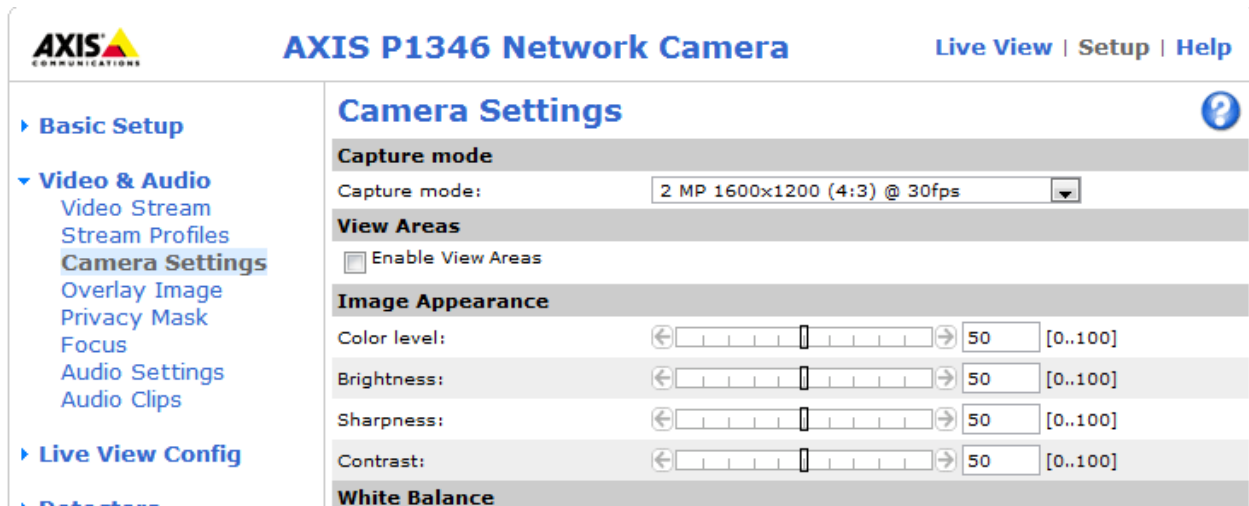
### Select a group of parameters to modify:

1. Select *ImageSource* from the list
2. Click on *Select group*

### ImageSource I0

3. Select *Imaging mode* drop down and choose Mode1
4. At the bottom of the page click on Save and scroll back up to the top of the page and click on Setup.

Navigate to Setup | Video & Audio | Camera Settings and modify the following:



**AXIS P1346 Network Camera** Live View | Setup | Help

**Camera Settings** ?

**Capture mode**  
Capture mode: 2 MP 1600x1200 (4:3) @ 30fps

**View Areas**  
 Enable View Areas

**Image Appearance**

Color level: 50 [0..100]  
Brightness: 50 [0..100]  
Sharpness: 50 [0..100]  
Contrast: 50 [0..100]

