TrueView Parking™ — Manual

embedded for Axis IP cameras

version 1.0

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Overview

TrueView Parking™ is a product for counting and managing occupancy in parking houses. The software installs directly into Axis cameras, which are placed in the ceiling over entrances and exits for counting vehicles to and from the facility. One camera can be assigned to be master collecting and managing the traffic data from all other cameras in the system. The master camera can also be configured to send the occupancy level directly to displays.

TrueView Parking™ offers a unique, cost efficient, scalable, and easy-to-install solution, that is 100 % IP based and built on standard off-the-shelf hardware. Using world

leading embedded video processing software, all counting is done locally on the cameras dramatically reducing Ethernet bandwidth requirements and increasing system reliability.
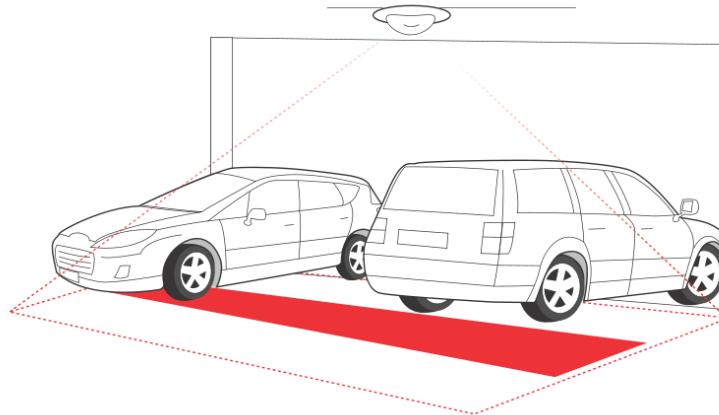
Use the live view to guide you.

The entire solution requires no auxiliary PC or PLC, no inductive loops and no costly pavement work.

1. **Camera based** – Counting at entrances and exits are done by world leading intelligent video analysis using standard IP cameras. As a consequence, no inductive loops or costly pavement work is required.

2. **Embedded counting** – fully embedded into Axis IP camera. TrueView Parking™ is a stand-alone vehicle counter directly in your Axis camera. Requiring no dedicated computer, all counting is done automatically on the camera, effectively converting the camera into a counting unit.

3. **Display result** – Counting results from all counting units in the system can be combined at one Axis IP camera acting as master. The result can be sent directly to auxiliary display from the camera without requiring any additional hardware.

4. **IP technology** – Using IP technology it offers a cost efficient, infinitely scalable, easy-to-install and flexible system for automatic vehicle counting, with a superior accuracy.

5. **Maintenance** – Maintain your TrueView Parking™ remotely over IP, set and check parameters, and stream video.

6. **Web reporting** – automatically export counting data to TrueView Web Report™.

7. **Two way counting** – the module simultaneously differentiates and counts vehicles moving upwards and downwards in the camera's field of view.

8. **Statistics** – Built in graphs in the camera web interface.

Easy to set up, with this software you can instantly monitor your parking occupancy. The entire solution is embedded in standard IP cameras requiring no dedicated PC, PLC

or other auxillary hardware. Installation can be done by local staff with basic network and surveillance camera experience. Improve your network video surveillance system with new cost-efficient analytics.

There are several ways to use the data from TrueView Parking™:

• View real-time counting data directly on the camera through a web browser.

• View graphs of historical data directly on the camera.

• Download data through an open API.

• Use TrueView Web Report™, which is a powerful statistical software package that lets you manage and monitor historical data conveniently.

Historical data is available on the camera up to one month and is updated every 15 minutes. The data is stored in 15 minutes bins representing the in and out counts for the 15 minutes periods.

Mounting the camera

The camera should be mounted right above the point where vehicles should be counted and should be facing straight down.

Height and width

TrueView Parking™ allows a mounting height range from 250 cm to 500 cm. The recommended minimum height, however, is 300 cm. As a rule-of-thumb, one counter unit will cover a passage as wide as the camera mounting height. Depending on the camera model and lens focal length, both the height range and the covered width can vary.

Positioning the camera

Adjust the position of the camera so that vehicles pass through the camera's view vertically. If you install TrueView Parking™ prior to mounting the camera, you can use the lines indicating the counting zone to guide you. The red line should run from left to right, across the path that vehicle will take when passing underneath the camera.

