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# Sigrand IP video cameras

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## Cameras description

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Sigrand video cameras SG-1C-111, SG-1C-121, SG-1C-131, SG-3C-1312 are professional **network video cameras** with high image quality and exclusively high efficiency of using network bandwidth. They are especially advantageous when used in wide open spaces such as an entrance to a building or airport, or in applications where precise identification is required, for instance, of the face of a person or the number in a vehicle registration plate.

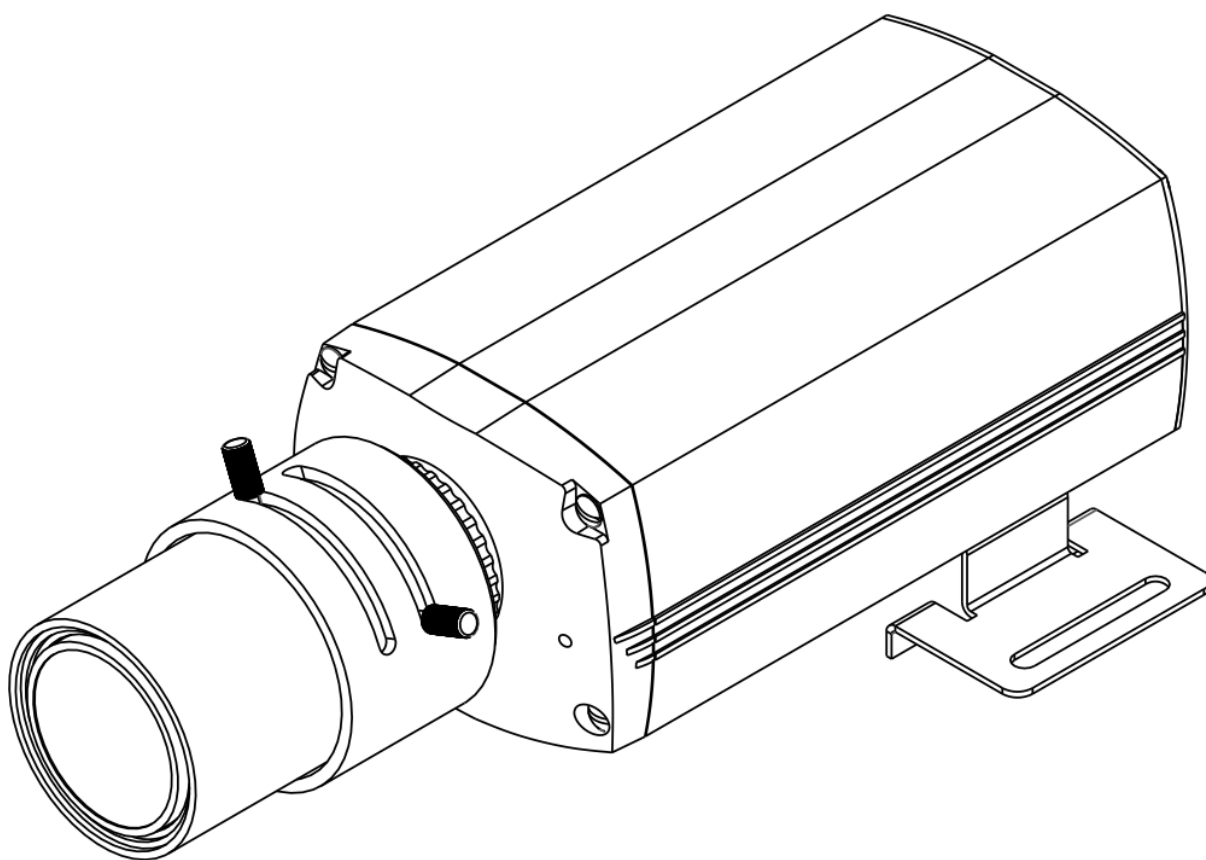


Figure 1.1: SG-1C-1\*1

These cameras have replaceable **image sensor**, allowing operation in a High Dynamic

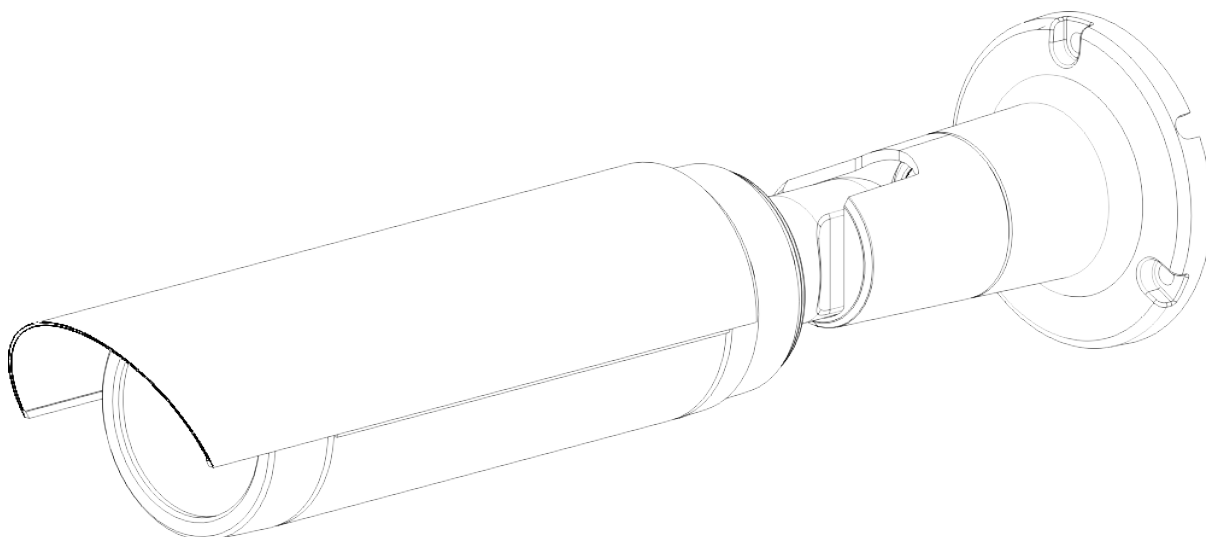


Figure 1.2: SG-3C-1312

Range (HDR), via superposing several pre-frames of the object taken with various exposures to produce a single fully-featured high-quality frame of natural contrast and color grade. This feature allows surveillance in a complicated environment, for instance, when the site of surveillance gets alternately in the sun and in the shade, or when the camera is spotlighted with directional glaring light.

Implementation of the cameras is based on one of the most state-of-the-art digital video processors from Texas Instruments DaVinci TMS320DM368: <http://processors.wiki.ti.com/index.php/Category:DaVinci>, <http://www.ti.com/product/tms320dm368>.

The cameras can be connected in a chain and powered over Ethernet (PoE), with the whole group being powered through the same cable; for this purpose, a 2-port built-in Ethernet switch is used.

For long-distance connection of a camera, a separate pluggable SHDSL module is provided for which also allows remote power supply and power transfer for a Sigrand LED spotlight.

## 1.1 Techical specifications

### 1.1.1 Camera

|                                   |   |
|-----------------------------------|---|
| Type                              | SG-1C-111:<br>SG-1C-121:<br><b>SG-1C-131:</b> <ul style="list-style-type: none"> <li>Indoor (Outdoor with Housing)</li> </ul> <b>SG-3C-1312:</b> <ul style="list-style-type: none"> <li>Outdoor</li> </ul>  |
| Image sensor                      | <b>SG-1C-111:</b> <ul style="list-style-type: none"> <li>1/3" CMOS Aptina MT9M034 1.2 Mpix</li> </ul> <b>SG-1C-121:</b> <ul style="list-style-type: none"> <li>1/3" CMOS Aptina AR0331 3.1 Mpix</li> </ul> <b>SG-1C-131:</b> <ul style="list-style-type: none"> <li>1/2.5" CMOS Aptina MT9P006 5 Mpix</li> </ul> <b>SG-3C-1312:</b> <ul style="list-style-type: none"> <li>1/2.5" CMOS Aptina MT9P006 5 Mpix</li> </ul> |
| Day and Night                     | Mechanical IR filter  |
| Minimum intensity of illumination | <b>SG-1C-111:</b> <ul style="list-style-type: none"> <li>0.20 lux, F 1.2 (color),</li> <li>0.03 lux, F 1.2 (black &amp; white)</li> </ul> <b>SG-1C-121:</b> <ul style="list-style-type: none"> <li>0.1 lux, F 1.2 (black &amp; white)</li> </ul>  |
| Dynamic range                     | SG-1C-111: up to 120 dB<br>SG-1C-121: up to 100 dB<br>SG-1C-131: up to 76 dB<br>SG-3C-1312: up to 76 dB   |

## 1.1.2 Video

|                            |  |
|----------------------------|--|
| Video streams              | Two streams (H.264, MPEG-4, MJPEG) through RTSP (unicast/multicast), MJPEG through HTTP, adjustable frame rate and channel bandwidth.  |
| Frame size and compression | <b>SG-1C-111:</b> <ul style="list-style-type: none"><li>• H.264, MPEG-4, MJPEG:<ul style="list-style-type: none"><li>– 1280 x 960 30 fps</li></ul></li></ul> <b>SG-1C-121:</b> <ul style="list-style-type: none"><li>• H.264:<ul style="list-style-type: none"><li>– 2048 x 1536 20 fps</li><li>– 1920 x 1080 30 fps</li></ul></li><li>• MPEG-4, MJPEG:<ul style="list-style-type: none"><li>– 1920 x 1080 30 fps</li></ul></li></ul> <b>SG-1C-131:</b> <b>SG-3C-1312:</b> <ul style="list-style-type: none"><li>• H.264, MPEG-4, MJPEG:<ul style="list-style-type: none"><li>– 2592 x 1920 10 fps</li><li>– 2048 x 1536 20 fps</li><li>– 1920 x 1080 30 fps</li></ul></li></ul> |
| Image adjustment options   | Brightness, contrast, sharpness, automatic white balance, automatic exposure, day & night mode, horizontal and vertical mirroring, on-screen display for arbitrary text, date, time, histogram   |

## 1.1.3 Audio

|                  |  |
|------------------|--|
| Audio stream     | Bi-directional   |
| Audio codecs     | G.711 (8 KHz, 64 Kbit/s), AAC LC (8 KHz, adjustable bitrate) |
| Input and Output | Microphone input and line output                             |

## 1.1.4 Network

|           |   |
|-----------|---|
| Control   | Web interface for user/admin, SSH   |
| Security  | Access to Web interface is protected with a password; SSL (HTTPS) encryption; access through SSH protocol |
| Protocols | IPv4, HTTP, HTTPS, SSL, TLS, SSH, DHCP, NTP, RTSP, RTP, UDP, TCP, ARP                                     |

### 1.1.5 System integration

|                        |   |
|------------------------|---|
| Programming interfaces | <ul style="list-style-type: none"> <li>• <b>ONVIF</b>: partly, under development</li> <li>• <b>Web API</b>: no</li> </ul>   |
| Alert                  | Activation of external alert signals; video- and audio-recording to <b>Micro SD</b> card, alert warning through E-mail ( <b>SMTP</b> ) (in development), uploading file to <b>FTP</b> server, <b>HTTP</b> server. |
| Alert input/output     | 2 inputs, 1 output, 1 line audio-output 3.5 mm  |
| Detection              | Motion detector   |
| Control ports          | <b>RS-232</b> / <b>RS-485</b> (selectable) for managing weather-proof IPhouse-15E/* housing modes   |
| Local data storage     | Slot for <b>Micro SD</b> cards  |

### 1.1.6 General specifications

|                                 |   |
|---------------------------------|---|
| Processor and Memory            | Texas Instruments TMS320DM368 432 MHz, 128 MB <b>DDR2 SDRAM</b> , 128 MB <b>NAND flash</b>              |
| Camera box                      | Cast of aluminum alloy  |
| Lens mounting type              | <b>CS</b>   |
| External dimensions (LxWxH), mm | 120 x 65 x 50   |
| Weight, g                       | 150   |
| Operating conditions            | -50 .. +50 C with a weather-proof housing IPhouse-15E/* and -35 .. +50 C without weather-proof housings |
| Network interface               | 2 x <b>Ethernet</b> 10/100  |
| Power supply                    | Local 12V or <b>PoE</b> class 2 with a feature of through-line powering of several cameras              |
| Power consumption, W            | 4.5   |

## 1.2 Power over Ethernet

Each camera has two **Ethernet** ports linked together through a built-in **Ethernet switch**, so it is possible to connect cameras into a chain.

Cameras can be supplied with power over Ethernet (**PoE**) and transmit power further in a through-line way.

According to the **PoE** standard, there are two possible modes of powering a device, A and B. In version A, the device is powered through the signal pairs of the **Ethernet** cable;

in version B, it is powered through spare pairs. The source of power supply can only use one of the versions, either A or B, while the receiver must support both.

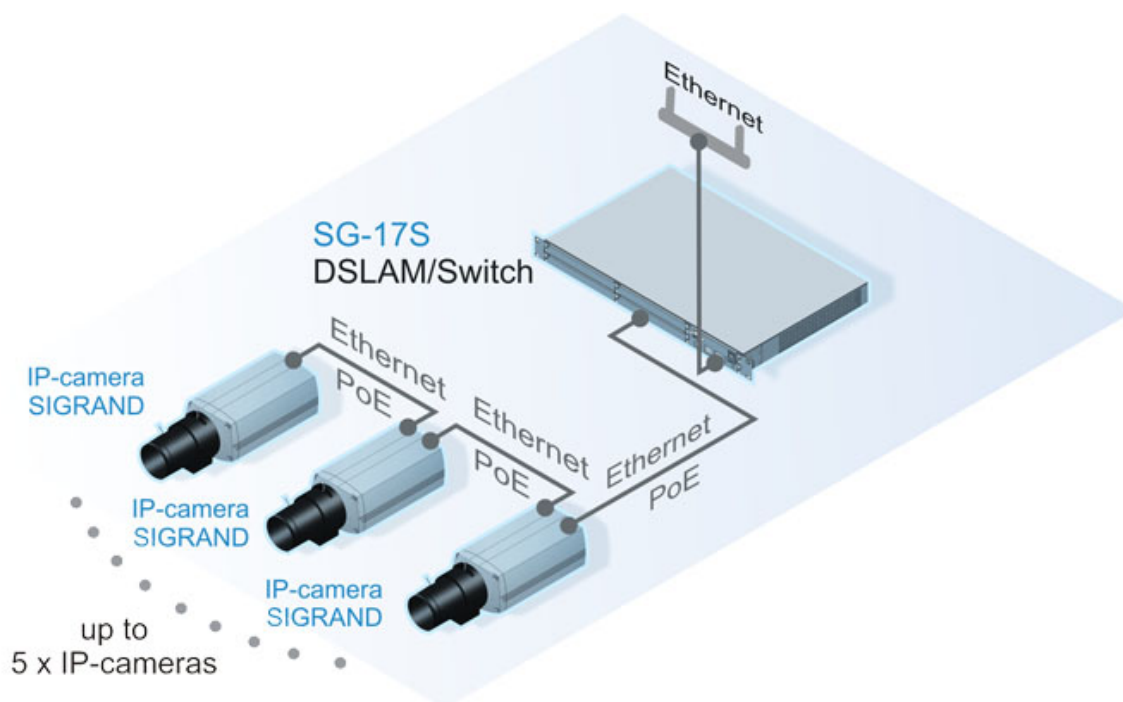
Camera port “PoE mode A or B” is compatible with the PoE standard and can be powered both through the signal pairs and through spare pairs.

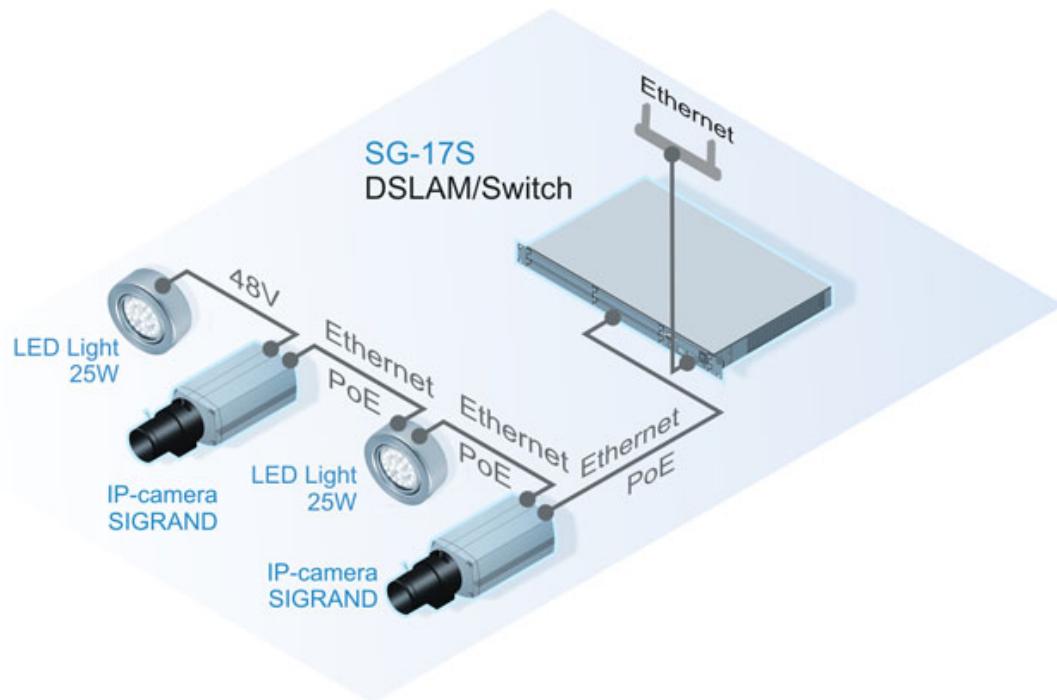
Camera port “PoE mode B” is used for connecting cameras into a chain. Spare pairs contacts of this port are connected in parallel with the corresponding contacts of spare pairs of the port “PoE mode A or B”.

