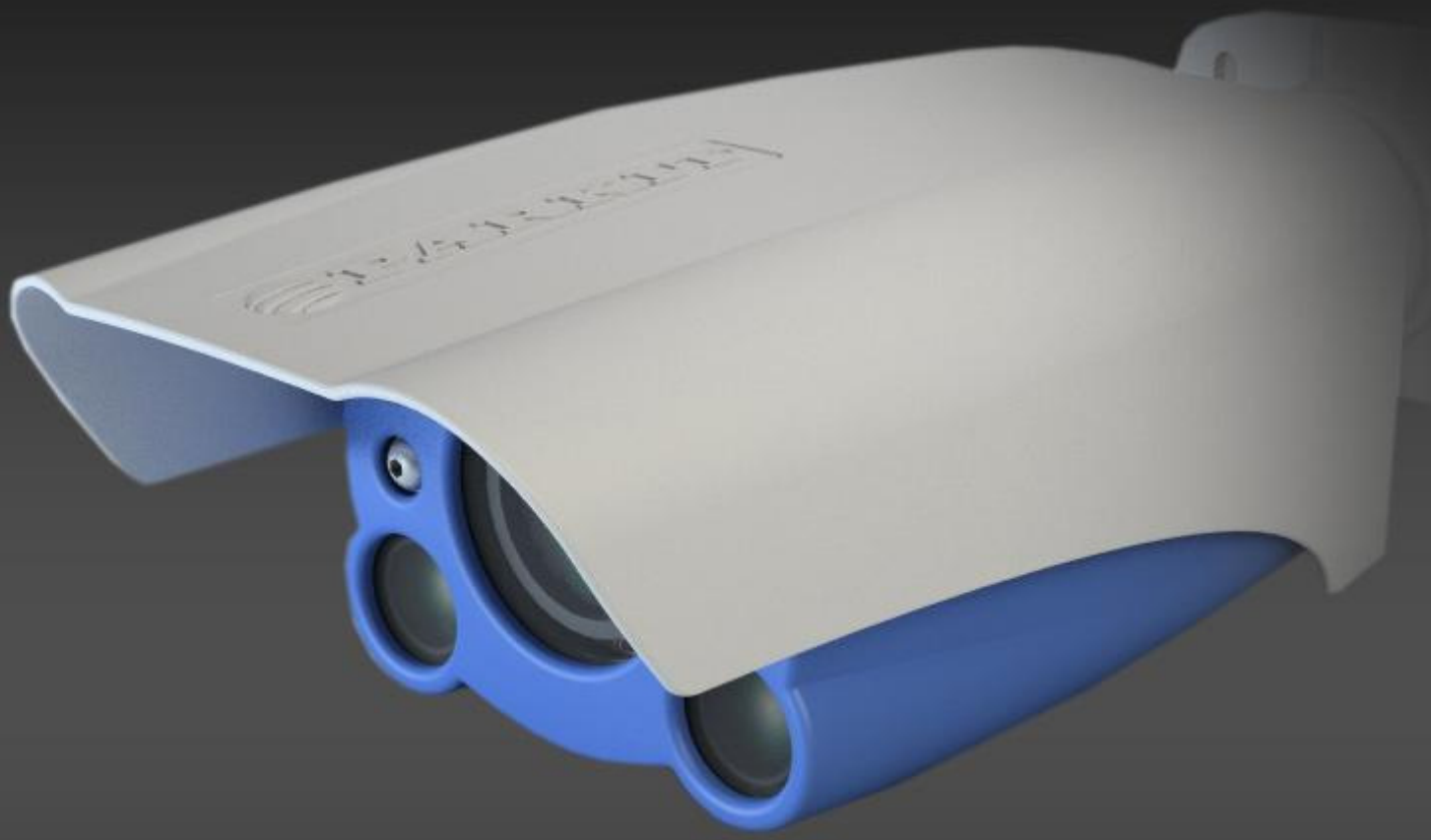
ParkIT

ANPR camera

User's Manual



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ParkIT User's Manual

Version 1.0

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Table of Contents

About this Manual

The aim of this guide is to help users to operate the camera and to make the most of it.
With the information provided below, users can easily manage the ParkIT camera through its web interface.

Key Features of ParkIT

- Auto brightness control designed for license plate recognition
- Automatic day-night mode switch, autofocus
- Camera image rotation (180°), horizontal and vertical mirroring
- Illuminant color compensation, automatic white balance
- Frame filtering
- Hardware motion detection
- Low bandwidth usage, built-in adjustable image compression
- Automatic time synchronization (NTP)
- Trigger IN/OUT

Accessing the Camera

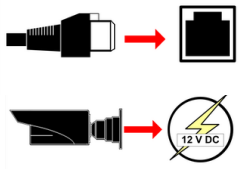
To access the camera, it has to be connected appropriately. For more information see ParkIT Install Guide.

For communication with the camera, camera commands have to be used. The easiest way of handling these commands is through the web interface of the camera. For more information on other communication methods see ParkIT Programmer's Manual.

Access from Browsers

Steps of accessing the web interface of the camera from a browser:

1. **Connect the camera to a computer or network switch then power on** the camera. After it is powered on, both status LEDs (red and green on the camera front) are turned on while the camera is booting. After finished, the green status LED flashes two times signaling that the camera is ready for operation.



2. **Set your computer's IP** address to192.0.2.x where x is an integer number between 1 and 254 **except 3** and your subnet mask to 255.255.255.0.

3. **Use the ping command** to test the communication with the camera

Windows:
```
C:\>ping -t 192.0.2.3
```

Linux:
```
username@mylinux:~$ ping 192.0.2.3
```

4. Soon, the ping package returns: `Reply from 192.0.2.3` If not, power off then on and enter the previous ping command again. After 3 seconds, the camera will try to get IP address automatically via DHCP.

5. **Start a browser** then enter the default IP address of the camera into the address bar (`http://192.0.2.3`). After this, the camera starts with administrator privileges, ready to be set up and configured.

For more information on accessing the camera see ParkIT Install Guide.

Live View

The live image of the camera can be viewed on this page.

Under the camera image, a status bar is located providing the following information:

- date & time (GMT)

NOTE: To alter date and time, see Date and Time configuration.

- IP address of the camera
- current FPS of the camera
- State of the automatic brightness controller. It has three states:
  - working
  - target reached
  - target unreachable

For more information on the automatic brightness control, see Easy Setup description.

Configuration Wizard

The ParkIT camera must be configured before using. Use the Configuration Wizard for setting up camera features (e.g. zoom, focus etc.) quickly and easily. The wizard guides users through the main calibration steps configuring various properties of the camera including the Event Manager. Of course, the use of the wizard is optional – camera properties can be set manually as well.

Steps of the Configuration Wizard:

Step 1: Set network settings to communicate with the camera. See Network Setup for more information.

Step 2: Time and date settings. For more information see Date and time.

Step 3: The Wizard can optimize the camera for ANPR (Automatic Number Plate Recognition) or Overview purposes. Select the one that is appropriate for your purposes.

Step 4: With the help of the Automatic Zoom (ZFG - Zoom From Geometry) feature, optimal character size on the camera image for ANPR can be reached quickly and easily. To use autozoom, enter the required data (e.g. distance of the number plate) into the textboxes then click next. Click skip to set zoom manually.

Step 5: Based on the values provided in the previous step, the camera creates a red rectangle that should include the license plate completely. If not, then adjust the position of the camera in order to do so.

Step 6: Use the Autofocus feature to achieve sharp camera image. The focusing process can operate on the entire camera image or on a specified section of it. Use the rectangle to select the area for the Autofocus.