General guidelines

In order for the camera and, in effect, TrueView Parking™ to function properly, make sure that the lighting is sufficient. A minimum of 1 LUX in the scene is required.

If the passage is wider than what could be covered by a single camera, then two or more cameras are required. Note that, currently, it is required that no two cars may pass the

counter in the same direction simultaneously. It is designed for use with single-lane traffic, and therefore one of these cars will be ignored.
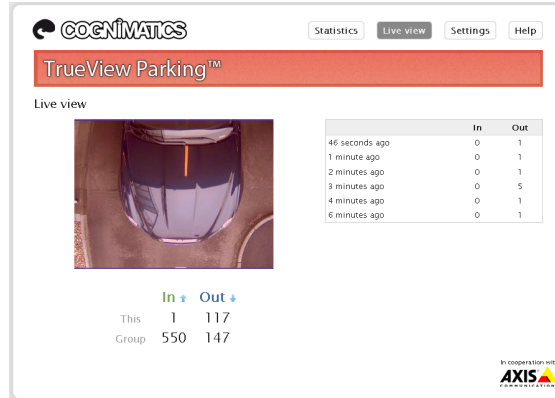

Use the live view to guide you.

Installing the software

If TrueView Parking™ software module is not already installed from your vendor it must be installed manually in your Axis camera.

1. Make sure you have one of the supported Axis IP cameras and that you have the correct corresponding software module of TrueView Parking™. The supported cameras and the corresponding software modules are listed in Appendix A.

2. Install the camera on your network, start it up and point your web browser to it. Supported web browsers are Firefox 3.x, Internet Explorer 7 & 8 and Safari 3 & 4.

3. Upload the TrueView Parking™ installation file by clicking **Setup** -> **Applications**. Under the section *Select package file to upload* , specify the path to the TrueView Parking™ installation file file or use the **Browse** button. Click on the **Upload Package** button. Press **Start** to start the product.
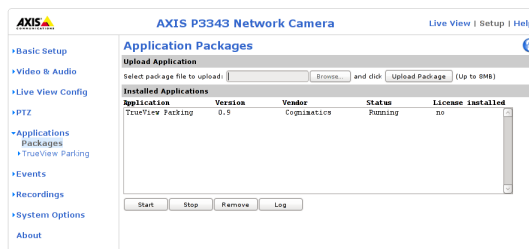
Axis P3343-VE application package page

4. Click the **TrueView Parking**™ link to get to the Vehicle Counter interface. The first time you do this, you will be asked to enter your license code. Enter your license code and follow the instructions. The software will attempt to activate the license automatically by connecting to a registration server. If the server cannot be reached you will be asked to activate the license on a computer with Internet access. When the license activation is complete the camera is ready to be used for counting.

Note that your software license is for one camera only. You can not install the software to another camera without a new registration key.
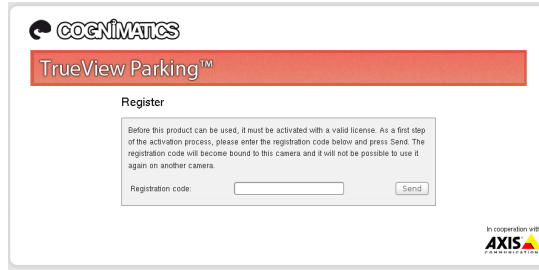
Registration page.

5. When you update any setting it can sometime take up to ten minutes for the counter to calibrate. You can see if the counter is counting OK by navigate to the **Live view** page and view vehicles passing the counting zone.

Configuring TrueView Parking™

Note: To ensure accurate counting of vehicles passing the camera, the TrueView Parking™ must be calibrated before use. This is done using the Visual height setting.

