FAMILY 400
Integration Manual

Revision 1.1

PUMATRONIX

www.pumatronix.com

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Change History

Date	Revision	Updated content
06/03/2022	1.0	Initial release
09/15/2022	1.1	ITSCAM VIGIA+ Model Specifications

Overview

This document is intended to guide the developer in using the operating interfaces available for ITSCAM image capture and processing devices, specifically for models of the ITSCAM 400 and ITSCAM VIGIA+ lines. This document details the options for configuring the behavior of the devices and available through the web interface, Pumatronix Protocol or HTTP command protocol up to firmware 19.3.1.

According to the firmware version applied to the accessed device, the web access interface is different and some functions may only be available in the most current versions.

Figure 1 - ITSCAM 400 devices

Figure 2 - ITSCAM VIGIA+ Device

Summary

1. Web Interface for Firmware 16.X to 17.X

From ITSCAM firmware versions 16 onwards, the web interface does not require the Java technology used in previous versions. This interface is compatible with the browsers (from the versions described): Internet Explorer 11, Google Chrome 38, Firefox 21, Opera 25 and Safari 8 and standard access data must be used.

The header always displays the main information about the ITSCAM, such as Resolution, MAC Address and respective Firmware. The Pumatronix logo redirects to the website, which displays the direct communication channels. More detailed information on commands and settings is available at the locations indicated by the symbol and in this document.

After logging into the ITSCAM, the web interface displays the screen shown in Figure 3.

Figure 3 - Initial screen of the Interface of firmware versions 16.X to 17.X

Button	Meaning
Settings	Displays the adjustments that the ITSCAM allows, grouped according to functionality
Downloads	Redirects to Pumatronix support page
Restart ITSCAM	Sends the reboot command. To re-establish communication with the ITSCAM, it is necessary to wait approximately 20 seconds and reload the browser page.
Current situation	Shows the image, settings and status of ITSCAM inputs and outputs
Parameter files	Exports and imports a text file with the ITSCAM settings. This file can be edited in a simple text editor. Network settings (including IP), servers, inputs and outputs, framing (except zoom and focus), image adjustment and OCR contained in the file are updated in the ITSCAM.
Update firmware	Updates ITSCAM firmware via browser. Note: If the *DisableFrwUp* parameter has been activated, the option to update Firmware will be unavailable

The ITSCAM settings are grouped according to functionality and are shown in Figure 4. Some configurations need to restart the device for the value change to take effect. In these cases, when you click on *Apply,* the

restart is automatic. When a reboot occurs, it is necessary to reload the browser page to re-establish communication with the ITSCAM.

It is necessary to *Apply* the settings when finishing editing on each screen, so that the information are validated and the device is updated.

Figure 4 - Options available in firmware 16.X to 17.X, Settings menu

Option	Settings
Network	ITSCAM Network Configuration Web interface access configuration
Servers	Settings for using the servers that the ITSCAM supports Clock Server Setup (NTP) GPS Setup
Date and time	Date and time adjustment with daylight saving time setting
General	Test Mode, Rotation, *Auto Iris, Day* / *Night* Mode Settings for changing *Day* / *Night operating mode*
Inputs and Outputs	Capture trigger settings (external trigger) – inputs Generated image type ITSCAM Output Settings
Image adjustment	*Level,* Gain, *Shutter, etc.*
Lighting adjustment	Configuring image settings that may be different for *Day* mode and *Night* mode
Zoom and Focus	Settings to adjust zoom and focus and autofocus
Weights	Setting weights in image regions

Option	Settings
OCR	For models with embedded OCR: OCR settings and method used for visible and infrared light

2. Web Interface for Firmware 18.X to 19.X

ITSCAM firmware version 18 also has the new web interface that does not require Java technology. This interface is compatible with browsers: Internet Explorer 11, Google Chrome 38, Firefox 21, Opera 25 and Safari 8.

The initial screen of the ITSCAM web interface shown in Figure 5 displays the layout and functions always visible: on the left is the fixed *Control panel for the visualization* of the image displayed by the ITSCAM and the *Current Status* which displays the values in effect *Operating Mode, Shutter, Gain* and *Level.* To the right of the home screen are the main menu buttons that access equipment settings.

In the upper right corner of the screen is the option to select the page display language. You can choose between Portuguese, English, Spanish and French.

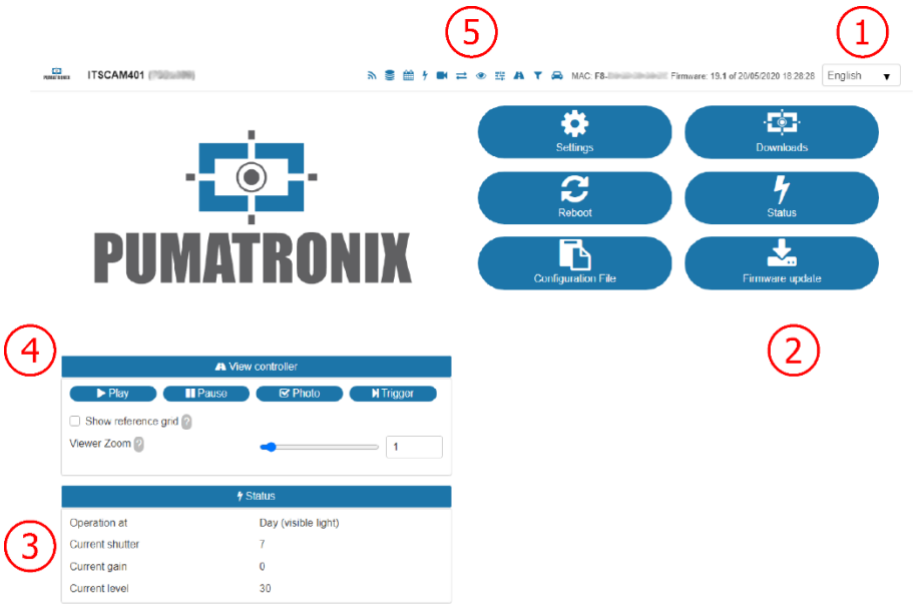

Figure 5 - Presentation of the initial screen of the firmware interface 18.X and 19.X: 1) Selection of the interface language; 2) Functions available on the home screen; 3) Current status of equipment operation; 4) Preview of the image displayed by the device; 5) Quick access menu to Settings options

Option	Meaning
Settings	Displays the settings that the ITSCAM allows, grouped according to functionality.
Downloads	Redirects to Pumatronix support page.
Reboot	Sends the reboot command. To re-establish communication with the ITSCAM, it is necessary to wait approximately 20 seconds and reload the browser page.
Status	Shows the image, settings and status of ITSCAM inputs and outputs.

Option	Meaning
Configuration file	Exports and imports a text file with the ITSCAM settings. This file can be edited in a simple text editor. Network settings (including IP), servers, inputs and outputs, framing (except zoom and focus), image adjustment and OCR contained in the file are updated in ITSCAM.
Firmware Update	Updates ITSCAM firmware via browser. Note: If the *DisableFrwUp* parameter has been activated, the option to update Firmware will be unavailable

When clicking on the section title or the relative blue bar, the contents of this section are minimized. Click again to access available fields.

All settings options are always available for quick access, on the top bar, being the same as when accessing the *Settings menu:*

Figure 6 - Configuration Options available in firmware 18.X to 19.X

It is necessary to *Apply* the settings when finishing editing on each screen, so that the information are validated and the ITSCAM device is updated

The *Settings* menu, available on the ITSCAM web interface, has all the features that can be adjusted through the interface and are presented in the execution sequence for installing an ITSCAM device.

General Configuration

Figure 7 - Fields available when accessing Settings > General

Settings	Operation mode	Coverage
Rotate image 180°	This functionality allows the installation of the equipment fixed to the ceiling, as it rotates the image by 180°.	Able; disabled
Auto Iris DC	Auto *Iris DC* allows additional lightness control and should only be disabled during the focusing process.	Able; disabled
Operation mode	When using the *Automatic mode,* the equipment switches between the operating modes acting through a combined adjustment of the *Iris, Shutter* and *Gain* based on the image clarity level, which varies according to the amount of lighting available in the environment. Check the Product Manual for a detailed description of how the Operating Modes work. *IN1* or *IN2* modes, when input 1 or 2 is active, the device switches to *Day* or *Night mode.* *Day* operation mode: The ITSCAM can provide color images with visible light in the daytime, due to the filter that prevents the passage of infrared light. *Night* operation mode: captures images with infrared light, resulting in black and white images.	Automatic; Always *Day mode;* Always *Night mode;* IN2 exchange*Day / Night;* IN1 exchange*day / night*

Settings	Operation mode	Coverage
Day / *Night* transition algorithm	When the transition between *Day* and *Night* modes is selected as *Auto,* to prevent external factors such as headlights from causing an unwanted switch between *Day and Night* modes, one of the switching logics is applied which can be configured as *Counter* or *Average.* In the *Counter* algorithm, it is observed if the level remains higher than the switching threshold for more than 60 seconds before switching the mode. In the *Average* algorithm, the average of the levels in the last 60 seconds is observed.	Counter; Average
Colored images on Night mode	When using *Day* mode*,* infrared lighting is filtered out and the colors reproduced in the image do not change. When in *Night* mode*,* images are processed with the entire spectrum of light, that is, from ultraviolet light (not visible), visible light (color) and infrared (non-visible) and so that there is no distortion of colors, are displayed in black and white. For the color photos option in *Night* mode*,* the *Exchanger* filter is not triggered at night time and color information is embedded in the images, which may not reflect the actual color of the objects in the scene due to the infrared lighting. This functionality is different from keeping the equipment always operating in *Day mode* and causes slight color distortion.	Able; disabled
Desired *Level*	The Desired *Level* defines the behavior of the *Gain,* the exposure time of the image sensor (*Shutter)* and the *Auto Iris*, making them adjust to generate darker or lighter images.	7 to 62
Day to *Night*	Operating in Auto mode: Switching from *Day mode to Night* mode only occurs when the current *Level* remains below the percentage of the desired *Level.* Generally, this value is less than the threshold for switching from *Night* to *Day* mode*.*	0 to 100
Night to *Day*	Operating in Auto mode: Switching from *Night mode to Day* mode only occurs when the percentage of the current *Level* remains greater than the specified value. Usually, this value is greater than the threshold for switching from *Day* to *Night mode.*	0 to 100
Visible to IR	The motorized lens has two focus settings, one for visible light and one for infrared. In order to avoid excessive adjustment changes at the end of the day, a threshold (percentage of the *Desired Level)* is established at which the equipment switches to *Night mode* and continues to focus on visible light.	0 to 100
IR to Visible	The motorized lens has two focus settings, one for visible light and one for infrared. In order to avoid excessive changes in the setting during the dim light at the beginning of the day, a threshold (percentage of the desired *Level)* is established at which the equipment switches to *Day mode* and continues to focus on infrared light.	0 to 100
Global label Global label (for videos)	Allows you to enable the printing of a label at the top of the image. This label can be with a black background and white letters, or with a white background and black letters.	disabled; White text; Black text
Global label text	Text to be printed on equipment photo captures, which can be formatted to display equipment and capture information through tags, similar to string formatting in C. Note that, unlike C, this field does not accept formatting number of characters or other modifiers. Table 1 indicates how to configure the fields to be displayed in the label.	alphanumeric characters

Table 1 - Symbols for configuring the fields to be displayed on the label

Symbol	Replacement
%P	Plaque (up to 7 characters) (for global image label only)
%y	Year (2 digits)
%m	Month (2 digits)
%d	Day (2 digits)
%H	Hour (2 digits)
%n	Minute (2 digits)
%s	Second (2 digits)
%v	Daylight Saving Time ('V'/'N')

*Example: **%py/%m/%d-%v** - Possible result: *ABC1234-20/03/20-N*

Inputs and Outputs Configuration

Triggers, Filters and Inputs Configuration

Figure 8 - Fields available when accessing Settings > Inputs and Outputs

Settings	Operation mode	Coverage
Captures per pulse *Day*	It configures the number of photos that will be captured for each request, defining the *Multiple Exposures* from 2 captures per request. It is recommended to use more than one exposure per capture in order to identify reflective and non-reflective plates in adverse conditions, as photos are generated with different image adjustments of the same vehicle.	1 to the limit of the ITSCAM model
Minimum time between triggers (milliseconds)	Time the equipment waits to process a new capture request. This time starts to be counted as soon as a photo request is received.	0 to 60000
Captured image format	To use the OCR software, it is necessary to choose the JPEG format.	BMP; JPEG
Quality	Quality of JPEG images sent.	0 to 100
Respect illuminator protection time	After activating the flash, the illuminator needs a rest time so as not to overload the LEDs and stabilize the voltage. The illuminators have protection circuits that, if the flash is required during this time, does not trigger the flash, causing the captured photo to not be illuminated correctly. When activating this option, the equipment automatically calculates the rest time based on several parameters such as shutter time, number of photos and the illuminator model. If any photo requests do not respect this rest time, the device ignores the request. However, this option does not prevent captures with a large number of photos and shutter time, which means that in these cases the last photos can be captured without insufficient lighting.	disabled; Enabled
Visible light trigger	Trigger type used when the ITSCAM is operating in *Day* mode. Check the Product Manual for the operation of each available trigger option.	disabled; Rising edge; Drop edge; Rising and falling edge; Approximation; Fast clearance; Slow retreat; Continuous; Periodical; High level; Low level; Rising and approaching edge; Motion detector; Motion start detector; End of motion detector.
Infrared light trigger	Trigger type used when the ITSCAM is operating in *Night* mode. Check the Product Manual for the operation of each available trigger option.	
Execute motion analysis	Motion analysis operation is only possible in conjunction with the *Continuous* or *Periodic* trigger as it filters only the moving images, by enabling the motion calculation in the processed images so that the algorithm can detect the presence of a vehicle and then perform the capture. Photos captured in the web interface and photo requests via the Pumatronix protocol will not be affected by *the Movement Filter.* The calculation result is added to the JPEG comment. Check the Product Manual for details on the structure of JPEG comments.	disabled; Enabled
Filter behavior	When motion analysis is enabled, it is possible to discard images that are considered motionless. Thus, if the option is	Do not discard; Select only the ones with movement; Select only the start of the

Settings	Operation mode	Coverage
	selected, all images that have movement less than the threshold will be discarded.	movement; Select only the end of the move
Threshold	*Movement Filter Threshold* serves to prevent identical image capture and excessive image processing. The lower the threshold value, the more sensitive the detection of motion in the image will be. The default value is 5.	1 to 254
Use ROI	Specify whether the motion variation calculation should be performed using a specific Region of Interest (ROI) for the *Movement Filter* or whether the same ROI created for the OCR reading should be used.	disabled; Use motion filter ROI; Use OCR ROI
Region of interest (ROI)	The Region of Interest in the image is to enable the calculation of motion variation only in the selected region and reduce image processing. It is recommended to use regions of interest to remove sidewalks and parts of the image that do not make up the road. The chosen region must be a polygon with four points, which are marked over the image in the *View Controller.*	Select region (mark the 4 points on the image); do not use region
Input 1 (IN1)	Entry status	off; on
Input 2 (IN2)		
Synchronism mode	Until firmware version 18.6, the timing done by the *sync* and *syncdt counters* corresponded to the number of frames after a transition on an input. As the frame rate may be different for different ITSCAM models, a trade-off should be made to compare the *sync* and *syncdt* values between devices. Firmware as of version 17 has *TSinc* and *TSincDT* counters representing time in milliseconds.	Controlled by IN1; Controlled by IN2; Cont. by IN1, when IN2=0; Cont. by IN1, when IN2=1; Cont. by IN2, when IN1=0; Cont. by IN2, when IN1=1;
Synchronism mode (DT)		

Output Configuration

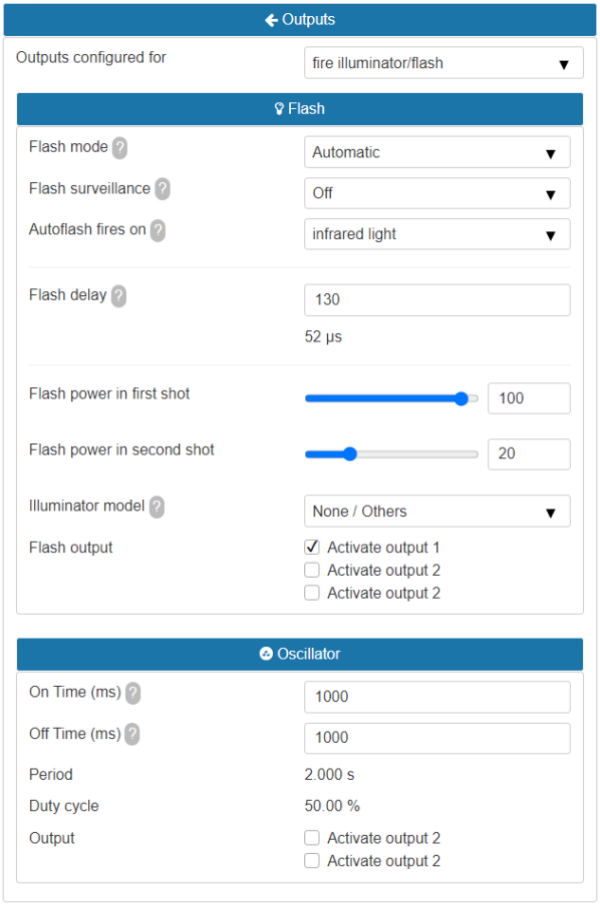

Figure 9 – Fields available when accessing Settings > Inputs and Outputs

Settings	Operation mode	Coverage
Outputs configured for	The outputs of the ITSCAM can be activated by protocol commands or by the web interface, when there is interest. If it is necessary to control equipment and activate ITSLUX, the illuminator can be activated through the ITSCAM serial port.	fire illuminator/flash (external); fire illuminator/flash (internal) or equipment control
Flash mode	The flash can be activated using the *delay,* which activates the flash moments before capturing the image, and thus, taking advantage of the maximum lightness that the illuminator can provide. In *Automatic* mode, the illuminator is not activated during the day, saving energy for the system. Flash mode options are detailed in Table 2.	disabled; Single; Continuous; Single with delay; Automatic; Automatic with delay; Continuous (*Night)* / OFF (*Day)*
Flash surveillance	The illuminators send information about their operating status via the serial output with each shot. This diagnostic contains possible electrical problems such as an internal short circuit, the voltage level of the capacitors, if there are any burned out LEDs, etc. When enabled, such information appears on the WEB interface (using JPEG photo output) and in the comments of the photos taken. Check the Product Manual for details on the structure of JPEG comments.	disabled; Enabled; Enabled and triggering via Serial Port 2

Settings	Operation mode	Coverage
Autoflash fires on	Indicates whether the illuminator will be activated whenever the *exchanger* is not filtering infrared light (operation in *Night* mode*)* or when the equipment detects that light levels are low and infrared light predominates.	*Night mode;* infrared light
Flash delay* (delay in µs calculated)	Time the equipment waits to expose the image sensor after the flash is activated. This delay allows you to align the image capture with the flash at its peak light output, to take advantage of the best artificial light. Using Pumatronix illuminators: There is a real delay of 50µs until the effective emission of light, which only influences the captures with shutter less than 250µs. In situations with very small shutter, it is recommended to correct this effect by assigning a delay in capturing the image (of 130 steps), so that the light peak can be taken advantage of.	0 to 25000
Flash power in first shot	Percentage of ITSLUX intensity when capturing *Multiple Exposures.* Check technical specifications of the illuminator.	0 to 100
Flash power in second shot		
Activate output 1	Changes the voltage level of the ITSCAM output. This configuration is lost when the device is reset or restarted. Check the Electrical Specifications section to connect only equipment compatible with the IO circuit.	ON; OFF
Activate output 2		
On time (ms)	A pulse oscillator can be configured on ITSCAM output 2 or M. This is done by specifying the time it will be ON and OFF.	1 to 3600000
Off time (ms)		
Period	Indicates the time interval until the trigger sequence repeats	Calculated by device
Duty cycle	The ratio between on time and off time (%)	Calculated by device
Output	Enable Output 2 and/or Enable Output M (used on specific models)	Enabled; disabled

*Each flash model reaches its peak light output at a certain time after firing. Consult the equipment's technical specifications for the correct configuration of the time that the ITSCAM device must wait to perform the image sensor exposure in the *Delay* function.