When a single camera is connected, port “PoE mode A or B” is used; the other one, “PoE mode B port”, must be left unconnected.

When cameras are connected into a chain, only mode B is to be used; i.e. power must be supplied through spare pairs. In this case, one of the camera ports is to be connected either to the power-supply source or to the previous camera, and the other is to be connected to the next camera in the chain. Thus, in each camera spare pairs of both ports will be interconnected and therefore all the cameras in the chain will be powered.

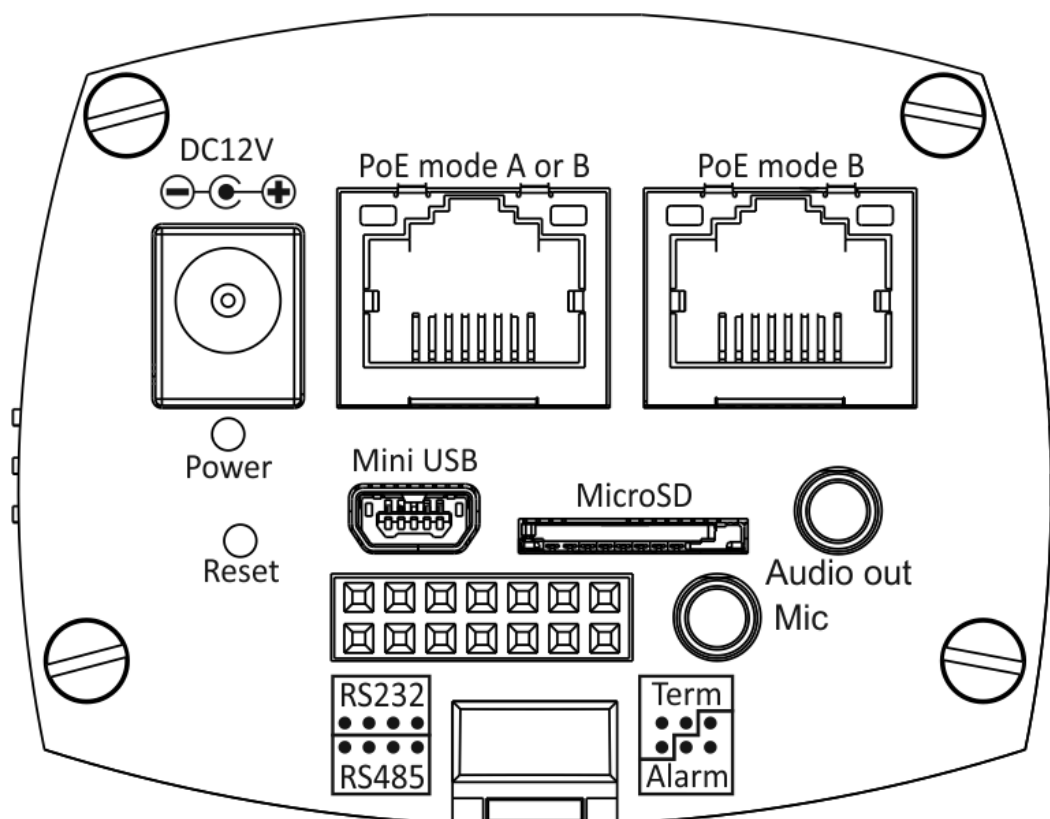
A standard PoE source of power supply will not recognize a camera chain as a permissible load even if power is delivered through spare pairs. A camera chain can only be powered from a power-supply source which can power any load, even non-standard one.





## 1.3 Back Panel

### 1.3.1 Back panel of SG-1C-1\*1:



Left to right, downward:

- “DC12V”: 12 V direct current power socket, + in the middle.
- “PoE mode A or B”: PoE Ethernet socket
- “PoE mode B”: PoE Ethernet socket

Both sockets are interconnected through a PoE Ethernet switch.

- “Power”: LED power indicator
- “Mini USB”: socket for USB 2.0 cable
- “MicroSD”: socket for Micro SD cards
- “Audio out”: linear audio output
- “Reset”: hidden software reset button
- Rectangular 14-contact socket (described below)
- “Mic”: microphone input

#### 1.3.1.1 Back panel socket SG-1C-1\*1

Socket at the camera *rear panel* <rear-view>:

Socket pinout:

|    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|
| 01 | 02 | 03 | 04 | 05 | 06 | 07 |
| 08 | 09 | 10 | 11 | 12 | 13 | 14 |

Pin description:

- 01,02,03,04 - RS-232 DTE port, for weather-proof housing management:

| Connector pin | RS-232 signal |
|---------------|---------------|
| 01            | TxD           |
| 02            | RxD           |
| 03            | GND           |
| 04            | +12 V         |

**Note:** Onto the camera connector pin 04, power supply voltage +12 V is fed, which is used at the controller side as a power-supply source for optical coupler of the interface halvanic isolation.

The default parameters of the port are 9600 baud, 8N1

The device file in the camera is /dev/ttyS0

- 08,09,10 - RS-485 port for weather-proof housing management:

| Connector pin | RS-485 signal |
|---------------|---------------|
| 08            | D+            |
| 09            | D-            |
| 10            | GND           |
| 11            | +12 V         |



**Note:** Power supply voltage +12 V is fed to the camera connector pin 11 which does not belong to RS-485.

The device file in the camera is `/dev/ttyS0`

**Note:** Both ports for managing weather-proof housing are in fact one and the same port with the switchable modes [RS-232](#) and [RS-485](#) selected through software.

The ports can only be used one at a time, by setting the UART to the corresponding mode in the *Device* -> *General* pad through the pop-down menu “serial port type”.

- 05,06,12 - [RS-232 DCE](#) port for console:

| Connector pin | RS-232 signal | DB-9F pin (COM port) |
|---------------|---------------|----------------------|
| 05            | RxD           | 2                    |
| 06            | GND           | 5                    |
| 12            | TxD           | 3                    |

The default parameters of the port are 115200 [baud](#), 8N1

The device file in the camera is: `/dev/ttyS1`

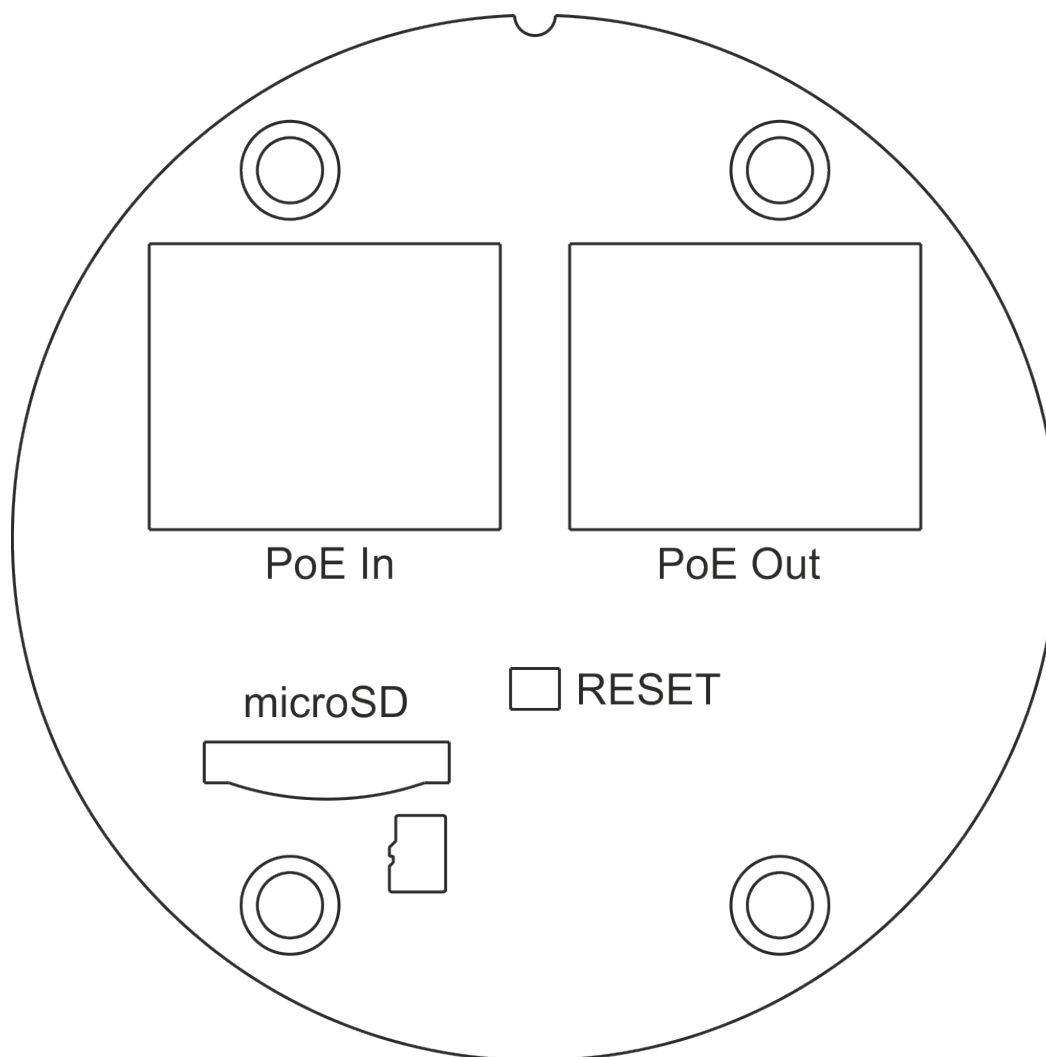
- 07,13,14 - alarm inputs and outputs:

| Connector pin | Function  |
|---------------|-----------|
| 07            | ALARM_IN2 |
| 13            | ALARM_OUT |
| 14            | ALARM_IN1 |

Alarm inputs are pulled up to +3.3 V power. An input is activated by connecting to “ground”.

Alarm output is 0 V in an inactive state and 3.3 V in an active state.

### 1.3.2 Back panel of SG-3C-1312:



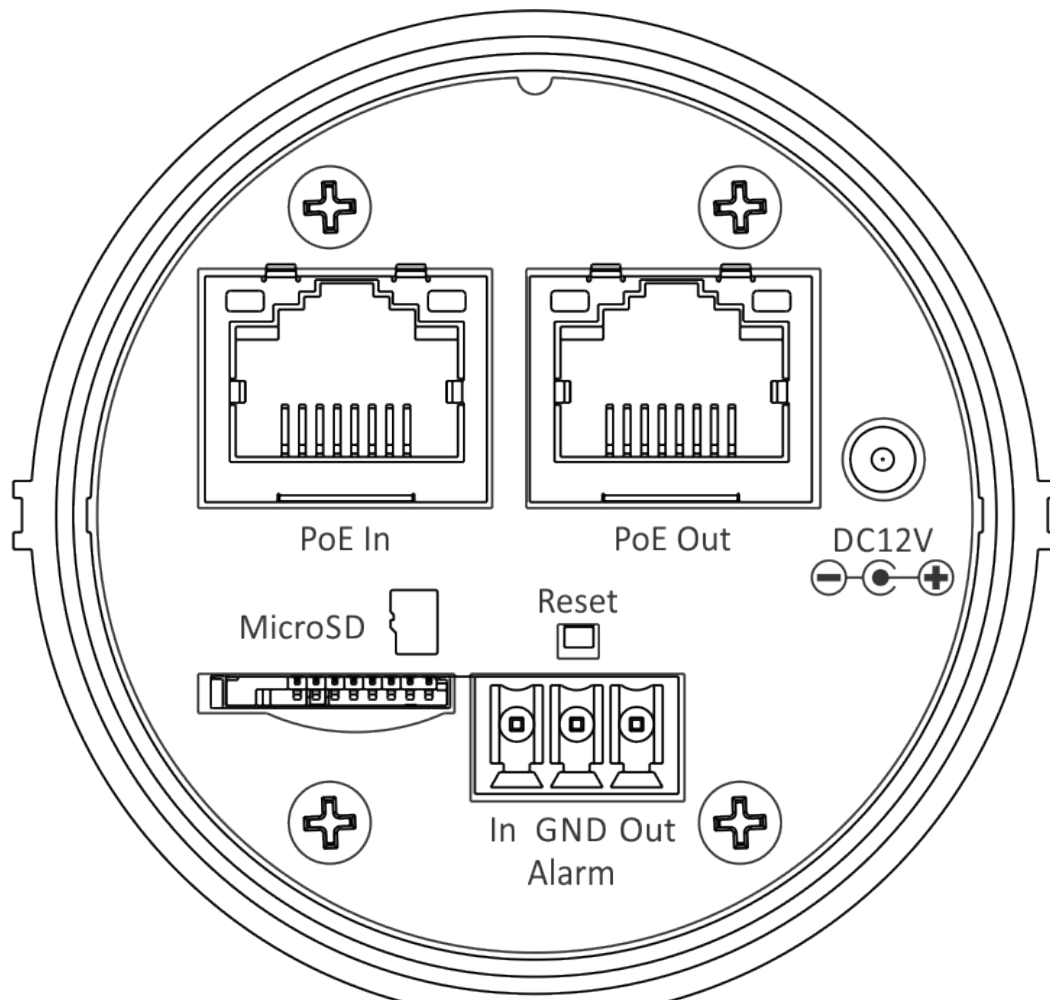
Left to right, downward:

- “PoE In”: PoE Ethernet socket
- “PoE Out”: PoE Ethernet socket

Both sockets are interconnected through a PoE Ethernet switch.

- “Reset”: hidden software reset button
- “MicroSD”: socket for Micro SD cards, “upside down”

### 1.3.3 Back panel of SG-3C-1612:



Rear panel of the SG-3C-1612 is the same as SG-3C-1312 with addition of alarm connector.

In the SG-3C-1612 camera alarm input and output are galvanically isolated by optical coupler.

Alarm input is activated by supplying voltage in range of 2..4 volts or by current 1..16 mA with external resistor.

Optical coupler input is sequence of LED and 220 Ohm resistor.

Alarm output is open collector type. The output is short to ground when asserted. Maximum voltage is 60 V and maximum current is 400 mA.



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# User Guide

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## 2.1 Initial setup

Cameras are supplied by the manufacturer with the unique [Ethernet \(MAC\)](#) addresses already assigned, started with 58-BD-F9, and with one and the same [IP address](#) - 192.168.2.200 - unless it is specified otherwise.

Cameras have stickers on them specifying model, serial number, Ethernet (MAC) address and bar code with Ethernet (MAC) address.

In special cases, cameras may have stickers on them specifying either the complete [IP address](#) assigned or just the last two [octets](#).

Before putting your camera into operation in your local network, it is necessary to assign a unique [IP address](#) to each camera.

To do so, you are to connect the camera either directly to your [PC](#) through an [Ethernet patch cord](#) in case you have a separate power-supply source for your camera or to an [Ethernet switch](#) with a [PoE](#) option;

Assign temporarily the IP address 192.168.2.0/24 (subnet mask 255.255.255.0) for the corresponding [PC](#) interface, and through your [Web browser](#) to go to the camera address 192.168.2.200.

The cameras [Web](#) interface will automatically redirect [Web browser](#) from the port of unprotected [HTTP](#) (80) to the port of protected [HTTPS](#) (443), and the [browser](#) will show information on the untrusted connection. You must agree to the risk of the untrusted connection nevertheless.

After that, a request for the users name and password will appear. The default username and password are “admin” and “system”, respectively.

In the *default page*, a video in the [H.264](#) format will be shown through [RTSP](#), if the [VLC plug-in](#) has been installed.

In the left part of the *camera page*, an inserted cameras configuration menu is shown.

Choose the *Device -> Network* tab, change the *IP address* and *Subnet mask* fields and click the “Save” button.

The *IP address* must be unique for your local network in which the camera will be used.

Immediately after you clicked the “Save” button, the connection with the camera may be lost until you connect the camera into the network again, for which it is now adjusted.

In case you have successfully changed the camera address and it is connected, you can go on with *camera settings*.

It is also desirable, for more safety, to change the passwords of the *Web* user “admin” and the *OS superuser* “root” by clicking the *Device -> Users* tab.

In case the connection with camera is lost and would not restore by any means, you can *reset* it and start from the beginning.

## 2.2 Resetting

In case the connection with camera is lost and would not restore, you can reset it to the factory defaults, with the exception for the *Ethernet (MAC)* address, through the following routine:

- switch off the power of the camera
- switch on the power of the camera
- after 10 seconds after the camera is powered, press the hidden “Reset” button at the camera rear panel for 1-2 seconds with a toothpick or a straightened paper clip
- wait 2 more minutes until the camera resets and reboot
- try to connect to the camera through your *Web browser* with default *IP address* 192.168.2.200.