The vehicle counter settings are divided into three categories:

1. Basic/counting

2. Data/reporting

3. Connectivity

There are also direct links to some basic Axis camera settings for convenience.
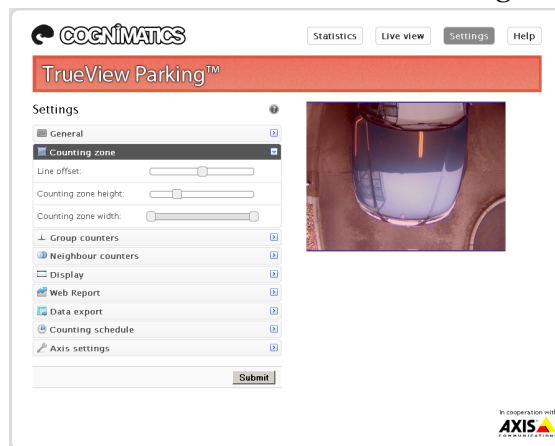
Basic counting configuration

For the basic setup, go to the *General* section. This is where one toggles the counter status, name the counter and set the most fundamental parameters.

1. Verify that Counter **status** is set to Enabled.

2. Enter the **name** of the camera or location the TrueView Parking™ is viewing. Note that all cameras used for vehicle counting need to have unique names.

3. Input the camera's **visual height** above the floor and select the proper height unit. This is normally the actual height over the floor but may differ from this value due to e.g. lighting conditions. It is recommended that the visual height is at least 300 cm.

4. Set the **direction** through the camera view, in which vehicles are to be counted as going in when passing underneath the camera.

Under the **Counting zone** section one can adjust the area, in which counting will take place. The counting zone is indicated in the image by two blue lines and a red area. The red area is the virtual counting line and the blue lines show the extent of the counting zone. For proper counting, a vehicle needs to be visible within the entire zone. Note that the position of the red and blue lines over the video on the settings page are just an estimate of where the line will be. For the actual position, go to the live view page.

1. The *Line offset* moves the entire counting zone upwards or downwards. How much it can be moved will depend on the counting zone size.

2. The *Counting zone* size slider sets the size of the counting area. How much it can be changed will depend on the visual height setting.

3. Use the *Counting line interval* setting to shorten/move the counting lines sidewise.

**Note!** Do not forget to press the Submit button when changes in settings are made, otherwise the settings will not be saved.

Under the *Counting schedule* section start and stop times for the counter can be set individually for each day of the week. By unchecking the Per day schedule box, changing the times for one day will affect all days. Unchecking a box by the sliders will disable counting for that particular day.
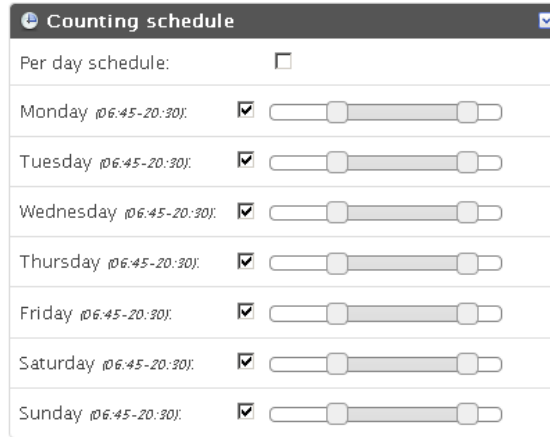
Data and reporting configuration

The format of the strings used when exporting data to CSV files can be customized in the *Data export* section. The CSV files are constructed using either the *time drive* or the *type drive* strategy. Time drive gives one line per time interval and may include values of several data types. Type drive gives one line per count type and time interval and may include a type description.
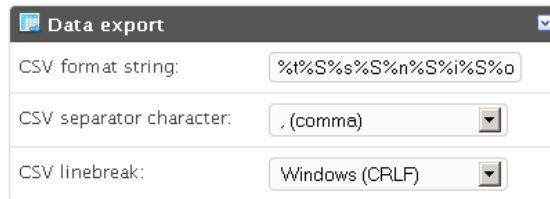
Possible patterns are:

Table 1.

%i	in
%o	out
%c	type code
%d	type description
%r	short type description
%n	counter name
%s	camera serial number
%v	value
%t	time stamp
%u	Unix time stamp
%S	character separator

Patterns associated with the two different strategies mentioned above are conflicting and may not be used in conjunction. The patterns %i and %o are used with *time drive* and patterns `%c`, `%d`, `%r` and `%v` are used with *type drive* .

The default pattern is `%t%S%s%S%n%S%i%S%o`.

Apart from showing statistics in the camera interface and serving CSV/XML data, the vehicle counter software can also push count data to the TrueView Web Report™. The settings for this are found in the *Web Report* section.