Table 2 - Available Options for Flash Mode

Settings	Operation mode
Disabled	Flash never fires
Single	Flash is instantly activated when an image is requested
Single with delay	Flash is triggered moments before the *Shutter exposure,* according to the configured time (only for the "*Photo"* command)
Continuous	Flash fires on all frames captured internally by the device. This mode is only recommended for illuminators without rest time, such as ITSLUX Video (ITSLUX W6032-V or W6075-V). Indicated for Illuminator testing only, as the Illuminator fires without any image request

Settings	Operation mode
Automatic	Flash is activated only when the environment is dark, in *Night* mode, avoiding shooting during the day. Generates energy savings for the system
Automatic with delay	*Auto* flash, but the *delay* is used to optimize the lighting at the time of capture.
Continuous (*Night*) / OFF (*Day*)	Flash fires on all frames captured internally by the device when the ITSCAM is operating in *Night* mode only. In *Day* mode the illuminator is not activated

Date and Time Setup

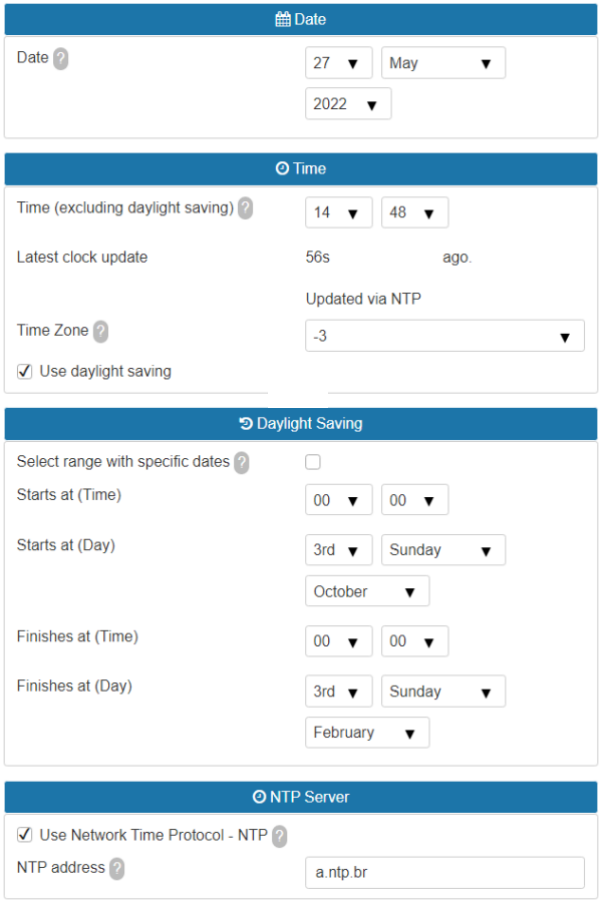

Figure 10 - Fields available when accessing Settings > Date and Time

Settings	Operation mode	Coverage
Date	Specify day, month and year.	Valid day, month and year
Time (excluding daylight saving time)	Specifies the time. ITSCAM automatically adds daylight saving time. The ITSCAM resets the time when it switches off. It is possible to configure the clock manually (via the WEB interface or Pumatronix Protocol), using the ITSCAMPRO server or even using an NTP server.	24 hours
Time Zone	Specify the time in relation to UTC (Universal Coordinated Time).	-12 to +12

Settings	Operation mode	Coverage
Use daylight saving	When checked, allows you to configure the duration of daylight-saving time.	Able; disabled
Start and end of Daylight saving	Daylight saving time start and end settings.	date and time

Network Configuration

Changes to the ITSCAM device's network settings are immediately written to flash memory, but will only take effect when the ITSCAM is restarted.

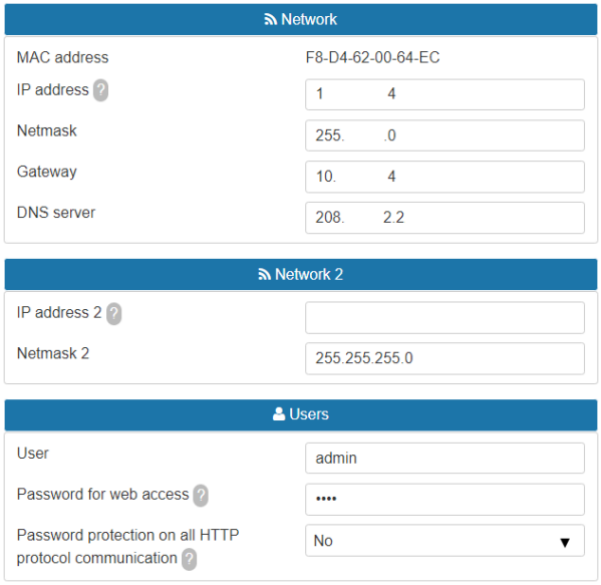

Figure 11 – Fields available when accessing Settings > Network

Settings	Operation mode	Coverage
MAC address	Informs the physical network address and cannot be modified	valid address
IP adress	Informs and allows changing the ITSCAM IP address. Need to restart to apply the configuration. Address to access ITSCAM. The factory default address is *192.168.0.254.* When changed, the new address is written to flash memory. The ITSCAM even has a second IP address (192.168.254.254), in case the user mistakenly changes the IP address and loses connection with the device.	Valid configuration
Netmask	It informs and allows changing the network mask, which defines the network to which the ITSCAM device belongs. Need to restart to apply the configuration.	
Gateway	It informs and allows changing the gateway (intermediate equipment that connects the ITSCAM device to other networks). Need to restart to apply the configuration.	
DNS server	Informs and allows changing the DNS server. Need to restart to apply the configuration.	

Settings	Operation mode	Coverage
IP address 2	It informs and allows changing the secondary IP address (192.168.254.254) of the device, as long as it is not on the same subnet as this IP address, it can be used for access. Need to restart to apply the configuration.	Valid configuration
Netmask 2	Informs and allows changing the netmask of the secondary IP address. Need to restart to apply the configuration.	
User	Informs that the *admin user* is accessing the equipment.	-
Password for web access	You must assign a password to the *admin* user. The factory default password is *123.* Need to restart to apply the configuration.	0 to 8 alphanumeric characters
Password protection on all HTTP protocol communication	The web interface is password protected, however the communication over the http protocol can be protected or not. Some operations that can be secured are rebooting, displaying and changing settings, and requesting photos.	Yes; No

Server Configuration

Figure 12 – Fields available when accessing Settings > Servers

Settings	Operation mode	Coverage
Server for image and data	Communication with the following types of servers is possible: • FTP: Device connects via FTP to one of the servers available for sending images; • ITSCAMPRO: Device connects to an ITSCAMPRO server to send images; • Serial port: Device becomes a TCP server on the specified ports and retransmits data from the serial port(s) to the TCP socket and vice versa; • RTSP: Device enables an RTSP (Real Time Streaming Protocol) server that displays the captured images; • Q Protocol: Device uses Protocol Q for sending a vehicle pass log to the client system that supports this integration.	None; FTP; ITSCAMPRO; Serial Port; RTSP; Q Protocol
Resolution	Resolution that images will be transmitted on the configured server (in pixels)	Original; 800x600; 640x480; 400x300; 320x240; 240x180; 160x120
Enable mosaic	When enabled, all captures are resized and grouped into a single mosaic shaped image to maintain a high plates recognition rate.	Able; disabled
Use Puma Protocol crop	Only send the region of interest of the image as the photo	Able; disabled
Enable authentication in Pumatronix Protocol	Protects communication through authentication operation. When enabling, all connections using the Pumatronix Protocol require a user and password. Contact Technical Support for more details on how to implement this operation.	Able; disabled
Serial Port 1 configured as	Serial Port 1 can be used as a server (which must be enabled in *Server for image and data)*, to control the integrated GPS or as an external trigger (receiving the capture signal). Need to restart to apply the configuration.	As a server; to control integrated GPS; to capture images
Baud rate (Serial Port 1 or 2)	Speed on serial ports is measured by the number of bits transmitted per second (bps). Need to restart to apply the configuration.	300; 1200; 2400; 4800; 9600; 14400; 19200; 28800; 38400; 57600; 115200; 230400
Data bits (Serial Port 1 or 2)	Number of data bits in a transmission. The packet refers to a single-byte transfer, including start/end bits, data bits, and parity. Need to restart to apply the configuration.	7; 8
Parity (Serial Port 1 or 2)	It is a simple form of error checking that is used in serial communication. Need to restart to apply the configuration.	Nonexistent; Odd; pair
Stop bits (Serial Port 1 or 2)	Used to signal the end of communication for a single packet. They indicate the end of transmission, but also give computers some margin of error in clock speeds. Need to restart to apply the configuration.	1; two

Use Network Time Protocol - NTP	Enables time update via NTP (Network Time Protocol) server.	Able; disabled
NTP address	NTP (Network Time Protocol) address for updating the time of the ITSCAM device. It is necessary to configure a DNS server.	Valid IP address or *hostname*

FTP Server Configuration

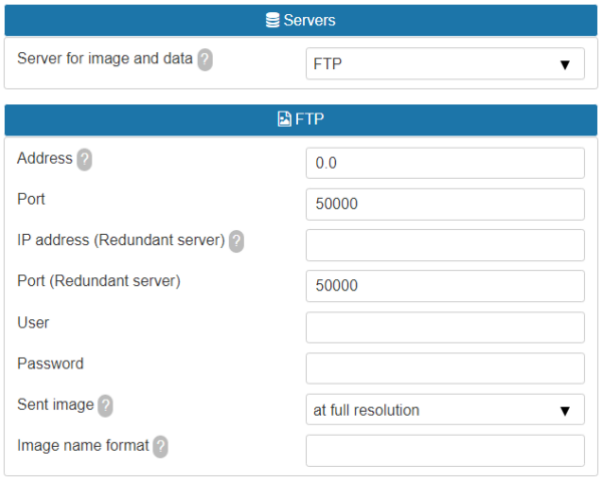

Figure 13 - Fields available for FTP server configuration

Settings	Operation mode	Coverage
Address*	Server IP address or URL (in case of URL, you must have configured a DNS server).	Valid IP address or *hostname*
Port	Server port that receives the information collected by the ITSCAM.	1 to 65535
IP adress (Redundant Server)	IP address of the redundant server in case of failure in communication with the main server (only valid for FTP server. In case of URL, a DNS server must be configured).	valid address
Port (Redundant Server)	Redundant server port (only valid for FTP server).	1 to 65535
User	User for authentication on the FTP server.	alphanumeric characters
Password	Password for authentication on the FTP server.	alphanumeric characters
Sent image	Actual resolution: sends image with ITSCAM resolution 320x240 pixels: Resizes images to 320x240 pixels before sending them to the server.	At full Resolution; 320x240 pixels
Image name format	The file name can start with / and have the symbols listed in Table 3	alphanumeric characters

*In version 19.1.4 of the software, a process was added that monitors the FTP server. This process has access to the *watchdog* and forces a restart of the equipment, if it is identified that the communication with the FTP server has been interrupted. To enable, check the *WDServerCheck parameters*and *ForceWDIO2 of the config.cgi* command, with specific use in this functionality and requires the evaluation of Technical Support in the identification of the hardware and use of the parameters.

Table 3 - Symbols for generating file names using FTP server

Symbol	Representation in the file name
%u	Unique identifier
%d	Day
%m	Month
%y	Year
%h	Hour
%n	Minute
%s	Second
%p	Vehicle plate
%i	IP address of the ITSCAM that originated the capture
%c	Photo counter (reset on restart)
%v	Daylight Savings Time: V for daylight saving time images and N for normal time
%a	MAC address of the ITSCAM that performed the capture

ITSCAMPRO Server Configuration

Figure 14 – Fields available for ITSCAMPRO server configuration

Settings	Operation mode	Coverage
Address	Server IP address or URL (in case of URL, you must have configured a DNS server).	valid address
Port	Server port that receives the information collected by ITSCAM.	1 to 65535
Send to ITSCAMPRO	Number of photos per vehicle sent to ITSCAMPRO.	One photo per pass; All the pictures

RTSP Server Configuration

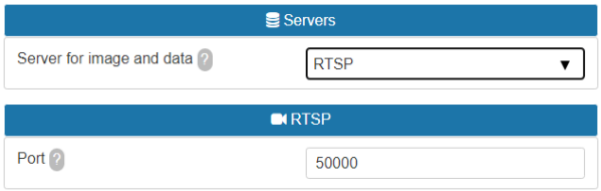

Figure 15 - Fields available for RTSP server configuration

Settings	Operation mode	Coverage
Port	To access the images via the RTSP protocol, it is necessary to configure a valid port and inform the link in the receiving application: rtsp://IP_EQUIP:PORTA/mjpeg If the default port 554 is chosen, the link corresponds to: rtsp://IP_EQUIP/mjpeg	1 to 79; 81 to 49999; 50001 to 65535; except ports in use by other services

Serial Port Server Configuration

Figure 16 - Fields available for configuring the Serial Port server

Settings	Operation mode	Coverage
Serial Port (RS-232) 1	Server port that receives the information collected by ITSCAM.	1 to 78; 81 to 49998; 50001 to 65534; except ports in use by other services
Serial Port (RS-232) 2	Server port that receives the information collected by ITSCAM.	Consecutive value to chosen port 1

Q Protocol Server Configuration

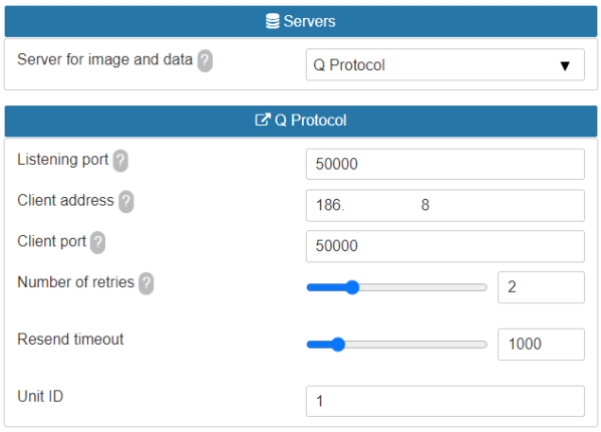

Figure 17 – Fields available for configuring the Q Protocol server

Settings	Operation mode	Coverage
Listening port	Port of ITSCAM device which has the function of listening for the Q protocol.	Valid UDP Port (1-65535) (standard= 7051)
Client address	Address to which Q protocol messages will be sent. If it is 0.0.0.0 or another invalid address, only responses will be answered (no events).	Valid IP address, ou 0.0.0.0
Client port	Port to which Q protocol messages responses will be sent.	Valid UDP Port (1-65535) (standard = 7050)
Number of retries	The retry and timeout parameters define the behavior of sending messages to the client if there is no confirmation (ACK) due to network problems.	1 a 10. (standard = 2)
Resend timeout		10 a 10000 ms (standard = 1000)
Unit ID	Identification of ITSCAM device for Q Protocol.	Any valid 32-bit value, must be replicated to the client server

Image Settings

The ITSCAM 400 was designed to provide images for automatic license plate recognition and likewise, the models of the ITSCAM VIGIA+ line. To maximize recognition rates, the use of *Multiple Exposures* is recommended, which can be done by accessing the *Settings > Inputs menu on the Web interface* and selecting the *Captures per pulse* from 2, or using the *Autosave* software which can be obtained from www.pumatronix.com. This software saves the images generated by the device in a local folder on the computer and, with this storage, allows to adjust and monitor the influence of the illuminator on images.

Adjust the parameters so that the characters on the vehicle's license plate are identified and have a contrast in relation to the background of the license plate. When using *Multiple Exposures,* this adjustment is made so that the non-reflective plates are clearly visualized in the first capture and the reflective plates are captured in the second capture. A starting point for achieving images under these conditions is presented in the *Default Settings for Images* section. The ideal period of the day in which the respective image parameters should be changed is indicated:

Period (lightness level)	Parameter
 Brightness of the day	Change the desired *Level*
 Penumbra or night	Change the *Gain* and *Shutter*

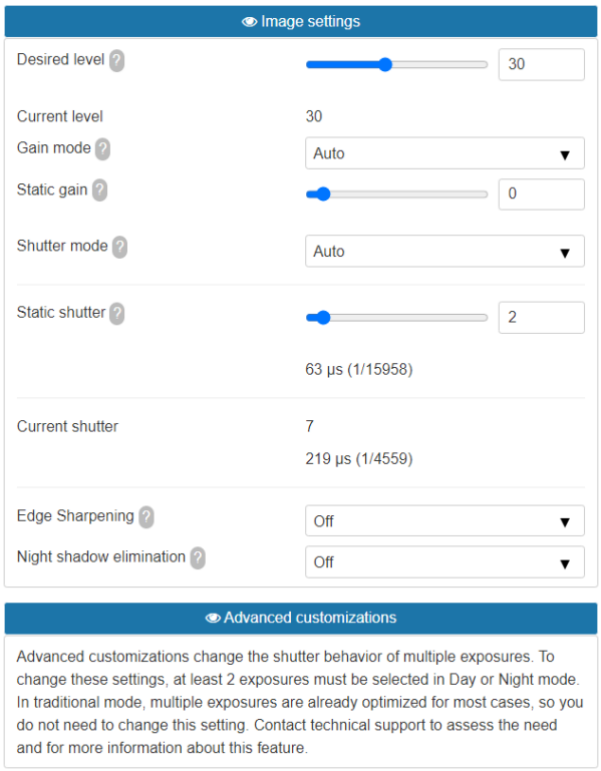

Figure 18 - Fields available when accessing Settings > Image Settings

Settings	Operation mode	Coverage
Desired level	The Desired *Level* defines the behavior of the *Gain*, the exposure time of the image sensor (*Shutter*) and Auto Iris, making them adjust to generate darker or lighter images. According to the position of the sun and at specific times, the desired Level value can be changed by the client application. Check the values indicated in *Operation Mode of Image Lightness Level*. *	7 to 62
Current level	Displays the current ITSCAM *Level*	7 to 62
Gain mode	*Gain* has the function of artificially brightening captured images, improving their appearance. However, content and noise are highlighted and for this reason, the *Gain* should not be too high. This parameter can be kept static or the equipment can change the value automatically, respecting the specified maximum value and image settings.	Static; Automatic
Static gain	*Gain* value that is kept constant, when the equipment operates with *Gain* in Static mode.	0 to 72
Shutter mode	Shutter corresponds to the time the image sensor will be exposed to light for image formation. Very high Shutter values generate clearer and more blurred images if there is movement. The value defined in Fixed Shutter can be used or it can be changed automatically by the equipment, which considers and does not exceed the entered value. Check the Shutter Operating Mode and the values indicated in Table 4, 5 and 6.	Static; Automatic; Static (Day) and Auto (Night)
Static shutter	Equipment always operates with the same Shutter value specified.	Varies by ITSCAM model
Current shutter	Displays the current ITSCAM Shutter	

Settings	Operation mode	Coverage
Edge Sharpening	Defines an edge enhancement digital filter. Enhancement algorithms give the impression that the image is better focused, making the edges of objects more evident and giving more contrast to the contours. This feature visually improves images, but license plate detection algorithms perform similar processing on images and turning on edge enhancement can degrade their performance.	Off; 1st order filter; 2nd order filter; 2nd order filter (smooth)
Enable custom shutter Day mode	Advanced customizations change the behavior of the Multiple Exposure Shutter. To change such settings, at least 2 exposures must be selected. When selected, the time between shots is increased. In traditional mode, Multiple Exposures are optimized for most cases and there is no need to change this setting. Contact Technical Support to assess the need for this configuration.	Able; disabled
Second exposure Day	Shutter Value customized for the second capture (exposure)	Varies by ITSCAM model
Enable custom shutter night mode	Advanced customizations change the behavior of the Multiple Exposure Shutter. To change such settings, at least 2 exposures must be selected. When selected, the time between shots is increased. In traditional mode, Multiple Exposures are optimized for most cases and there is no need to change this setting. Contact Technical Support to assess the need for this configuration.	Able; disabled
Second, Third and Fourth Night exposure	Shutter value for the second capture (exposure)	Varies by ITSCAM model

Operation Mode of Image Lightness Level

The lightness *Level* is a parameter provided by ITSCAM that informs the current lighting condition of the image. When set to Auto *Shutter* and *Gain,* the ITSCAM will keep the *Level* at the same value as the *Desired Level* value or as close as possible by adjusting the *Gain* and *Shutter* values and the opening of the Auto Iris when applied. These adjusted values allow to generate darker or lighter images. If *Gamma* is set as *Logarithmic,* the minimum operating value of the *Desired Level* is 20.