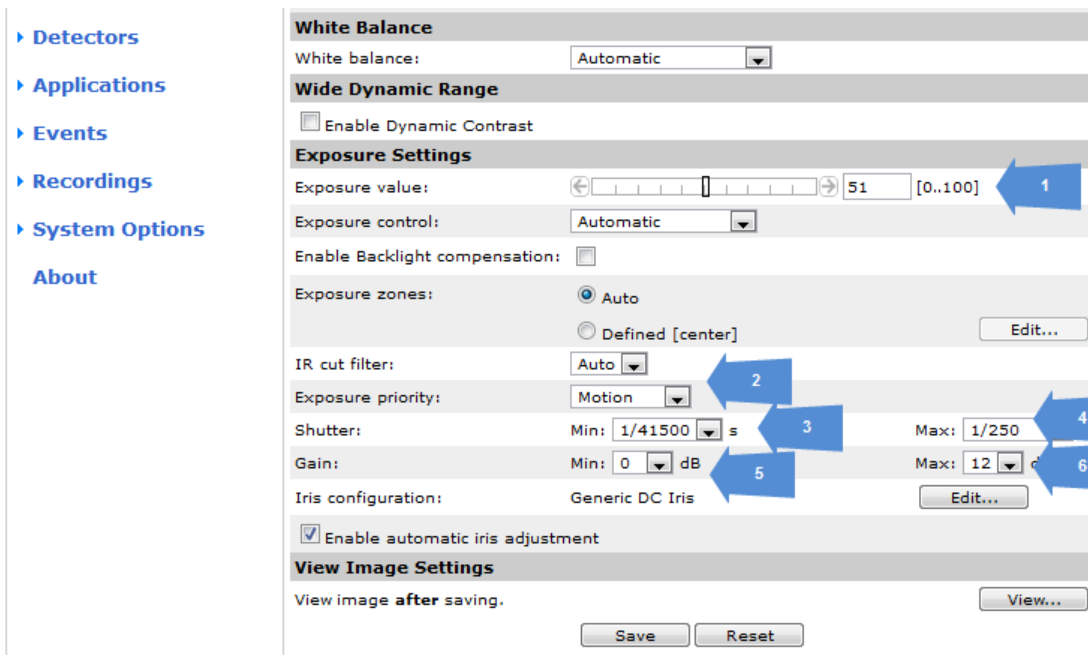
**White Balance**

**Image Appearance:**

Start with all settings set to the default of 50 and adjust from there. The settings should be adjusted so that the image is acceptable to the eye. The license plate in the image needs to be very clean and crisp so that the characters are not blurred or skewed. Here is an example of the image quality required and the settings used in this instance.

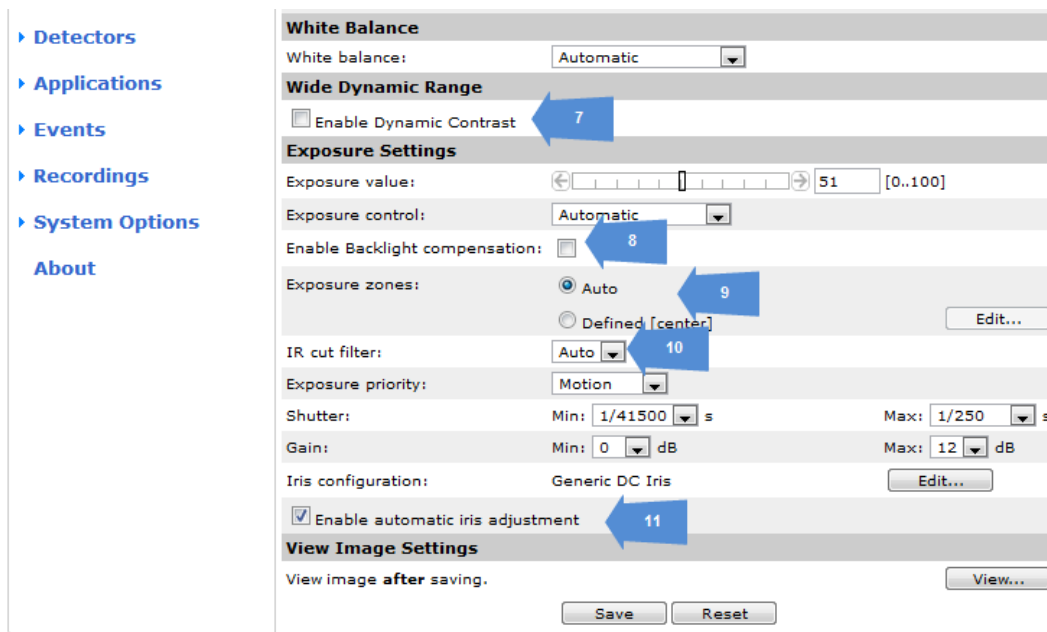


Settings in this example:  
Brightness= 65, Sharpness=15, Contrast=65, Exposure=55