Step 7: Configure the basic camera parameters. For more information see Easy Setup description.

Step 8: Configure triggering and trigger events. For more information see Event Manager description.

Step 9: Set or create camera profile. For more information, see Profiles.

Setup

Profiles

Under the profile menu, the list of profiles can be viewed. Camera profiles are pre-set camera configurations containing a complete set of settings that are loaded at startup and their settings cannot be changed at runtime (to apply new profile settings, the camera must be restarted). One of the profiles has to be always active and the active profile cannot be deleted.

The camera has a pre-defined default profile that cannot be erased but altered or **Set as current** by users.

NOTE: To activate new profiles the camera must be restarted.

Creating new profiles

New profiles can be created according to the followings:

1. Click **Create new** on the '*Profiles'* page.
2. Customize the new profile by setting the parameters of the '*HTTP server*', '*Hardware layer*' and '*Live view setup*' menus.
3. Enter a name for the new profile and click **Save**.

NOTE: Maximum 32 different profiles can be created.

Editing Profiles

HTTP Server Setup

NOTE: HTTP Server options (except '**Name of the server'**) are read only and cannot be altered by users.

HTML rootpath: Path of the static files (HTML pages, images etc.).

Listen port: Port used by the web server, the default is 80.

Max. connected clients: Maximal number of connected clients (to the web server) at the same time. Maximal value is 64.

Max. sessions: Maximal number of sessions at the same time.

Max. opened modules per session: Maximal number of opened modules per session at the same time.

Session timeout (seconds): Maximal length of a session, max 3600 seconds (60 minutes).

Filter module: If defined, then queries are only transferred to the module specified here.

Default module: If no module with the specified name/type has been found, then the module specified here is called.

Name of the server (title of the website): Text appearing in the address bar of the browser.

Click **Save** to save the settings.

Hardware Layer Setup

Capturing

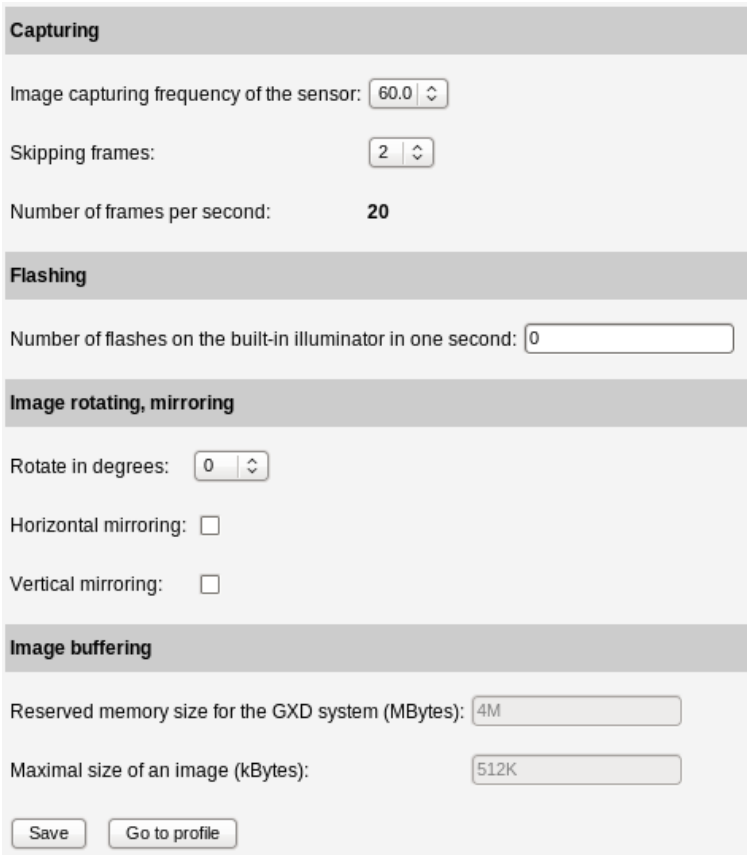


Image capturing frequency of the sensor: The image capturing frequency of the sensor determines the number of frames the sensor captures in one second. Note that the actual number of frames processed by the camera can be further reduced with the help of the **Skipped frames** and **Number of skipped frames** (see next chapter) options.

This option can be used for reducing mains flickering –caused by artificial light sources– on the camera image. By this value, the camera can be synchronized to the mains frequency of its environment (230V@50Hz or 110V@60Hz).

Skipped frames: Frames captured by the sensor can be skipped and omitted from processing.

- 0 = no skipping, the system processes all images
- 1 = every second frame is processed
- 7 = every eighth frame is processed (it drops 7 frames than keeps one)

Number of frames per second: This option calculates the actual FPS value from the **Image capturing frequency of the sensor** and the **Skipping frames** values.

Flashing

Number of flashes on the built-in illuminator in one second: Flashing frequency of the illuminator.

Image rotating, mirroring

The system is capable of rotating and mirroring images.

- **Rotate in degrees** (0 or 180). Camera image rotation in degrees.
- **Horizontal mirroring**: If ticked then horizontal mirroring is enabled.
- **Vertical mirroring**: If ticked then vertical mirroring is enabled.

Image buffering

NOTE: Image buffering parameters are read only.

Reserved memory size for the GXD system (Mbytes): Maximal size of memory for the system. The rest of the memory is used as image buffer. This memory is dynamic, if the system needs more memory it allocates for itself automatically.

Maximal size of an image: Max. size of images in the camera memory.

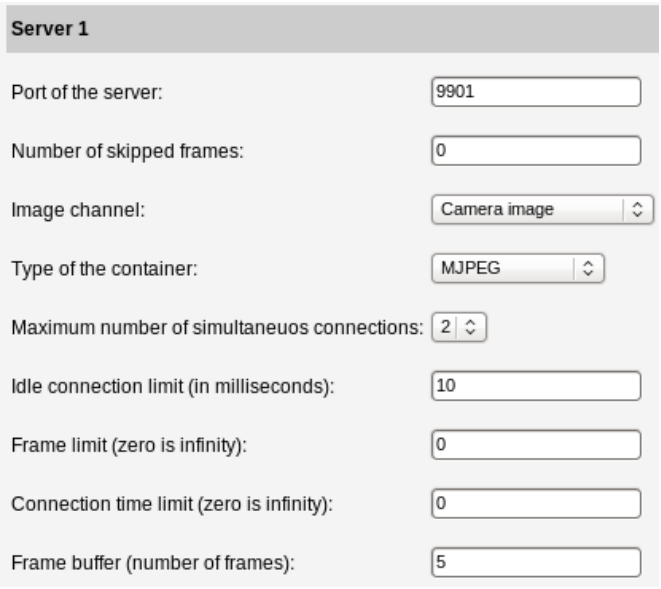
Live View Setup

The camera is capable of streaming live image with four parallel configurations. Number of configurations to be used can be set at **Number of servers** (default: 1). Settings for each configuration can be specified in the corresponding **Server** sections.

Server options:

Port of the server: Default: 9901.

Number of skipped frames: The number of frames reduced at the **Skipped frames** option on the *Hardware layer setup* page can be further divided here by omitting frames from the image stream.



Type of the container:

- MJPEG (only if the image channel is set to live image)
- JPEG sequence (only if the image channel is set to live image)
- H264 - For creating H264 streams (only if the image channel is set to motion detection image)

Image Channel: The source of images the camera transmits can be of two types: Camera image and Motion detection image.

Maximum number of simultaneous connections: Default: 2.

Idle connection limit (in milliseconds): Default: 10.

Frame limit: Connection is closed as the number of frames the camera has sent reaches this value. Default: 0 (0 = no limit).

Connection time limit: Connection is closed after this time is up. It represents the maximal length of connection time in seconds. Default: 0 (0 = no limit).