If the current lightness *Level* is ***less*** than the desired *Level*, the ITSCAM increases *Shutter* and the *Gain* gradually until reaching the desired *Level.* However, these values are limited to the maximum defined value. During the night, even with these two values at the maximum allowed, the Lightness *Level* is lower than desired and the image remains dark. In this case, if the flash setting is *Auto* or *Auto with delay* mode, the ITSCAM device activates the flash firing.

If the current lightness *Level* is ***greater*** than the desired *Level*, the ITSCAM will act according to the configured lens type (with or without *Auto Iris)*:

- Lens **without *Auto Iris*** (or lens **with *Auto Iris* disabled**): To decrease the lightness, first the *Gain is decreased* to a minimum of 0, then the *Shutter exposure time*up to a minimum of 1. It is possible for the current *Level* to be higher than the desired *Level at times* with direct sunlight on the monitored object, even with *Gain* and *Shutter* at minimum values. In these cases, you should work with the manual Iris slightly closed.
- Lens **with *Auto Iris*:** In this case the ITSCAM decreases the *Gain* and then decreases the *Shutter* to a value of 7. With the values of *Gain* at 0 and *Shutter* at 7, the lightness adjustment is done by opening the Iris.

Shutter Operation Mode (Exposure Time)

Shutter corresponds to the time the image sensor will be exposed for image formation. Very high values for *Shutter* generate clearer images and if there is movement, they will be blurred. The standard relationship between vehicle speed and *Shutter values* can be found in Table 4.

Table 4 - Default values for ITSCAM Shutter configuration according to the resolution and the road speed

Road speed	Resolution	Sensor	Optimal maximum shutter
Up to 60 km/h	752x480px	S01	30 to 60
	640x480px	S07	
	1280x960px	S04 and S05	22 to 44
	1280x800px	S08	
	1636x1220px	S06	
Above 60 km/h	752x480px	S01	15 to 30
	640x480px	S07	
	1280x960px	S04 and S05	11 to 22
	1280x800px	S08	
	1636x1220px	S06	

Shutter exposure time values are configured according to the resolution of ITSCAM, defined by integers, ranging from 1 (shortest exposure time) to the maximum value that each model supports (longest exposure time), as Table 5.

Table 5 - Maximum Shutter values for each ITSCAM resolution and time equivalent to each Shutter unit (in microseconds)

Resolution	Sensor	maximum shutter	Shutter pitch in µs
640x480px	S07	450	19,97
752x480px	S01	2047	33.84
1280x960px	S04 and S05	1000	44.4
1636x1220px	S06	1100	53.33
1280x800px	S08	750	60,12

The most common *Shutter values* and exposure time in seconds for each ITSCAM resolution are correlated in Table 6 and can be accessed in the web interface, in the help of the configuration field.

Table 6 - Relationship between value configured for Shutter and the exposure time for each ITSCAM resolution (in seconds)

Shutter	640x480px	752x480px	1280x800px	1280x960px	1636X1220px
1	1/50075	1/ 29550	1/16633	1/ 22522	1/18751
2	1/25037	1/ 14775	1/8316	1/ 11261	1/9375
3	1/16691	1/9850	1/5544	1/7507	1/6250
5	1/10015	1/5910	1/3326	1/4504	1/3750
10	1/5007	1/2955	1/1663	1/2252	1/1875
15	1/3338	1/1970	1/1108	1/1501	1/1250
20	1/2503	1/1477	1/831	1/1126	1/937
30	1/1669	1/985	1/554	1/750	1/625
40	1/1252	1/738	1/415	1/563	1/468
50	1/1001	1/591	1/332	1/450	1/375
60	1/835	1/492	1/277	1/375	1/312

Default Settings for Images

Image Adjustment parameter settings allow the characters on the license plate to be identified and contrast with the plate background. The recommended configuration of *Multiple Exposures* by *Trigger,* aims to enable the first capture to clearly visualize non-reflective plates and the second capture to identify reflective plates, increasing the recognition rates of all types of plates available. The settings provided as a rough setting serve as a basis for installations using the ITSCAM device and the ITSLUX illuminator.

Parameters that are not mentioned in this configuration depend on the application, for example, network configuration parameters and image transmission options. However, basic image adjustments that affect the resulting images are listed, along with their recommended default setting.

The suggested default configuration may vary depending on the installation environment, but serves as a starting point for tuning.

Default Settings for Firmware 16.X to 17.X

	Parameter	Recommended Value
Network	Network	according to installation
	Password protect all communication with the ITSCAM	Yes
Servers	Servers	according to installation
	Use clock server - NTP	Marked
	NTP address	a.ntp.br
General	Test mode	Image captured
	Operation mode	Automatic
	Rotate photos 180°	according to installation
	DC Auto Iris lens	Marked
	Level for switching from *Day* to *Night mode*	15
	Transition threshold from visible to infrared light	5
	Number of skipped frames Between the *Multiple Exhibitions*	0
	Shutter for switching from *Night* to *Day mode*	33
	Transition threshold from infrared to visible light	5
	Number of frames skipped between *Multiple Exposures*	0
	Color photo in images captured in *Night mode*	unchecked
Inputs and Outputs	Number of captures per pulse	2 to 4
	Minimum time between triggers	50
	Format of captured images	JPEG
	Quality	70%
	Trigger for visible light	according to installation
	Trigger for infrared light	
	Outputs configured for	activate the illuminator
	Flash mode	Automatic
	Auto flash with trigger	with infrared light
	Flash delay	0

Image adjustment	Desired level	20
	Gain operation	Automatic
	Shutter operation	Automatic
	Maximum shutter Resolution up to 800x600	Speed up to 60 km/h from 30 to 60 Speed above 60km/h from 15 to 30
	Maximum shutter Resolution greater than 800x600	Speed up to 60 km/h from 22 to 44 Speed over 60km/h from 11 to 22
	Edge enhancement	Disabled
	Shadow elimination	Disabled
	High dynamic range	unchecked
Lighting Adjustment for Day Mode	Maximum gain	50
	I win on the second photo	20
	Gamma	logarithmic
	Logarithmic value	110
	Saturation	100
	Shine	10
	Contrast	100
	White balance (red, green and blue)	0
Lighting Adjustment for Night Mode	Max gain (adjust at night)	40
	I win on the second photo	0
	Gamma	Linear
	Saturation	100
	Shine	3
	Contrast	100
	White balance (red, green and blue)	0
Weights	All windows	15
OCR	Number of valid characters	7
	Minimum reliability	60%
	Ocr mode – visible light	Slow
	OCR mode – Infrared light	very slow
	Recognized plate	Not sent by serial

Default Settings for Firmware 18.X

	Parameter	Recommended value
Network	Network	According to installation
	Password protect all communication with the ITSCAM	Yes
Servers	Servers	According to installation
	Use clock server - NTP	Marked
	NTP address	A.ntp.br
General	DC auto iris	Marked
	Operation mode	Automatic
	Day / *Night* transition algorithm	Counter
	Night mode	Unchecked
	Desired level	20
	Day to *Night* transition threshold	50
	Night to *Day* transition threshold	90
Inputs and Outputs	Number of captures per pulse	2 to 4
	Minimum time between triggers	50
	Format of captured images	Jpeg
	Quality	70%
	Number of skipped frames Among the *Multiple* Daytime Exhibitions	0
	Number of skipped frames Among the *Multiple Nighttime* Exhibitions	0
	Trigger for visible light	According to installation
	Trigger for infrared light	
	Threshold (motion filter)	5
	Use ROI*	Disabled
	Outputs configured for	Trigger illuminator/flash
	Flash mode	Automatic
	Flash supervision	Enabled
	Auto flash with trigger	With infrared light
	Flash delay	Check technical specifications of the flash used. For ITSLUX use 0.
	Flash power on second shot	100%

Image adjustment	Desired level	20
	Gain operation	Automatic
	Shutter operation	Automatic
	Fixed shutter (Resolution up to 800x600)	Speed up to 60 km/h: 30 to 60 Speed above 60km/h: 15 to 30
	Fixed shutter (Resolution greater than 800x600)	Speed up to 60 km/h: 22 to 44 Speed above 60km/h: 11 to 22
	Edge enhancement	Disabled
	Night shadow elimination	Disabled
Lighting adjustment (Day)	Maximum gain	50
	Gain on the 2nd photo	20
	Gamma	Logarithmic
	Gamma value	110
	Saturation	100
	Brightness (black level)	10
	Contrast (digital gain)	100
	White balance (red, green and blue)	0
Lighting adjustment (Night)	Max gain (adjust at night)	40
	Gain on the 2nd photo	0
	Gamma	According to the model: For ITSCAM 400 HDR Gamma = Quadratic Gamma Value = 13 Other itscams: Gamma = Linear Gamma Value = 110
	Gamma value	
	Brightness (black level)	3
	Contrast (digital gain)	100
	White balance (red, green and blue)	0
Weights	In all windows	15
OCR	OCR server	MAP (when available)
	Region of interest	Select region: (It is recommended to use the region to remove sidewalks and areas that are not lanes in the image); Do not use region: (Clear config)

OCR	Vehicle license plate type	Both
	OCR server	Brazil
	Maximum number of low probability characters	0
	Timeout	4500
	OCR mode – visible light	Very slow
	OCR mode – Infrared light	Very slow
	Minimum character reliability	50%
	Plate tilt angle**	0°
	Plate rotation angle**	0°
	View angle correction	Selected
	Recognized plate	Not sent by serial

*ROI (region of interest) is used to define the region where the motion detection algorithm will run.

**This setting must be modified by experienced users or with assistance from Pumatronix Technical Support.

Lighting Adjustment

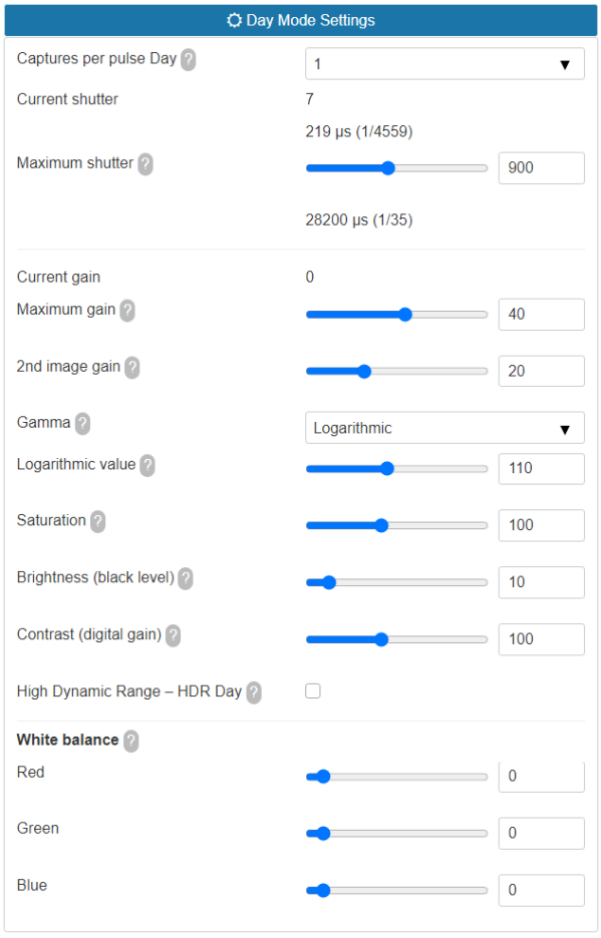

Figure 19 - PART A - Fields available when accessing Settings > Lighting Adjustment

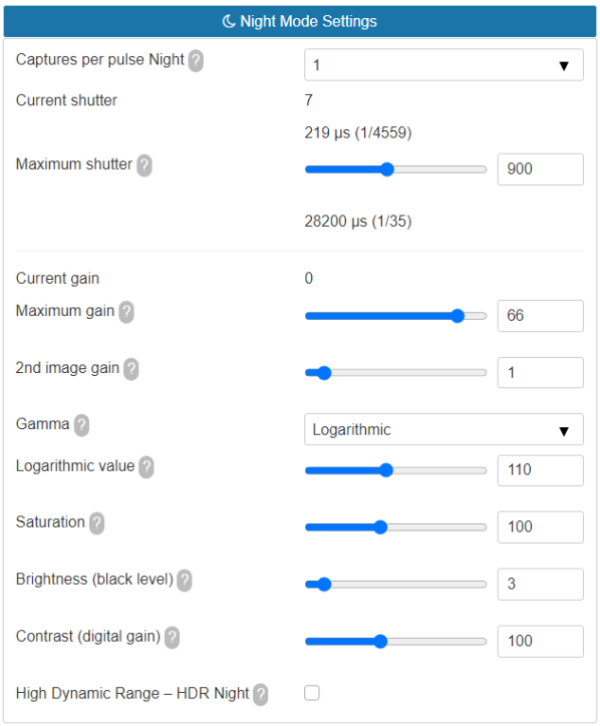

Figure 20 - PART B - Fields available when accessing Settings > Lighting Adjustment

Settings	Operation mode	Coverage
Captures per pulse *Day*	It is recommended to use more than one exposure per capture to identify reflective and non-reflective plates under adverse conditions. *Multiple Exposures* per vehicle generate images of the same vehicle with different configurations.	1 to 4
Captures per pulse *Night*		
Current shutter	Shutter value	Varies by ITSCAM model
Maximum Shutter *Day*	Maximum shutter value that the equipment uses, when it is configured to operate with automatic shutter. The higher the value chosen, the longer the maximum exposure time of the image sensor.	Varies by ITSCAM model
Current gain	Gain value	0 to 72
Global gain	Maximum gain value that can be used by the level adjustment algorithm, when the equipment operates with *Gain* in *Automatic* mode and the predominant light is visible.	
Gain for plates in shadow	Gain applied to plates and objects in the dark regions of the image.	
Reflective plate gain	Gain value used in the second photo when in *Multiple Exposure* mode for infrared light.	

Settings	Operation mode	Coverage
Gamma	Defines how the correlation of pixel values between the image sensor and the digital photo with a predominance of visible light is performed. In **linear mode** (gamma value =0), the value of each pixel is directly proportional to the amount of light that is captured by the sensor. In **quadratic** (gamma value between 1 and 69) and **logarithmic** (gamma value between 70 and 255) modes, the amount of light undergoes a transformation that can improve the quality of the image generated in low light conditions, shadows or night photos. Figure 21 shows the conversion curve when enabled, which follows a logarithmic curve when *Quadratic* or *Logarithmic.*	Linear; Logarithmic; Quadratic
Gamma value	110: suggested value for images with the license plate in the shadow 150: suggested value under normal shooting conditions	0 to 255
Saturation	Saturation is the proportion of the color in relation to the average gray color, that is, the minimum saturation corresponds to the gray color and the maximum shows the pure chosen color. When this value is kept at 0 the resulting image is displayed in grayscale.	0 to 255
Brightness (black level)	Brightness or black level is used to correct dark tones in the image. The behavior of this function is to subtract the chosen value from all pixels in the image. Therefore, when this parameter is set to the maximum value, the resulting image is completely black.	0 to 255
Contrast (digital gain)	The contrast or digital gain works like the application of a multiplicative factor in all the pixels of the captured image. It is not recommended to change this factor to values other than 100% (which corresponds to the multiplicative factor 1.00 and keeps the original formatting). Applying the value 255, multiplies by 2.55 all the pixels in the image.	0 to 255
High Dynamic Range – HDR *Day* High Dynamic Range – HDR *Night*	The "High *Dynamic Range"* (HDR) mode aims to compensate for very dark or saturated areas of the image, changing the pixel values of these regions to intermediate values. When disabled, the pixel response is linear in relation to the amount of light received, with variations of 55db. It can be enabled in the current *Day* or *Night operating mode* , if it is necessary to balance the contrast, apply the *Logarithmic Gamma setting* with a value of 180. Available on ITSCAM 400 models with 752x480 pixels, 1280x960px and 1636x1220px resolutions.	Able; disabled
White balance Red Green Blue	Color adjustment of the color images, through the parameterization of the intensities of the three basic colors: R (red), G (green) and B (blue). The equipment automatically adjusts these components if they are set to 0 (indicated setting).	0 to 255

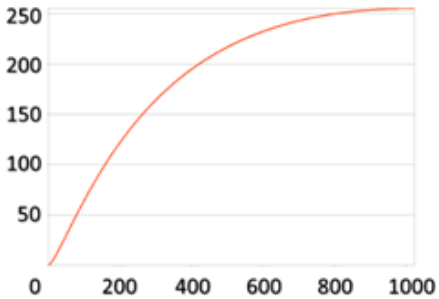

Figure 21 - Example of the Gamma curve 140, which logarithmically converts the values of each pixel in the image

Weights Setup

In situations where part of the image is under sunlight and part is in shadow, it is possible to configure regions for automatic image adjustment, when the algorithm performs an average of the pixel values. Possibly, the images of license plates captured in the shadow region will be dark and the license plates captured in the sunny region will be saturated.

To mitigate this situation, the ITSCAM allows selecting the contribution of each region of the image during the execution of the automatic adjustment algorithm, which has the function of keeping the current lightness *Level* equivalent to the *Desired Level.* This contribution is proportional to the amount specified for the region.

Figure 22 - Importance coefficients (Weights) of the regions demarcated in the image, when accessing Settings > Weights

Zoom and Focus Adjustment

For the zoom and focus adjustments of the ITSCAM, it is recommended to consult the steps for installing the equipment in the Installation and Maintenance Guide and in the web interface, perform the following procedure:

1) Disable the trigger and applications that are requesting images;
2) View images in real time, through the web interface or through applications available at www.pumatronix.com;
3) Disable *Auto Iris* for a better result (if the ITSCAM model has this feature);
4) Use the *Show only center of image* function when you need to reduce response time to interface adjustments when accessing over mobile networks. In this option, the display scale is reduced to 320x240;
5) When adjusting night Focus, adjust *Maximum shutter* and *Maximum Gain* so that, in video mode, only vehicle headlights and taillights appear;
6) Select the zoom and focus setting that produces images in which the license plate characters are 20 pixels high;
7) Save the focus (when ITSCAM VIGIA+ or ITSCAM 400 with motorized lens and operation in the interface is available);
8) Enable *Auto Iris*.

During changes to *Zoom* and *Focus* the *Auto Iris* should remain disabled.