### Exposure Settings:

1. *Exposure value* will normally be in the range from 50 to 70.
2. *Exposure priority* should be set to Motion
3. *Shutter Min* should be set to 1/41500
4. *Shutter Max* should be set to 1/250
5. *Gain Min* should be set to 0 db
6. *Gain Max* should be set between 9 and 12 db



7. Make sure *Enable Dynamic Contrast* is not checked
8. Make sure *Enable Backlight compensation* is not checked



9. Set *Exposure zones* to Auto
10. Set *IR cut filter* to Auto
11. Make sure *Enable automatic iris adjustment* is checked.
12. Once you are finished making adjustments Click on *Save* to commit these settings

Navigate to Setup | Video & Audio | Focus and perform the following:

1. First select the check box for *Show pixel counter* and manually enter a *Width* of 200 and a *Height* of 100.
2. Use the reference window to verify the plate size in the image. The plate should fit this entire box. If the plate does not fill this size window then the camera FOV needs to be adjusted to meet this requirement.

3. After the plate size has been verified click the *Open iris* button
4. Click on the *Reset* button
5. Click on *Fine-tune focus automatically*. This will allow the camera to use the current image and focus in using the automatic tuning in the Axis camera. This can be optimized by having a vehicle in the image near where you expect traffic so that it adjusts according to the car placement and shadowing that may occur.
6. Once you are happy with the focus click on *Enable Iris* to finish.

*If you are unhappy with the results the auto focus is returning you may also click on the Advanced tab to make the adjustments manually*

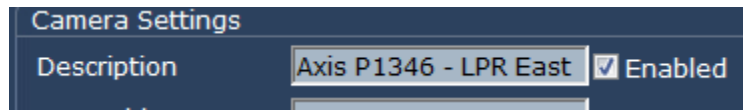
## LPR Camera Setup in ESM

Before calibrating an LPR camera it needs to be added into ESM. Adding the camera for the most part is just like any normal surveillance camera with a few exceptions explained here.

### Camera settings from the ESM Admin UI:

1. **Camera Application:** By default this will be set to “Surveillance”, Using the drop down change this to “LPR” and click “Apply”
2. **Overview Camera:** This allows linking the LPR camera with a secondary camera already configured in the ESM system. Linking that cameras recordings with the LPR reads captured.
3. **Image Resolution:** For LPR application this needs to be set to 2MP (1600x1200).
4. **Frame Rate:** Best results are at 10 fps.
5. **Compression:** Best results are at 1%.

*\*Quick Tip\* Once all settings have been made make sure there is a check box in the “Enabled” field and then click “Apply” to start up the process.*