Values are applied after clicking **Save**.

Users

By default, the camera starts with administrator privileges. After at least one user profile is created, the camera will start with the login page.

Settings related to users can be managed on this page. The camera handles users on four different access levels (detailed below).

Adding new users

New user profiles can be created after clicking on **Add new user**. In the appearing form, data of the new user must be provided into the corresponding fields.

Access level of the logged out users: The camera can be set up to be accessed by users who are not logged in. The access level of such users can be set up by this option.

Change password of the 'root' user: Password of the Administrator level user can be changed here.

NOTE: Only numbers and the letters of the English alphabet can be used in passwords and user names. Settings are applied after clicking **Save**.

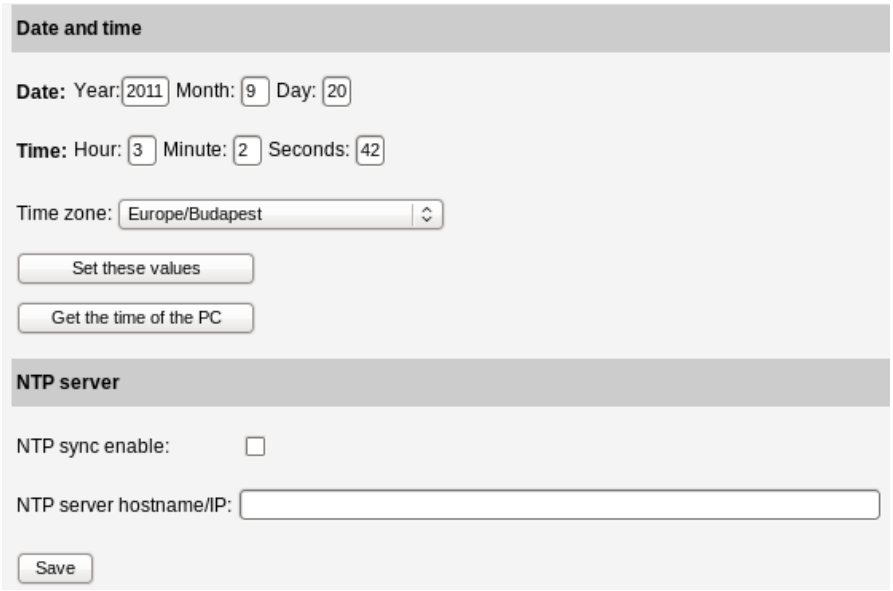
Access levels of the ParkIT camera

Access level	Privileges
Guest	• no privileges
Viewer	• live view • help • log in/out
Normal user	• live view • help • login/log out • easy setup • advanced setup • event manager • diagnostics • steps of the Configuration Wizard (see page 5)
Power user	• live view • help • login/log out • easy setup • advanced setup • event manager • diagnostics • profiles • restart • Configuration Wizard
Administrator	• access to every camera feature

Date and Time

Date and time settings of the camera can be managed easily on this page according to the followings:

- Getting time: Set camera time according to the connected PC's time by clicking **Get the time of the PC**. (Date and time of the camera appears in the uppermost row).
- Setting the time: Date and time can be set by simply rewriting the values of the uppermost row and then clicking on the **Set these values** button.



Use **Time Zone** option to set the time zone according to your region.

NTP synchronization is supported to ensure accurate time consistently on the camera. To enable NTP synchronization, the **NTP sync enable** checkbox must be checked. An NTP server can be specified by hostname or IP address in the **NTP server hostname/IP** textbox.

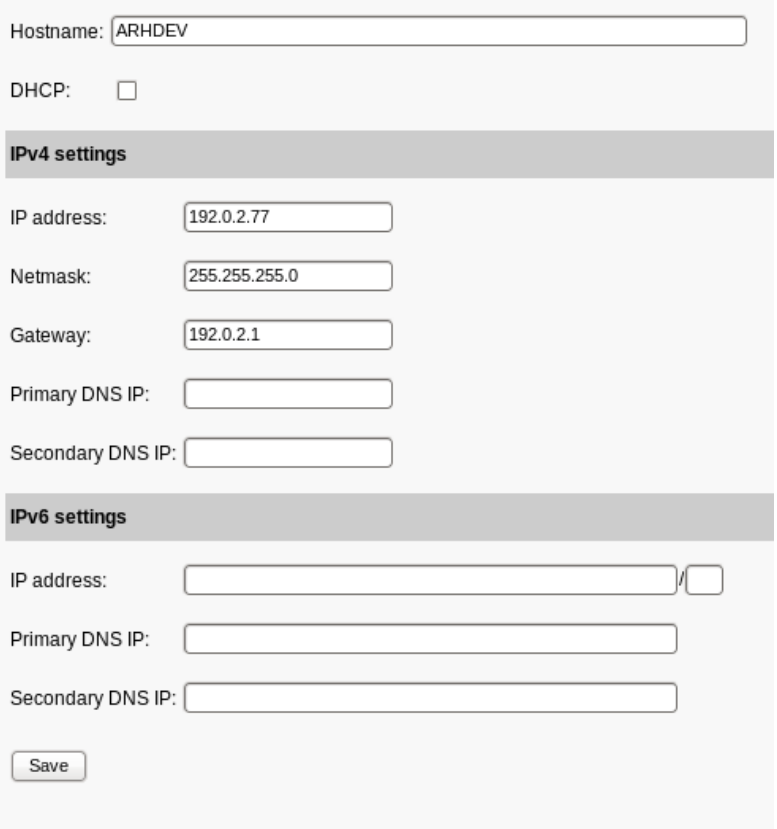
NTP settings are applied after clicking **Save**.

NOTICE: The camera has an internal battery feeding its Real Time Clock (RTC) while the camera is powered off. If this battery is low or down then the camera clock is reseted every time it is disconnected from power. In case of such a problem, contact ARH Support Team.

Network Setup

Hostname: The host name of the camera has to be entered into this field.

The camera can operate in **DHCP** mode in which the camera queries the **IP address**, **Netmask**, **Gateway**, **Primary DNS IP** and **Secondary DNS IP** from the server. Otherwise, these values have to be set by the user.



IP version 4 and 6

The camera supports both IPv4 and IPv6. Both versions can be enabled simultaneously, and at least one version must always be set. When using IPv4, the IP address for the camera can be set automatically via DHCP, or a static IP address can be set manually. IPv6 addresses are supported when fixed IPv6 addresses are used.

NOTE: In case of IPv6 addresses **/16** stands for the length of the subnet mask (16 refers to an 8 character long mask).

Settings are applied after clicking on **Save**.

Easy Setup

Image

Focus - Manual focus adjustment. Set focus to make the camera image sharp.

Start Autofocus - By autofocus, the camera adjusts focus automatically until it detects that the camera image is sharp. Autofocusing may also include automatic brightness adjustment if the brightness of the camera image is not satisfactory for the autofocusing process.

Zoom - Manual zoom adjustment. Set zoom to reach the intended camera view.

BrightNow! - The BrightNow! function automatically adjusts gain, shutter and iris to achieve the selected target value (Brightness target). With the help of BrightNow!, the optimal brightness of the camera image can be reached quickly but less accurately. When the target level is reached, the camera switches back to the previously set autobrightness mode.

Brightness target - The following automatic brightness strategies set and maintain the value set here.

Brightness Control Mode - Strategy of the brightness controller

- **Manual** - In manual mode, the values of gain, shutter and iris can be adjusted manually.
- **ANPR** - Strategy appropriate for ANPR camera purposes The ANPR strategy does not let any pixels to burn out.
- **Overview** - Strategy appropriate for overview camera purposes. This mode allows some pixels to burn out.
- **Quick** - The Quick controller method adapts to the brightness changes of the camera environment quickly. This strategy is suitable for special overview purposes.