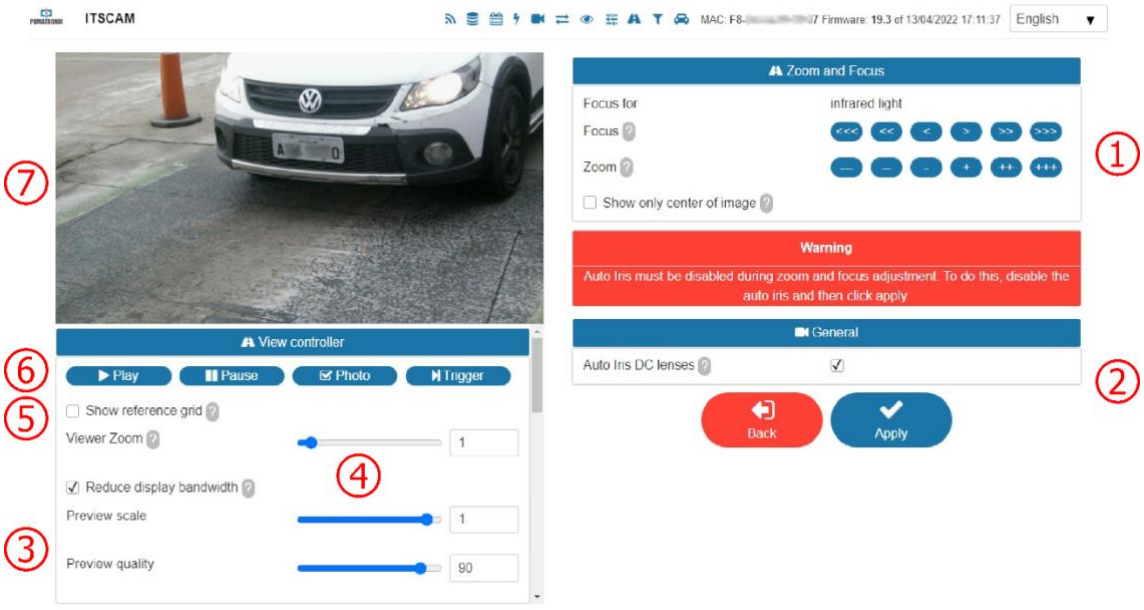

Figure 23 - Fields available when accessing Settings > Zoom and Focus

Index	Meaning
1 – Focus Adjustment and Zoom Adjustment*	Allows you to increase or decrease the setting in multiples of 2, 20, or 200 lens steps. *Show only center of image* optimizes the response time to adjustments made.
2 - Auto Iris DC	Activates the control of the Iris by the ITSCAM. Keep this option deactivated only during the Zoom and Focus adjustment.
3 – Reduce display bandwidth	The option to display the original resolution of the device with reduction of band use can be made with reduction of resolution (Preview Scale) which reduces equipment processing time or reduction of quality (Preview Quality). Both options are intended to decrease interference from live preview in the processing time of other ITSCAM tasks.
4 - Zoom	Allows you to zoom in or out on the image reproduced by ITSCAM, which helps in identifying the OCR of the board.
5 – Show reference grid	Facilitates vehicle license plate character height adjustment. The ideal height of the plate characters will be reached when they are fully inserted into one of the grid rectangles.
6 - Controls (Play/ Pause/ Photo/ Trigger)	Allows the preview of the video being displayed live (Play) or freezes the video at the desired point (by clicking on Pause). When clicking on Photo, an image with flash is requested, if the illuminator is configured and it is necessary to activate it and the image will be displayed on the screen. The Trigger button displays the image resulting from the next trigger made by ITSCAM, which can be induced by an installed sensor, such as the inductive loop or optical barrier, or by processing the images identifying the passage of a vehicle (Virtual Trigger) and can be used to check lighting and trigger settings. To request images by trigger button the following settings are required to operate correctly: Servers must be set to None; Number of captures per pulse must be 1; Visible Light Trigger and/or Infrared Trigger must be configured for the desired vehicle detection type.
7 - Capture screen	Display of live video and captured image. The changes made are displayed on this screen.

*Zoom and focus adjustment can be done automatically using the *Execute Autofocus button,* available on select models excluding models with 4.7-47mm motorized lens.

*For ITSCAM 400 with non-motorized lens (*CSMount*) it is recommended to fix the zoom and focus position with the minimum necessary tightening, as excessive pressure of the fixing screw can damage the lens.

*Model with L4 lens (4.7-84mm) has the option to record focus in memory. As this model has a lens without Infrared correction, an adjustment must be made and saved during the day and another during the night.

OCR Setup

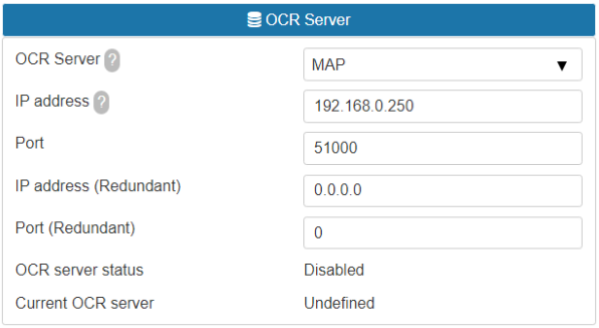

Figure 24 - PART A - ITSCAM Web Interface Screen in the Settings > OCR area

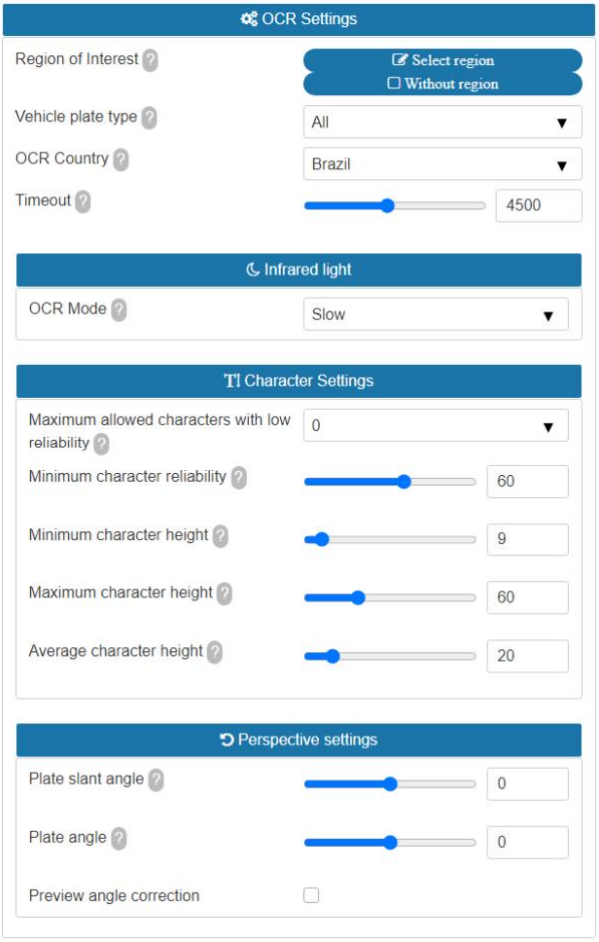

Figure 25 - PART B - Fields available when accessing Settings > OCR

Settings	Operation mode	Coverage
Region of Interest	The creation of an OCR Region of Interest (ROI) over the image serves to limit the search for license plates only in the indicated region and reduce image processing. It is recommended to additionally use regions of interest to remove sidewalks and parts of the image that do not make up the lane. The chosen region must be a polygon with four points, which are marked over the image in the Control region of the visualization, as shown in .	Select region (mark the 4 points on the image); Do not use region
Vehicle plate type	The OCR algorithm searches the images for the pattern of letters and numbers on the license plate, but vehicles and motorcycles tend to have different patterns.	Car; motorcycle; Both
OCR Country	It configures the pattern of letters and numbers that the license plate of the country vehicles has.	Brazil; Argentina; Chile; Mexico; Paraguay; Uruguay; Netherlands; France; Colombia
Timeout (milliseconds)	The OCR algorithm searches for the vehicle's license plate in the image and, when it finds the license plate, returns. However, images without a plate or with hidden characters cause the algorithm to continue searching for the plate until the time specified in Timeout is reached.	0 to 100
OCR Mode (Visible Light)	Setting the OCR operating mode when the ITSCAM is operating in Day mode, in which visible light is captured in the image.	Disabled; Fast; Normal; Slow; Very slow
OCR Mode (Infrared light)	Setting the OCR operating mode when the ITSCAM is operating in Night mode, in which infrared light can be captured in the image.	
Maximum allowed characters with low reliability	For a license plate to be valid, characters can be identified with low probability. Characters that are identified with reliability lower than the established minimum value are represented by the character " –" .	0 to 6
Minimum character reliability (%)	Degree of similarity between the letter that was extracted from the photo with a letter in perfect capture conditions. Characters that are identified with reliability lower than the established minimum value are represented by the character "– ".	0 to 100
Minimum character height	Allows you to specify the minimum acceptable height (in pixels) of the character. This value is by default 9 and must not be greater than the 'Maximum character height' value.	9 to 120
Maximum character height	Allows you to specify the maximum acceptable character height (in pixels). This value is by default 60 and must not be less than the 'Minimum character height' value.	9 to 200
Average character height	OCR performs best over a given character height range. By specifying the average character height, it allows the OCR algorithm to improve recognition rates.	9 to 150
Plate slant angle (°)	Allows you to bypass the Italic effect on the plate. The angle is expressed with respect to the vertical axis. If the slope is to the right, the angle must be negative. If the slope is to the left, the angle must be positive. Check the Preview angle correction option to check the adjustment.	-15 to 15

Settings	Operation mode	Coverage
Plate angle (°)	Allows OCR of angled plates. The angle is expressed with respect to the horizontal axis. If the rotation is counterclockwise, the angle must be positive. If the slope is clockwise, the angle must be negative. Check the *Preview angle correction* option to check the adjustment.	-15 to 15
Plate angle correction	Allows live preview of corrections at configured pitch and roll angles.	Able; disabled

Figure 26 - Image Preview with a region of interest (ROI) configured for OCR, which searches for plates inside the rectangle

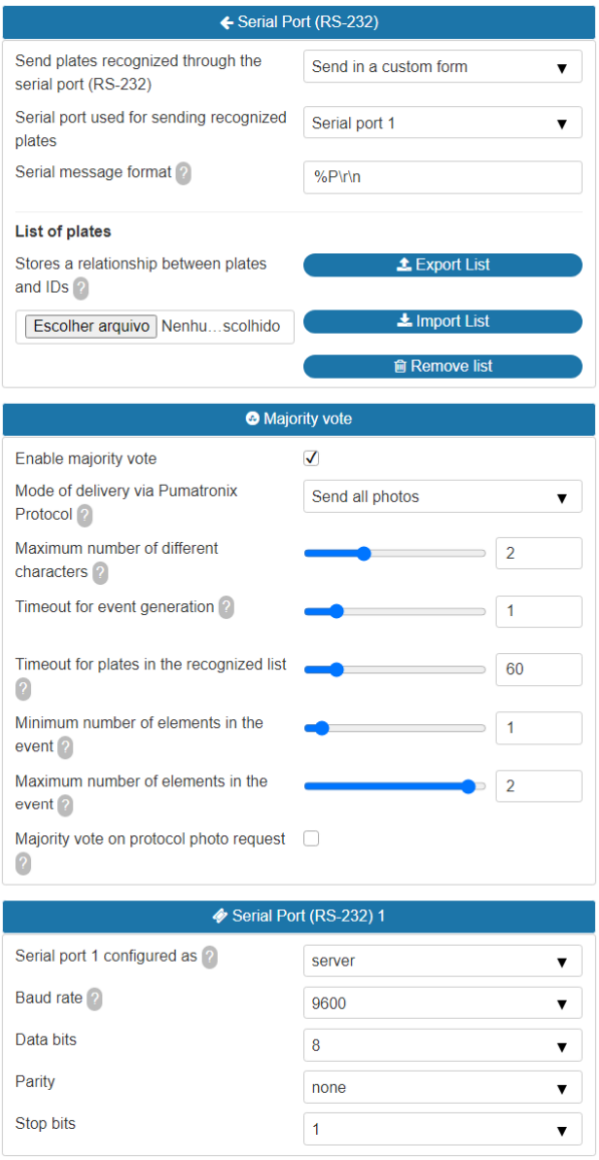

Figure 27 - PART C - Fields available when accessing Settings > OCR

Settings	Operation mode	Coverage
Send plates recognized through the serial port (RS-232)	Configures the format of the message that will be sent when performing an acknowledgment.	Do not send; Send as standard (board only); Send ID to Wiegand Converter 26; Send in a customized way
Serial port used for sending recognized plates	Select the port	Serial port 1; serial port 2
Serial message format	The sequence of bytes sent by the serial, when a plate identification occurs, is formatted according to this field, similarly to the formatting of *Strings* in C. Note that, unlike FTP, the output can be configured to have characters that do not are readable. Table 7 indicates the fields that can be exported in the message.	String

Settings	Operation mode	Coverage
List of Plates	Used to identify a set of cards using only 24 bits, making it possible to send via Wiegand 26 through a serial converter. Check in Table 7 how the file must be configured to identify the boards listed.	CSV file
Enable majority vote	When OCR is operated in *Multiple Exposures* the resulting plate considers the detection result most reliably for each character.	Able; disabled
Mode of delivery via Pumatronix Protocol	This option makes it possible to make *Multiple Exposures,* perform OCR and choose the best photo to send via Pumatronix Protocol.	Submit all exhibits; Send only the one with the best recognition
Maximum number of different characters	It is the maximum number of different characters tolerated to consider two plates as being the same and that must contribute to the final vote.	0 to 7
Timeout for event generation	It is the maximum time (after the last acknowledgment) expected to end an event. This time is in seconds.	0 to 10
Timeout for plates in the recognized list	It is the time (in seconds) that must elapse before an already sent card is treated as a new event.	0 to 600
Minimum number of elements in the event	It is the minimum number of requests in an event. If the event timeout occurs and this number has not been reached, the event will be discarded.	1 to 2
Maximum number of elements in the event	It is the maximum number of requests in an event. If the maximum number has been reached, the event will be closed even if the timeout has not been reached.	1 to 2
Majority vote on protocol photo request	Enabling majority voting for all Pumatronix protocol photo requests	Able; disabled
Serial Port 1 configured as	Serial Port 1 can be used as a server (which must be enabled in Server that Receives Images and Data), to control the integrated GPS or as an external trigger (receiving the capture signal). Need to restart to apply the configuration.	As a server; to control integrated GPS; to capture images
Speed (Serial Port 1 or 2)	Speed on serial ports is measured by the number of bits transmitted per second (bps). Need to restart to apply the configuration.	300; 1200; 2400; 4800; 9600; 14400; 19200; 28800; 38400; 57600; 115200; 230400
Data bits (Serial Port 1 or 2)	Number of data bits in a transmission. The packet refers to a single-byte transfer, including start/end bits, data bits, and parity. Need to restart to apply the configuration.	7; 8
Parity (Serial Port 1 or 2)	It is a simple form of error checking that is used in serial communication. Need to restart to apply the configuration.	None; Odd; even
Stop bits (Serial Port 1 or 2)	Used to signal the end of communication for a single packet. They indicate the end of transmission, but also give computers some margin of error in clock speeds. Need to restart to apply the configuration.	1; two

Table 7 - Symbols for generating messages sent through the Serial Port

Symbol	Representation in the file name	Symbol	Representation in the file name
%F	Equivalent board ID (see footer) decimal ASCII	%P	original ASCII board
%E	ASCII hexadecimal equivalent ID	%p	Converts ASCII card characters to their respective decimal value
%e	Binary equivalent ID (3 bytes)	%I	IP in ASCII
%D	ASCII day	%i	Binary IP (4 bytes, local address first)
%d	Binary day (1 byte)	%T	ASCII message counter
%M	ASCII month	%t	Binary message counter (4 bytes, littleendian)
%m	Binary month (1 byte)	%A	MAC in ASCII
%Y	ASCII year	%a	Binary MAC (6 bytes, vendor first)
%y	Binary year (1 byte, decade and unit only)	%c	Binary CRC16/XMODEM (2 bytes)
%H	ASCII time	%C	CRC16/XMODEM hexadecimal (4 bytes)
%h	Binary time (1 byte)	\n	New line (0xA0)
%N	ASCII minute	\r	Carriage return (0x0D)
%n	Binary minute (1 byte)	\0	Null character (0x00)
%S	According to ASCII	\\	Backslash (0x5C)
%s	Second binary (1 byte)	\t	Tabulation (0x09)
%V	ASCII Daylight Saving Time (V/N)	\NNN	Octal equivalent character
v	Binary Daylight Saving Time (1/0) (1 byte)	\xNN	Hexadecimal equivalent character

*You can specify a fixed size for a given field, which will be padded with spaces or truncated accordingly. Additional options:

- An exclamation mark (!) reverses the byte order of the field.
- A dash (-) added before this number determines whether to align to the left.
- It is also possible to determine another hexadecimal character in place of a space. For example:
    - **%\x00-4e** -> Will print the equivalent ID, fixed-length at 4, left-aligned, with the rest of the bytes padded by zero (0x00)
    - **%016I** -> Will print the IP in ASCII (4 decimals separated by a dot) in 16 bytes, right-aligned, filling the rest of the spaces with ASCII '0' (0x30).

3. Open Source Communication Protocol (Socket)

Communication with the ITSCAM is done through the Ethernet interface, using the Pumatronix UDP and TCP/IP Communication Protocol. The port used for communication with the external equipment is number

50000. Therefore, the application developed to communicate with the ITSCAM must be configured to send commands using this port in the TCP and UDP protocols.

The UDP protocol is used only for the identification of equipment connected to the network, as it allows the sending of *broadcast-type* packets, which are received by all devices. This allows the ITSCAMs to send their identification upon receipt of this packet. All other commands use the TCP protocol, which establishes a point-to-point connection between the control device and the ITSCAM. Security in the reception and alteration of configurations occurs with the transmission of a *CRC* code. However, most responses sent by the equipment do not have *CRC.*

The Pumatronix Protocol supports connections that were developed based on the Dynamic Library (dll) and the C++ class for Linux. A *Development Kit (SDK)* is available at www.pumatronix.com with the files necessary for the development of the application, to download, access the *Client Area > Technical Support website.*

Representation of Hexadecimal Values: In this manual, the representation of hexadecimal values receives the addition of a letter *h* at the end of the number.

The structure of commands that can be transmitted and received by the Pumatronix Communication Protocol is:

Header	Command	parameters	CRC
1 Byte: AAh	1 Byte: Variable value	N Bytes: Variable value	2 bytes

The header of commands sent and received by the ITSCAM is fixed and corresponds to a Byte with the value *AAh.* Depending on the nature of the command, it may be necessary to send the parameters to the ITSCAM, therefore, after the type of command, the values for correct execution of the command are inserted. From these bytes the *CRC* is extracted, which is inserted at the end of the message.

An example of sending a request to ITSCAM that returns an image, with flash synchronization (command 02h), in JPEG format and 100% quality is: *AAh 02h 01h 64h.* In this word, which has a size of 4 Bytes, the CRC must be calculated, which will be *AAFEh.* The application requesting the image must send a 6-byte word to the ITSCAM: *AAh 02h 01h 64h Feh AAh.* For the CRC, the least significant byte should always be sent first, so the fifth byte in the example is *FEh* and the sixth byte is *AAh.*

CRC of the Pumatronix Communication Protocol

To ensure command integrity, the ITSCAM requires a 16-bit (2 Bytes) CRC on all commands it receives. This CRC must be calculated according to the specification of the CRC-CCITT, using the value 1021h as the generator polynomial.

To calculate the CRC, all Bytes of the command to be sent must be considered, that is, the header, the command and all the Bytes with parameters must be computed. **In commands where integers with more than 1 Byte are passed as a parameter, the first passed must be the least significant. Also, the CRC must be transmitted with the least significant byte first.** The CRC is inserted at the end of the command and corresponds to the last two Bytes to be sent. The only exception to this rule occurs in the transmission of network settings (such as the IP address, for example), as the first byte sent corresponds to the most significant of the address.