## 2.3 User interface

In the left of the *browser* screen *camera control menu* is located vertically.

### 2.3.1 Status bar

The status bar is between the image in the top part of the screen and the *control menu* and shows several states of the device:

- **Hostname** Shows the current name of the device (*hostname*). The device name can be set in the *Device -> General* tab.
- **Network**

Shows the state of being connected to the network:

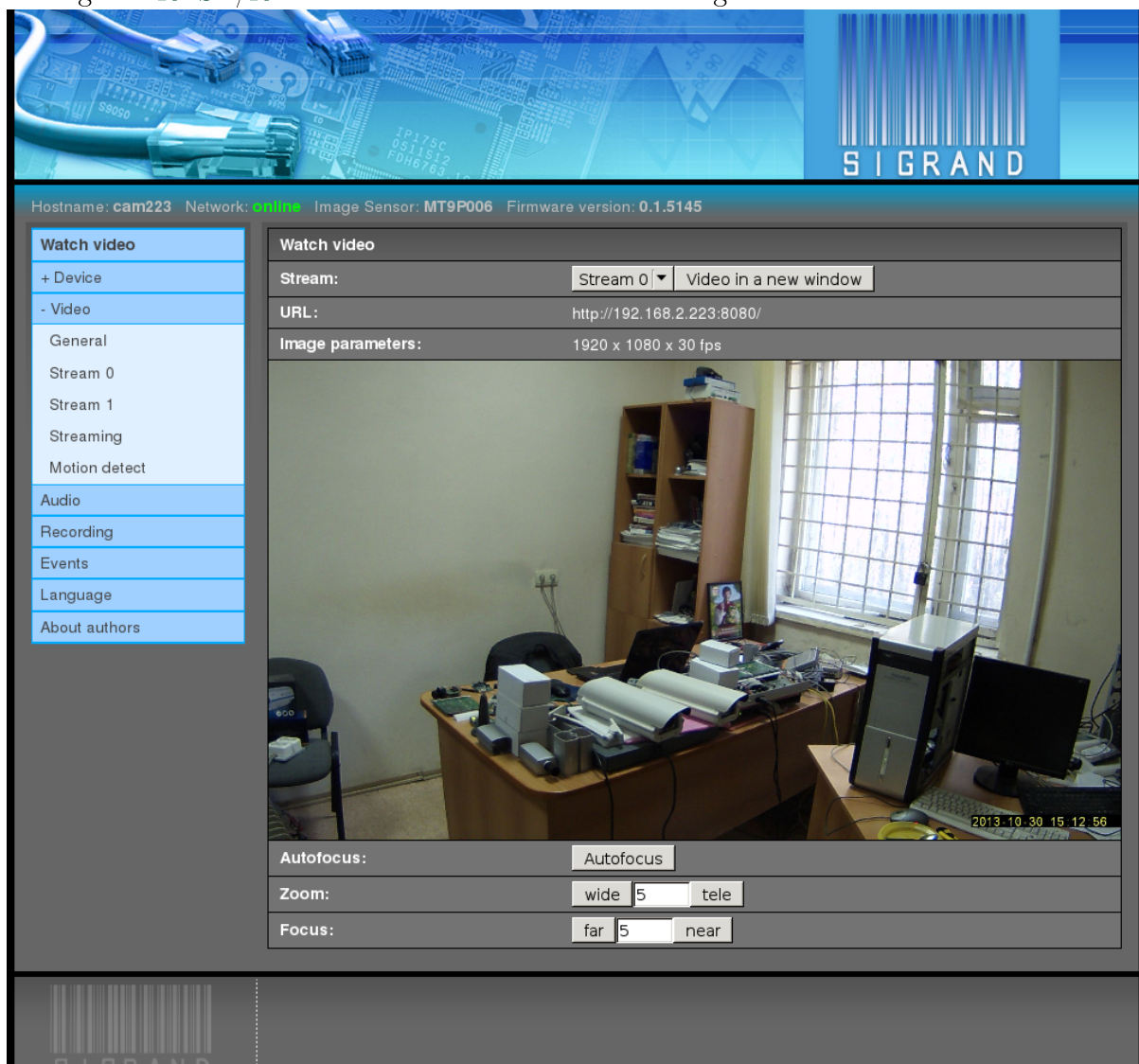
- “online” shown by the green color, or
- “offline” shown with the yellow color, the duration (in seconds) of being offline being specified in brackets.

The state of being online is determined periodically (every 5 seconds) by downloading a small file. Success of the operation defines the state.

- **Image Sensor** Shows the type of **image sensor**.
- **Firmware version** Shows the version of installed **firmware**.

## 2.3.2 Watch video

The item at the very top of the menu, “Watch video”, opens by default and shows the camera video in the default format H.264 through RTSP/RTP unless other streaming formats are set:



**Note:** The browser shows the reduced size of the image; in its initial size, the image would not fit into the screen of some monitors.

**Note:** The time lag between the real objects movement seen by the camera and the received image is about 0.25 second in case of RTSP/RTP streaming.

The browser displays the video by means of a VLC plug-in, which adds up to 2 seconds more to the delay.

For the minimum delay, use either a standalone VLC player with a “-network-caching 200” option:

```
vlc -network-caching 200 rtsp://camera/H264
```

or an mplayer:

```
mplayer rtsp://camera/H264
```

### 2.3.2.1 Stream

The pop-down menu “Stream” selects the number of the video stream to be shown.

### 2.3.2.2 Video in a new window

The button “Video in a new window” opens the video in a separate new window so as not to lose the video when passing to other items in the menu.

### 2.3.2.3 URL

The “URL” string contains the URL through which the current video stream is received. The URL can be given to other client programs in order to make the video stream from the camera available to them.

### 2.3.2.4 Image parameters

This item shows the frame size (in pixels) and frame rate.

### 2.3.2.5 Autofocus

One-time autofocus button.

Works only on cameras with motorized lens.

### 2.3.2.6 Zoom

The “Wide” and “Tele” buttons run stepper motor for a specified number of steps to change the zoom of the lens in the appropriate direction.

Works only on cameras with motorized lens.



### 2.3.2.7 Focus

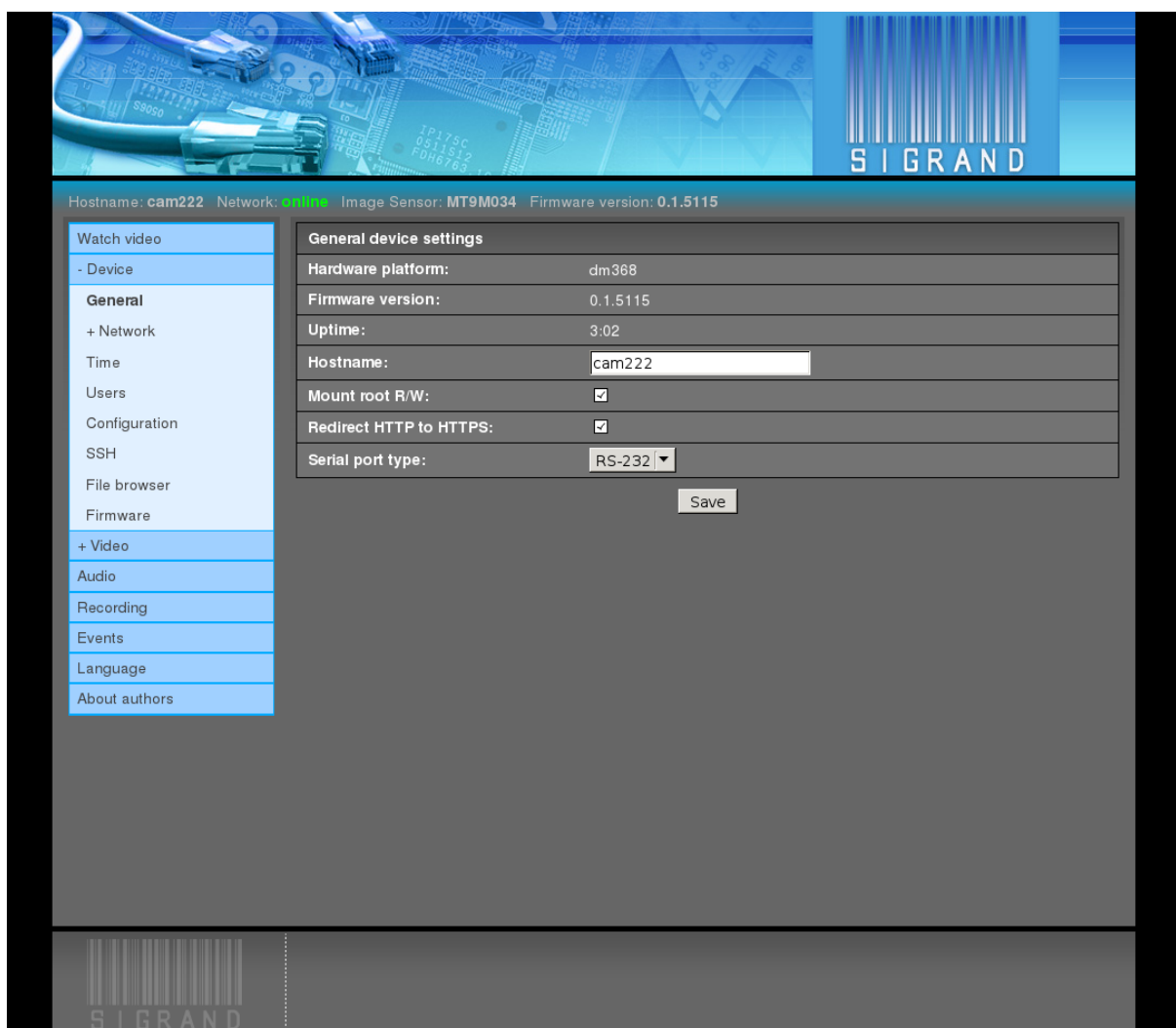
The “Far” and “Near” buttons run stepper motor for a specified number of steps to change the focus of the lens in the appropriate direction.

Works only on cameras with motorized lens.

## 2.3.3 Device

### 2.3.3.1 General

The *Device* → *General* tab shows the general parameters and settings of the device:



- Hardware platform

It shows the version of the Texas Instruments Inc. SoC chip.

The possible values are: dm368, dmva2.

- Firmware version

The version of *firmware* is shown.

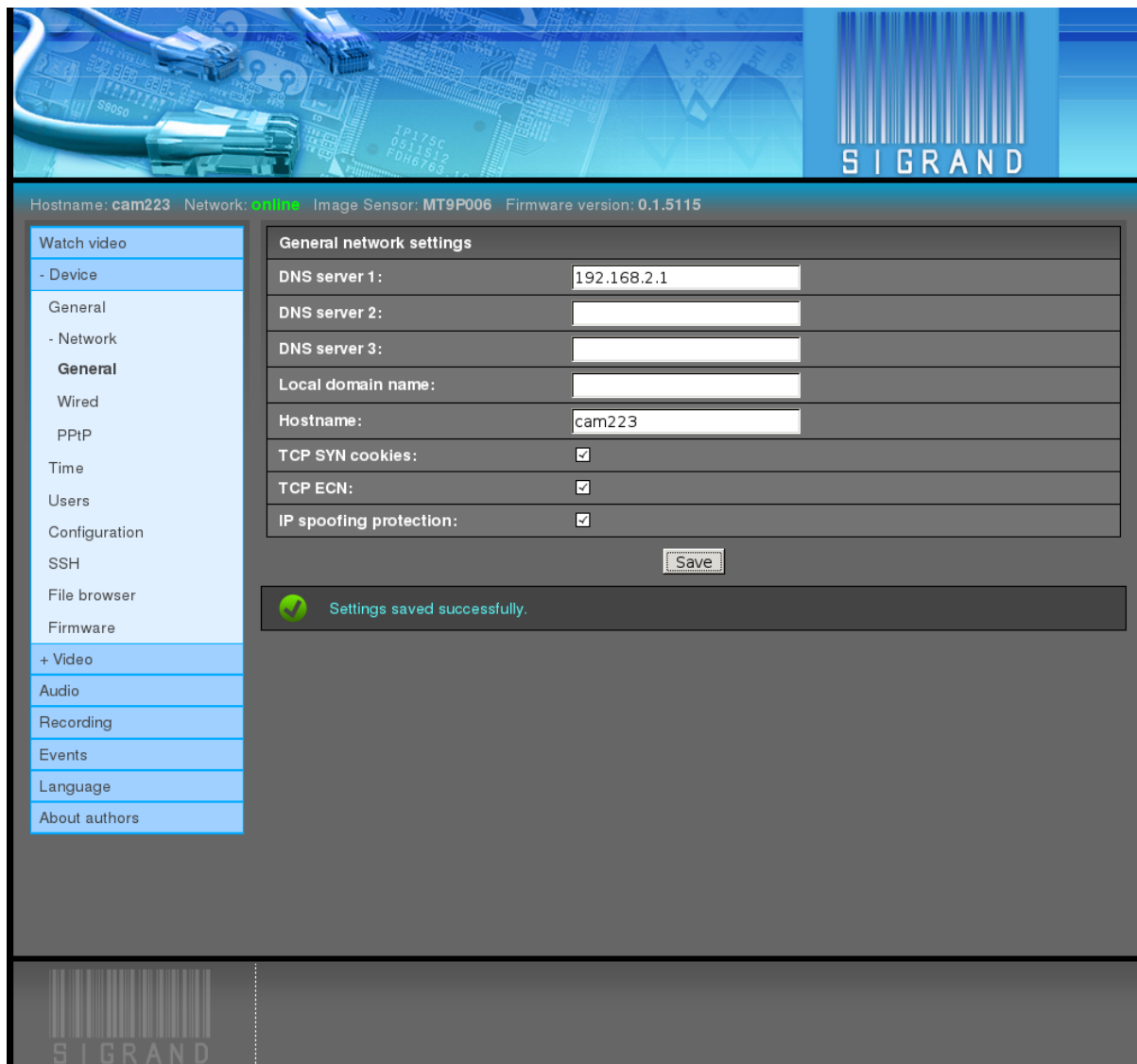
- Uptime  
Shows the time of work since last boot.
- Hostname  
The input field for the name of the device (`hostname`).  
The default value is “sigTlcam”.
- Mount root R/W  
Mounting the root file system for reading and writing.  
Used for debugging.  
The default value is off.
- Redirect HTTP to HTTPS  
Automatically redirect `Web browser` from the port of unprotected `HTTP` (80) to the port of protected `HTTPS` (443),  
The default value is on.
- Serial port type  
The pop-down menu for setting the type of the `serial port` used in managing of a weather-proof housing or a `PTZ` drive.  
The possible values are: `RS-232`, `RS-485`.  
The default value is `RS-232`.

### 2.3.3.2 Network

The *Device* → *Network* tab is used to adjust the networking settings of the device.

#### General

The *Device* → *Network* → *General* tab is used to adjust the common part of different types of network connections of the device:



**DNS server 1,2,3** In the “Name server” 1,2,3 fields, the DNS server addresses is defined.

The default value is empty.

**Local domain name** The input field is value of “domain” directive of /etc/resolv.conf file.

Example: sigrand.local

The default value is empty

**Hostname** The input field for the name of the device (hostname).

The default value is “sigTlcam”.

This field is the same as the one in *Device* -> *General* tab.

**TCP SYN cookies** The flag “TCP SYN cookies” switches the corresponding flag ([http://en.wikipedia.org/wiki/SYN\\_cookies](http://en.wikipedia.org/wiki/SYN_cookies)) of the network stack of the device OS kernel, in order to prevent the corresponding network attack ([http://en.wikipedia.org/wiki/SYN\\_flood](http://en.wikipedia.org/wiki/SYN_flood)).

The default value is on.

**TCP ECN** The flag “TCP ECN” switches the corresponding flag ([http://en.wikipedia.org/wiki/Explicit\\_Congestion\\_Notification](http://en.wikipedia.org/wiki/Explicit_Congestion_Notification)) of the network stack of the device OS kernel.