1. Check the *Enable* check-box to enable pushing data to TrueView Web Report™.

2. Select the correct version of TrueView Web Report™ that will be accessed.

3. Enter the Web Report server address and your camera group account credentials.

4. If the camera resides behind a proxy server, enter the proxy server address and credentials.

Connectivity configuration

If there are several counter units in your network you can let one unit be master collecting traffic data from the others and computing the occupancy level. In the master unit select the *Group counters* section.

1. Check the *Enable* check-box.

2. Enter the updating time interval (in seconds) for *Update frequency*.

3. Enter *Actual number of cars* if this is known at the moment.

    Note! This is where you can calibrate the systems if you have manually counted the occupancy level. It is good practise to do manual calibrations regularly.

4. Add the URL and credentials for the additional counter units to include for the total count. Use the plus and minus sign to add and delete units.

The occupancy level from a group of counter units can be sent from the group master directly to a supported display (see Appendix B for a specification of the communication protocol and a list of supported displays). To do this select the *Display* section and check the *Enable* check-box.

Enable display

Input the addresses to your displays and set the update frequency. Then input the total number of parking spaces available in the lot. According to the limits for when the parking garage has vacant spaces and when it is to be considered full, a different string is sent to the displays. Input these strings in the corresponding fields. The text for free spaces is displayed until the limit for full is exceeded. Then the text for full is displayed until the number of cars in the parking garages becomes less than the limit for free.

Display settings

If two or more counter units are used to cover one entrance or exit, each counter must be synced with its neighboring counters. To setup this, go to the *Neighbour counters* section and check one or both boxes enabling neighbours.

Enable neighbour counters

If the counter has a neighbour to the right of the camera view, then check the *Enable right neighbour* checkbox and enter the ip address to that counter. Go through the same procedure on the other neighbouring cameras. Checking the overlap checkbox(es) will make one counter keep track of the counts in one or both of its neighbours. That way either one can be queried for data and they will give the same result.

Right neighbour counter

Left neighbour counter

Axis settings

You can set the standard parameters of the AXIS camera by selecting one of **Users**, **TCP/IP** or **Date & Time** in the *Axis settings* section. See your AXIS camera manual for how to set the parameters. To assure the best counting performance, avoid using any camera built-in functionality that may affect the counting accuracy. Do not set any other parameters than:
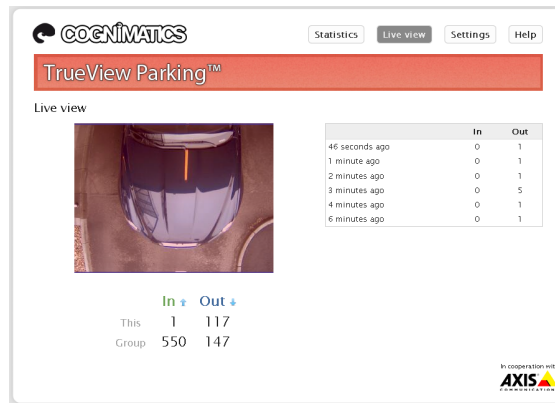

a. Local time

b. IP address

c. Users

Live view

To see when TrueView Parking™ is counting you go to the *Live view* page. This page can also be a great help when polishing the settings. To the right the latest counts are shown in a table.

Statistics

You can obtain statistics from your counters in different ways. Select *Statistics* at the top of the page.

1. **Real time data with graphs** – This data is updated in real time every five seconds. At the top of the page there is a table showing traffic data for vehicles passing in and out during the last seven days.

   Beneath the table there are two charts. The left chart (*Day chart*) shows counts of the current day while the right chart (*Week chart*) shows values for the last week (not including the current day). When new data is available the day chart will automatically be updated.
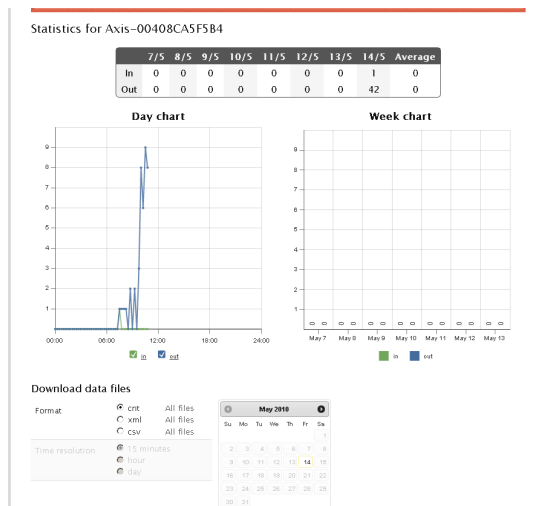
Data files can be downloaded in cnt, xml or csv-format by selecting the format and click day you want the data for. For csv and xml different time resolutions can be chosen as well. If you want to download all files for a certain format just press the All files link.