Command	Meaning	
00h	Recognize ITSCAMs connected to the data network. This command must be sent in *broadcast,* with the UDP protocol. Interfaces that are listening on the correct port and understand the command will send an identification packet. The default network *broadcast address* is *255.255.255.255,* and any packet sent to this address will be read by all network interfaces. All IP addresses received will be considered as a reachable device.	
	Shipping format	**Parameters**
	Aah 00h [CRC(2)]	Not applicable
	Answer format	
	Aah 00h [IP_ITSCAM(4)] [CRC(2)]	

Command	Meaning	
01h	Request a frame without flash sync.	
	Sending format	**Parameters**
	Aah 01h [format (1)] [quality(1)] [CRC(2)]	Format: 0: Photo BMP, odd value (between 1 and 255): Photo JPEG; Quality: 1 to 100%
	Answer format	
	Aah 01h [format(1)] [size(4)] [data(*)] Format: Same order number Size: in Bytes - little-endian Data: vector with the image Obs .: The format can be used as a photo identifier because the response always repeats the number informed in the request	

Command	Meaning	
02h	Request a frame with flash sync (if flash enabled).	
	Sending format	**Parameters**
	Aah 02h [format (1)] [quality(1)] [CRC(2)]	Format: 0: BMP photo, odd value (between 1 and 255): JPEG photo Quality: 1 to 100%
	Answer format	
	Aah 02h [format(1)] [size(4)] [data(*)] Format: Same order number Size: in Bytes - little-endian Data: vector with the image Note: The format can be used as a photo identifier because the response always repeats the number informed in the request	

Command	Meaning	
04h	Command sent by ITSCAM to indicate that there was a trigger event and ITSCAM will start transmitting photos	
	Sending format	**Parameters**
	None, as this command is generated by ITSCAM, upon receiving a trigger event	Not applicable
	Answer format	
	Aah 04h [number of photos (1)] [CRC (2)]	

Command	Meaning	
0Ch	Command to export the RSA public key.	
	Sending format	**Parameters**
	Aah 0Ch [CRC(2)]	Not applicable
	Answer format	
	Aah 0Ch [key(*)] Key: Public key in text. The size of this field depends on the signature used (256Bytes for RSA1024 or 512 for RSA2048)	

Command	Meaning	
0Fh	Restart ITSCAM by software. The reset starts as soon as the ITSCAM receives the command and takes about 20 seconds.	
	Sending format	**Parameters**
	Aah 0Fh [CRC(2)]	Not applicable
	Answer format	
	Aah 0Fh 01h (Answer sent only in firmwares from version 14 onwards)	

Command	Meaning	
10h	Require current ITSCAM settings.	
	Sending format	**Parameters**
	Aah 10h [CRC(2)]	Not applicable
	Answer format	
	Aah 10h [version(1)] [review(1)] [flash mode(1)] [trigger mode(1)] [output type(1)] [output value(1)] [inputs value(1)] [delay flash(2)] Version and revision: of the firmware; Flash mode: 1 disabled, 2: single, 3: continuous, 4: single with delay, 5: automatic, 6: automatic with delay, 7: Continuous in Night mode; Trigger mode: 1: Disabled, 2: Rising edge, 3: Falling edge, 4: Both edges, 5: By approaching image, 6: By receding image (fast), 7: By receding image (slow), 8: continuous, 9: periodic, 10: high level, 11: low level, 12: rising and approaching edge; Output type: 1: flash, 2: I/O; Output and input value: 0: both disabled, 1: output/input 1 enabled, 2: output/input 2 enabled, 3: both enabled; Delay: time before the capture when the flash will fire (0.4 microsecond steps)	

Command	Meaning	
13h	Assign the trigger's operating mode.	
	Sending format	**Parameters**
	Aah 13h [trigger mode(1)] [CRC(2)]	Trigger mode: 1: Disabled, 2: Rising edge, 3: Falling edge, 4: Both edges, 5: By zooming image, 6: By zooming out image (fast), 7: By zooming out image (slow), 8: Continuous, 9: Periodic, 10: High level, 11: Low level, 12: Ascent and approach
	Answer format	
	Aah 13h[status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
14h	Assign the function of the outputs.	
	Sending format	**Parameters**
	Aah 14h [output type (1)] [CRC (2)]	Output type: 1: Operating as flash, 2: Operating as I/O
	Answer format	
	Aah 14h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
15h	Assign the value of the outputs (when configured as I/O).	
	Sending format	**Parameters**
	Aah 15h [output_value (1)] [CRC(2)]	Output value: 0: Both outputs disabled, 1: Output 1 enabled, 2: Output 2 enabled, 3: Both outputs enabled
	Answer format	
	Aah 15h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
16h	Request the value of entries.	
	Sending format	**Parameters**
	Aah 16h [CRC(2)]	Not applicable
	Answer format	
	Aah 16h [level (1)] Level 0: both inputs disabled, 1: input 1 enabled, 2: input 2 enabled, 3: both inputs enabled	

Command	Meaning	
17h	Restore ITSCAM to factory settings.	
	Sending format	**Parameters**
	Aah 17h [CRC(2)]	Not applicable
	Answer format	
	Aah 17h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
18h	Assign the delay between flash firing and shutter exposure to capture the image.	
	Sending format	**Parameters**
	Aah 18h [delay (2)] [CRC(2)]	Delay: set in multiple 0.4µs steps ranging from 100 to 25000
	Answer format	
	Aah 18h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
1Bh	Assign the minimum time the ITSCAM waits to request a new image using the I/Os.	
	Sending format	**Parameters**
	Aah 1Bh [time(2)] [CRC(2)]	0 to 60000 in milliseconds
	Answer format	
	Aah 1Bh [time(2)] Time: 0 to 60000 in milliseconds	

Command	Meaning	
1Ch	Request the minimum time that the ITSCAM waits to request a new image using the I/Os.	
	Sending format	**Parameters**
	Aah 1Ch [CRC(2)]	Not applicable
	Answer format	
	Aah 1Ch [time(2)] Time: 0 to 60000 in milliseconds	

Command	Meaning	
1Dh	Require the ITSCAM model.	
	Sending format	**Parameters**
	Aah 1Dh [CRC(2)]	Not applicable
	Answer format	
	Aah 1Dh [model(3)] Model: ITSCAM[model] (little-endian) List of the models that can be displayed: 400: itscam400, 401: itscam401, 411: itscam411, 431: itscam_ccd13cs, 491: itscam_hdr13cs, 501: itscam_hdr20cs, 65938: itscam402, 65939: itscam403, 65957: itscam421, 65967: itscam_ccd13csj, 66027: itscam_hdr13csj, 131472: itscam400lm84, 131473: itscam401lm84, 131483: itscam411lm84, 131523: itscam401lm47, 131553: itscam_ccd13l3, 131613: itscam_hdr13l3, 197010: itscam402lm84, 197011: itscam403lm84, 197029: itscam421em84, 197089: itscam_ccd13l3j, 197149: itscam_hdr13l3j, 262545: itscam401_800x600, 262555: itscam411_1280x720, 328083: itscam403_800x600, 328101: itscam421_1280x720, 393617: itscam401lm84_800x600, 459155: itscam403lm84_800x600, 524699: itscam411_1920x1440, 655791: itscam_ccd13l2, 655851: itscam_hdr13l2, 721327: itscam_ccd13l2j, 721387: itscam_hdr13l2j	

Command	Meaning	
20h	Request network settings: MAC and IP address, netmask and gateway.	
	Sending format	**Parameters**
	Aah 20h [CRC(2)]	Not applicable
	Answer format	
	Aah 20h [mac (6)] [ip (4)] [mask(4)] [gateway(4)] Example response: aah 20h 00h 50h C2h 8Ch 80h 01h 192 168 0 254 255 255 255 0 192 168 0 1 for IP: 192.168.0.254, MAC: 00 50 C2 8C 80 01, Mask: 255.255. 0.1	

Command	Meaning	
21h	Configure the IP address.	
	Sending format	**Parameters**
	Aah 21h [ip (4)] [CRC (2)]	Valid IP address
	Answer format	
	Aah 21h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
22h	Configure the netmask.	
	Sending format	**Parameters**
	Aah 22h [mask(4)] [CRC(2)]	Valid netmask
	Answer format	
	Aah 22h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
23h	Configure the gateway address.	
	Sending format	**Parameters**
	Aah 23h [gateway(4)] [CRC(2)]	Valid gateway
	Answer format	
	Aah 23h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
24h	Configures the MAC address of the network interface.	
	Sending format	**Parameters**
	Aah 24h [mac (6)] [CRC(2)]	MAC: ITSCAM MAC information * Note: The MAC address can only be assigned once in production.
	Answer format	
	Aah 24h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
25h	Configures the IP address of the network's DNS server.	
	Sending format	**Parameters**
	Aah 25h [ipdns (4)] [CRC(2)]	Valid DNS IP address.
	Answer format	
	Aah 25h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
26h	Request DNS server IP address configuration.	
	Sending format	**Parameters**
	Aah 26h [CRC(2)]	Not applicable
	Answer format	
	Aah 26h [dns (4)] Example response: aah 26:00 08:00 08:008 am08:00 for DNS: 8.8.8.8	

Command	Meaning	
30h	Require the main image settings.	
	Sending format	**Parameters**
	Aah 30h [CRC(2)]	Not applicable
	Answer format	
	Aah 30h [hdr (1)] [shutter type (1)] [static shutter (2)] [maximum shutter (2)] [gain type(1)] [static gain(1)] [maximum gain(1)] [test mode(1)] [desired level(1)] [current level(1)] [current gain(1)] [current shutter (2)] [differentiated gain type(1)] [differentiated gain value(1)] [photo format via trigger(1)] [photo quality via trigger(1)] Hdr: 0: disabled, 1: enabled; Shutter: 1 to ITSCAM model limit; Gain type: 0: static, 1: Automatic; Fixed, maximum, current, differential gain: 0 to 72; Test mode: 0: send image captured by lens, 1: send vertical pattern, 2: send horizontal pattern, 3: send diagonal pattern; Desired level, current: 7 to 62; Differentiated gain type: 0: disabled, 1: enabled differentiated gain in Day mode, 2: enabled differentiated gain in Night mode; Photo format: 0: BMP, 1: JPEG; Photo quality: 1 to 100%	

Command	Meaning	
33h	Assign the High Dynamic Range – (HDR) logarithmic gain applied to the image, which aims to compensate for very dark or saturated areas of the image by bringing them to an intermediate value. Disabled generates linear pixel response.	
	Sending format	**Parameters**
	Aah 33h [hdr (1)] [CRC(2)]	Hdr: 0: disabled, 1: enabled
	Answer format	
	Aah 33h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
34h	Assign the ITSCAM shutter type, which can be static or automatic. When static, the ITSCAM will always use the configured static value. When automatic, the ITSCAM will modify the shutter so that the image lightness level reaches the desired level, but always limiting the shutter to the maximum configured value.	
	Sending format	**Parameters**
	Aah 34h [shutter type (1)] [CRC (2)]	Shutter type: 0: Fixed, 1: Automatic, 2: Fixed in Day mode and automatic in Night mode
	Answer format	
	Aah 34h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
35h	Assign the value of the static shutter.	
	Sending format	**Parameters**
	Aah 35h [shutterstatic(2)] [CRC(2)]	Shutter type: 0: Fixed, 1: Automatic, 2: Fixed in Day mode and automatic in Night mode
	Answer format	
	Aah 35h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
36h	Assign the maximum shutter value. Automatic shutter is limited by this parameter.	
	Sending format	**Parameters**
	Aah 36h [shuttermaximum(2)] [CRC(2)]	Shutter: 1 to the limit of each ITSCAM model
	Answer format	
	Aah 36h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
39h	Assign electronic gain. Set to static, the ITSCAM will always adopt the static gain value. Set to automatic, the ITSCAM will modify its gain so that the lightness level reaches the desired level, respecting the maximum allowable gain.	
	Sending format	**Parameters**
	Aah 39h [type gained (1)] [CRC (2)]	Gain type: 0: Fixed, 1: Automatic
	Answer format	
	Aah 39h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
3Ah	Assign the value of the static electronic gain.	
	Sending format	**Parameters**
	Aah 3Ah [static gain(1)] [CRC(2)]	Fixed gain: 0 to 72
	Answer format	
	Aah 3Ah [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
3Bh	Assign the maximum electronic gain value.	
	Sending format	**Parameters**
	Aah 3Bh [maximum gain(1)] [CRC(2)]	Max gain: 0 to 72
	Answer format	
	Aah 3Bh [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
3Ch	Set the ITSCAM test mode.	
	Sending format	**Parameters**
	Aah 3Ch [mode(1)] [CRC(2)]	Mode: 0: Send image captured by lens, 1: Send vertical pattern, 2: Send horizontal pattern, 3: Send diagonal pattern
	Answer format	
	Aah 3Ch [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
3Dh	Assign the desired lightness level of the image. Automatic gain and automatic shutter are required, as the ITSCAM changes these parameters to keep the image at the desired level.	
	Sending format	**Parameters**
	Aah 3Dh [desired level(1)] [CRC(2)]	Desired level: from 7 to 62
	Answer format	
	Aah 3Dh [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
3Fh	Assign the value of the maximum differential gain. It is used because, in some situations, it is important that the maximum gain of Day mode is different from Night.	
	Sending format	**Parameters**
	Aah 3Fh [maximum gain(1)] [CRC(2)]	Max gain: 0 to 72
	Answer format	
	Aah 3Fh [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
40h	Assign the differential maximum gain setting.	
	Sending format	**Parameters**
	Aah 40h [type differentiated maximum gain (1)] [CRC(2)]	Maximum differential gain type: 0: Disabled, 1: Differentiated gain enabled in Day mode, 2: Differential gain enabled in Night mode
	Answer format	
	Aah 40h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
44h	Define the image format sent by I/O requests.	
	Sending format	**Parameters**
	Aah 44h [format(1)] [CRC(2)]	Format: 0: BMP, 1: JPEG
	Answer format	
	Aah 44h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
45h	Define the quality of JPEG images of requests via I/O.	
	Sending format	**Parameters**
	Aah 45h [quality(1)] [CRC(2)]	Quality: 1 to 100%
	Answer format	
	Aah 45h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
46h	Define the number of images captured per photo request (command 02h) via the network. Photos will be spaced exactly 1 frame apart unless a delay between photos is set.	
	Sending format	**Parameters**
	Aah 46h [number of photos(1)] [CRC(2)]	Number of photos: 1 to the limit of each ITSCAM model
	Answer format	
	Aah 46h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
47h	Define the number of images captured per I/O request. Photos will be spaced exactly 1 frame apart unless a delay between photos is set.	
	Aah 47h [number of photos(1)] [CRC(2)]	Number of photos: 1 to the limit of each ITSCAM model
	Aah 46h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
48h	Request the number of photos being captured per request via network and via trigger, respectively.	
	Sending format	**Parameters**
	Aah 48h [CRC(2)]	Not applicable
	Answer format	
	Aah 48h [number of photos via network(1)] [number of photos via trigger(1)] Number of photos: 1 to the limit of each ITSCAM model.	

Command	Meaning	
4Ch	Assign 180° rotation to images.	
	Sending format	**Parameters**
	Aah 4Ch [rotation(1)] [CRC(2)]	Rotation: 0: No rotation, 1: 180° rotation in images
	Answer format	
	Aah 4Ch [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
4Dh	Request image rotation setting.	
	Sending format	**Parameters**
	Aah 4Dh [CRC(2)]	Not applicable
	Answer format	
	Aah 4Dh [rotation(1)] Rotation: 0: No rotation, 1: 180° rotation in images	

Command	Meaning	
4Eh	Assign weight to image regions. This weight influences the calculation of the image's lightness level and is useful only when there are regions of constant reflection or shadow in the image.	
	Sending format	**Parameters**
	Aah 4Eh [weights(16)] [CRC(2)] Example: aah 4Eh 15 15 15 15 15 15 15 15 15 15 15 15 15 15 15 15 [CRC(2)]	Weights: 0 (minimum relevance) to 15 (maximum relevance), total of 16 values (4x4 matrix of image subdivisions)
	Answer format	
	Aah 4Eh [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
4Fh	Request the weights assigned to each region of the image to calculate the desired lightness level of the image.	
	Sending format	**Parameters**
	Aah 4Fh [CRC(2)]	Not applicable
	Answer format	
	Aah 4Fh [weights (16)] Weights: relevance 0 (minimum) to 15 (maximum), with a total of 16 values (4x4 matrix of image subdivisions)	

Command	Meaning	
56h	Assign the saturation of the image (influences the intensity of the colors). Assign the black level (preventing the black from turning gray) Assign the digital gain, that is, the image contrast (this value must be kept at 100 when the digital gain and shutter are automatic, as this digital gain is applied after the shutter and gain have been adjusted by ITSCAM).	
	Sending format	**Parameters**
	Aah 56h [saturation (1)] [black level (1)] [digital gain (1)] [CRC(2)]	Saturation: 0 (colorless image) to 255 (maximum intensity); Black level: 0 (lowest level) to 255 (maximum); Digital Gain: 0 (lowest contrast) to 255 (maximum).
	Answer format	
	Aah 56h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
57h	Request saturation, black level and digital gain values.	
	Sending format	**Parameters**
	Aah 57h [CRC(2)]	Not applicable
	Answer format	
	Aah 57h [saturation(1)] [black level(1)] [digital gain(1)] All parameters return between 0 and 255	

Command	Meaning	
58h	Assign the white balance of the image components: red, green and blue.	
	Sending format	**Parameters**
	Aah 58h [red (1)] [green(1)] [blue (1)] [CRC(2)]	0: ITSCAM adjusts white balance automatically, 1 to 255: Component gain
	Answer format	
	Aah 58h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
59h	Request image white balance settings.	
	Sending format	**Parameters**
	Yah 59h [red(1)] [green(1)] [blue(1)]	Not applicable
	Answer format	
	Yah 59h [red(1)] [green(1)] [blue(1)] All parameters return between 0 and 255	

Command	Meaning	
5Ah	Assign the gamma value of the image, that is, specify the logarithmic curve that allows very dark areas of the image to be amplified so that they are more evident.	
	Sending format	**Parameters**
	Aah 5Ah [gamma (1)] [CRC(2)]	Gamma: 0: Linear response, 1: Standard logarithmic curve, 70 to 255: Custom curves
	Answer format	
	Aah 5Ah [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
5Bh	Request gamma setting .	
	Sending format	**Parameters**
	Aah 5Bh [CRC(2)]	Not applicable
	Answer format	
	Aah 5Bh [gamma (1)] Gamma: 0: Linear response; 1: Standard logarithmic curve, 70 to 255: Custom curves	

Command	Meaning	
5Eh	Move the focus of the motorized lens. The parameter received by this command defines the number of steps to be moved.	
	Sending format	**Parameters**
	Aah 5Eh [focus(2)] [CRC(2)]	Focus: 1 to 999: Moves the lens to focus on objects at infinity, 1000: Does not move the focus, 1001 to 1999: Moves the lens to focus on nearby objects (the number of steps is the parameter value subtracted from 1000)
	Answer format	
	Aah 5Eh [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
60h	The timestamp of the time the ITSCAM device is on.	
	Aah 60h [CRC(2)]	Not applicable
	Aah 60h [on time (4)] On Time: On time in milliseconds	