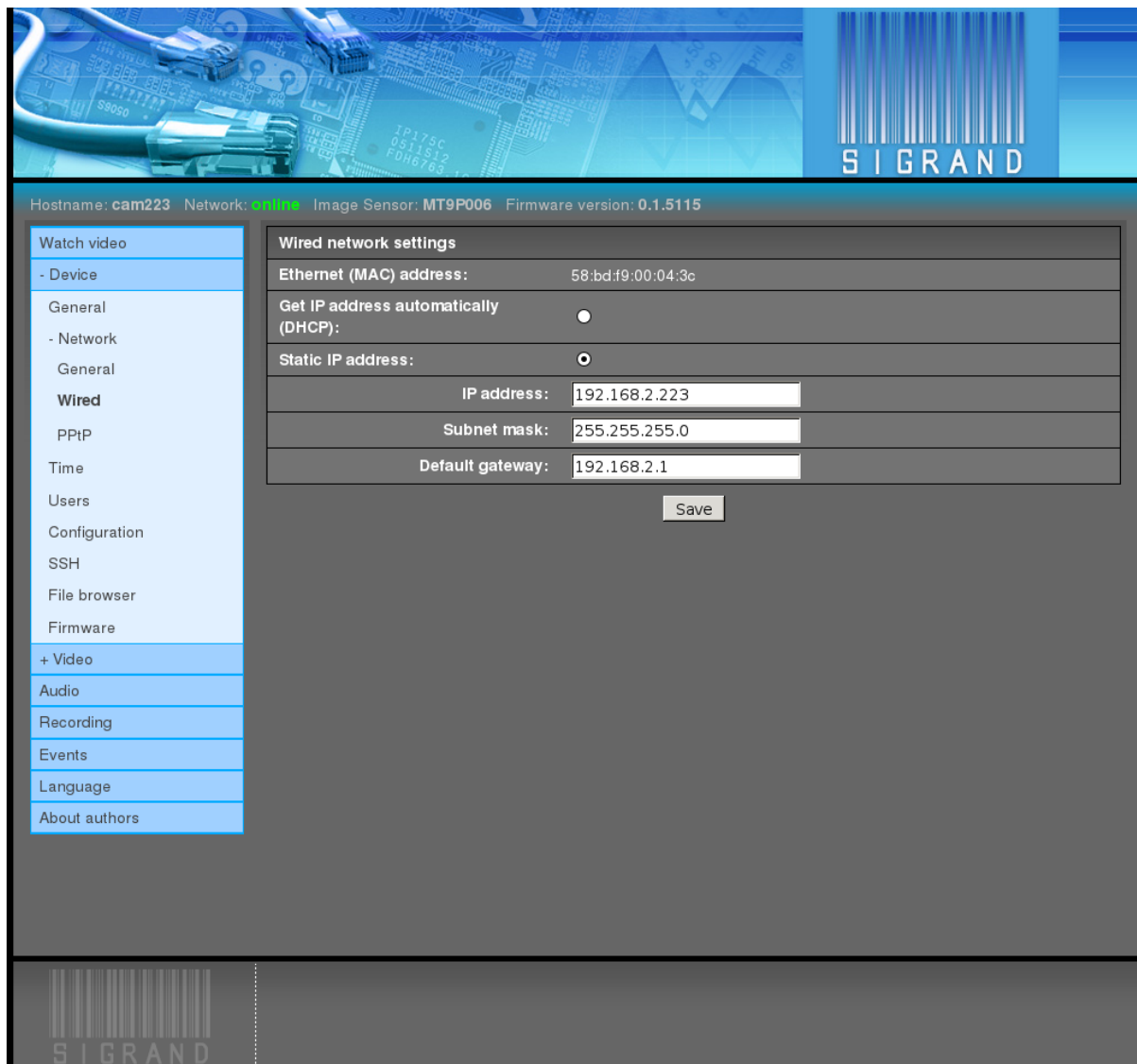
The default value is on.

**IP spoofing protection** The flag “IP spoofing protection” switches the corresponding flag ([http://en.wikipedia.org/wiki/IP\\_spoofing](http://en.wikipedia.org/wiki/IP_spoofing)) of the network stack of the device OS kernel, in order to prevent the corresponding network attack.

The default value is on.

### Wired

The *Device* → *Network* → *Wired* tab is used to adjust the wired Ethernet connection of the device:



**Ethernet (MAC) address** When manufactured, the device gets its unique [Ethernet \(MAC\)](#) address which is preserved across resetting.

[Ethernet \(MAC\)](#) address is stored in a file on configuration partition and is supplied with no special protection against loss or corruption, just as all the other configuration files.

The default value is 00:00:11:22:33:44.

**Get IP address automatically (DHCP)** The flag permitting to get the [IP address](#) automatically through the [DHCP](#).

Depends on availability of a [DHCP](#) server in the network and on the servers settings. If the configuration of the [DHCP](#) server does not provide that a fixed [IP address](#) should be assigned to this [Ethernet \(MAC\)](#) address, in most cases a vacant pseudo-random address selected from the corresponding address pool will be assigned to the device.

The default value is off.

**Static IP address** The flag assigning the static IP address from the field “IP address” to the network interface.

The default value is on.

**IP address** The input field of “IP address”.

This address is to be assigned by hand, and it has to be unique in the network where the device is going to be used.

The default value is 192.168.2.200

**Subnet mask** In the field “Subnet mask”, a mask is assigned to separate the IP address of the network node from the network address.

The default value is 255.255.255.0

**Default gateway** In the field “Default gateway”, the IP address of the router is defined.

The default value is 192.168.2.1.

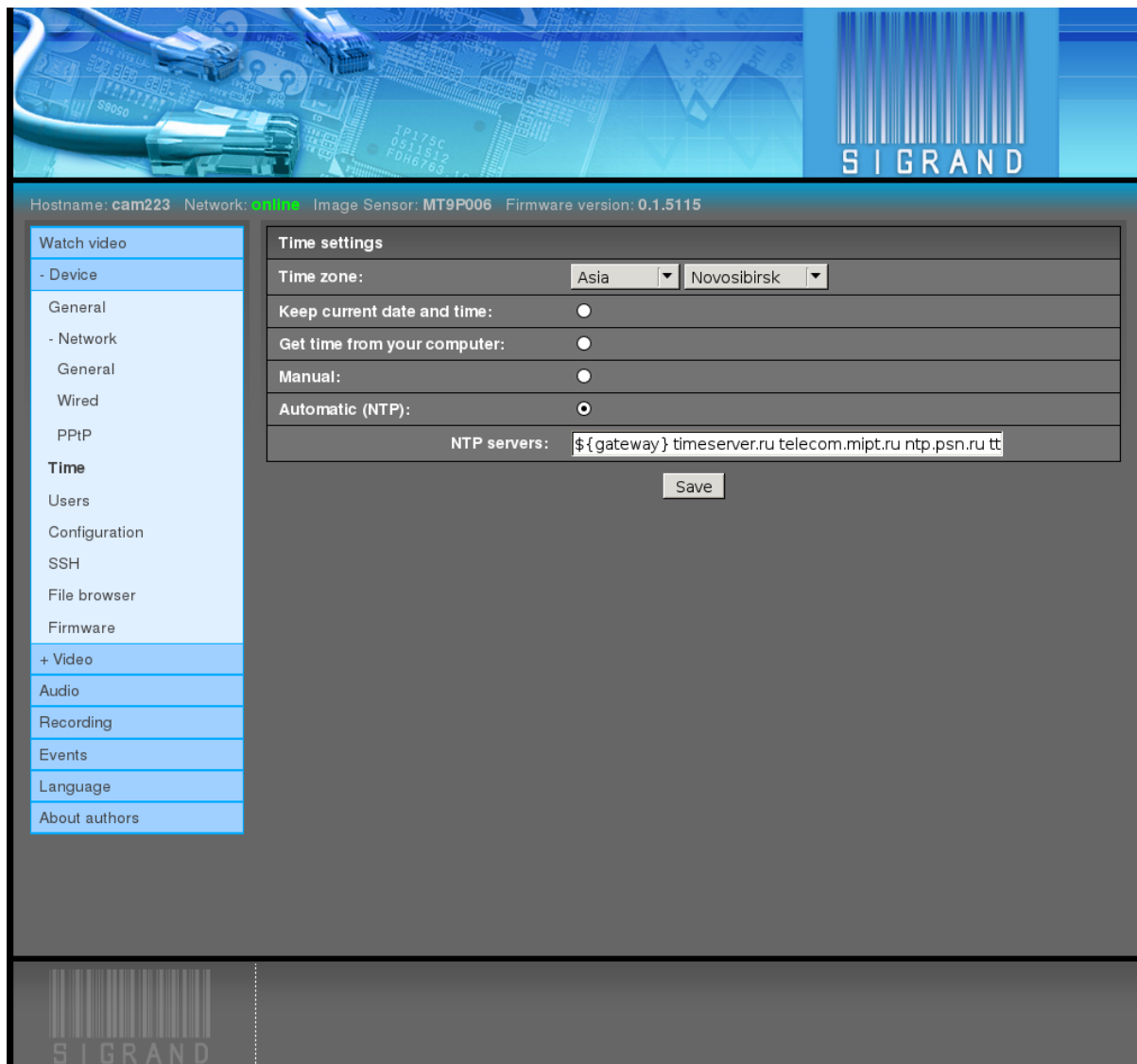
The field can be left blank or assigned the value 0.0.0.0.

In local networks, there is no need for a gateway; however, it can be useful for the following purposes:

- to have Internet access for the device, which allows its connection with NTP servers in order to maintain high-precision time shown in the video stream;
- to have an own NTP server at the gateway when Internet connection is forbidden;

### 2.3.3.3 Time

The *Device* → *Time* tab opens an interface for setting time synchronization of the device:



## Time zone

The pop-down menus “Time zone” selects the time shift of the local time against the Universal Time Coordinated (UTC)

The default value is Asia/Novosibirsk.

## Mutually exclusive flags

- Keep current date and time:  
No time manipulations are performed
- Synchronize with your computer time
- Manual  
Time is set by entering it manually

- Automatic (NTP)

An [NTP daemon](#) works at the device constantly synchronizing time from the [NTP](#) servers specified below.

The default value is automatically ([NTP](#)).

### NTP servers

The input field “NTP servers” contains a list of time servers names.

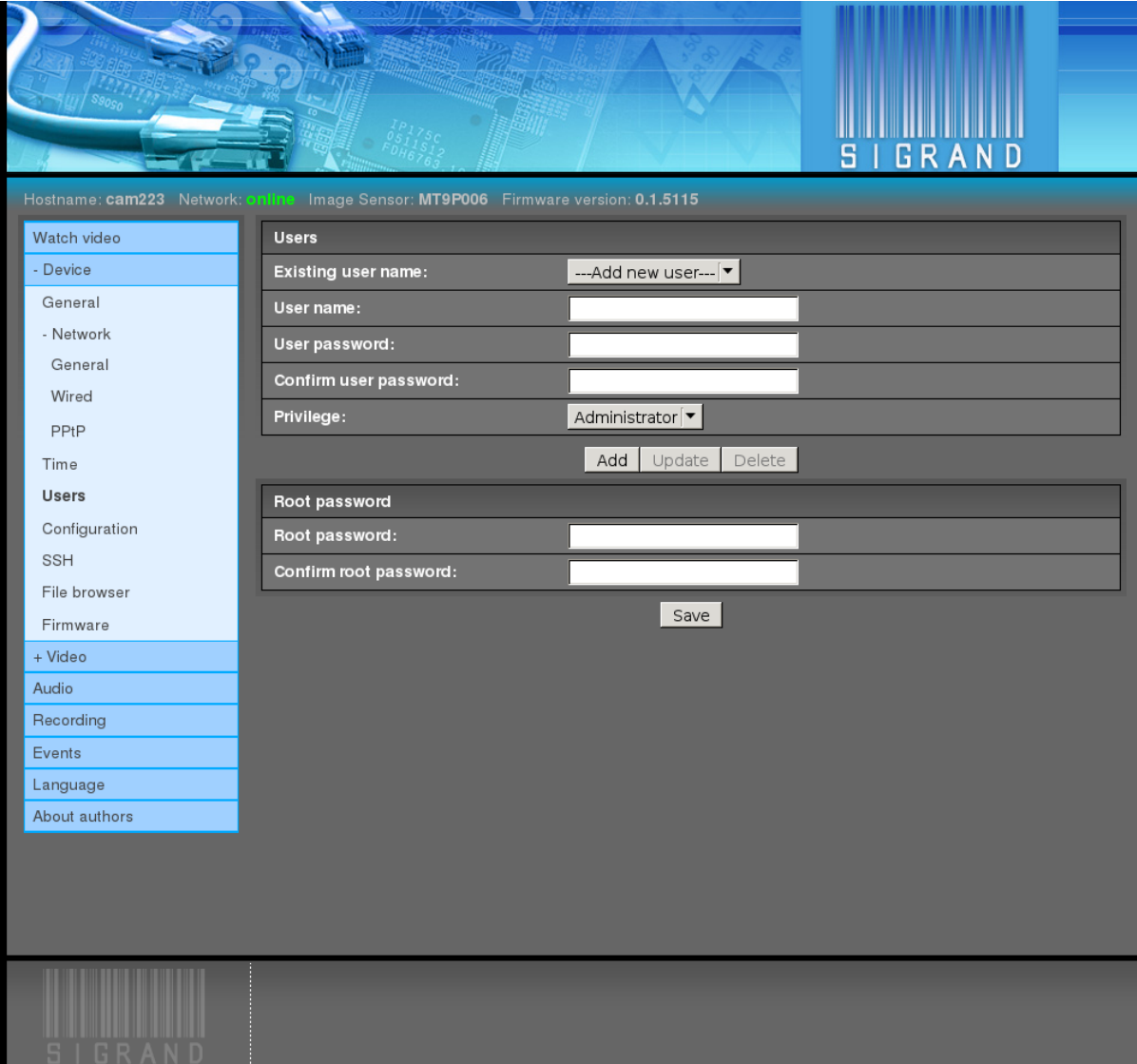
The default value is “`${gateway} timeserver.ru telecom.mipt.ru ntp.psn.ru ttm.chant.ru`”.

**Note:** The first server `${gateway}` is a reference to the variable containing “*Default gateway*”. In case there is an [NTP](#) server established at the [gateway](#), the device will get time synchronization from the server.

### 2.3.3.4 Users

The *Device* → *Users* tab is used for adjusting users settings. It gives the possibility to change the [Web](#) admin password, add new [Web](#) users, and change the password of the OS superuser (root):





Hostname: cam223 Network: online Image Sensor: MT9P006 Firmware version: 0.1.5115

**Watch video**

- Device
  - General
  - Network
    - General
    - Wired
    - PPtP
    - Time
    - Users**
    - Configuration
    - SSH
    - File browser
    - Firmware
- + Video
  - Audio
  - Recording
  - Events
  - Language
  - About authors

**Users**

Existing user name:

User name:

User password:

Confirm user password:

Privilege:

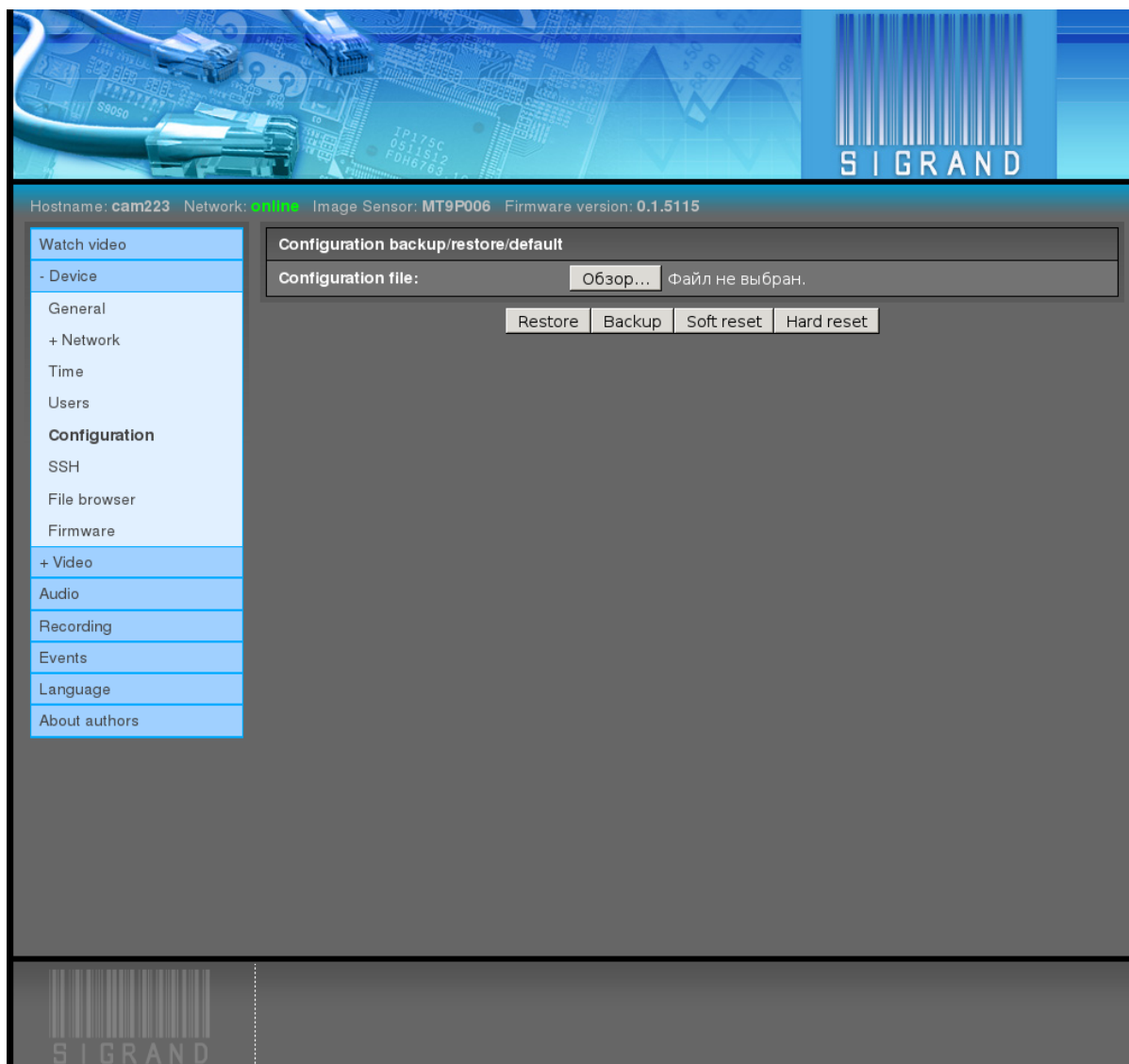
**Root password**

Root password:

Confirm root password:

### 2.3.3.5 Configuration

The *Device* → *Configuration* tab is used to save the current configuration of the device to a file at the file system of the PC which run *browser*, to restore the device configuration from the file, and to reset the configuration:



### 2.3.3.6 SSH

You can use the *Device* → *SSH* tab to add users public keys so that access through the SSH protocol will proceed without entering a password.