Flash Intensity: - The light intensity of the camera's built-in infrared illuminator can be set by this option. Note that infrared light can severely damage the human eye. Do not look into the light source directly to avoid the risk of eye damage.

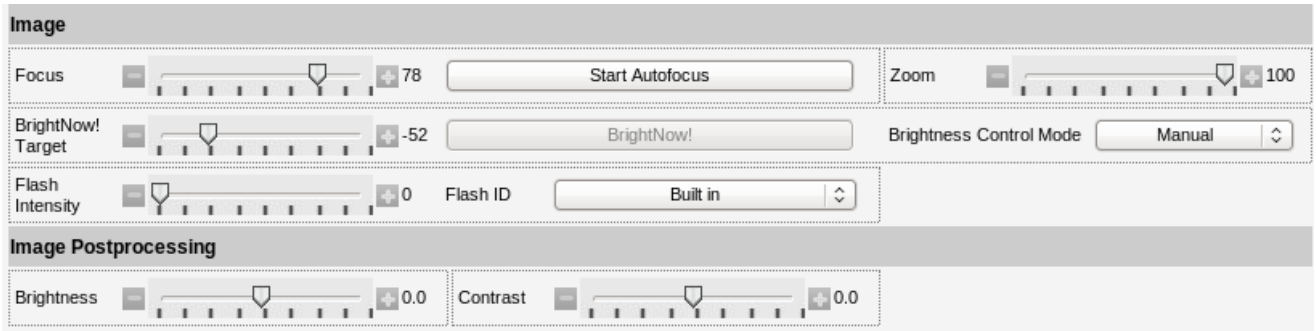


Image Post Processing

NOTE: These are software image manipulation tools. Their effects do not appear in the histogram.

Brightness - Brightness of the camera image can be adjusted manually.

Contrast - Contrast of the camera image can be adjusted manually.

Advanced Setup

Image Setup

Gamma - Gamma correction used on the camera image.

Brightness - Brightness of the camera image can be adjusted manually.

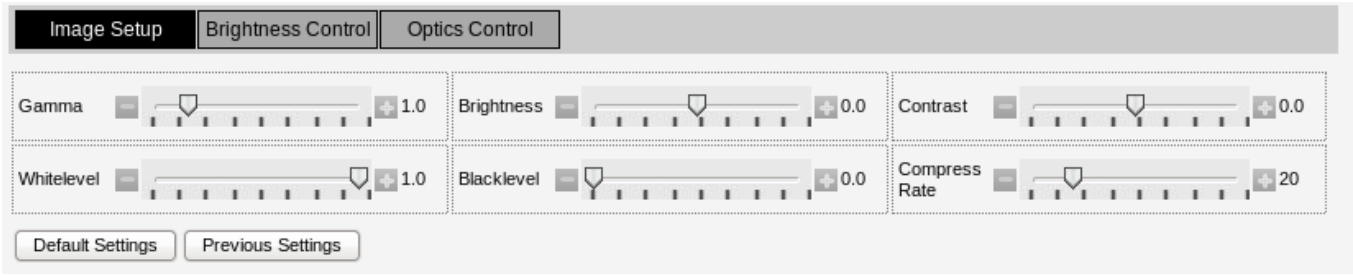
Contrast - Adjust this control to change the contrast of the camera image.

Whitelevel - Defines the highest pixel value that will be mapped to white. This will be the ending point of the gamma curve. Values between 0 and 1.0 are valid.

Black level - Defines the lowest pixel value that will be mapped to black. This will be the starting point of the gamma curve. Values between 0 and 1.0 are valid.

NOTE: Incorrect whitelevel and blacklevel values may cause entirely black or entirely white camera image. In such cases, reset the whitelevel and blacklevel values to default (whitelevel=1 and blacklevel=0) to restore the camera's live view. See Appendices to inspect the effect of adjusting the main image properties.

Compress Rate - The quality of the captured images can be set. The lower this value is, the better the quality of the images will be. Note, that images of better quality are greater in size therefore, they increase network load.



Parameters for Color Cameras Only

Wb. Red, Wb. Green, Wb. Blue - Red, green and blue channel gains.

Saturation - The intensity of colors can be adjusted by saturation. See appendices to inspect the changes of saturation value.

Color compensation - Color correction can be used to achieve the best color fidelity in captured images by compensating the color of the dominant light source illuminating the scene. The following options can be set for different light sources:

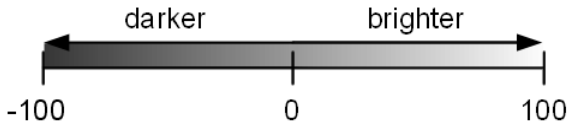
- Incandescent tungsten, (CCT=2865 K)
- Cool White Fluorescent, (CCT=4300 K)
- Mid-morning Daylight, (CCT=5500 K)
- Overcast Sky, (CCT=6000 K)
- Average Summer Sunlight, (CCT=6500)
- North daylight, (CCT=7500 K)
- Auto - Auto compensation
- Off - No light source compensation

Settings can be reseted to the defaults by clicking on **Default Settings**.

Brightness Control

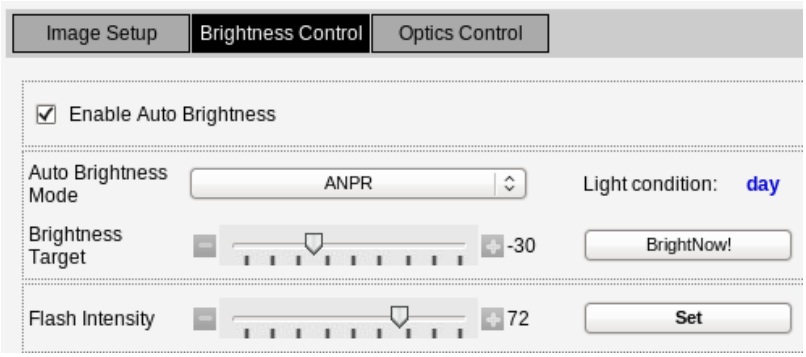
Enable autobrightness - If autobrightness is enabled, automatic strategies are used to adjust the brightness of the camera image. The progress of the current automatic strategy is displayed in the **State** field.

Brightness target - The following automatic brightness strategies set and maintain the value set here.



- **Manual** - In manual mode, the values of gain, shutter and iris can be adjusted manually.
- **ANPR** - Strategy appropriate for ANPR camera purposes The ANPR strategy does not let any pixels to burn out.
- **Overview** - Strategy appropriate for overview camera purposes. This mode allows some pixels to burn out.
- **Quick** - The Quick controller method adapts to the brightness changes of the camera environment quickly. This strategy is suitable for special overview purposes.

Auto Brightness mode - The current strategy is displayed and can be selected here.



Light condition - Brightness settings can be set for day and night light conditions respectively. The light condition returns the value **day** or **night** based on the camera light sensor.

Gain - Gain is the extent to which the strength of a video signal is boosted. Note that high gain values result in noisy images.

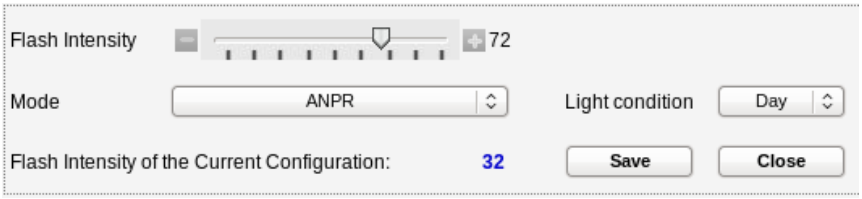
Iris - Iris is a mechanical device that controls the amount of light reaching the sensor. If 0 then no light can pass through to the camera sensor.