Command	Meaning	
61h	Assign an edge enhancement algorithm, which generates the impression of better focus in the image. However, it hinders the performance of OCR.	
	Sending format	**Parameters**
	Aah 61h [edges(1)] [CRC(2)]	Edges: 0: Disabled, 1: Algorithm with 1st order filter, 2: Algorithm with 2nd order filter, 3: Algorithm with 2nd order filter with smooth detection
	Answer format	
	Aah 61h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
62h	Require Edge Enhancement Setting.	
	Sending format	**Parameters**
	Aah 62h [CRC(2)]	Not applicable
	Answer format	
	Aah 62h [edges(1)] Edges: 0: Disabled / 1: Algorithm with 1st order filter / 2: Algorithm with 2nd order filter / 3: Algorithm with 2nd order filter with smooth detection	

Command	Meaning	
63h	Assign color photos setting in Night mode. Photos produced with the ITSCAM always in Day mode are not equivalent to this command.	
	Sending format	**Parameters**
	Aah 63h [photo (1)] [CRC (2)]	Photo: 0: Grayscale photo in Night mode, 1: Color photo in Night mode
	Answer format	
	Aah 63h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
64h	Require color photos setting in Night mode.	
	Sending format	**Parameters**
	Aah 64h [CRC(2)]	Not applicable
	Answer format	
	Aah 64h [photo (1)] Photo: 0: Grayscale photo in Night mode, 1: Color photo in Night mode	

Command	Meaning	
67h	Assign the value of the differentiated gamma of the image, that is, change the value assigned to the gamma in one of the chosen Day or Night modes.	
	Sending format	**Parameters**
	Aah 67h [type(1)] [gamma (1)] [CRC(2)]	Type: 0: Disabled, 1: Enabled in Day mode with the chosen values, 2: Enabled in Night mode with the chosen values; Gamma: 0: Linear response, 1: Basic logarithmic curve, 70 to 255: Custom curves
	Answer format	
	Aah 67h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
68h	Gamma configuration .	
	Sending format	**Parameters**
	Aah 68h [CRC(2)]	Not applicable
	Answer format	
	Aah 68h [gamma (1)] Gamma: 0: Linear response, 1: Standard logarithmic curve, 70 to 255: Custom curves	

Command	Meaning	
69h	Set a second white balance setting as there are situations where it is necessary to work with different white balances for Day and Night modes	
	Aah 69h [type(1)] [red(1)] [green(1)][blue(1)] [CRC(2)]	Type: 0: Disabled, 1: Enabled in Day mode with the chosen values, 2: Enabled in Night mode with the chosen values; Components: 0: ITSCAM 400 automatically adjusts, 1 to 255: Component gain
	Aah 69h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
6Ah	Request differential white balance settings.	
	Sending format	**Parameters**
	Ah 6Ah [CRC(2)]	Not applicable
	Answer format	
	Aah 6Ah [type(1)] [red(1)] [green(1)] [blue(1)] Type: 0: No differentiated bank balance, 1: Differentiated for Day mode, 2: Differentiated for Night mode; Components return between 0 and 255	

Command	Meaning	
6Bh	Request real-time white balance settings.	
	Sending format	**Parameters**
	Aah 6Bh [CRC(2)]	Not applicable
	Answer format	
	Aah 6Bh [red(1)] [green(1)] [blue(1)] All parameters return between 0 and 255	

Command	Meaning	
6Ch	Set the flash intensity on the second shot.	
	Sending format	**Parameters**
	Aah 6Ch [intensity(1)] [CRC(2)]	Intensity: 0 to 100% of the first shot
	Answer format	
	Aah 6Ch [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
6Dh	Require the flash intensity on the second shot that has been set.	
	Aah 6Dh [CRC(2)]	Not applicable
	Aah 6Dh[intensity(1)] Intensity: 1 to 100% of the first shot	

Command	Meaning	
6Eh	Move the zoom of the motorized lens. The parameter received by this command defines the number of steps to be moved.	
	Sending format	**Parameters**
	Aah 6Eh [zoom(2)] [CRC(2)]	Zoom: 1 to 999: Moves the lens by expanding the field of view, 1000: Does not move, 1001 to 1999: Moves the lens by reducing the field of view (step=value-1000)
	Answer format	
	Aah 6Eh [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
6Fh	Memorize the focus position for visible light or infrared light situation.	
	Sending format	**Parameters**
	Aah 6Fh [light(1)] [CRC(2)]	Light: 1: Save current focus position (visible light), 2: Save current focus position (infrared light), 50: clear zoom and focus position (lens is static), 101: Position lens at value visible light saved, 102: Positions the lens in the infrared position saved
	Answer format	
	Aah 6Fh [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
70h	Assign the delay (in frames) the ITSCAM waits to capture Multiple Exposures in Day mode.	
	Sending format	**Parameters**
	Aah 70h [delay (1)] [CRC(2)]	Delay: 0: Minimum, 10: Maximum
	Answer format	
	Aah 70h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
71h	Require the setting of the delay between Multiple Exposures (in frames) in Day mode.	
	Sending format	**Parameters**
	71h [CRC(2)]	Not applicable
	Answer format	
	Aah 71h [delay (1)] Delay: 0 to 10 frames	

Command	Meaning	
72h	Assign the delay (in frames) the ITSCAM waits to capture Multiple Exposures in Night mode.	
	Sending format	**Parameters**
	Aah 72h [delay (1)] [CRC(2)]	Delay: 0: Minimum, 10: Maximum
	Answer format	
	Aah 72h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
73h	Request setting of delay between Multiple Exposures (in frames) in Night mode.	
	Sending format	**Parameters**
	73h [CRC(2)]	Not applicable
	Answer format	
	Aah 73h [delay (1)] Delay: 0 to 10 frames	

Command	Meaning	
76h	Assign the absolute position of the zoom in relation to the internal reference of the lens.	
	Sending format	**Parameters**
	Aah 76h [zoom(4)] [CRC(2)]	Zoom: -1000 to 1000 (in int32 format)
	Answer format	
	Aah 76h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
77h	Require the zoom setting in relation to the internal reference of the lens.	
	Sending format	**Parameters**
	Aah 77h [CRC(2)]	Not applicable
	Answer format	
	Aah 77h [zoom(4)] Zoom: -1000 to 1000 (in int32 format)	

Command	Meaning	
78h	Assign the absolute position of the focus in relation to the internal reference of the lens.	
	Sending format	**Parameters**
	Aah 78h [focus(4)] [CRC(2)]	Focus: -1000 to 1000 (in int32 format)
	Answer format	
	Aah 78h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
79h	Order the focus setting in relation to the internal reference of the lens.	
	Sending format	**Parameters**
	Aah 79h [CRC(2)]	Not applicable
	Answer format	
	Aah 79h [focus(4)] Focus: -1000 to 1000 (in int32 format)	

Command	Meaning	
7Ah	Assign the electronic gain value of the second photo, when the predominant light is visible and the ITSCAM is configured for two or four photos per request. The first photo will have the normal gain.	
	Sending format	**Parameters**
	Aah 7Ah [gain(1)] [CRC(2)]	Gain: 0 to 72
	Answer format	
	Aah 7Ah [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
7Bh	Request the electronic gain value of the second photo, when the predominant light is visible.	
	Sending format	**Parameters**
	Aah 7Bh [CRC(2)]	Not applicable
	Answer format	
	Aah 7Bh [gain(1)] Gain: 0 to 72	

Command	Meaning	
7Ch	Assign the electronic gain value of the second photo, when the predominant light is infrared and the ITSCAM is configured for two or four photos per request. The first photo will have the normal gain.	
	Sending format	**Parameters**
	Aah 7Ch [gain(1)] [CRC(2)]	Gain: 0 to 72
	Answer format	
	Aah 7Ch [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
7Dh	Request the value of the electronic gain of the second photo, when the predominant light is infrared.	
	Sending format	**Parameters**
	Aah 7Dh [CRC(2)]	Not applicable
	Answer format	
	Aah 7Dh [gain(1)] gain: 0 to 72	

Command	Meaning	
7Eh	Configure autofocus operation when zoom is changed.	
	Aah 7Eh [zoom focus(1)] [CRC(2)]	Zoom Focus 0: Disabled, 1: Enabled, 2: Force autofocus adjustment
	Aah 7Eh [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
7Fh	Require setting of autofocus operation when zoom is changed.	
	Sending format	**Parameters**
	Aah 7Fh [CRC(2)]	Not applicable
	Answer format	
	Aah 7Fh [zoom focus(1)] Zoom Focus 0: Disabled, 1: Enabled, 2: Force autofocus adjustment	

Command	Meaning	
80h	Configure the Auto Iris DC control.	
	Sending format	**Parameters**
	Aah 80h [auto iris (1)] [CRC (2)]	Auto Iris: 0: Without DC Auto Iris control, 1: With DC Auto Iris control
	Answer format	
	Aah 80h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
81h	Require Auto Iris DC configuration.	
	Sending format	**Parameters**
	Aah 81h [CRC(2)]	Not applicable
	Answer format	
	Aah 81h [auto iris (1)] Auto Iris: 0: Without DC Auto Iris control, 1: With DC Auto Iris control	

Command	Meaning	
82h	Assign the operating mode of the ITSCAM in relation to the type of light.	
	Sending format	**Parameters**
	Aah 82h [mode(1)] [CRC(2)]	Mode: 0: Auto, 1: Day, 2: Night
	Answer format	
	Aah 82h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
83h	Request ITSCAM Day/Night configuration.	
	Sending format	**Parameters**
	Aah 83h [CRC(2)]	Not applicable
	Answer format	
	Aah 83h [mode(1)] Mode: 0: Auto, 1: Day, 2:Night	

Command	Meaning	
84h	Request real-time Day/Night mode setting.	
	Sending format	**Parameters**
	Aah 84h [CRC(2)]	Not applicable
	Answer format	
	Aah 84h [mode(1)] Mode 0: Night, 1: Day	

Comando	Significado	
85h	Sets the time interval (in minutes) that the ITSCAM waits to capture new images using periodic triggering.	
	Formato de envio	**Parâmetros**
	AAh 85h [range (2)]	Range 0 to 60000
	Formato de resposta	
	AAh 85h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
86h	Requires the time interval (in minutes) for the periodic trigger stored on the ITSCAM.	
	Sending format	**Parameters**
	Aah 86h [CRC(2)]	Not applicable
	Answer format	
	Aah 86h [range(2)] Range from 0 to 60000	

Command	Meaning	
87h	Request Infra Red Focus status.	
	Sending format	**Parameters**
	Aah 87h [CRC(2)]	Not applicable
	Answer format	
	Aah 87h [focus (1)] Focus IR: 0: Off, 1: On	

Command	Meaning	
88h	Define a second trigger configuration, as there are situations where it is necessary to work with different values for Day and Night modes.	
	Sending format	**Parameters**
	Aah 88h [type(1)] [CRC(2)]	Type: 0: Disabled, 1: Enabled in Day mode, 2: Enabled in Night mode
	Answer format	
	Aah 88h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
89h	Request differential trigger settings.	
	Sending format	**Parameters**
	Aah 89h [CRC(2)]	Not applicable
	Answer format	
	Aah 89h [type(1)] Type: 0: No differential trigger, 1: Differentiated for Day mode, 2: Differentiated for Night mode	

Command	Meaning	
8Ah	Set the value of the differentiated trigger.	
	Sending format	**Parameters**
	Aah 8Ah [trigger(1)] [CRC(2)]	Type: 0: Disabled, 1: Enabled in Day mode, 2: Enabled in Night mode
	Answer format	
	Aah 8Ah [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
8Bh	Request the value of the differentiated trigger.	
	Sending format	**Parameters**
	Aah 8Bh [CRC(2)]	Not applicable
	Answer format	
	Aah 8Bh [trigger(1)] Trigger: value from 1 to 12 as described in command 13h	

Command	Meaning	
8Ch	Set a second OCR setting, as there are situations where it is necessary to work with different values for Day and Night modes.	
	Sending format	**Parameters**
	Aah 8Ch [type(1)] [CRC(2)]	Type: 0: Disabled, 1: Enabled in Day mode, 2: Enabled in Night mode
	Answer format	
	Aah 8Ch [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
8Dh	Differentiated OCR mode request.	
	Sending format	**Parameters**
	Aah 8Dh [CRC(2)]	Not applicable
	Answer format	
	Aah 8Dh [type(1)] Type: 0: No differentiated OCR, 1: Differentiated for Day mode, 2: Differentiated for Night mode	

Command	Meaning	
8Eh	Set the differentiated OCR value.	
	Sending format	**Parameters**
	Aah 8Eh [ocr (1)] [CRC (2)]	OCR: value from 0 to 4 as described in the D2h command
	Answer format	
	Aah 8Eh [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
8Fh	Request the differentiated OCR value.	
	Sending format	**Parameters**
	Aah 8Fh [CRC(2)]	Not applicable
	Answer format	
	Aah 8Fh [ocr (1)] OCR: 0: Disabled OCR, 1: Fast OCR, 2: Normal OCR, 3: Slow OCR, 4: Very Slow OCR	

Command	Meaning	
94h	Sets the ITSCAM Current Date.	
	Sending format	**Parameters**
	94h [date(4)] [CRC(2)]	Valid date in DDMMYY format
	Answer format	
	Aah 94h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
95h	Requires ITSCAM Current Date.	
	Sending format	**Parameters**
	Aah 95h [CRC(2)]	Not applicable
	Answer format	
	YYH 95h [date(4)] Date: Date in DDMMYY format	

Command	Meaning	
96h	Sets the ITSCAM time.	
	Sending format	**Parameters**
	YY 96h [hour(4)] [CRC(2)]	Valid time in HHMMSS format
	Answer format	
	Aah 96h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
97h	Requires ITSCAM timetable.	
	Sending format	**Parameters**
	Aah 97h [CRC(2)]	Not applicable
	Answer format	
	Yah 97h [hour(4)] Time: Time in HHMMSS format	

Command	Meaning	
9Ch	Configures the server that receives images from the ITSCAM.	
	Sending format	**Parameters**
	Aah 9Ch [server(1)] [CRC(2)]	Server 0: None, 1: FTP, 2: ITSCAMPRO, 3: RTSP, 4: K32, 5: Panoramic, 6: Serial port, 8: Files
	Answer format	
	Aah 9Ch [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
9Dh	Requires the type of server that receives images from the ITSCAM.	
	Sending format	**Parameters**
	Aah 9Dh [CRC(2)]	Not applicable
	Answer format	
	Aah 9Dh [server(1)] Server 0: None, 1: FTP, 2: ITSCAMPRO, 3: RTSP, 4: K32, 5: Panoramic, 6: Serial port, 8: Files	

Command	Meaning	
9Eh	Configure the serial port so that it is compatible with the device connected to the ITSCAM.	
	Sending format	**Parameters**
	Aah 9Eh [serial cfg (25)] [CRC(2)]	Serial Cfg: stringwith the settings of the two serial interfaces. Example: 115200-8n1/115200-8n1. SERIAL 1 and 2: 115200 bits/sec; 8 data bits; (n) no parity; 1 stop bit. Note: the stringwith the settings should be 25 bytes. If necessary, add '\0'.
	Answer format	
	Aah 9Eh [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
9Fh	Request the configuration of the ITSCAM serial ports.	
	Sending format	**Parameters**
	Aah 9Fh [CRC(2)]	Not applicable
	Answer format	
	Aah 9Fh [serial cfg (25)] Serial Cfg: string with the configurations of the two serial interfaces. Example: 115200-8n1/115200-8n1. SERIAL 1 and 2: 115200 bits/sec; 8 data bits; (n) no parity; 1 stop bit. Note: the string with the settings must have 25 bytes. If necessary, add '\0'.	

Command	Meaning	
A1h	Requires motorized lens status.	
	Sending format	**Parameters**
	Aah A1h [CRC(2)]	Not applicable
	Answer format	
	Aah A1h [status(1)] 0: Not available (in motion), 1: Available	

Command	Meaning	
A2h	Configures the port for the Image Server.	
	Sending format	**Parameters**
	Aah A2h [port(2)] [CRC(2)]	Port: TCP port for connection (0 to 65535)
	Answer format	
	Aah A2h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
A3h	Requires the port that is configured for the Image Server.	
	Sending format	**Parameters**
	Aah A3h [CRC(2)]	Not applicable
	Answer format	
	Aah A3h [port(2)] Port: TCP port for connection (0 to 65535)	

Command	Meaning	
A5h	Threshold level requirement for automatic switching from Day to Night mode.	
	Sending format	**Parameters**
	Aah A5h [CRC(2)]	Not applicable
	Answer format	
	Aah A5h [threshold(1)] Threshold: 5 to 40	

Command	Meaning	
A7h	Requires shutter percentage for automatic switching from Night to Day mode.	
	Sending format	**Parameters**
	Aah A7h [CRC(2)]	Not applicable
	Answer format	
	Aah A7h [threshold(1)] Threshold: 0 to 100	

Command	Meaning	
ADh	Requirement Level Threshold for Auto Focus Switching Visible for Infrared focus.	
	Sending format	**Parameters**
	Aahadh [CRC(2)]	Not applicable
	Answer format	
	Aahadh [threshold(1)] Threshold: 1 to 50	

Command	Meaning	
AFh	Requirement Threshold level for automatic switching from Infrared to Visible focus.	
	Sending format	**Parameters**
	Aahafh [CRC(2)]	Not applicable
	Answer format	
	Aahafh [threshold(1)] Threshold: 1 to 50	

Command	Meaning	
B0h	Firmware update commands.	
	Sending format	**Parameters**
	Aah B0h [size(3)] [CRC(2)] [firmware (size)]	Size: firmware size in little-endian; CRC: CRC16 firmware only
	Answer format	
	Aah B0h [status] Status 0: Update failed, 1: Update successful	

Command	Meaning	
D2h	Assign the OCR mode that the ITSCAM will use.	
	Sending format	**Parameters**
	Aah D2h [OCR(1) mode] [CRC(2)]	OCR Mode: 0: Disabled OCR, 1: Fast OCR, 2: Normal OCR, 3: Slow OCR, 4: Very Slow OCR
	Answer format	
	Aah D2h [status(1)] Status 0: Command not accepted, 1: Command accepted	

Command	Meaning	
D3h	ITSCAM OCR mode request.	
	Sending format	**Parameters**
	Aah D3h [CRC(2)]	Not applicable
	Answer format	
	Aah D3h [OCR(1) mode] OCR Mode: 0: Disabled OCR, 1: Fast OCR, 2: Normal OCR, 3: Slow OCR, 4: Very Slow OCR	

4. HTTP Communication Protocol with CGI Commands

The HTTP protocol is composed of commands that allow from consulting/changing the value of a configuration parameter to capturing images and restarting the equipment. HTTP commands give the device a lower performance than a TCP connection via socket using port 50000. For a robust application, implementations with the Pumatronix Open Source Communication Protocol (Socket) are recommended.

Command http://(IP_da_ITSCAM)/api/conexoes.cgi

conexoes.cgi command lists the last connections made in ITSCAM. Each connection is listed with the IP address of the connected device, the time in milliseconds the ITSCAM was on and the port used. The result of a connection made on the ITSCAM is:

```
Establishing new connection at 192.168.0.123 in 248403828 ms. Port: 50263
```

Command http://(IP_da_ITSCAM)/api/conn.cgi

The *conn.cgi* command returns the HTTPs connections that were made on ITSCAM. It is possible to list all connections of this type made. The output of this command when there are no connections is:

```
No HTTP connection has been established so far (368589069 ms)
```

Command http://(IP_da_ITSCAM)/api/lastFrame.cgi

lastframe.cgi command returns the last frame recorded in memory by ITSCAM.