If you do not have a public key, you can create it with a command in a user shell of your computer:

```
ssh-keygen -t rsa
```

```
Generating public/private rsa key pair.
```

```
Enter file in which to save the key (/home/tst/.ssh/id_rsa):
```

```
Created directory '/home/tst/.ssh'.
```

```
Enter passphrase (empty for no passphrase):
```

```
Enter same passphrase again:
```

```
Your identification has been saved in /home/tst/.ssh/id_rsa.
```

```
Your public key has been saved in /home/tst/.ssh/id_rsa.pub.
```

```
The key fingerprint is:
```

```
0f:b3:a2:cf:6e:98:a3:c3:e1:51:30:9a:86:be:fc:02 tst@dfsig
```

The key's randomart image is:

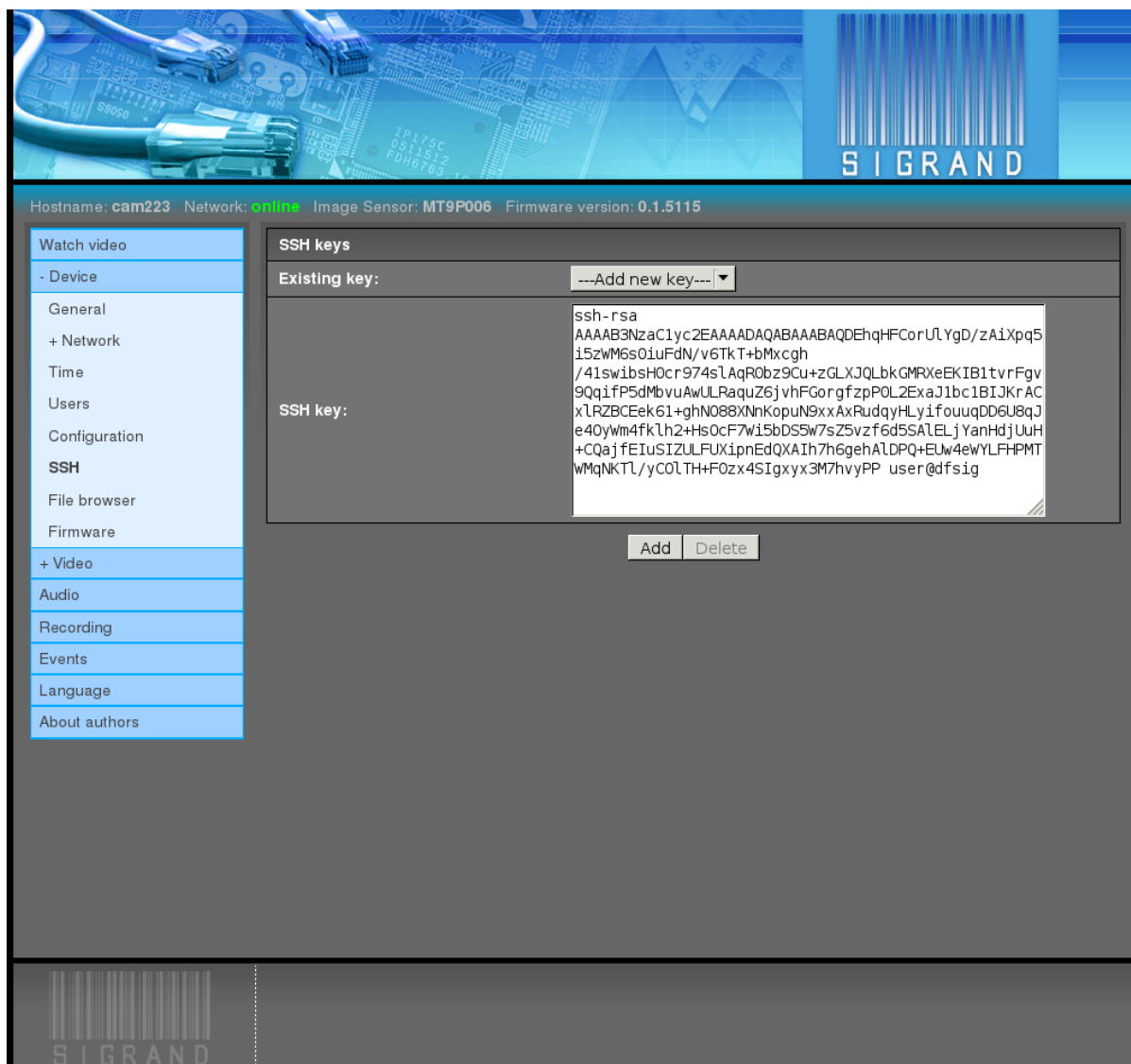
```
+--[ RSA 2048]-----+
|
| o
|.o o
|+. .
|o . S
|E.o =
|oo.o o. . .
| ++ +o..
| ++.=+
+-----+
```

Then output the created key .. code-block:: sh

```
cat $HOME/.ssh/id_rsa.pub
```

```
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAQBAQDVQbG8+dxn/bmAZmNrYc+Mqs
QeL11bX2h3UkH9uAeUssw2czQxSryHdQZaRgdCliFPdq07NYB1pQxWDcX2ES3C
wv6g2lshQyHmvrxcxFmxYQ/U9LtW7fk/5Ad2piSJkvKQgbxU4uvFnHlBT0yOKl
Zhd3wd5STEWMF2q9FORpROMZz9pb/ALnCQgSXjEBJRcrq8fwu74t+E/5P1n8If
2+1Vwk1v+Gen7106xvcWICmPPs/Q0/twGOA6cVmFHg4+Ag91yoC2+jCU4kQhjm
lVuaUSRCL2UWhltJJjRCXkdf+jJgfN1WhJjsMoSizH1u6fC1ju1B12C2gqn73m
qVPTc9Jn tst@sigrand
```

and select it with a triple click of the left mouse button. Insert the selected fragment into the field “SSH key” by clicking the middle button of the mouse:



and press the button “Add”. Note:

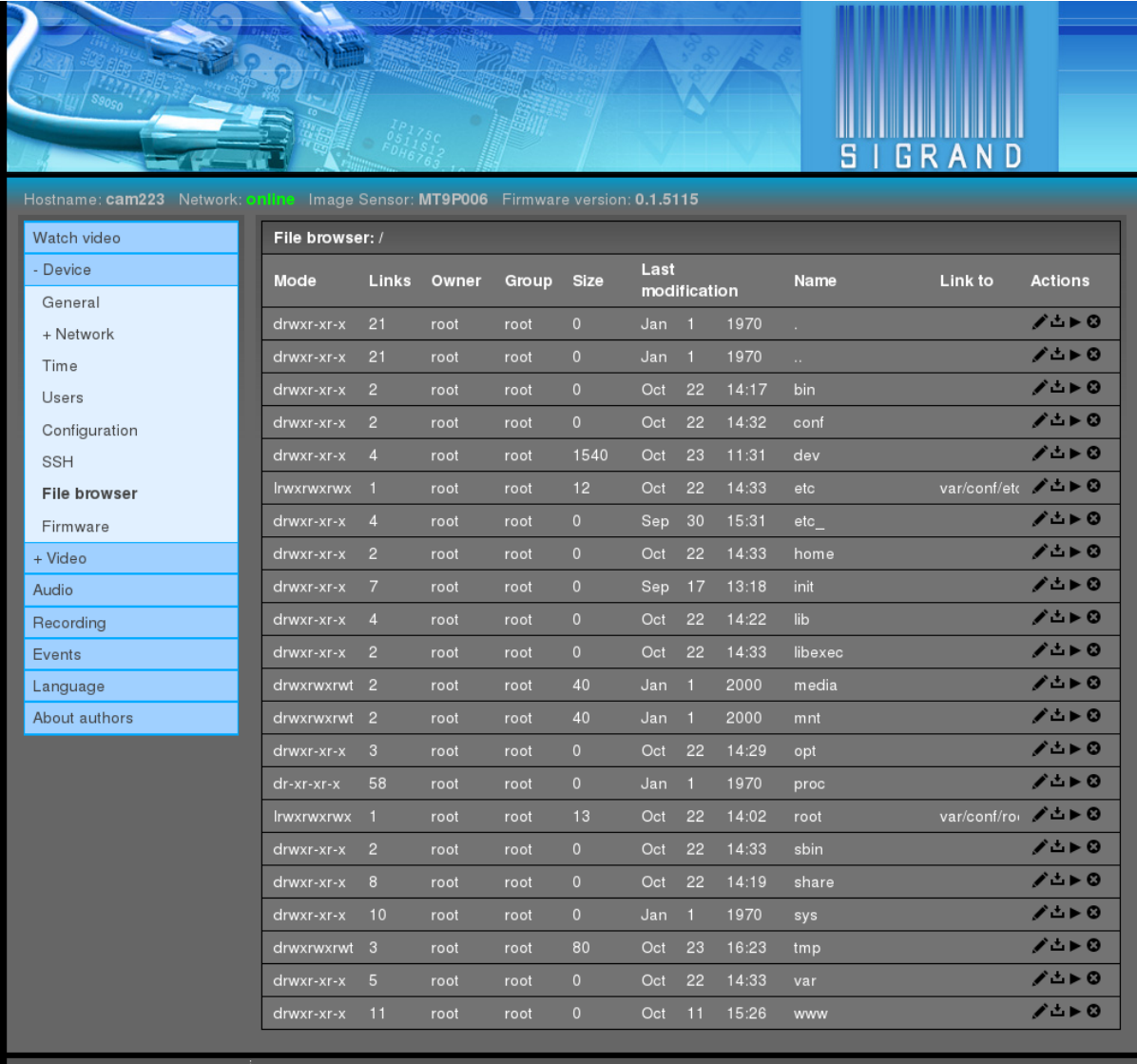
If the operating system used at your computer is Microsoft Windows, then you can make use of one of the SSH client programs for Windows:

PuTTY, SecureCRT, ShellGuard, Axessh, ZOC, SSHWindows, ProSSHD, or XShell

and the routine of creating keys will be different.

### 2.3.3.7 File browser

The *Device* → *File browser* tab can be used to view the list of files of the mounted file systems of the device, view and edit files, save a device file to the computer where the Web browser is started, start or remove a file:



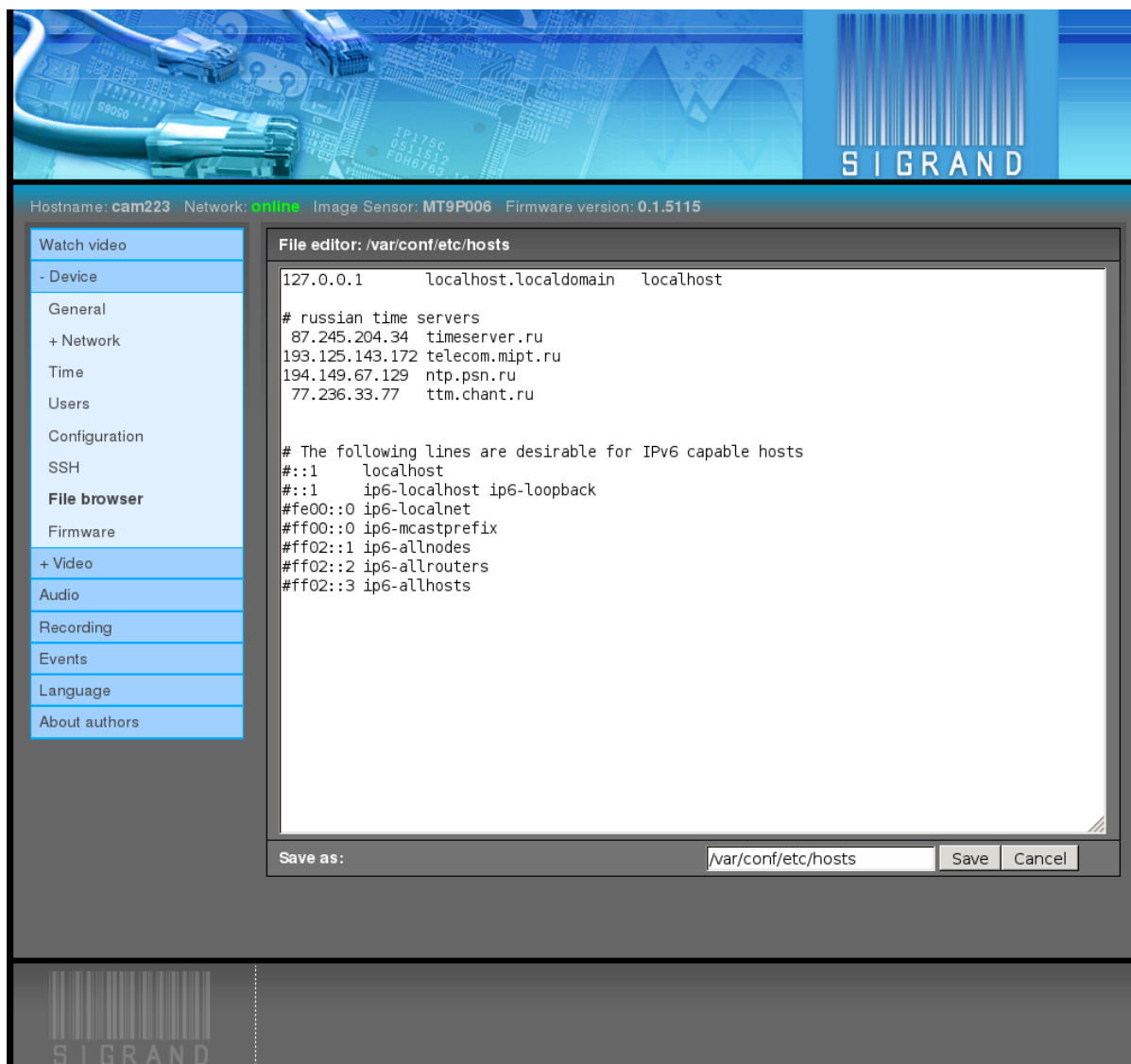
The screenshot shows the Sigrand IP video camera web interface. At the top, there is a header with a blue background featuring a circuit board and a barcode. The header includes the text "Sigrand" and a barcode. Below the header, the interface displays the following information: Hostname: cam223, Network: 192.168.1.100, Image Sensor: MT9P006, Firmware version: 0.1.5115.

On the left side, there is a sidebar menu with the following items: Watch video, - Device, General, + Network, Time, Users, Configuration, SSH, File browser (selected), Firmware, + Video, Audio, Recording, Events, Language, and About authors.

The main content area displays a file browser interface. The title is "File browser: /". Below the title is a table with the following columns: Mode, Links, Owner, Group, Size, Last modification, Name, Link to, and Actions.