Shutter - Controls the length of exposure time. Too high shutter values may result in blurred images.

BrightNow! Target - The BrightNow! function automatically adjusts gain, shutter and iris to achieve the selected target value. With the help of BrightNow!, the optimal brightness of the camera image can be reached quickly but less accurately. When the target level is reached, the camera switches to the previously set mode.

Flash Intensity: - The light intensity of the camera's built-in infrared illuminator can be set by this option. Note that infrared light can severely damage the human eye. Do not look into the light source directly.

Set: - Click **Set** to assign different Flash Intensity values for each Autobrightness mode respectively, according to the followings:



1. Select the Autobrightness mode and Light condition to which you want to assign a Flash intensity value (at **Mode** and at **Light condition**).

2. Set the desired Flash Intensity value (at **Flash Intensity**).

3. Click **Save**.

As a result of this procedure, the set Flash Intensity values will be applied for the assigned Mode and Light condition automatically when changing Autobrighness mode.

NOTE: The camera must be restarted to apply new settings.

Optics Control

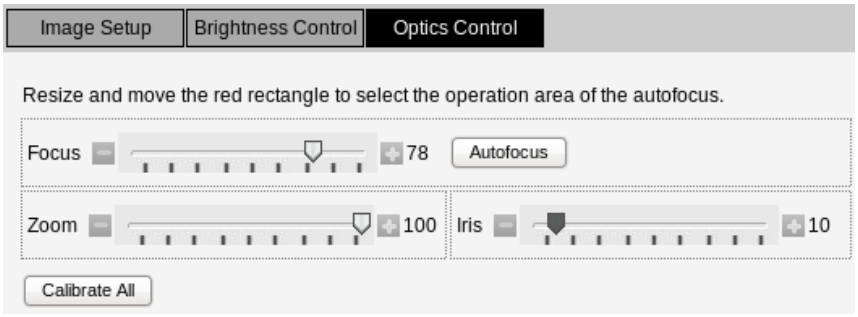
Focus - Manual focus adjustment. Set focus to make the camera image sharp.

Autofocus - By autofocus, the camera adjust focus automatically until it detects that the camera image is sharp. Autofocusing may also include automatic brightness adjustment if the brightness of the camera image is not satisfactory for the autofocusing process.

NOTE: The camera is capable of focusing to a specified area within its view (e.g. on a license plate). Move and resize the red rectangle on the camera image to set this area for the autofocus.

Zoom - Manual zoom adjustment. Set zoom to reach the intended camera view.

Iris - Iris is a mechanical device that controls the amount of light reaching the sensor. If 0 then no light can pass through to the camera sensor.



Calibrate All - Use this button for focus, zoom and iris calibrations. The motorized optics can be operated in finite many steps. Calibration means rescanning the entire range of the optics to measure the exact position and length of control to compensate deviations (if there are any).

Filter - This parameter is available only for cameras equipped with filter switchers. The state of a filter switcher can be of two types:

- **IR pass** - The filter passes infrared light only, use this setting when only infrared illumination is present (typically at nighttime capturing).
- **IR cut** - The filter cuts out infrared light to maintain color fidelity on color images.

Motion Detection

With the help of the hardware motion detector, the camera is capable of detecting motions in image streams based on the pixel differences between consequent frames. This motion detector can be customized for different purposes through its settings detailed below and can be used to launch trigger events on motions.

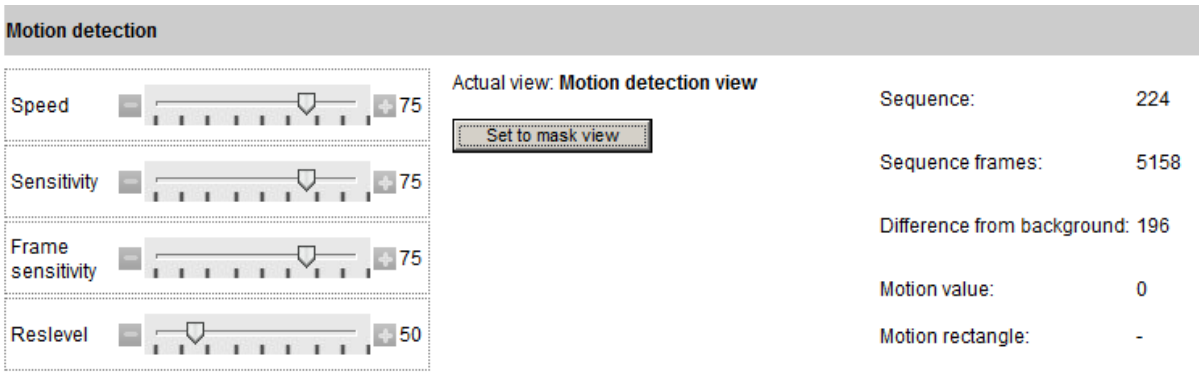
Actual View - In **Motion detection view**, the live camera image can be seen to help to setup motion detection. Note that this view is intended to help the setup process, the quality of the image stream is not appropriate for other purposes.
When clicking **Set to mask view**, the mask toolbar (detailed below) appears.

Speed - By setting the speed of the motion detector, it can be specified that how fast pixel changes should be considered as motions. If this value is set too low then slow ambient brightness changes (e.g. cloudy/sunny weather) may be considered as motion. If set too high, even a lightning can trigger signaling motion.

Sensitivity - By sensitivity, it can be set that what extent of pixel changes of the camera image should be considered as motion. If low, then minimal pixel changes are sufficient to cause motion, if high, only great pixel changes initiate motion.

Frame sensitivity - Sensitivity of the motion detection frame.

Reslevel - Motion limit. The extent of pixel changes below which the detected motion is ignored (the “motion” text does not appear).



Sequence - Images containing motion are arranged into sequences. These sequences have unique IDs.

Sequence frames - The index of frames within the sequences.

Difference from background - This value represents the extent of difference between the previous and the current image. The higher this value is the more motion has occurred.

Motion value - This value shows the extent of motion on the current image. This value is based on the sensitivity, speed and difference from background.

Motion rectangle - The area in which motion has occurred is framed by a motion rectangle defining the place of motion in the image. This option returns the coordinates of the motion rectangle.

Masking - With the help of image masking, certain parts of the camera view can be ignored by the motion detector. This feature is designed for situations when not the entire camera image is interesting for triggering (e.g. if the camera covers two lanes but only one of them is observed by the user).

Creating mask

1. Click **Mask View**.
2. Select the **Brush size** (the amount of pixels to be masked on one click).
3. Move the mouse cursor on the camera image and click on the area to be masked. Repeat this step as many times as necessary to mask the desired area(s).
4. Click **Save Mask**.