Command http://(IP_da_ITSCAM)/api/logwatchdog.cgi

The *logwatchdog.cgi* command returns parameters that allow identifying what was the cause of the last reboot forced by the watchdog. These parameters are used by Technical Support to identify the reason for the reboot. Example of message received:

```
[15220 000000 000000 0] cTx =1 cRx =-10 cOcr =0 FWD=2 wdRd =3000 TWD=15020 TTX=15220
TRX=2863311530 TPD=2863311530 TVD=15020 TPC=2863311530 TQD=2702 MST9=00
```

Command http://(IP_da_ITSCAM)/api/mjpegvideo.cgi

The *mjpegvideo.cgi command* sends a stream*MJPEG* with the video images captured by the ITSCAM. To receive these images, it is necessary to specify the quality of the images, the resolution and the frame rate that will be sent. Used only for real-time viewing of captured images, therefore, it does not allow requesting

an image with flash. Contact Technical Support if there is a need to save the video stream. An example stream configuration and request is:

```
http://(ITSCAM ip)/ api / mjpegvideo.cgi ?Quality =80&Resolution=320x 240&FrameRate=0
```

This command is influenced by the existing connection between the ITSCAM and the equipment that is requesting the images, with the possible configurations:

Command	Limits
Quality	Quality of images in the video stream: 1: lower quality and higher compression 100: highest quality and no compression
Resolution	Output resolution, with resizing: 160x120, 240x180, 320x240, 480x360, 640x480, 752x480 (ITSCAM 401 only) or 1280x960 (ITSCAM 411 only)
Framerate (frames per second)	0: Maximum possible rate 1,2,3,5,6,10,15 or 30

* Some browsers such as Internet Explorer have restrictions on displaying video in mjpeg format, so images may not be displayed correctly.

Command http://(IP_da_ITSCAM)/api/mjpegphoto.cgi

The *mjpegphoto.cgi command* is used only to send captured images, which allows requesting an image with flash. In conjunction with the illuminator protection, it is possible to stream fully illuminated video at night using a continuous trigger. Possible settings for images are:

Command	Limits
Quality	Quality of the displayed image: 1: lower quality and higher compression 100: highest quality and no compression
Resolution	Output resolution, with resizing: 160x120, 240x180, 320x240, 480x360, 640x480, 752x480 (ITSCAM 401 only) or 1280x960 (ITSCAM 411 only)
Framerate (frames per second)	Maximum Frames Per Second Rate Limiter: 0: Maximum possible rate 1,2,3,5,6,10,15 or 30
Exposition	Selects which exposure (up to 4 shots) will be used in the image stream. If none is selected, use only the first exposure.

Command http://(IP_da_ITSCAM)/api/plateidlist.cgi

The *plateidlist.cgi command* is used to manipulate the plate list stored in ITSCAM for use with the Wiegand 26 protocol. The CSV file of the plate list sent follows the pattern *PLATE, ID <new row (|n)>*, following the example:

ABC1234,321
ZZZ4444,456
XYZ9876.99

When sent to the device without parameters, it returns the list that is currently used in CSV format. The *write* parameteris used in POST type requests and has the objective of specifying the loading mode of the list on the device:

***write* value**	**Behavior**
0	Saves only to volatile memory, not to use the internal FLASH
1	Save to flash if 1 hour has passed since the last save, to reduce FLASH usage. If 1 hour has not passed, update the list in volatile memory and save later when 1 hour has elapsed
2	Force FLASH save

plate and *serial* parameters can be used in this cgi to assist in the debug process, as *plate* is the field used to simulate plate recognition and must contain a string of up to 7 characters, representing the desired plate. While the *serial* field indicates the serial port on which the card should be sent, that is, values 1 or 2 can be assigned. In addition to sending the chosen card by the specified serial, it returns a cgi command containing the card, hexadecimal values of the bytes sent and the string sent. When passing 0 for the serial parameter, the return is done only via CGI.

Command http://(IP_da_ITSCAM)/api/reboot.cgi

The *reboot.cgi* command restarts the ITSCAM immediately.

In firmware prior to version 14, no response is sent when this command is received. However, in newer versions a message appears in the browser informing you that the ITSCAM is restarting.

The ITSCAM reboot process takes approximately 20 seconds to complete. Then communication with the device that sent the reset command can be restored.

Command http://(IP_da_ITSCAM)/api/snapshot.cgi

snapshot.cgi command is used to request a JPEG photo from ITSCAM. When the ITSCAM is operating in NIGHT mode and the flash is in "single mode" or "auto mode", the photo sent by the ITSCAM is synchronized with the flash. To use this command, it is necessary to determine the image quality value. The default value is quality 80%. The quality ranges from 1 to 100, with 100 corresponding to an image with low compression and maximum quality. An example of using this command is:

```
http://(ITSCAM ip)/ api / snapshot.cgi ?quality =100
```

Command	**Limits**
Quality	Image quality: 1: lower quality and higher compression 100: highest quality and no compression
Resolution	Resizes the image to the chosen size. Size must be supported by the resize option for the protocol, the possible resolutions being: 160x120, 240x180, 320x240, 480x360, 640x480, 752x480 (ITSCAM 401 only) or 1280x960 (ITSCAM 411 only)
Nfotos	Definition of the number of exposures (between 1 to 4). Images are only sent when a trigger event occurs

dualshot	when set to 1, concatenates 2 exposures in the same request.
Encode	Responds to image in base64 when set to 64 (ie: "encode=64")
ocr	when set to 1, performs OCR on the requested image
sign	When set to 1 and hardware is available, perform digital signature of the image

Command http://(IP_da_ITSCAM)/api/trigger.cgi

trigger.cgi command works similarly to the photo request, however when the ITSCAM receives the request made by this script, the images are sent only when a trigger event occurs. This event can be produced by external equipment, such as inductive loops and optical barriers, and by processing the images captured by the ITSCAM (virtual trigger).

Command http://(IP_da_ITSCAM)/api/watchdog.cgi

watchdog.cgi command starts an external watchdog. This means that if the ITSCAM does not receive this command again within 5 minutes, it will restart automatically. It is recommended that, when using this functionality of the ITSCAM, the sending of watchdog reactivation commands occur every minute.

Command http://(IP_da_ITSCAM)/api/configs.cgi

The *configs.cgi* command displays the ITSCAM configuration modification history. This command lists when the change was made, which parameter was changed, the previous value and the one assigned to ITSCAM. These values are shown in decimal and, in parentheses, in hexadecimal. For each command, the IP address of the person who made the change and the protocol used are also displayed. Each change made is saved in the ITSCAM memory. Here is an example of changing the *Desired Level:*

```
[442329886 150102 030432 1] IMAGE_LEVEL: 20 (2pm) to 22 (4pm) (from 192.168.100.57:5047
[http])
```

Command http://(IP_da_ITSCAM)/api/config.cgi?tudo

config.cgi command is used to query and update ITSCAM settings. It can be used either to request the reading of a current configuration or to define a new value.

To view all ITSCAM real-time settings, the command sent is:

```
http://(ITSCAM ip)/ api / config.cgi ?all
```

This command returns all ITSCAM settings in the browser, with the variable name and current value. At the same time, to list the value of an ITSCAM parameter, the word *tudo* must be replaced by the variable name (as it is listed in the browser):

```
http://(ITSCAM ip)/ api / config.cgi ?parameter
```

Querying the value of some ITSCAM parameters can be done in just one cgi command, using the & operator between variables. However, the maximum length of the query string must not exceed 500 characters.

```
http://(ITSCAM ip)/ api /config.cgi ?parameter1&parameter2
```

With this same command it is possible to assign values to the ITSCAM parameters. The command follows the same structure and at the end of the parameter name must be inserted the equal sign and the new value to be assigned. This possibility of updating commands can be done for one or several parameters simultaneously, respecting the maximum command line size limit of 500 characters and the use of separator & between parameters, as in the example:

```
http://(ITSCAM ip)/ api /config.cgi ?parametro1=10&parametro2=40
```

After assigning a new value to an ITSCAM parameter, the response is the display of the parameter with the value that was assigned. Therefore, if a parameter is updated with an invalid value, no update occurs and the function's return with the parameters that would be updated displays the parameter without updating.

Parameters displayed in command http://(ITSCAM_IP)/api/config.cgi?tudo

Command	**ArquivoFTP**
Description	Name pattern for files uploaded to FTP server.
Type	Reading and writing
Possible Values	String (Table 7 contains the list of possible characters)
Example	%c.jpg

Command	**Autoiris**
Description	Auto Iris Setup.
Type	Reading and writing
Possible Values	0: Without DC Auto Iris lens, 1: With DC Auto Iris lens
Example	1

Command	**BuffersLivres**
Description	Number of images that can still be stored internally and waiting to be transmitted
Type	Reading
Possible Values	0: No space to process new images, 16: No images waiting for transmission
Example	1

Command	**ConfigPortaSerial**
Description	Configuration so that the serial port is compatible with the device connected to the ITSCAM.
Type	Reading and writing
Possible Values	String containing baud rate (300-230400), number of bits (7 or 8), parity (N, O, E) and number of stop-bits (1 or 2)
Example	300-7N1, 1200-8N2

Command	**CountOcr, CountRx and CountTx**
Description	Parameters for error tracking.
Type	Reading
Possible Values	Integer value
Example	90935 | -10 | 0

Command	**Data**
Description	Current date of the ITSCAM.
Type	Reading and writing
Possible Values	Valid date in DDMMYY format
Example	160614

Command	**DataComp**
Description	Firmware build date.
Type	Reading
Possible Values	DD/MM/YY format HH:MM:SS
Example	03/13/2014 15:14:40

Command	**DelayCapturaDay**
Description	Delay between *multiple exposure* frames, counted in frames, in Day mode.
Type	Reading and writing
Possible Values	0 to 10
Example	0

Command	**DelayCapturaNight**
Description	Delay between *multiple exposure* frames, counted in frames, in Night mode.
Type	Reading and writing
Possible Values	0 to 10
Example	0

Command	**DelayFlash**
Description	Time between flash firing and shutter exposure.
Type	Reading and writing
Possible Values	100 to 25000 with 0.4µ second steps
Example	130

Command	**DisableFrwUp**
Description	Disables the firmware update option, it is no longer possible to update, as this action is irreversible.
Type	Reading and writing
Possible Values	6271155477 Note: it will no longer be possible to update the firmware of the ITSCAM if it receives this value in the parameter
Example	6271155477

Command	**Dns**
Description	ITSCAM DNS address.
Type	Reading and writing
Possible Values	Valid DNS address
Example	208,67,222,222

Command	**enableNtpServer**
Description	Synchronize ITSCAM time with NTP server.
Type	Reading and writing
Possible Values	0: Disabled, 1: Enabled
Example	0

Command	**EnderecoServidor**
Description	IP address of the server that receives the images from the ITSCAM.
Type	Reading and writing
Possible Values	Valid IP address
Example	192.168.0.94

Command	**EnderecoServidorRedundante**
Description	Redundant IP address of the server receiving the images from the ITSCAM.
Type	Reading and writing
Possible Values	Valid IP address
Example	192.168.0.91

Command	**FiltroIO**
Description	Not implemented

Command	**FinalHorarioVerao**
Description	Daylight Saving Time End Date
Type	Reading and writing
Possible Values	Valid date in Day-Month-Hour-Minute format or Ordinal-DayWeek - Month-Hour format
Example	31100000 (October 31 at 00:00) or 11020000 (first Sunday in February at 00:00)

Command	**Foco**
Description	Motorized lens focus position
Type	Reading and writing
Possible Values	0 to 1999
Example	10

Command	**FocoDayNight**
Description	Saves the current lens focus.
Type	writing
Possible Values	1: Saves the current focus for visible light, 2: Saves the current focus for infrared light, 50: clears the memorized focuses, 101: Resets the focus to the saved position for visible light, 102: Repositions the focus to the saved position for infrared light
Example	1

Command	**FocoIR**
Description	Motorized lens focus used (in real time).
Type	Reading
Possible Values	0: Focus for visible light, 1: Focus for infrared light
Example	0

Command	**FocoZoom**
Description	Autofocus operation when zoom is changed.
Type	Reading and writing
Possible Values	0: Disabled, 1: Enabled, 2: Forces autofocus adjustment
Example	0

Command	**ForceWDIO2**
Description	Used in cases where the *watchdog* is external on output 2. The *watchdog reset process* it is possible if it is identified that the communication with the FTP server has been interrupted. To activate this functionality, the cgi command must be sent *WDServerCheck* =1, however it is necessary to have a version of the product with hardware revision 6 or with external hardware *watchdog connected to output 2.*
Type	Reading and writing
Possible Values	In cases where the *watchdog* is external on output 2, the command *ForceWDIO2* =1 must also be configured via cgi. Requires Technical Support evaluation in hardware identification and parameter usage.
Example	1

Command	**FormatoTrigger**
Description	Image format sent when requests occur via I/O.
Type	Reading and writing
Possible Values	0: BMP, 1: JPEG
Example	1

Command	**FotoColorida**
Description	Color image in Night mode. Different from keeping ITSCAM always in Day mode.
Type	Reading and writing
Possible Values	0: Disabled, 1: Enabled
Example	1

Command	**Gamma**
Description	Gamma value.
Type	Reading and writing
Possible Values	0: Linear, 1 to 70: Quadratic, 70 to 255: Logarithmic
Example	110

Command	**GammaDiurno and GammaNoturno**
Description	Gamma value for Day mode or Night mode operation.
Type	Reading and writing
Possible Values	0: Disabled, 1: Enabled, 70 to 255: Enabled with specified conversion
Example	110

Command	**GanhoAtual**
Description	Real-time gain value.
Type	Reading
Possible Values	0 to 72
Example	0

Command	**GanhoB**
Description	Gain value in the second photo for visible light.
Type	Reading and writing
Possible Values	0 to 72
Example	19

Command	**GanhoC**
Description	Gain value in the second photo for infrared light.
Type	Reading and writing
Possible Values	0 to 72
Example	15

Command	**GanhoFixo**
Description	Static gain value.
Type	Reading and writing
Possible Values	0 to 72
Example	15

Command	**GanhoMaximo**
Description	Maximum gain value.
Type	Reading and writing
Possible Values	0 to 72
Example	15

Command	**GanhoMaximoDiurno**
Description	Maximum gain value for Day mode operation.
Type	Reading and writing
Possible Values	0 to 72
Example	15

Command	**GanhoMaximoNoturno**
Description	Maximum gain value for Night mode operation.
Type	Reading and writing
Possible Values	0 to 72
Example	15

Command	**Gateway**
Description	ITSCAM Gateway.
Type	Reading and writing
Possible Values	valid gateway
Example	192.168.0.1

Command	**GlobalInterruptDisable**
Description	Variable used for debug

Command	**GPS**
Description	ITSCAM Gateway.
Type	Reading and writing
Possible Values	valid gateway
Example	192.168.0.1

Command	**HasOcrRoi**
Description	Defines the use of a region of interest.
Type	Reading and writing
Possible Values	0: Disabled, 1: Enabled
Example	0

Command	**Hdr**
Description	HDR (High Dynamic Range) operating mode on ITSCAM 400 models (including CCD model) and ITSCAM VIGIA+.
Type	Reading and writing
Possible Values	0: Disabled, 1: Enabled
Example	0

Command	**HdrFpga**
Description	HDR (High Dynamic Range) operating mode on ITSCAM 400 HDR model.
Type	Reading and writing
Possible Values	0: Disabled, 3: Enabled
Example	0

Command	**HdrFpgaNight**
Description	HDR (*High Dynamic Range)* operating mode, on ITSCAM 400 HDR models, when in Night mode.
Type	Reading and writing
Possible Values	0: Disabled, 3: Enabled
Example	0

Command	**HdrNight**
Description	HDR *(High Dynamic Range)* operating mode on ITSCAM 400 and CCD models, when in Night mode.
Type	Reading and writing
Possible Values	0: Disabled, 3: Enabled
Example	0

Command	**Hora**
Description	ITSCAM timetable.
Type	Reading and writing
Possible Values	Valid time in HHMMSS format
Example	95320

Command	**Horario**
Description	Real-time date and time.
Type	Reading
Possible Values	DD/MM/YY format HH:MM: SS
Example	06/16/14 09:53:20

Command	**HorarioVerao**
Description	Sets the daylight saving time operation.
Type	Reading and writing
Possible Values	0: Disabled, 1: Enabled by absolute date, 2: Enabled by day of the week
Example	two

Command	**Identificador**
Description	Variable used for debug

Command	**InicioHorarioVerao**
Description	Daylight saving time start date.
Type	Reading and writing
Possible Values	Valid date in Day-Month-Hour-Minute format or Ordinal-DayWeek - Month-Hour format
Example	31100000 (October 31 at 00:00) or 11020000 (first Sunday in February at 00:00)

Command	**Ip**
Description	ITSCAM IP address.
Type	Reading and writing
Possible Values	Valid IP address
Example	192.168.0.213

Command	**Ip2**
Description	ITSCAM secondary IP address.
Type	Reading and writing
Possible Values	Valid IP address
Example	192.168.0.213

Command	**IpServidor**
Description	IP address of the server that receives the images from the ITSCAM.
Type	Reading and writing
Possible Values	Valid IP address
Example	192.168.0.10

Command	**IpServidorRedundante**
Description	IP address of the server that receives the images from the ITSCAM.
Type	Reading and writing
Possible Values	Valid IP address
Example	192.168.0.10

Command	**JuntaFotosBMP**
Description	It composes a single BMP image with all the images generated in each capture request and then transmits them.
Type	Reading and writing
Possible Values	0: Send separate photos, 1: Compress into a single file
Example	0

Command	**LenteMotorizada**
Description	Identifies if the ITSCAM 400 model has motorized lens.
Type	Reading
Possible Values	0: Does not have, 1 an: Lens types
Example	two

Command	**LimiarDayNight**
Description	Level threshold for automatic switching from Day to Night mode (variable not used with switching mechanism of switching between Day and Night modes which is based only on Level).
Type	Reading
Possible Values	5 to 40
Example	15

Command	**LimiarDayNightMotorizada**
Description	Threshold level for auto focus switching Visible for Infrared focus.
Type	Reading and writing
Possible Values	1 to 50
Example	5

Command	**LimiarNightDay**
Description	Shutter percentage for automatic switching from Night to Day mode (unused variable with switching mechanism between Day and Night modes which is based only on Level).
Type	Reading
Possible Values	1 to 100
Example	33

Command	**LimiarNightDayMotorizada**
Description	Threshold level for automatic switching from Infrared to Visible focus.
Type	Reading and writing
Possible Values	1 to 50
Example	5

Command	**LimiarPercentDayNight**
Description	Level threshold for automatic switching from Day to Night mode
Type	Reading
Possible Values	1 to 100
Example	50

Command	**LimiarPercentDayNightMotorizada**
Description	Threshold level for automatic switching of lens focus from visible to infrared.
Type	Reading and writing
Possible Values	1 to 100
Example	20

Command	**LimiarPercentNightDay**
Description	Level threshold for automatic switching from Day to Night mode
Type	Reading
Possible Values	1 to 100
Example	50

Command	**LimiarPercentNightDayMotorizada**
Description	Threshold level for automatic switching of lens focus from infrared to visible.
Type	Reading and writing
Possible Values	0 to 100
Example	30

Command	**LimTM**
Description	Motion Detector Threshold.
Type	Reading and writing
Possible Values	0 to 50
Example	5

Command	**Mac**
Description	ITSCAM MAC address.
Type	Reading
Possible Values	Valid MAC address
Example	F8-D4-62-00-10-D5

Command	**MaiorShutter**
Description	Maximum shutter value that can be assigned.
Type	Reading
Possible Values	positive integer value
Example	2047

Command	**MapHabilitado**
Description	Indicates whether there is a MAP configured to perform OCR.
Type	Reading and writing
Possible Values	0: Disabled, 1: Enabled
Example	1

Command	**MapIp**
Description	IP address for MAP access.
Type	Reading and writing
Possible Values	Valid IP address
Example	192,168,0,253

Command	**MapIp2**
Description	IP address for secondary MAP access.
Type	Reading and writing
Possible Values	Valid IP address
Example	192,168,0,253

Command	**MapPorta**
Description	Communication port with the MAP.
Type	Reading and writing
Possible Values	1 to 65535
Example	50000