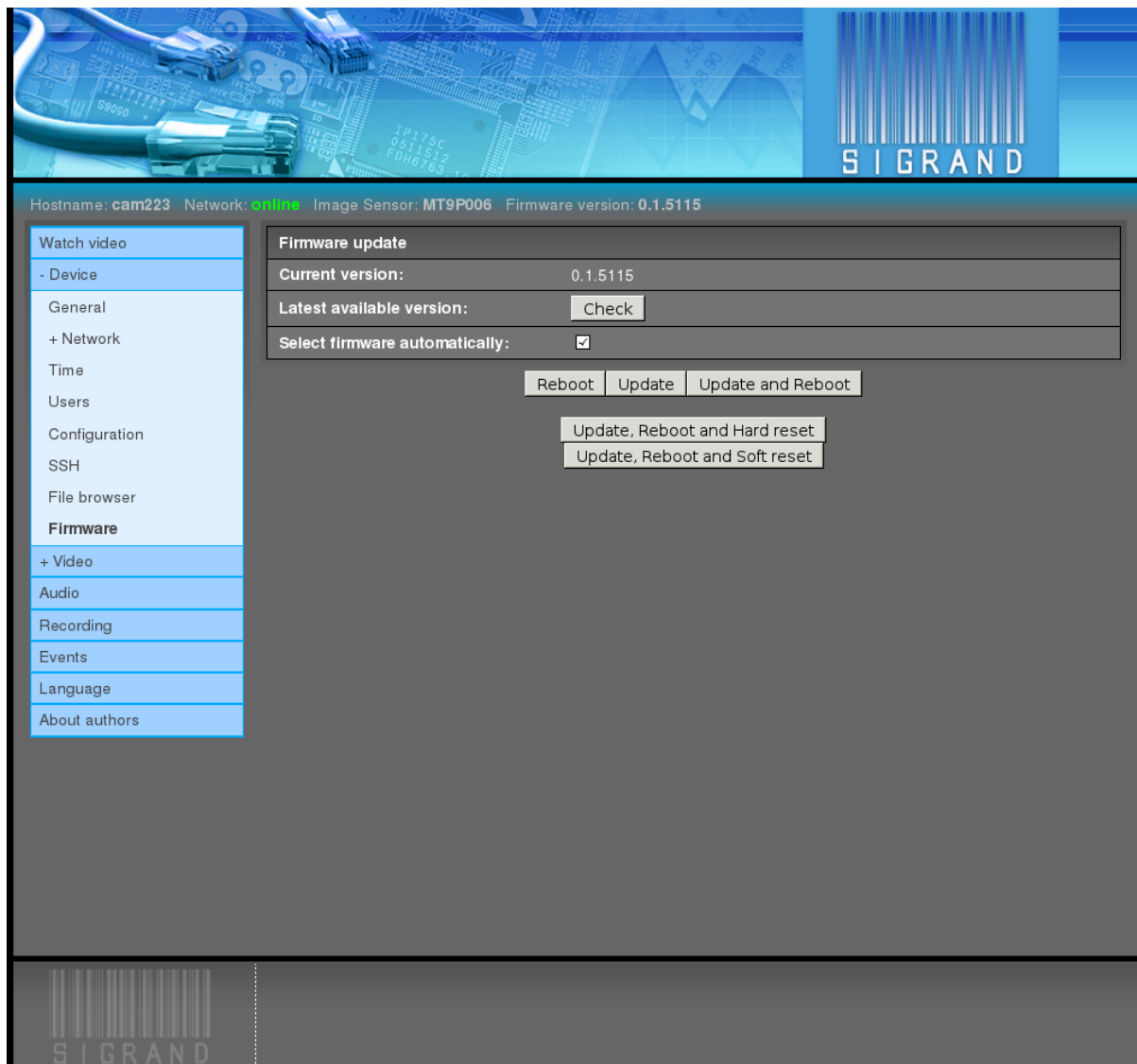
| Mode       | Links | Owner | Group | Size | Last modification | Name    | Link to      | Actions                  |
|------------|-------|-------|-------|------|-------------------|---------|--------------|--------------------------|
| drwxr-xr-x | 21    | root  | root  | 0    | Jan 1 1970        | .       |              | [edit] [upload] [delete] |
| drwxr-xr-x | 21    | root  | root  | 0    | Jan 1 1970        | ..      |              | [edit] [upload] [delete] |
| drwxr-xr-x | 2     | root  | root  | 0    | Oct 22 14:17      | bin     |              | [edit] [upload] [delete] |
| drwxr-xr-x | 2     | root  | root  | 0    | Oct 22 14:32      | conf    |              | [edit] [upload] [delete] |
| drwxr-xr-x | 4     | root  | root  | 1540 | Oct 23 11:31      | dev     |              | [edit] [upload] [delete] |
| lrwxrwxrwx | 1     | root  | root  | 12   | Oct 22 14:33      | etc     | var/conf/etc | [edit] [upload] [delete] |
| drwxr-xr-x | 4     | root  | root  | 0    | Sep 30 15:31      | etc_    |              | [edit] [upload] [delete] |
| drwxr-xr-x | 2     | root  | root  | 0    | Oct 22 14:33      | home    |              | [edit] [upload] [delete] |
| drwxr-xr-x | 7     | root  | root  | 0    | Sep 17 13:18      | init    |              | [edit] [upload] [delete] |
| drwxr-xr-x | 4     | root  | root  | 0    | Oct 22 14:22      | lib     |              | [edit] [upload] [delete] |
| drwxr-xr-x | 2     | root  | root  | 0    | Oct 22 14:33      | libexec |              | [edit] [upload] [delete] |
| drwxrwxrwt | 2     | root  | root  | 40   | Jan 1 2000        | media   |              | [edit] [upload] [delete] |
| drwxrwxrwt | 2     | root  | root  | 40   | Jan 1 2000        | mnt     |              | [edit] [upload] [delete] |
| drwxr-xr-x | 3     | root  | root  | 0    | Oct 22 14:29      | opt     |              | [edit] [upload] [delete] |
| dr-xr-xr-x | 58    | root  | root  | 0    | Jan 1 1970        | proc    |              | [edit] [upload] [delete] |
| lrwxrwxrwx | 1     | root  | root  | 13   | Oct 22 14:02      | root    | var/conf/ro  | [edit] [upload] [delete] |
| drwxr-xr-x | 2     | root  | root  | 0    | Oct 22 14:33      | sbin    |              | [edit] [upload] [delete] |
| drwxr-xr-x | 8     | root  | root  | 0    | Oct 22 14:19      | share   |              | [edit] [upload] [delete] |
| drwxr-xr-x | 10    | root  | root  | 0    | Jan 1 1970        | sys     |              | [edit] [upload] [delete] |
| drwxrwxrwt | 3     | root  | root  | 80   | Oct 23 16:23      | tmp     |              | [edit] [upload] [delete] |
| drwxr-xr-x | 5     | root  | root  | 0    | Oct 22 14:33      | var     |              | [edit] [upload] [delete] |
| drwxr-xr-x | 11    | root  | root  | 0    | Oct 11 15:26      | www     |              | [edit] [upload] [delete] |

View/edit file /etc/hosts:



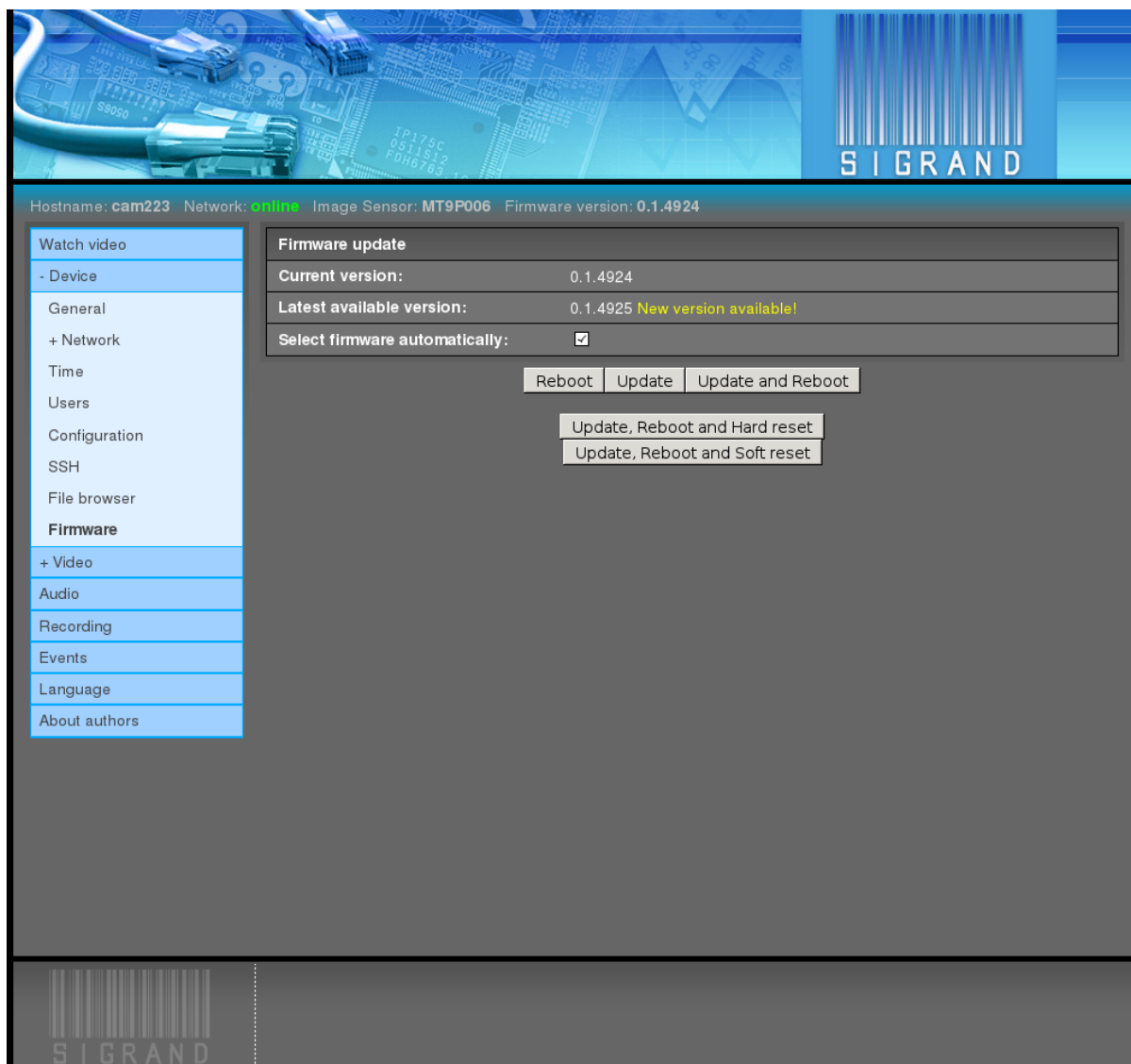
### 2.3.3.8 Firmware

The *Device* → *Firmware* tab is used to update the [firmware](#) of the device.



The “Check” button checks availability of a new firmware version at the manufacturer site, if the camera has access to the Internet.

If the latest version at the manufacturer site is newer than current one, a message “New version available!” is shown.

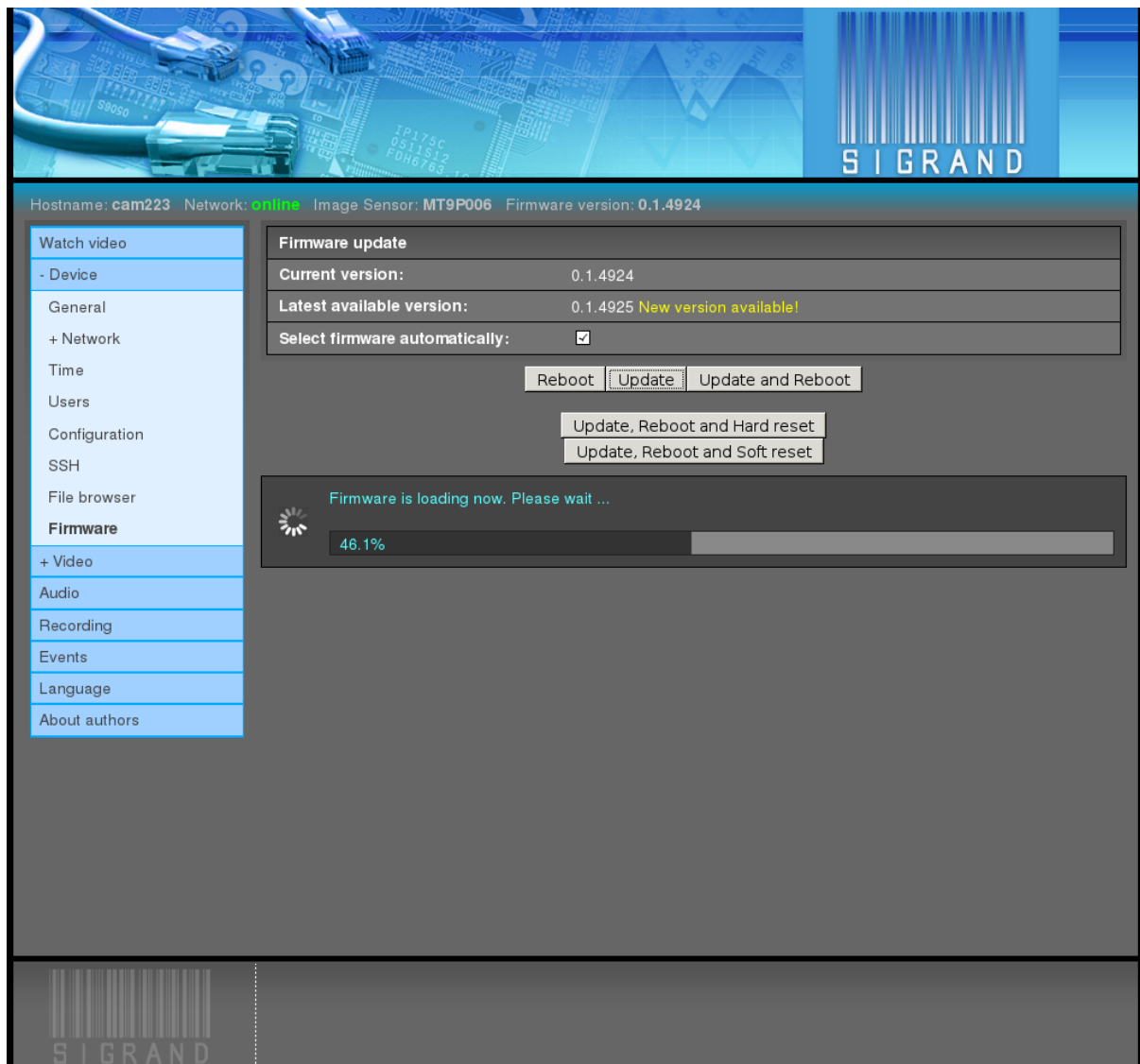


If access to the Internet is not available, you can update the firmware from your PC by unchecking the box “Select firmware automatically” and choosing a firmware update file by the “Browse” button. The file should be downloaded beforehand from the manufacturer site.

The firmware update files are published at the site of the device manufacturer <http://sigrand.ru/dl/camera/ti/firmware> and have the following form: sigticam-  
<platform>-<version>.tar.

After choosing the firmware update file,  
click the button “Update and Reboot”:



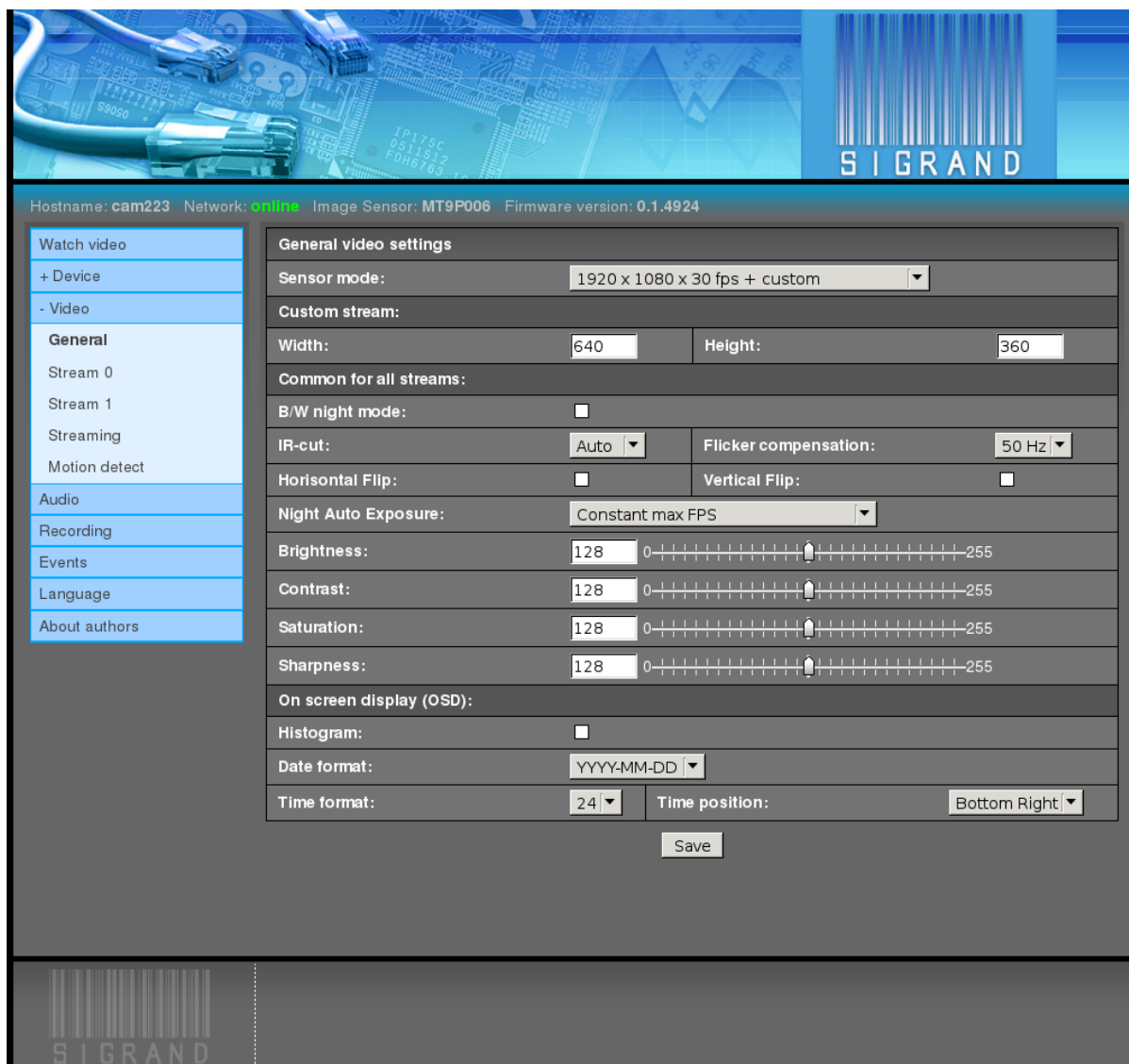


It takes up to 90 seconds to perform reboot with **firmware** update.