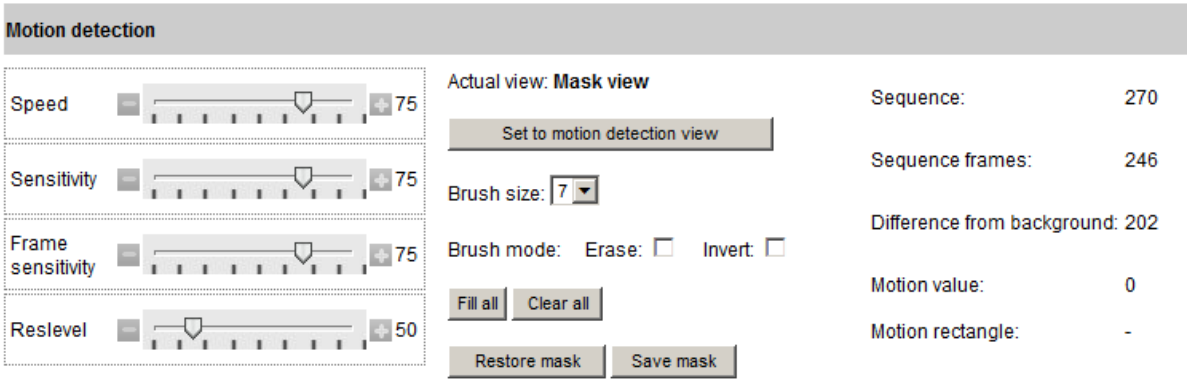
Modifying mask

A. **Erase**
- Click **Clear All** to delete the entire mask.
- Check **Erase** and click on the masked area(s) to be deleted

B. **Fill**
Mask the entire camera image by clicking on **Fill All**.

C. **Invert**
When selecting invert, masked areas can be erased and unmasked areas can be masked by simple mouse clicks. The size of the brush can be adjusted in case of inverting as well.

D. **Restore**
Return to the previously saved mask by clicking on **Restore Mask**.



Event Manager

The camera can be set up to execute tasks on various occasions (e.g. to upload images when it detects motion). These occasions are called **triggers** (in the above example: the detection of motion) while executed tasks are called **trigger tasks** (in the example: uploading images). Currently, one trigger task (uploading images) is provided with the camera, but adding further tasks is possible.

The Event Manager is responsible for deciding at each time instant if the prescribed trigger task should be executed. This decision is based on the state of the trigger sources at the given time instance.

Trigger sources

A trigger source has two states: asserted and not asserted. Being asserted means being active. A trigger source may have multiple outputs: this is like having multiple instances of the same trigger source (each may be configured differently), but handling them together.

Basically, trigger sources can be of two types:

- external trigger: signals arriving from the trigger input or the user UART of the camera, triggers sent from the client software programmatically or manually (by clicking on the button on *Software Trigger* page)
- internal trigger: the motion detector of the camera, or scheduled (see **Configure Scheduler**) by the user

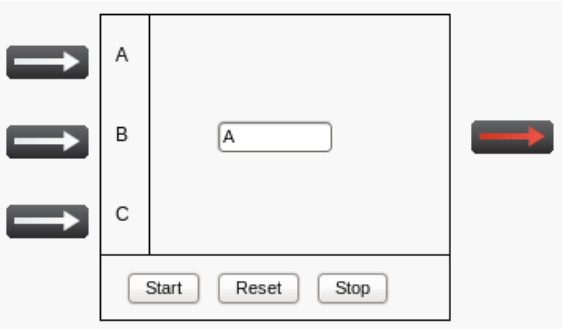
By default, there are five trigger sources:

- Hardware Motion Detection
- Software trigger
- UART trigger
- GPIO trigger
- Scheduler trigger

Every trigger source can be assigned with a letter (capital letters of the English alphabet from A to V, see figure below). When configuring through the web interface, it is done automatically. The Event Manager will identify the trigger source using this letter. The trigger sources to be used can be selected by registering them with the Event Manager.

Simple events

In the simplest case, the execution of the trigger task depends only on one trigger source. In this case, by simply writing the letter of a trigger source into the formula box, trigger event (upload set on the upload page) occurs when trigger signal arrives on the source associated with letter. E.g. if the UART trigger is assigned with the letter C and C is written to the formula box (see figure) upload will occur on trigger signals arriving through UART. It is not even necessary to register any other trigger source in this case.



The formula is applied (marked with green arrow after the formula box) right after clicking **Start** and can be invalidated (marked with red arrow after the formula box) by the **Stop** button. When clicking **Reset**, all the

registered sources are deleted.

Complex events

In case of complex events, upload depends on more than one trigger sources. To express relationships between the sources, logical operators can be used. Available logical operators: AND(&), OR(|), NOT(!).
You can use two shorthands 'any' and 'each', which mean 'launch trigger task if *any* of the registered sources is asserted' and 'launch trigger task if *each* of the registered sources is asserted' respectively.

Example A:

Let '**A&B**' be set where:

A is the Hardware Motion Detector
B is the Scheduler

This setup may correspond to a situation where traffic monitoring is only necessary at some times of the day: e.g. we want to upload images containing motion e.g. from 6 to 11.
With this setup, the trigger task (uploading of images) will be executed only when both the Scheduler and the Hardware Motion Detector are asserted, so, **both** trigger signals at the same time are necessary to start uploading.

Example B:

Let '**A|B**' be set where

A is the Hardware Motion Detector
B is the GPIO trigger

This setup may correspond to a scenario where an inductive loop is used to send triggers (through GPIO) when it detects motion and the camera Hardware Motion Detector is also used to support the loop (in case of pedestrians or vehicles that can be barely detected by the loop (e.g. bicycles). If '**A|B**' is set then upload occurs when a trigger signal arrives on the GPIO or from the Hardware Motion Detector or both, so, **either** trigger signal is sufficient to start uploading.

Brackets can also be used in the formulas to express complex relationships:

Let '**(A|B)&!C**' be set where

A is the Hardware Motion Detector
B is the Scheduler
C is the UART trigger

In this case, trigger event occurs only if

1. motion is detected
2. the Scheduler trigger is asserted
3. trigger signal does not arrive on the UART

} at the same time.

NOTE: Spaces are not allowed in formulas.

Software Trigger

By using the software trigger source, triggers can be sent to the camera either from user applications or using the button on the web interface. The time of trigger start and trigger end can be brought forward or delayed by **Start offset [ms]** and **End offset [ms]**. Settings are applied after clicking **Submit**.

UART Trigger

The camera can be triggered through its UART. Besides the common UART properties (baudrate, byte size, parity, number of stop bits) the communication protocol can also be specified here.
An UART trigger event starts with a **Trigger Start Token** (TST) byte, then max. 254 bytes of trigger data may follow, and then it ends with a **Trigger End Token** (TET) byte. The trigger start timestamp will be the system time at the instant the TST arrives, plus the **Start Offset**, while the trigger end timestamp will be the system time at the instant the TET arrives, plus the **End Offset**. Trigger data (including the TST and TET) will be forwarded to the Event Manager along with the image.

It is possible to specify the byte value of the TST (e.g. entering 0x0A means the trigger will begin with a '\n' byte) or check 'Start on first byte', which means, whatever byte comes first or follows the last end token will be the trigger start token.