2. **TrueView Report™** – Installing TrueView Report™ on your windows PC or TrueView Web Report™ on a web server lets you manage and view historical data conveniently. For more information about these statistical software packages we refer to their respective manuals.

   At the bottom of the statistics page you can find data from TrueView Parking™ in both .cnt and .xml format.

3. **HTTP API** – Download data in text format using the HTTP API described below.

HTTP API

You can request and clear data in different ways.

1. **Request real time data**: Returns JSON file with real time counting data

2. **List available data**: Returns a list of days where data exists

3. **Download binary data**: Returns Cognimatics proprietary format

4. **Request CSV data**: Returns a file with comma-separated values

5. **Request XML data**: Returns an XML file containing historical data

6. **Clear local counting data**

7. **Live view information**: Returns information about the placement of the lines in Live view

8. **Group counter data**: Returns data for the group counters.

9. **Display information**: Returns information for the display.

1. Real time data

URL
```
http://<servername>/local/parking/.api?live-sum.json
```

Format
    JSON

Method
    GET

Return

```
{
  "name":"<counter-name>",
  "timestamp":<timestamp>,
  "in":<in>,
  "out":<out>
}
```

`<counter-name>`
    name of the counter

`<timestamp>`
    time in the camera in the format `YYYYMMDDhhmmss`

`<in>`
    number of vehicles passing in until now today

`<out>`
    number of vehicle passing out until now

Example
    Request real time data from TrueView Parking™.

URL
    `http://<servername>/local/parking/.api?live-sum.json`

Return

```
{
  "name":"Exit south",
  "timestamp":20100517132154,
  "in":2,
  "out":18
}
```

2. List all days where there exists counting data

URL
    `http://<servername>/local/parking/.api?list-cnt.json`

Format
    JSON

Method
    GET

Return

```
{
  "timestamp":"<timestamp>",
  "days":["YYYYMMDD", [..] "YYYYMMDD"]}
}
```

`<timestamp>`
> time in the camera in the format `YYYYMMDDhhmmss`

`<days>`
> an array of days where there exists

Example
> List all days of data available in TrueView Parking™

URL
> `http://<servername>/local/parking/.api?list-cnt.json`

Return

```
{
  "timestamp" : "20100513132513",
  "days":["20100510", "20100511", "20100513"]}
}
```

3. Download .cnt data files

URL
> `http://<servername>/local/parking/.api?export-cnt&date=<date>`
>
> where `<date>` can be

- a date of the form `YYYYMMDD`

- a date interval of the form `YYYYMMDD-YYYYMMDD`

- comma separated dates of the form `YYYYMMDD,[..],YYYYMMDD`

- `all` for all available data

Format
> cnt

Method
> GET

Return
> This script returns a Cognimatics proprietary binary data file for the given date(s), to be used in TrueView Report™

Example
Request historical data for the 12th to the 15th of May 2010.

URL
```
http://<servername>/local/parking/.api?export-
cnt&date=20100512-20100515
```

Example
Request all available historical data.

URL
```
http://<servername>/local/parking/.api?export-cnt&date=all
```

4. Request CSV data

URL
```
http://<servername>/local/parking/.api?export-
csv[&date=<date>][&res=<res>]
```

where `<date>` can be

- a date of the form `YYYYMMDD`

- a date interval of the form `YYYYMMDD-YYYYMMDD`

- comma separated dates of the form `YYYYMMDD,[..],YYYYMMDD`

- `all` (default) for all available data

and `<res>` can be

- `15m` (default) for data in 15 minute bins

- `1h` for data in 1 hour bins

- `24h` for data in 1 day bins

Format
CSV

Method
GET

Return
This script returns data in plain text, comma-separated values. The format for each line can be defined on the settings page, described above.