Command	**MapPorta2**
Description	Communication port with the secondary MAP.
Type	Reading and writing
Possible Values	1 to 65535
Example	50001

Command	**MapSt**
Description	MAP health status.
Type	Reading
Possible Values	-1: Undefined, -2: Disabled, 0: Connected, 5: Country not supported, 7: Invalid ROI, 16: Invalid License, 17: License expired, 100: Failed to connect, 101: Server disconnected, 102: Timeout on queue, 103 or 108: Queue full, 105: Failed to send to server, 213: Connection limit
Example	0

Command	**MapUsd**
Description	MAP being used.
Type	Reading
Possible Values	-1: Undefined, 0: Major, 1: Minor
Example	0

Command	**MascaraRede**
Description	ITSCAM netmask.
Type	Reading and writing
Possible Values	Valid netmask
Example	255,255,255.0

Command	**MascaraRede2**
Description	Secondary IP ITSCAM netmask.
Type	Reading and writing
Possible Values	Valid netmask
Example	255,255,255.0

Command	**MaxLowProbChars**
Description	Maximum number of low probability characters.
Type	Reading and writing
Possible Values	0 to 6
Example	0

Command	**MinimaProbPorCaracter**
Description	Minimum acceptable probability that a character will be considered recognized.
Type	Reading and writing
Possible Values	1 to 100
Example	60

Command	**MinimoCaracteresValidos**
Description	Minimum number of characters that must be recognized for the license plate to be considered valid.
Type	Reading and writing
Possible Values	0 to 7
Example	7

Command	**Modelo**
Description	String with the ITSCAM model.
Type	Reading
Possible Values	ITSCAM400 to 421
Example	ITSCAM403LM84

Command	**ModoDayNight**
Description	Day and Night mode operation.
Type	Reading and writing
Possible Values	0: Auto, 1: Day Mode, 2: Night Mode
Example	0

Command	**ModoFlash**
Description	Flash operation.
Type	Reading and writing
Possible Values	1: Disabled, 2: Single, 3: Single with delay, 4: Continuous, 5: Auto, 6: Automatic with delay, 7: Continuous (Night)/OFF (Day)
Example	5

Command	**ModoFlashAuto**
Description	Defines whether the flash will be activated with the ITSCAM operating in Night mode or with Infrared Light.
Type	Reading and writing
Possible Values	0: Night mode, 1: Infrared light
Example	1

Command	**ModoOCR**
Description	Setting the OCR operating mode on ITSCAMs with this functionality.
Type	Reading and writing
Possible Values	0: Disabled, 1: Fast, 2: Normal, 3: Slow, 4: Very Slow
Example	3

Command	**ModoOCRIR**
Description	Setting the OCR operating mode when the ITSCAM is operating in Night mode (on ITSCAMs with this functionality).
Type	Reading and writing
Possible Values	0: Disabled, 1: Fast, 2: Normal, 3: Slow, 4: Very Slow
Example	3

Command	**ModoOCRVisivel**
Description	Setting the OCR operating mode when the ITSCAM is operating in Day mode (on ITSCAMs with this functionality).
Type	Reading and writing
Possible Values	0: Disabled, 1: Fast, 2: Normal, 3: Slow, 4: Very Slow
Example	3

Command	**ModoTarjaVideo**
Description	Video frame label text display mode selection.
Type	Reading and writing
Possible Values	0: Disabled, 1: White text, 2: Black text
Example	1

Command	**ModoTeste**
Description	Indicates whether the ITSCAM sends the image or color pattern as a signal.
Type	Reading
Possible Values	0: Image, 1: Vertical pattern, 2: Horizontal pattern, 3: Diagonal pattern
Example	0

Command	**NivelAtual**
Description	Real-time level value.
Type	Reading
Possible Values	0 to 62
Example	22

Command	**NivelAutomatico**
Description	Not implemented.

Command	**NivelDesejado**
Description	Image lightness level value.
Type	Reading and writing
Possible Values	7 to 62, 20 to 62 (with gamma enabled)
Example	21

Command	**ntpServer**
Description	Definition of the NTP server address queried.
Type	Reading and writing
Possible Values	Valid IP address or hostname
Example	a.ntp.br

Command	**NumeroFotosIO**
Description	Number of photos per request via I/O.
Type	Reading and writing
Possible Values	1 to the maximum value supported by the ITSCAM model
Example	two

Command	**NumeroFotosRede**
Description	Number of photos per request via the network.
Type	Reading and writing
Possible Values	1 to the maximum value supported by the ITSCAM model
Example	1

Command	**OcrAngle**
Description	Rotation angle of the plate letters.
Type	Reading and writing
Possible Values	-15 to 15
Example	1

Command	**OcrCountry**
Description	OCR country.
Type	Reading and writing
Possible Values	1: Brazil, 4: Chile
Example	1

Command	**OcrSlant**
Description	Tilt angle of the plate letters.
Type	Reading and writing
Possible Values	-15 to 15
Example	0

Command	**Password**
Description	Password to access the ITSCAM web interface.
Type	Reading and writing
Possible Values	valid password
Example	123

Command	**PeriodicTriggerInterval**
Description	Time interval (in minutes) that the ITSCAM waits to capture new images using periodic triggering.
Type	Reading and writing
Possible Values	0 to 60000
Example	1

Command	**PeriodoHorarioVerao**
Description	Time range in which daylight saving time is in effect.
Type	Reading
Possible Values	Date
Example	FROM 3rd Sunday in October at 00:00 TO 3rd Sunday in February at 00:00

Command	**Pesos1, Pesos2, Pesos3 and Pesos4**
Description	Weights of image lines regions (top to bottom). The rightmost region of the image corresponds to the least significant *nibble.*
Type	Reading and writing
Possible Values	0: No Influence Region, 15: Maximum Influence. Each nibble represents a weight, 0 to 65535 in total
Example	65535

Figure 28 - Importance coefficients (Weights) of the regions demarcated in the image

Command	**PlacasSerial**
Description	Sends the recognized card via the ITSCAM serial.
Type	Reading and writing
Possible Values	0: Do not send plate, 1: Send plate
Example	1

Command	**PorcentagemSegundoDisparo**
Description	Pumatronix Illuminator Intensity When Triggered for *Multiple Exposure* capture. Check technical specifications of the illuminator.
Type	Reading and writing
Possible Values	1 to 100
Example	100

Command	**PortaServidor**
Description	ITSCAM server port.
Type	Reading and writing
Possible Values	valid port
Example	9000

Command	**PortaServidorRedundante**
Description	ITSCAM redundant server port.
Type	Reading and writing
Possible Values	valid port
Example	50000

Command	**QualidadeTrigger**
Description	Quality of JPEG images sent.
Type	Reading and writing
Possible Values	1: highest compression level and lowest quality, 100: highest quality
Example	70

Command	**RealceBorda**
Description	Edge Enhancement Algorithm.
Type	Reading and writing
Possible Values	0: Disabled, 1: 1st order filter, 2: 2nd order filter, 3: 2nd order filter with soft detection
Example	0

Command	**RebootNeeded**
Description	Indicates whether the ITSCAM needs to be restarted to apply pending settings.
Type	Reading
Possible Values	0: No, 1: Yes
Example	0

Command	**Resolucao**
Description	Resolution of ITSCAM images.
Type	Reading
Possible Values	752x480, 800x600, 1280x720, 1280x960, 1636x1220 and 1920x1440
Example	752x480

Command	**ResolucaoImagemFTP**
Description	Resolution of photos from FTP server.
Type	Reading and writing
Possible Values	0: ITSCAM resolution, 1: 320x240 pixels
Example	0

Command	**Revisao**
Description	ITSCAM firmware revision.
Type	Reading
Possible Values	Not applicable
Example	53

Command	**RoiOCR**
Description	Coordinates of the four points that determine the OCR region of interest.
Type	Reading and writing
Possible Values	Pixel coordinate values
Example	0,0,0,0,0,0,0,0

Command	**RoiTM**
Description	Coordinates of the four points that determine the Motion Detector's region of interest.
Type	Reading and writing
Possible Values	Pixel coordinate values
Example	0,0,0,0,0,0,0,0

Command	**RoiTMMode**
Description	Motion Detector region of interest working configuration.
Type	Reading and writing
Possible Values	Pixel coordinate values
Example	0,0,0,0,0,0,0,0

Command	**Rotacao**
Description	180° image rotation (only on ITSCAM 400 with 752x480pixels resolution).
Type	Reading and writing
Possible Values	0: Normal image, 1: Rotated image
Example	0

Command	**Saturacao**
Description	Multiple parameter containing 1 Byte to represent: Saturation, Black Level and Digital Gain (respectively).
Type	Reading and writing
Possible Values	0 to 255 for each parameter, 0 to 16777215 in total
Example	6554468

Command	**SaturacaoDiurno**
Description	Multiple parameter containing 1 Byte to represent: Saturation, Black Level and Digital Gain (respectively) for Day mode operation.
Type	Reading and writing
Possible Values	0 to 255 for each parameter, 0 to 16777215 in total
Example	6554468

Command	**SaturacaoNoturno**
Description	Multiple parameter containing 1 Byte to represent: Saturation, Black Level and Digital Gain (respectively) for Night mode operation.
Type	Reading and writing
Possible Values	0 to 255 for each parameter, 0 to 16777215 in total
Example	6554468

Command	**SenhaAPI**
Description	Use password for all ITSCAM communication through the protocol (reboot, read/write settings, etc.).
Type	Reading and writing
Possible Values	0: Disabled, 1: Enabled
Example	1

Command	**SenhaFTP**
Description	Password to authenticate FTP user.
Type	Reading and writing
Possible Values	Valid alphanumeric password
Example	123

Command	**ShutterAtual**
Description	Real-time shutter value.
Type	Reading
Possible Values	integer value
Example	51

Command	**ShutterFixo**
Description	Static shutter value.
Type	Reading and writing
Possible Values	1 to the maximum value supported by the ITSCAM model
Example	30

Command	**ShutterMaximo**
Description	Maximum shutter value.
Type	Reading and writing
Possible Values	1 to the maximum value supported by the ITSCAM model
Example	60

Command	**Sincronismo**
Description	debug variable

Command	**SituacaoDayNight**
Description	Day/Night operating mode in real time.
Type	Reading
Possible Values	1: Day Mode, 2: Night Mode
Example	1

Command	**Sombra**
Description	Shadow removal algorithm near vehicle headlights in night images.
Type	Reading and writing
Possible Values	0: Disabled, 1 to 8: Algorithms available
Example	0

Command	**StatusFirmware**
Description	debug variable

Command	**StatusSupervisao**
Description	Response sent by ITSLUX when its operation supervision is enabled.
Type	Reading
Possible Values	0 to 255
Example	0

Command	**StringTarjaGlobal**
Description	Configuration of the text that will be displayed in the global image label.
Type	Reading and writing
Possible Values	String (Table 1 contains the list of possible characters)
Example	%p-/%m/%d-%v

Command	**StringTarjaVideo**
Description	Setting the text that will be displayed on the video strip.
Type	Reading and writing
Possible Values	String up to 255 characters (Table 1 contains the list of possible characters)
Example	%p-/%m/%d-%v

Command	**SupervisaoIluminador**
Description	It enables the inclusion of the illuminator status in the JPEG comments at each capture (when the ITSLUX line supervision is connected) and enables the sending of the trigger command through the serial port.
Type	Reading and writing
Possible Values	0: Disabled, 1: Enabled, 2: Enabled and triggering via the serial port
Example	1

Command	**TempoEntreTriggers**
Description	Time (milliseconds) in which new triggers are not processed in the ITSCAM, after capturing a vehicle.
Type	Reading and writing
Possible Values	0 to 60000
Example	400

Command	**TempoLigado, TempoPc, TempoPd, TempoQd, TempoRx, TempoTx, TempoVd e TempoWd**
Description	Counters used for debugging that indicate the timestamp of certain features.
Type	Reading
Possible Values	integer value
Example	5645645, 7954215 or 12314566

Command	**TimeoutOCR**
Description	Maximum time that the OCR algorithm has to search the license plate of the vehicle in the image.
Type	Reading and writing
Possible Values	0 to 10000
Example	4500

Command	**TipoGammaDif**
Description	Definition of differentiated gamma operation.
Type	Reading and writing
Possible Values	0: Do not use different gamma, 1: Use different gamma for Day mode, 2: Use gamma dif. for night mode
Example	two

Command	**TipoGanho**
Description	Definition of gain operation.
Type	Reading and writing
Possible Values	0: Fixed, 1: Automatic
Example	1

Command	**TipoGanhoDif**
Description	Definition of how differential gain works.
Type	Reading and writing
Possible Values	0: Do not use differential gain, 1: Use maximum diff gain. for Day mode, 2: Use maximum gain diff. for night mode
Example	1

Command	**TipoOCR**
Description	OCR configuration.
Type	Reading and writing
Possible Values	0: Disabled, 1: Fast, 2: Normal, 3: Slow, 4: Very Slow
Example	1

Command	**TipoOcrDif**
Description	Differentiated OCR definition.
Type	Reading and writing
Possible Values	0: Do not use OCR dif., 1: Use OCR dif. for visible light, 2: Use OCR dif. for infrared light
Example	two

Command	**TipoSaida**
Description	Output configuration.
Type	Reading and writing
Possible Values	1: Flash, 2: I/O
Example	1

Command	**TipoSaturacaoDif**
Description	Output configuration.
Type	Reading and writing
Possible Values	1: Flash, 2: I/O
Example	1

Command	**TipoServidor**
Description	Server that receives images from the ITSCAM.
Type	Reading and writing
Possible Values	0: None, 1: FTP, 2: ITSCAMPRO, 3: RTSP, 4: K32, 5: Panoramic, 6: Serial port, 7: In process of implementation, 8: Files
Example	two

Command	**TipoShutter**
Description	shutter configuration
Type	Reading and writing
Possible Values	0: Fixed, 1: Auto, 2: Fixed in Day mode and Auto in Night mode
Example	1

Command	**TipoTriggerDif**
Description	Differentiated trigger definition.
Type	Reading and writing
Possible Values	0: Do not use differential trigger, 1: Trigger dif. for visible light, 2: Trigger dif. for infrared light
Example	0

Command	**TipoWhiteBalanceDif**
Description	Differentiated white balance setting.
Type	Reading and writing
Possible Values	0: Do not use Diff. White Balance, 1: Diff. White Balance. in Day mode, 2: White balance diff. in night mode
Example	0

Command	**TodasFotosItscamPro**
Description	Number of photos per vehicle sent to ITSCAMPRO.
Type	Reading and writing
Possible Values	0: Only one photo, 1: All photos
Example	0

Command	**TotalFotos**
Description	Maximum number of photos that can be captured per request.
Type	Reading
Possible Values	4 or 16
Example	16

Command	**TransicaoMotorizadaIO**
Description	How the lens focus transition will be made.
Type	Reading and writing
Possible Values	0: Using thresholds, 1: using IN2, 2: Using IN1
Example	0

Command	**Trigger**
Description	Trigger type used.
Type	Reading and writing
Possible Values	1: Disabled, 2: Rising edge, 3: Falling edge, 4: Both edges, 5: Zoom in, 6: Zoom out (fast), 7: Zoom out (slow), 8: Continuous, 9: Periodic (enable NTP server), 10: High level, 11: Low level
Example	8

Command	**TriggerIR**
Description	Trigger type used in Night mode.
Type	Reading and writing
Possible Values	Ditto *Trigger command*
Example	8

Command	**TriggerVisivel**
Description	Trigger type used in Day mode.
Type	Reading and writing
Possible Values	Ditto *Trigger command*
Example	8

Command	**triggerEndPaddingAfastDiurno, triggerEndPaddingAproxDiurno**
Description	Definition of trigger margins by image analysis
Type	Reading and writing
Possible Values	0 to 15
Example	0

Command	**triggerEndPaddingNoturno, triggerStartPaddingAfastDiurno, triggerStartPaddingAproxDiurno e triggerStartVeiculoPaddingNoturno**
Description	Definition of trigger margins by image analysis
Type	Reading and writing
Possible Values	0 to 15
Example	0

Command	**triggerStartMotoPaddingNoturno**
Description	Definition of trigger margins by image analysis
Type	Reading and writing
Possible Values	0 to 50
Example	30

Command	**TZ**
Description	Time Zone.
Type	Reading and writing
Possible Values	-12 to 12
Example	-3

Command	**UsuarioFTP**
Description	User for connecting to the FTP server.
Type	Reading and writing
Possible Values	alphanumeric characters
Example	admin

Command	**ValorEntrada1**
Description	Input state definition 1.
Type	Reading
Possible Values	0: Input at logic level 0, 1: Input at logic level 1
Example	0

Command	**ValorEntrada2**
Description	Input state definition 2.
Type	Reading
Possible Values	0: Input at logic level 0, 1: Input at logic level 1
Example	0

Command	**ValorEntradas**
Description	Definition of the status of the inputs in binary input2input1.
Type	Reading
Possible Values	0: Inputs disabled, 1: Input 1 enabled, 2: Input 2 enabled, 3: Inputs enabled
Example	0

Command	**ValorGammaDif**
Description	Definition of the differentiated gamma.
Type	Reading and writing
Possible Values	0: Disabled, 1: Enabled, 70 to 255: Enabled with specified conversion
Example	70

Command	**ValorGanhoDif**
Description	Definition of differential gain.
Type	Reading and writing
Possible Values	0 to 72
Example	50

Command	**ValorOcrDif**
Description	Definition of the differentiated OCR operating mode on ITSCAMs with this functionality.
Type	Reading and writing
Possible Values	0: Disabled, 1: Fast, 2: Normal, 3: Slow, 4: Very Slow
Example	1

Command	**ValorSaida**
Description	Output status.
Type	Reading and writing
Possible Values	0: Disabled, 1: Output 1 enabled, 2: Output 2 enabled, 3: Outputs enabled
Example	0

Command	**ValorSaturacaoDif**
Description	Definition of differentiated saturation.
Type	Reading and writing
Possible Values	0 to 255 for each parameter, 0 to 16777215 in total
Example	0

Command	**ValorTriggerDif**
Description	Definition of the different trigger used.
Type	Reading and writing
Possible Values	1: Disabled, 2: Rising edge, 3: Falling edge, 4: Rising and falling edge, 5: Zoom image, 6: Zoom out image (fast), 7: Zoom out image (slow), 8: Continuous, 9: Periodic (Need to enable NTP server), 10: High level, 11: Low level
Example	1

Command	**ValorWhiteBalanceDif**
Description	White balance is a multiple parameter containing 1 Byte to represent: Red, Green and Blue (respectively).
Type	Reading and writing
Possible Values	0 to 255 for each parameter, 0 to 16777215 in total
Example	0

Command	**Versao**
Description	ITSCAM firmware version.
Type	Reading
Possible Values	-
Example	15

Command	**WhiteBalance, WhiteBalanceAtual, WhiteBalanceDiurno e WhiteBalanceNoturno**
Description	White balance is a multiple parameter containing 1 Byte to represent: Red, Green and Blue (respectively).
Type	Reading and writing
Possible Values	0 to 255 for each parameter, 0 to 16777215 in total
Example	0

Command	**WDServerCheck**
Description	Used in cases where the *watchdog* is external on output 2. The *watchdog reset process* it is possible if it is identified that the communication with the FTP server has been interrupted. To activate this functionality, the cgi command must be sent *WDServerCheck* =1, however it is necessary to have a version of the product with hardware revision 6 or with external hardware *watchdog connected to output 2.*
Type	Reading and writing
Possible Values	In cases where the *watchdog* is external on output 2, the command *ForceWDIO2* =1 must also be configured via cgi. Requires Technical Support evaluation in hardware identification and parameter usage.
Example	1

Command	Zoom
Description	Motorized lens zoom value.
Type	writing
Possible Values	0 to 1999
Example	500


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