Trigger task (upload) can be set to be launched at various stages of a trigger signal:

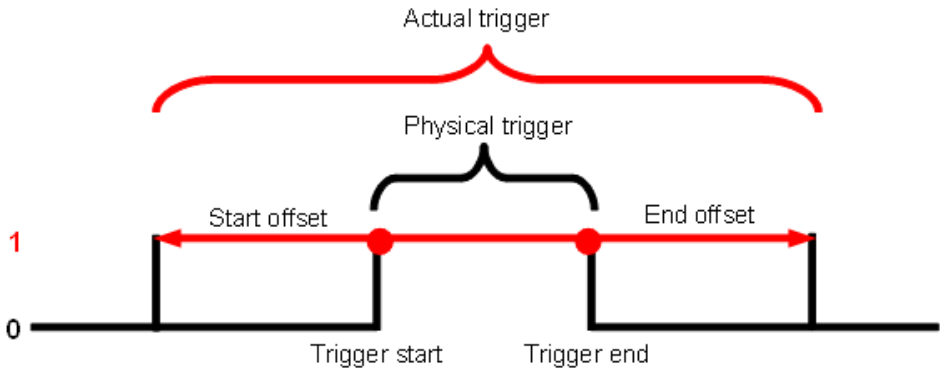
1. Level Mode
In case of level mode, trigger task is executed continuously until the end of the trigger signal:

2. Rising Edge Mode
In case of rising edge mode, trigger task is executed once, at the moment when the trigger signal arrives:

3. Falling Edge Mode
In case of falling edge mode, trigger task is executed once, at the moment when the trigger signal ceases:

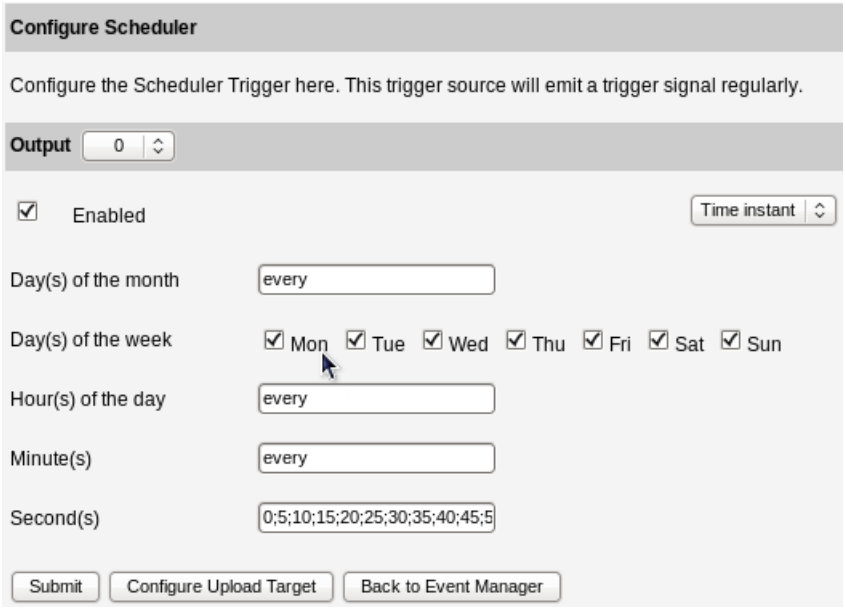
GPIO Trigger

On this page, the general purpose input and output (GPIO) ports can be set.
GP input can be used for triggering. To do this, the sample rate with which the port is sampled must be specified. Note that if a high sample rate is set then erratic behavior may occur due to bouncing. Always use the lowest possible sample rate. The voltage level can also be set that corresponds to the logic '1' level. A constant offset can be added to the assertion and the de-assertion of the GP input with start and end offset.



Scheduler

With the help of the scheduler, timed trigger events can be launched by users (events must be set on the '*Event Manager*' page). For timing these events, as many outputs (timers) are available as set in the **Output** field (maximum 2).



In the fields of the outputs the following expressions can be used:

- numerals separated by semicolons (e.g. 6;9)
- the word 'every'
- hyphens to express intervals (e.g. 7-9)

+ combinations e.g. 6;7;9-11;15

NOTE: Use semicolons at the end of the lines the mark end of data.

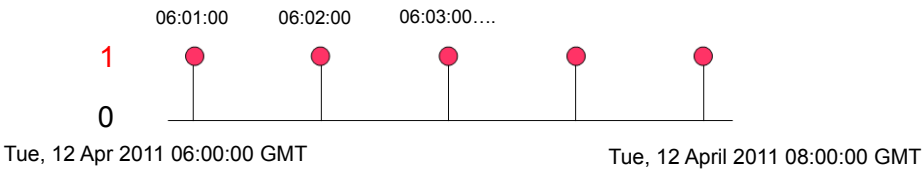
Within the outputs, two kinds of triggering can be specified: **time instance** and **time interval**.

Time instance(s)
When selecting time instances, trigger signals are emitted according to the set frequency. This frequency can be set from once a month to every second.

Time interval(s)
When selecting time intervals, a trigger signal is emitted until the specified second/minute/hour has elapsed.

E.g.
Day(s) of the month: `12;15` – *on the 12th and 15th of the every month*
Days of the week: ☑ Mon ☑ Tue ☑ Wed ☑ Thu ☑ Fri ☑ Sat ☑ Sun – *on every weekday*
Hour(s) of the day: `6-8;` – *from 6am until 8am*
Minute(s): `every` – *in every minute of the selected hour(s)*
Second(s): `0`

As time instances:
Trigger signals are emitted on the 12th and 15th in every month, independently from weekdays (since all weekdays are ticked it dose not matter that on which weekday 12th and 15th will be), from 6am until 8am once in every minute at 0 seconds.



As time intervals:
Trigger signals are emitted on the 12th and 15th of the every month, independently from weekdays (since all weekdays are ticked it dose not matter that on which weekday 12th and 15th will be) and asserted from 6am until 8:59:59.99 am.

Settings are saved after clicking **Submit.**

The target for uploading on scheduler trigger can be set by clicking the **Configure Upload Target** button, right after submitting changes.

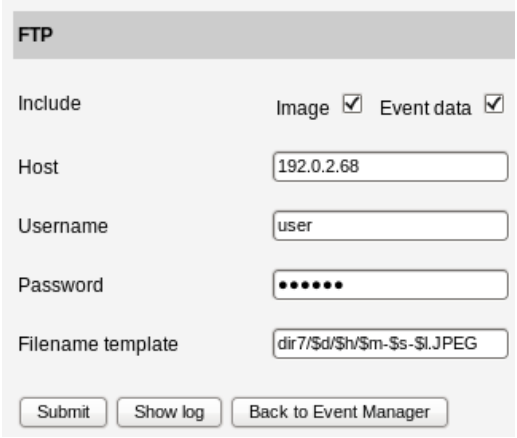
Upload

Images and image information can be forwarded from the camera via the following protocols:

1. FTP
2. SMTP
3. HTTP POST

FTP

Set the following fields to upload camera images and data to FTP servers:



Include: The uploaded data can consist of images, data or both. Use the checkboxes to select.
Host: the hostname of the FTP server
Username: for authorization to the FTP server
Password: for authorization to the FTP server
Filename template: The filename format of the images (data) can be customized with the help of the following arguments:

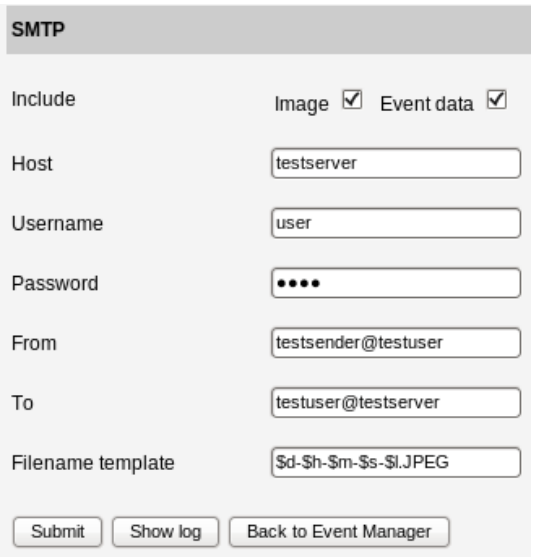
`$y`: year (4 characters)
`$r`: year (2 characters)
`$o`: month
`$d`: day
`$h`: hour
`$m`: minute
`$s`: second
`$l`: millisecond
`$t`: frametimems
`$i`: motion sequence ID (hexadecimal number)
`$x`: frame index within a sequence (hexadecimal number)
`text`: string

e.g. `$d/$h-$m-$s-$l.JPEG` argument set results in file names like:
`06/11-08-37-957.JPEG`

Settings are applied after clicking **Submit**.