Example
Request historical CSV data for the 12th and the 15th of May 2010 with 15 minute resolution.

URL
```
http://<servername>/local/parking/.api?export-
csv&date=20100512,20100515&res=15m
```

Example
Request historical data for all available days, with 24 hour resolution.

URL
```
http://<servername>/local/parking/.api?export-
csv&date=all&res=24h
```

5. Request XML data

URL
```
http://<servername>/local/parking/.api?export-
xml[&date=<date>][&res=<res>]
```

where `<date>` can be

- a date of the form `YYYYMMDD`

- a date interval of the form `YYYYMMDD-YYYYMMDD`

- comma separated dates of the form `YYYYMMDD,[..],YYYYMMDD`

- `all` (default) for all available data

and `<res>` can be

- `15m` (default) for data in 15 minute bins

- `1h` for data in 1 hour bins

- `24h` for data in 1 day bins

Format
CSV

Method
GET

Return
This script returns data in XML format. The DTD file can be found at `http://
<servername>/parking/appdata.dtd`

Example
Request historical XML data for the 12th and the 15th of May 2010 with 15 minute
resolution.

URL
```
http://<servername>/local/parking/.api?export-
xml&date=20100512,20100515&res=15m
```

6. Clear local counting data

URL
```
http://<servername>/local/parking/.api?clear-data
```

Format
    text/plain

Method
    GET

Return
    OK

7. Live view information

URL
    `http://<servername>/local/parking/.api?cntpos.json`

Format
    JSON

Method
    GET

Return
    Information about the counting area.

```
{
  "width":<width>,
  "height":<height>,
  "left":<left>,
  "right":<right>,
  "top":<top>,
  "bottom":<bottom>,
  "yfirst":<yfirst>,
  "ylast":<ylast>,
  "radius":<radius>
}
```

`<width>,<height>`
    dimension of the video stream

`<left>,<right>`
    x coordinates in pixels for start and stop for the blue lines in Live view

`<top>,<bottom>`
    y coordinates in pixels for the two blue lines in Live view

`<yfirst>,<ylast>`
    y coordinates in pixels for the top and bottom of the red counting area, disregarding curvature

`<radius>`
    radius in pixels describing the curvature of the red counting area, as measured in the center of the area on both axes, or 0 if the area is not curved

Example

Request Live view information from TrueView Parking™.

URL

```
http://<servername>/local/parking/.api?cntpos.json
```

Response

```
{
  "width":320,
  "height":240,
  "left":0,
  "right":296,
  "top":88,
  "bottom":224,
  "middle":136,
  "yfirst":88,
  "ylast":152,
  "radius":0
}
```

8. Group counters data

URL

```
http://<servername>/local/parking/.api?group-count.json
```

Format

JSON

Method

GET

Return

```
{
  "group-enabled":<group-enabled>,
  "display-enabled":<display-enabled>,
  "timestamp":<timestamp>,
  "in":<in>,
  "out":<out>,
  "offset":<offset>,
  "offset-timestamp":<offset-timestamp>
}
```

`<group-enabled>`

`true` if group counters is enabled, `false` otherwise

`<display-enabled>`

`true` if display is enabled, `false` otherwise

`<timestamp>`

camera's UNIX timestamp if `<group-enabled>` is `true`, `0` otherwise

```
<in>
```
   number of vehicles in group passing in until now today

```
<out>
```
   number of vehicle in group passing out until now

```
<offset>
```
   offset to correct for the actual number of cars in the garage

```
<offset-timestamp>
```
   UNIX timestamp when the current offset was set

Example
   Request group count data from TrueView Parking™.

URL
   ```
   http://<servername>/local/parking/.api?group-count.json
   ```

Return

```
{
  "group-enabled":"true",
  "timestamp":1274168157,
  "in":590,
  "out":531,
  "offset":4,
  "offset-timestamp":1274168101
}
```

9. Display information

URL
   ```
   http://<servername>/local/parking/.api?display.json
   ```

Format
   JSON

Method
   GET

Return

```
{
  "enabled":<enabled>,
  "text":"<text>"
}
```

```
<enabled>
```
   `true` if the display is enabled, `false` otherwise

```
<text>
```
   current display text

Example
Request display information from TrueView Parking™.