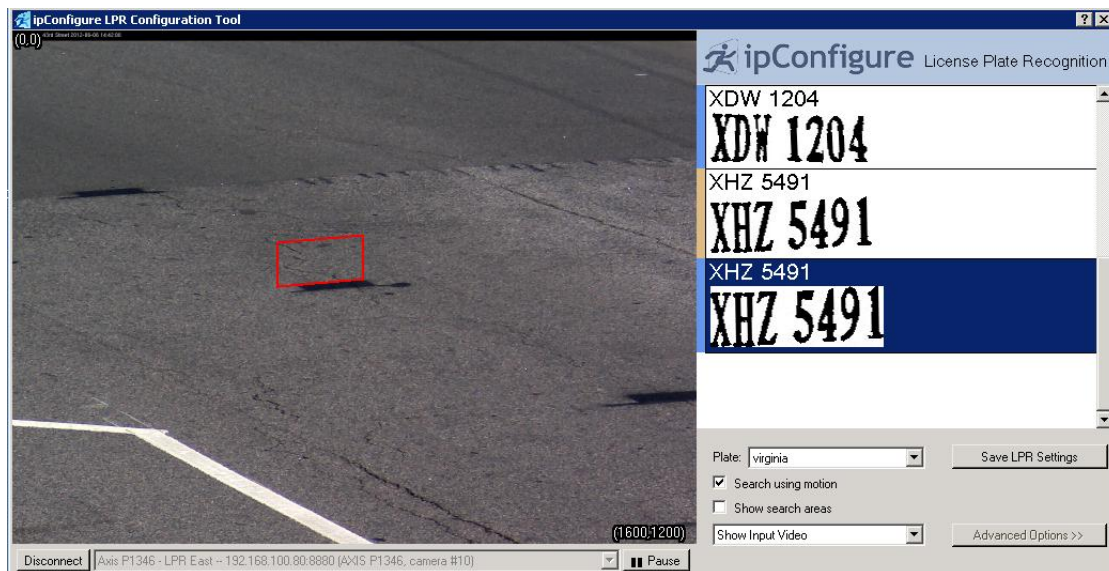
## LPR CONSOLE- IPCONFIGURE’S LPR CALIBRATION UTILITY PROGRAM

LPRCalibrate.exe is a built in configuration utility that will assist with your LPR Calibration.

The program is installed by default to C:\Program Files\ipConfigure\ServerCapture\”. Double click on LPRCalibrate.exe to launch the LPR Console utility.

The goal of using the LPR Calibrate utility is to properly tweak the camera settings after the FOV and initial setup has been completed above and use the information gathered to go back and tweak the camera settings if needed. With the use of the LPR Calibrate utility and start to see what is being passed to the LPR engine, it will become clear if you have a good image or bad image based on current camera settings, FOV, area of Focus, etc.

First step once you run the utility is to select the LPR camera from the drop down list and then click “Open”. This list is auto populated based on the LPR cameras configured for the archive server the utility is accessed from. If there are no cameras loaded please go back to the previous page to setup the LPR camera in ESM.



## Details For the items Above:

1. **Live view:** This is a live stream from the camera selected. You will notice it has the resolution in the bottom right hand side which should be at 1600x1200 based on the camera configuration in ESM.
2. **LPR Results:** This contains active reads using the LPR engine while the LPR Calibrate tool is running. The results are a combination of the image captured which is on the bottom and the letters detected by our Optical Character Recognition (OCR) engine based on the image captured. This allows for real-time results based on the settings you choose. Please note that for one vehicle it may grab anywhere from 2 to 5 reads. For the User interface these reads would be combined to present the best composite of the set of reads.
3. **Plate:** This is a drop down to choose the state or region of plates being detected.
4. **Search using motion:** This check box lets the utility know to look for plates based on motion in the image. This is suggested to be used as it is the way the engine detects the need to look for plates in the native engine.
5. **Show search area:** When activated the image will darken and will show lightened areas in the image where motion is detected.
6. **Configuration drop down:** This includes three chooses of “Show Input Video”, “Show Perspective-Correct Video”, and “Setup Perspective Correction”. More on these sections below.
7. **Save LPR Settings:** Clicking this button will commit the setup and changes for the LPR camera to the database for use in the ESM User interface. **\* If this is not clicked when changes are made they will not be committed to the database and thus not reflected in the User interface for reads\***
8. **Advanced Options:** In the future this will be the gateway to more advanced features and configurations. It is currently inactive.

## Configuration Drop Down Expanded:

1. **Show Input Video:** This option is used to view the camera’s native live view and what results are being captured based on the current settings. This will be used for evaluation of the reference area setup which will be done in the Perspective Correction section.
2. **Show Perspective-Correct Video:** This view gives an example of how the live image is being modified to get the best read from plates being captured at an angle. This view will reflect changes made in the next section with the reference plate setup.
3. **Setup Perspective Correction:** This section is where the main calibration for LPR is performed and is the most important. Using the four grid points, a reference area is

created for the angle and size of the license plates traveling through the image. This configuration box requires a reference grid of 200x100 much like the reference image below. If possible the best situation would be to pull a vehicle through the lane at the angle expected and park it to set the reference grid around it. If you do not meet the 200x100 pixel requirement then the camera will need to be adjusted.