SMTP

Camera data can be forwarded in simple e-mails as well. To use SMTP protocol, provide the following information:



Send: type of data to be sent in e-mail
Host: hostname or IP address of the mail server
Username: for authentication
Password: for authentication
From: sender of the e-mail
To: recipient of the e-mail
Filename template: see above

Settings are applied after clicking on **Submit**.

HTTP POST

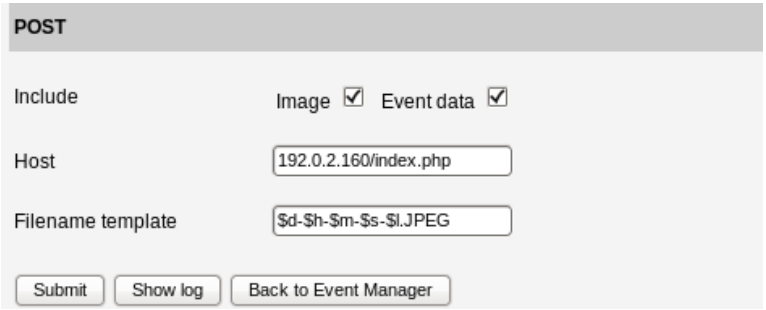
When using the HTTP POST protocol, camera data can be forwarded to web servers (for further processing).

Include: The uploaded data can consist of images, data or both. Use the checkboxes to select.

Host: Address of the web server (e.g. 192.168.0.12/index.php).

Filename Template: See FTP above.

Settings are applied after clicking on **Submit**.



Logging

Uploaded data and/or images are logged by the camera. The log can be viewed by clicking on the **Show Log** button on the Upload page.

Structure of the log:

Besides the name of the uploaded files, the log also contains:

- the protocol used for uploading
- the type of the uploaded data (image, data or both)
- state of the upload OK signals successful uploading
- if there was any error during the upload

Diagnostics

Diagnostics

Light sensor value [%]: Value of the light sensor in percentage: The brighter the camera environment is, the higher this value will be. (0 refers to complete darkness). This value saturates at 100% in normal daytime light conditions.

Temperature [ºC]: Inside temperature of the camera.

Built-in Flash Overdrive: The LED control circuit of the camera turns off the LEDs for a short period preventing impairment when exceeding safe voltage/FPS values.

Possible values: **No** - no overdrive
Yes - the LED control circuit intervenes to protect the LEDs

Memory usage

Total Buffer Memory: size of the image buffer

Free Buffer Memory: size of free memory in the image buffer

Total Device Memory: size of full system memory

Free Device Memory: size of free system memory

Loaded Modules

The name, path and short description of modules is enlisted in this group. For more information, see ParkIT Programmer's Manual.

Camera Log

Camera events are logged into the central log file for administrative and error management purposes. The lines (records) of the log can be filtered for specific events according to the typed in characters. Filtered events are listed after clicking **Submit**.

Update

The firmware of the camera can be updated by this option according to the followings: **Browse** the tar.gz firmware file then click **Update**.

Restart

Under certain circumstances (e.g. when changing camera profile) the camera must be restarted. The restart takes several seconds after which the camera is ready for operation with saved or default settings.

Help

Open the ParkIT manuals for more information on camera setups and management.

Recovery Mode

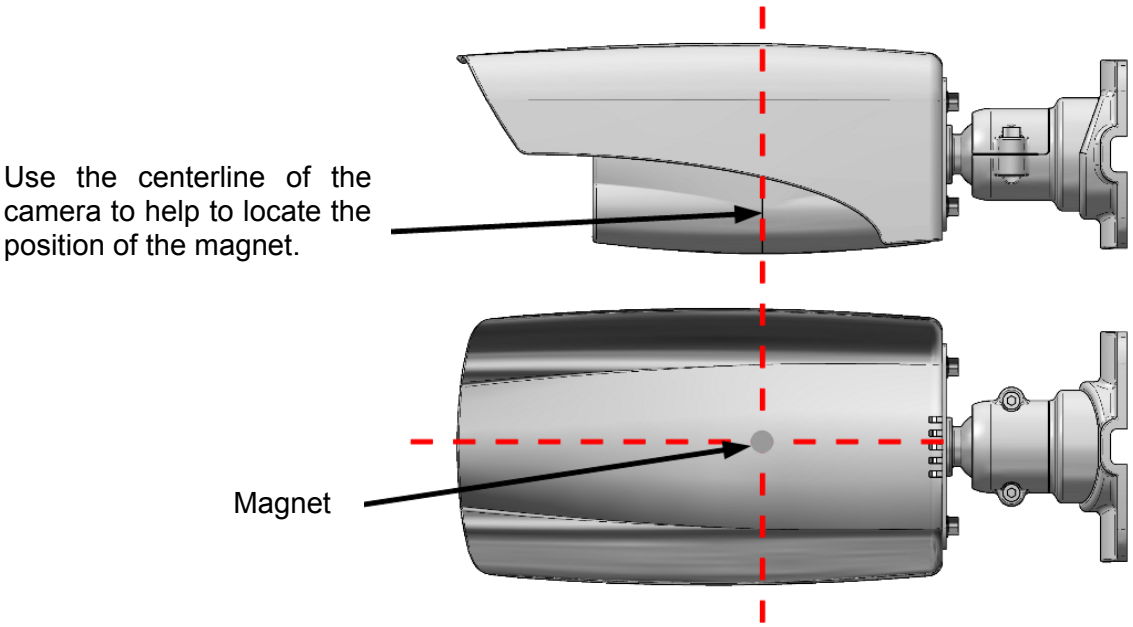
The camera has a Recovery Mode primarily designed to maintain the communication with the camera when it is unreachable for various reasons e.g. due to misconfiguration.

Features of the Recovery Mode

- **Firmware update** - It is the same function as the firmware update on the web interface for cases when the HTTP communication is not available with the camera.
- **Load TFTP image** - The camera can download a system image file from a distant server to repair severe software errors. Set the path of the image file and the camera downloads it from a server with the 192.0.2.1 IP address.
- **Recovery mode** - Click here to restart the camera in recovery mode.
- **Restart** - Click here to restart the camera in normal mode.

Starting the camera in Recovery Mode

1. Power off the camera.
2. Touch the provided magnet to the sunshield of the camera, right in the middle. See figure below.
3. Power on the camera.
4. Remove the magnet.
5. Reach the camera via its default (192.0.2.3) IP address.



Appendices

	Low	Normal	High
Contrast			
Brightness			
Saturation			
Gamma			

White balance

	Low	Normal	High
Red			
Green			
Blue			

Contact Information

Should you have any problem during operating the ParkIT cameras, our support team is at your disposal. Please try to explain the problem as detailed as possible and do not forget to send the following information to make it easier to help you:

- The name of your company (for administration purposes).
- The **exact type** of the **product** you have (serial number is appreciated).
- If you have problems **during recognition, send images** in the original file format.
- If there is any **error code or message** appearing, please send us the code snippet where it occurs (a screenshot may also be helpful).
- If you noticed the problem while running a Demo or a sample application, please let us know the **name of the application** you tested.
- If you have some problem while **developing your own** application, please specify the followings:
    - your programming language
    - your operating system
    - the name and version number of the compiler you use
    - the programming technology (e.g. native C/C++ / ActiveX / .NET)
    - If possible please send a short part of the source code. Please try to determine the place where the error occurs (e.g. “the scapture?getshutter command returns a negative number…“).

IMPORTANT NOTES:

- **Before sending back a faulty device, always contact ARH Support Team.**
- **Repairs may be executed by the manufacturer only!**

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