URL
```
http://<servername>/local/parking/.api?display.json
```

Return

```
{
  "enabled":"true",
  "text":"FULL"
}
```

Maintenance

On the *Maintenance* page (found under **Help** > **Maintenance**) there are several options for simplifying maintenance of TrueView Parking™.

1. **Restart** If you find the counting inaccurate or the web interface unusually slow, you may try restarting the running services or restart the camera.

2. **Logs** If you have any trouble with your camera you can send counter logs to Cognimatics. These can be generated by pressing the **Generate logs** button. After a while you will be prompted with a file you can save to your computer and send to `support@cognimatics.com`.

3. **Record video** You can use this feature to record video from your camera, locally to your computer. Just select the desired duration of the video and press **Record**.

4. **Patch software** When minor modifications to the counter software is made they are usually released as patches that will be provided by Cognimatics. When you have such patch file you can use it by selecting the file in the form and press **Upload and patch**.

Troubleshooting

The video does not show in Live view.

Make sure no one else is watching the video and click reload in your web browser. If you are using Internet Explorer a Flash player plug-in must be installed, the browser will probably prompt you with a notification if it is not.

The software prompts me with a warning saying that the frame rate is too low.

- If the scene is too dark, the Axis camera does not deliver enough frames per second for TrueView Parking™ to work. The scene must have a lightning with at least 1 LUX.

- When streaming video from the camera make sure to open only one stream at a time and to stream in 320x240 MJPEG format.

The software does not count after changing parameters.

After changing the parameters the software may need to run up to 10 minutes before the counting accuracy is at optimum.

The software does not count correctly.

- Make sure vehicle are passing the entire counting zone crossing both blue lines – not passing out to the left or to the right.

- If the software counts too many – lower the visual height.

- If the software counts too few – increase the visual height.

I still cannot get the software to count.

If you have followed the advice above and still cannot get the software to work, please contact the Cognimatics support team at `support@cognimatics.com`. Do not forget to send the archive with logs and other generated material from the page

`http://<servername>/local/parking/.api?generate-logs.`

A. Supported cameras

Table A.1. Supported cameras

Camera model	Software module
Axis P3343-VE 6mm	tvparkingAxisP3343ve_xx.bin

xx is the version number of the software module.

B. Display communication

The message that is sent to the displays consists of four parts: *initiation*, *length*, *text* and a *checksum*.

The message initiation consists of four bytes, and it is always the following sequence:

0x82	0x00	0x00	0x03

The length is section is the text length + 1 for the checksum. It is a 16-bit integer, with the most significant byte first:

MSB	LSB

The text that should be displayed consists of a sequence of characters and control sequences, described in the two tables below. The control sequences describe layout patterns for the display.

Finally, the checksum is taken as the sum of all characters in the text portion of the message modulo 256 and stored as an 8-bit integer.

Table B.1. Control sequences

hex	control
0x1C	wide
0x0F	flash
0x02	center
0x09	jump
0x0B	up
0x0E	down
0x1D	blink
0x1E	open
0x1F	wipe
0x1B	freeze
0x10	pause

hex	control
0x16	display time
0x15	display temperature

Table B.2. Valid characters

dec	char	dec	char	dec	char
32	Space	60	<	89	Y
33	!	61	=	90	Z
34	"	62	>	97	a
35	#	63	?	98	b
36	$	65	A	99	c
37	%	66	B	100	d
38	&	67	C	101	e
39	'	68	D	102	f
40	(	69	E	103	g
41	)	70	F	104	h
42	*	71	G	105	i
43	+	72	H	106	j
44	,	73	I	107	k
45	-	74	J	108	l
46	.	75	K	109	m
47	/	76	L	110	n
48	0	77	M	111	o
49	1	78	N	112	p
50	2	79	O	113	q
51	3	80	P	114	r
52	4	81	Q	115	s
53	5	82	R	116	t
54	6	83	S	117	u
55	7	84	T	118	v
56	8	85	U	119	w
57	9	86	V	120	x
58	:	87	W	121	y
59	;	88	X	122	z

The table below shows the displays that are currently supported directly from the manufacturer.

Table B.3. Supported displays

Manufacturer	Model
Poltech	LDPH20/6