## 2.3.4 Video

### 2.3.4.1 General

The *Video* → *General* tab adjusts the general video parameters:



## Sensor mode

The pop-down menu “Sensor mode” defines the image sensor mode and at the same time parameters of the second and third video streams.

The default value depends on the type of the image sensor: 1920 x 1080 for [AR0331](#) and [MT9P006](#), 1280 x 720 for [MT9M034](#).

## Custom stream

The input fields “Width” and “Height” for parameters of the second stream if it is enabled by “Sensor mode”.

The default values is 640 x 360.

## B/W night mode

Enables automatic Black-White mode at low light condition (at night).

## IR-cut

The pop-down menu “IR-cut” selects the mode of the IR filter:

- Auto  
The filter opens automatically in a low light condition (at night) and closed in a high light condition (in the daytime).
- Close  
The filter is always closed.
- Open  
The filter is always opened.

## Flicker compensation

The pop-down menu “Flicker compensation” is used to set the feeding current frequency for the illuminating lamps which create the effect of the image flickering.

The possible values are:

- No  
No flicker compensation is made
- 50 Hz  
Flicker compensation is made for the lamps fed by 50-Hz current
- 60 Hz  
Flicker compensation is made for the lamps fed by 60-Hz current

## Horizontal Flip; Vertical Flip

The flags of horizontal and vertical mirroring are used to switch on rotatory reflection round the horizontal and vertical axis, respectively.

The feature is useful when the camera is fixed in a wrong position.

## Night Auto Exposure

The pop-down menu “Night Auto Exposure:” is used to select priorities for the automatic exposure algorithm.

The possible values are:

- Constant max FPS

In this case, intensity of illumination is maintained through intensification, with the frame rate being kept to the utmost at the prescribed level.

- Variable FPS from max to half of max

In this case, intensity of illumination is maintained by increasing exposure at the expense of the frame rate up to half of max FPS

- Constant 5 FPS

### Brightness, Contrast, Saturation, Sharpness

You can use the input fields and graphic slider bars to adjust the corresponding parameters.

The range of values is 0 .. 255.

The default value is 128.

### HDR mode

The flag “HDR mode” is used to switch on the High Dynamic Range (HDR) mode when several pre-frames of the object taken with various exposures are superposed to produce a single fully-featured high-quality frame of natural contrast and color grade.

This feature allows surveillance in a complicated environment, for instance, when the site of surveillance gets alternately in the sun and in the shade, or when the camera is spotlighted with directional glaring light.

The “HDR mode” is presented only for image sensors [MT9M034](#) and [AR0331](#).

Adaptive Local Tone Mapping It is recommended to turn on this parameter in outdoor conditions or indoor with bright objects.

With high noise level indoor try turn this parameter off.

“Adaptive Local Tone Mapping” is presented only for image sensor [AR0331](#).

### Histogram

When the flag “Histogram” is switched on, the [histogram](#) is displayed in the left bottom corner, superimposed over the video.

### Date format

The pop-down menu “Date format” selects the format of displaying data in the video stream.

The possible values are:

- DD.MM.YYYY
- MM/DD/YYYY
- YYYY-MM-DD

The default value is YYYY-MM-DD

where:

- DD is the day of the month, 1..31
- MM is the number of the month, 1..12
- YYYY: year, 4 digits

### Time format

The pop-down menu “Time format” selects the format of displaying time in the video.

The possible values are:

- 12
- 24

The default value is 24.

### Date and Time position

The pop-down menu “Date and Time position” defines where to display the date and time.

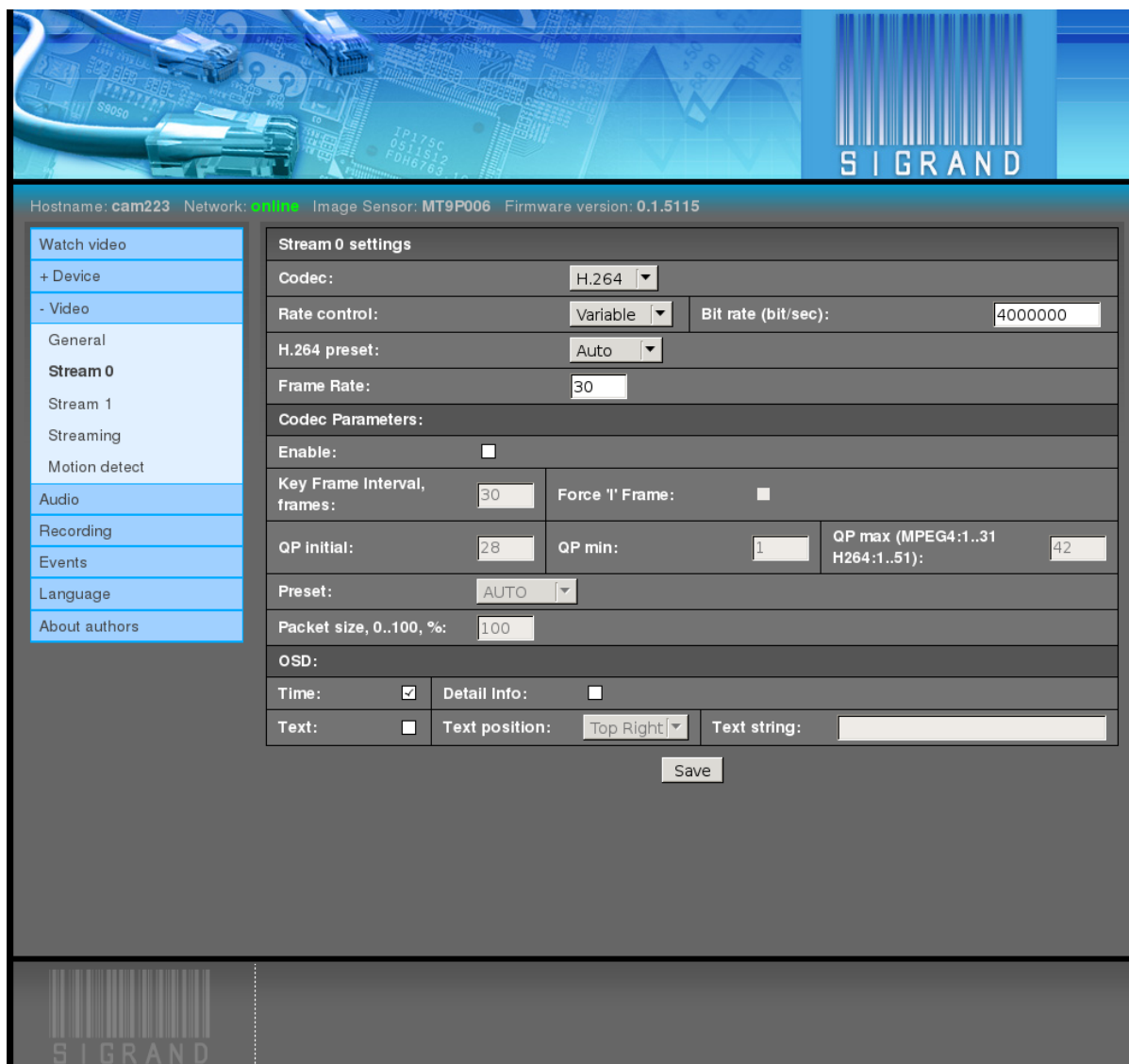
The possible values are:

- Bottom Right
- Bottom Left

The default value is Bottom Right

#### 2.3.4.2 Stream N

The *Video* → *Stream N* tabs, where N is the stream number 0,1, show the settings for the video streams; the size of their images is selected in the settings of *image sensor mode*:



The image shows the web interface of a Sigrand IP video camera. At the top, there is a banner with a blue background featuring circuitry and a barcode. Below the banner, the status bar shows: Hostname: cam223, Network: online, Image Sensor: MT9P006, Firmware version: 0.1.5115. On the left is a sidebar menu with options: Watch video, + Device, - Video, General, Stream 0 (selected), Stream 1, Streaming, Motion detect, Audio, Recording, Events, Language, and About authors. The main area is titled 'Stream 0 settings' and contains various configuration fields. A 'Save' button is located at the bottom of the settings area. The bottom of the page features a large grey area with a Sigrand logo and barcode on the left.

Hostname: cam223 Network: online Image Sensor: MT9P006 Firmware version: 0.1.5115

**Stream 0 settings**

Codec: H.264

Rate control: Variable Bit rate (bit/sec): 4000000

H.264 preset: Auto

Frame Rate: 30

**Codec Parameters:**

Enable: ☐

Key Frame Interval, frames: 30 Force 'I' Frame: ☐

QP initial: 28 QP min: 1 QP max (MPEG4:1..31 H264:1..51): 42

Preset: AUTO

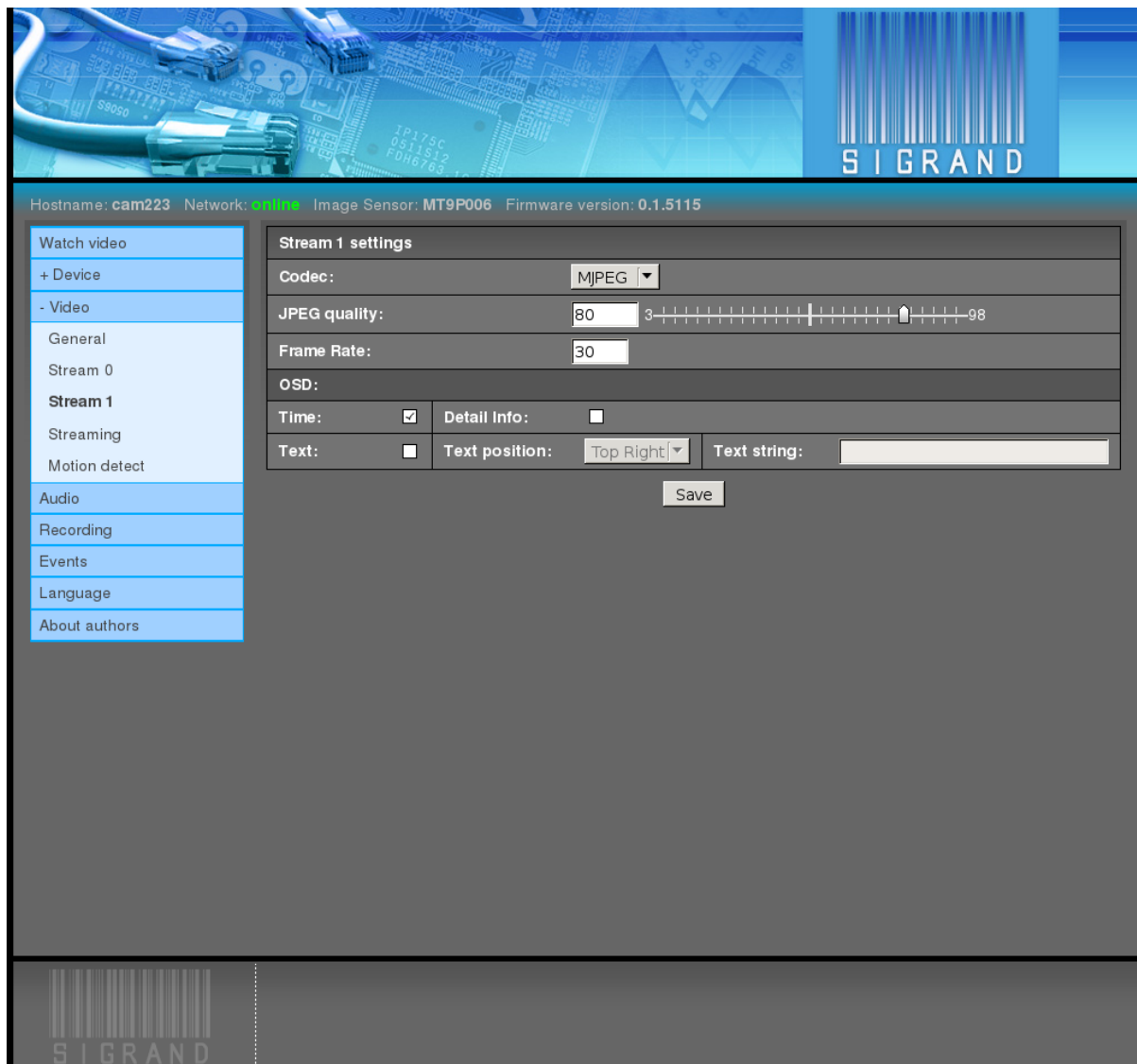
Packet size, 0..100, %: 100

**OSD:**

Time: ☒ Detail Info: ☐

Text: ☐ Text position: Top Right Text string:

Save



## Codec

The pop-down menu “Codec” is used to set the codec type for the current stream.

The possible values are:

- No  
The stream is shut off.
- MJPEG  
Motion JPEG.  
This codec is available for streaming through HTTP and RTSP.
- MPEG4  
MPEG-4. The codec so far is only available for streaming through RTSP.
- H.264

H.264. The codec so far is only available for streaming through RTSP.

### Rate control

The pop-down menu “Rate control” selects the compression mode of MPEG-4 and H.264 codecs:

- Off  
No control of stream rate.
- Variable  
Variable `bitrate`.
- Constant  
Constant `bitrate`.

### Bitrate

The input field “Bittate” is used to adjust the compression parameter for MPEG-4 and H.264 codecs, bits per second.

The range of values is 2.000.000 .. 12.000.000.

Values below 512.000 are also possible but not recommended.

### JPEG quality

The input field and graphic slider bar “JPEG quality” are used to adjust the image quality / compression degree parameter for JPEG frames.

The range of values is 3..98

The default value is 75.

The higher the value, the better the image quality, and the lower the compression degree, and the larger the frame size.

### Frame rate

In the field “Frame rate”, frames-per-second rate of the stream is defined.

The specified frame rate of the stream is provided by frame skipping.

The default value is 30.



### **Codec parameters**

The flag “Enable” is used to enable the codec parameters block described below.

The default value is Off.

### **Key frame interval**

The interval (the number of frames) is defined after which the key frame is repeated.

The default value is 30.

### **Force ‘I’ frame**

Codec does not create P- and B-frames, only I.

The default value is Off.

### **QP initial, min, max**

The input field for entering the initial, minimum, and maximum values of the codec Quantization Parameter (QP).

The range of values is 1..31 for MPEG-4 codec and 1..51 for H.264 codec.

### **Preset**

The pop-down menu “Preset”.

The possible values are AUTO, CUSTOM, SVC.

The default value is AUTO.

### **Packet size**

In the field “Packet size”, the packet size is defined in terms of percentage.

### **Time**

When the flag “Time” is switched on, the current local time and date is displayed, superimposed on the current video stream.

### Detail info

When the flag “Detail info” is switched on, the detailed information on the video stream is displayed, superimposed over the image.

### Text

When the flag “Text” is switched on, a users text line is displayed over the video.

### Text position

The pop-down menu “Text position” defines where to display the users text line:

- Top right
- Top left

### Text string

In the input field “Text string”, you can enter a users text line.

The length of the line must not exceed 23 printed 7-bit ASCII characters from the following set:

A-Za-z:; ' /\+ - \_ ( ) & \$ % . 0123456789

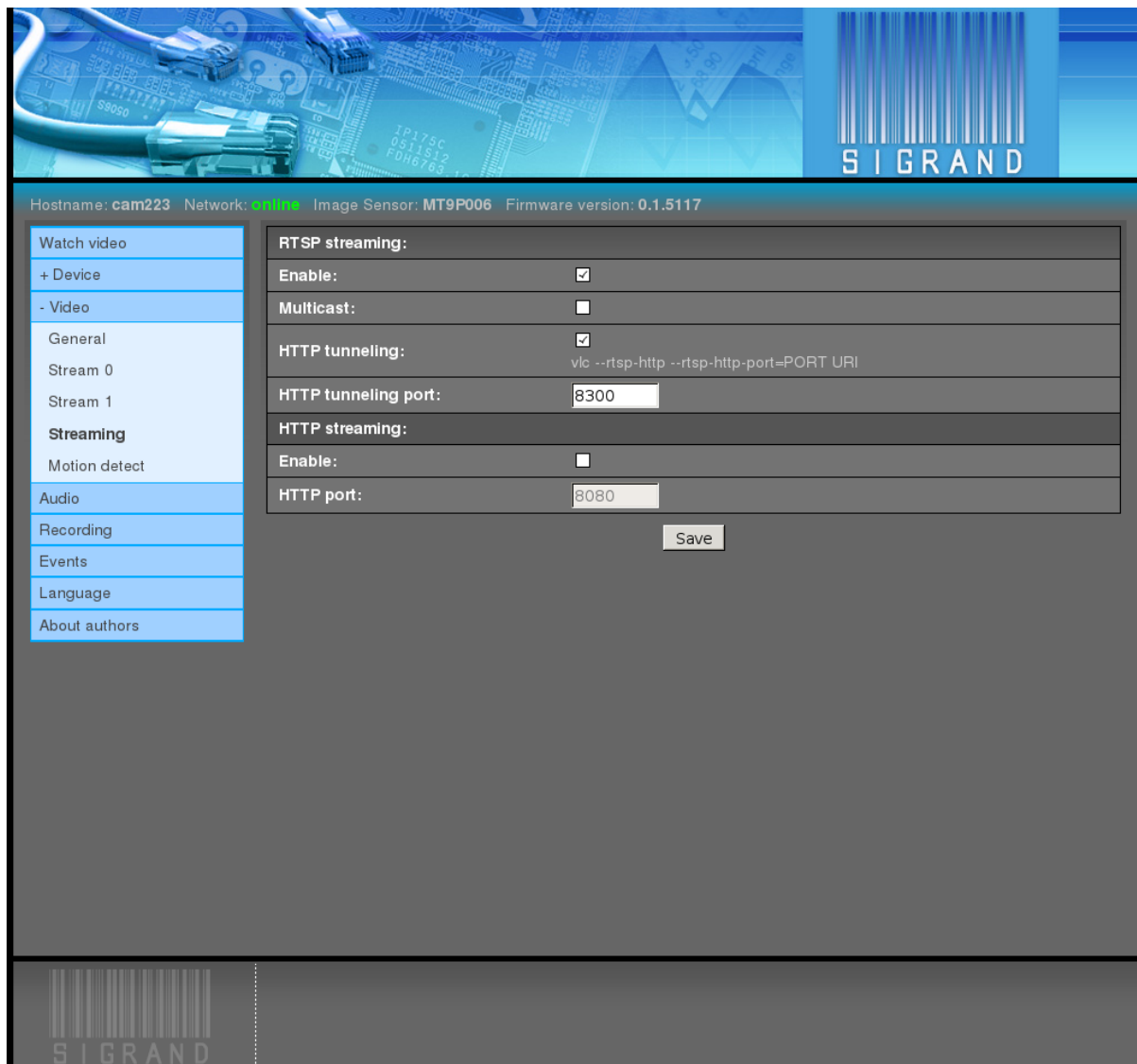
In order to prevent falling down of the camera audio/video server, characters outside this set will be substituted as follows:

- % to space
- Double quote ‘ ’ ‘ to single quote ” ’ “
- Others to #

Extra symbols (in the positions after 23) are cut off.

### 2.3.4.3 Streaming

The “Streaming” tab configures different modes of video and audio streaming:



## RTSP streaming

**Enable** The “Enable” checkbox enables [RTSP/RTP](#) streaming.

**Multicast** The “Multicast” checkbox turns on the mode of group transfer of media stream.

Multicast streaming greatly reduces the traffic in case of multiple clients.

**HTTP tunneling** The “HTTP Tunneling” checkbox turns on HTTP-based tunneling mode of packet streaming.

It is useful for bypassing restrictions of the Internet provider.

**HTTP tunneling port** The “HTTP tunneling port” input field specifies a [port](#) for the [HTTP](#) tunnel.

Default setting: 8300.

### HTTP streaming

HTTP streaming is currently available only for silent video encoded by MJPEG.

**Note:** Video streaming in MJPEG format through HTTP is fully supported by such browsers as Mozilla Firefox, Iceweasel, Google Chrome, and to no extent by Microsoft Internet Explorer and Opera.

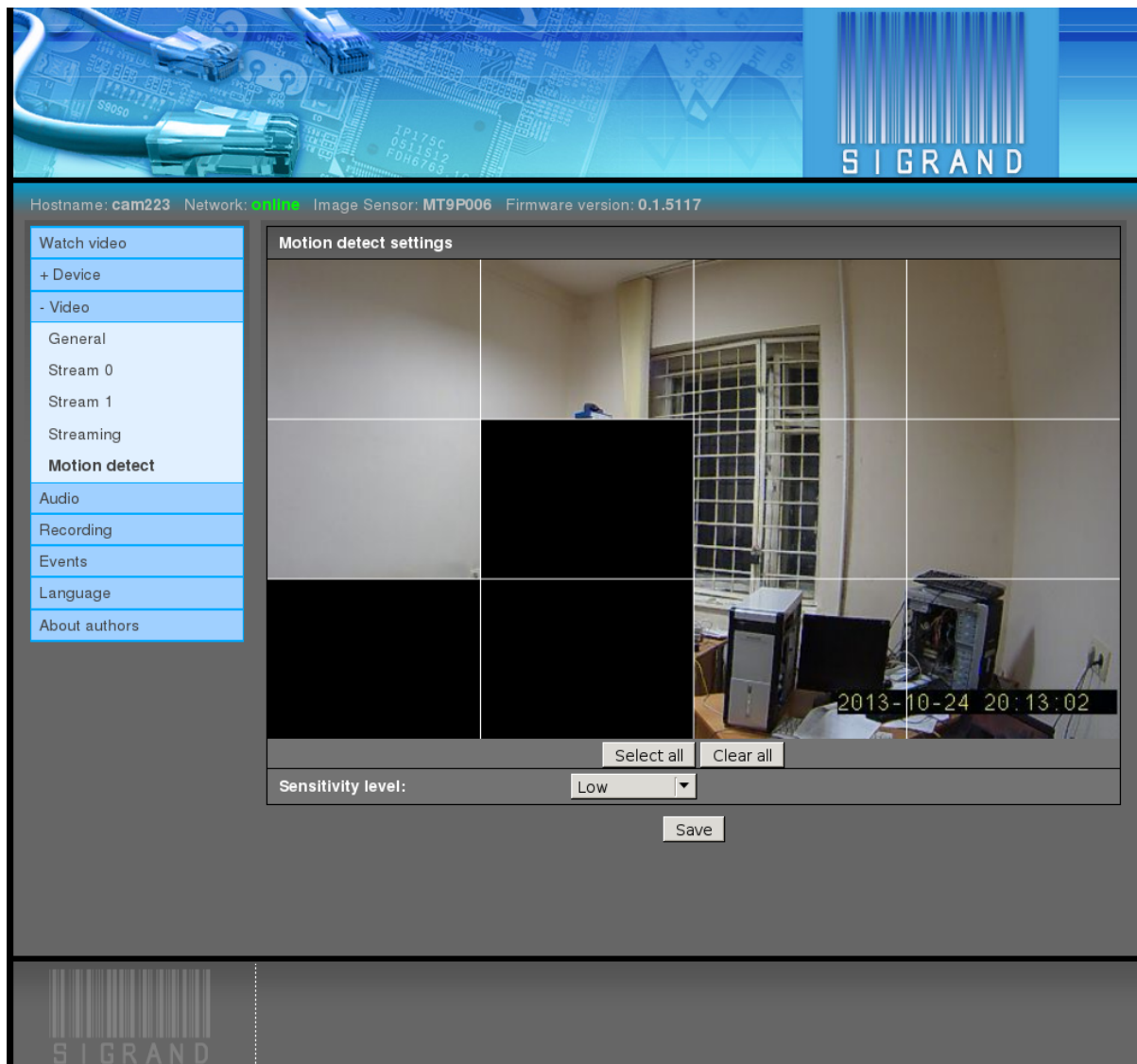
**Enable** The “Enable” checkbox enables streaming by HTTP.

**HTTP port** The “HTTP port” input field specifies a port for the HTTP streaming server of the camera.

Default setting: 8080.

#### 2.3.4.4 Motion detect

The “Motion detect” tab manages the motion detector settings:



The window contains a picture from the camera updated every 5 seconds.

To obtain the picture, select the JPEG codec for one of streams.

The window is partitioned into 12 equal rectangulars, defining sensitive areas of the motion detector.

By a left click of the **mouse** corresponding area is turned on or off.

Disabled areas do not take part in motion detection.

The changes are activated by pressing the “Save” button.

### Select all

The “Select All” button turns on all motion detector areas.

### Clear all

The “Clear all” button turns off all motion detector areas.

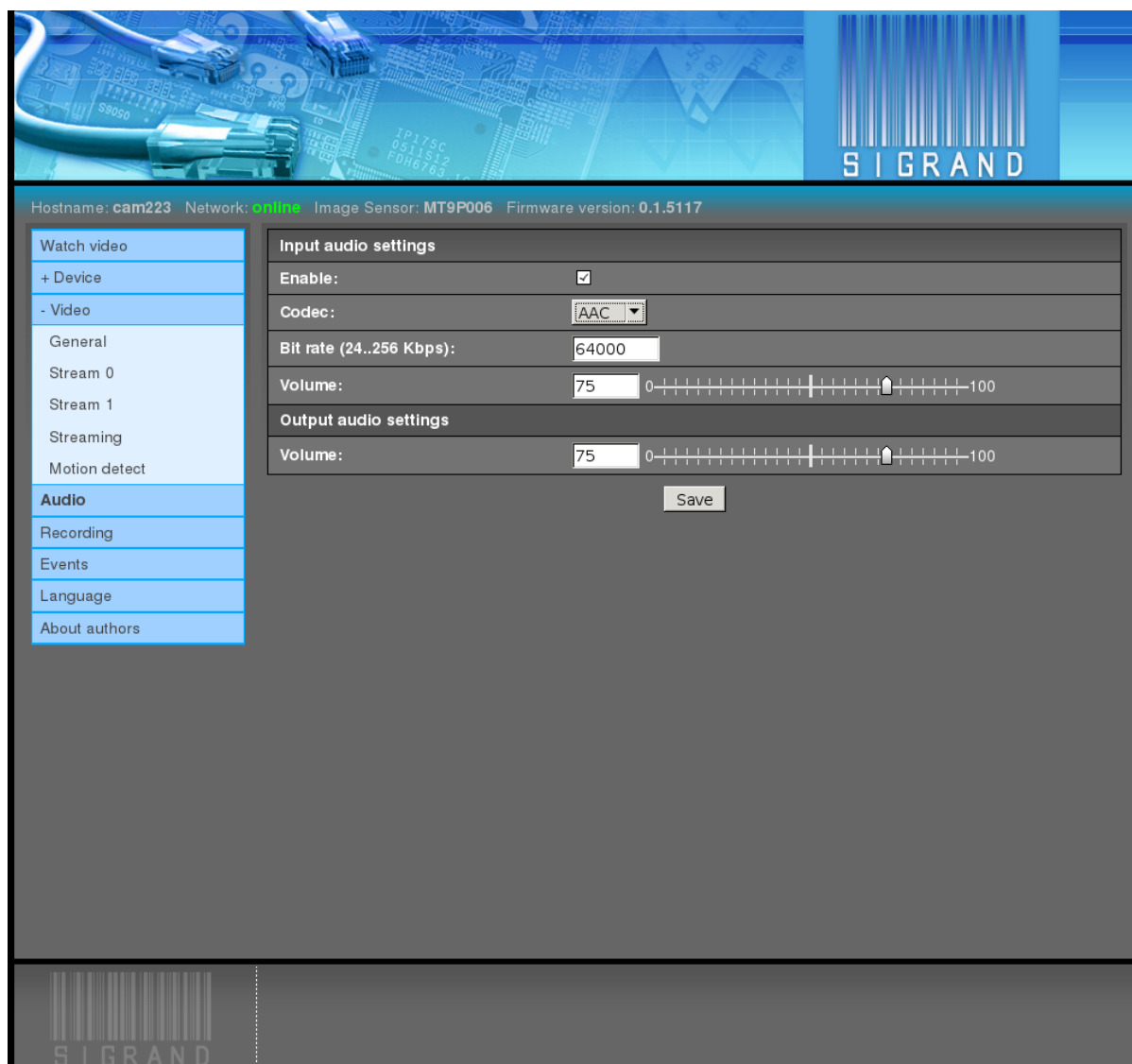
### Sensitivity level

The “Sensitivity level” pulldown menu changes the motion detector sensitivity:

- Low
- Medium
- High

## 2.3.5 Audio

The *Audio* tab is used for adjusting the audio subsystem of the device:



### 2.3.5.1 Enable

The flag “Enable” switches on the audio subsystem of the device and enables the other audio settings.

### 2.3.5.2 Audio codec

The pop-down menu “Audio codec” is used to select one of the two supported audio codecs:

- G.711
  - Sampling frequency: 8 KHz
  - Bitrate: 64 Kbits per second
- AAC
  - Sampling frequency: 8 KHz
  - Bitrate: 24..128 Kbits per second

### 2.3.5.3 Audio bitrate

The input field “Audio bitrate” is used to select the stream bitrate.

For G.711 codec, the only possible value is 64000.

For AAC codec, the range of values is 24000..128000.

### 2.3.5.4 Input and Output volume

The input fields and graphic slider bars “Input volume” and “Output volume” are used to set the values of the corresponding regulators of the hardware mixer.

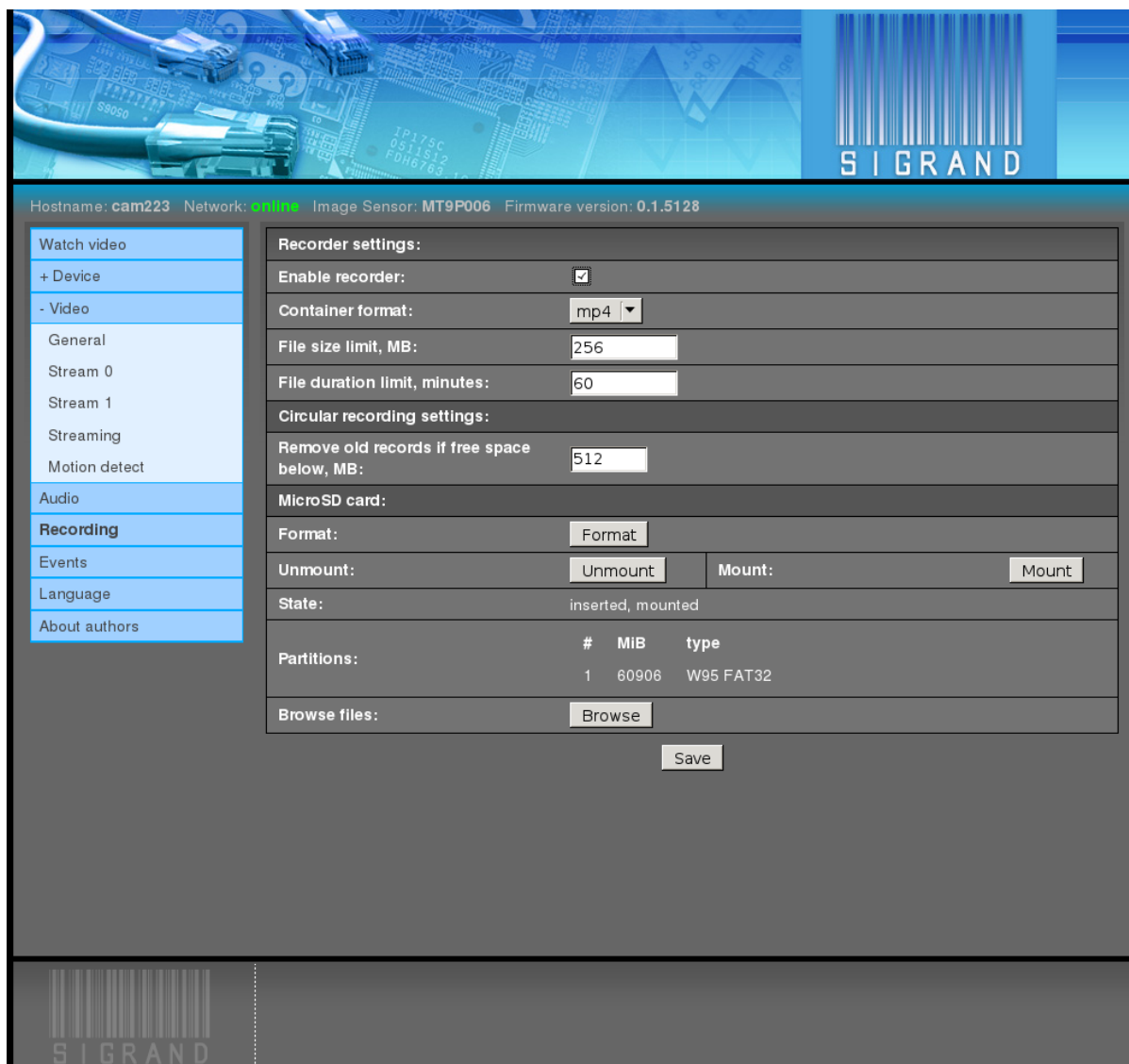
The range of values is 0..100.

The default value is 75.

**Note:** The regulators of the hardware mixer may have rougher level scales.

## 2.3.6 Recording

The “Recording” tab manages video and audio recording to files on the Micro [SD card](#):



Recorded files have user-defined time and size limits.

Upon reaching the limit the file is written with several frames until a keyframe is found, whereupon the file is closed. Then a new file opens and begins with the last keyframe.

Thus, subsequent files have a one-frame overlap and always begin with a keyframe.

Files have names derived from their start time in the local timezone:

YYYY-MM-DD\_hh-mm-ss-msc.ext

where:

- YYYY - year
- MM - month number
- DD - day of month
- hh - hours
- mm - minutes
- ss - seconds



- msc - milliseconds
- ext - choosen file extension

**For examle:** 2013-10-25\_19-25-33-153.mp4

#### 2.3.6.1 Enable recorder

The “Enable recorder” checkbox enables video and audio recording.

#### 2.3.6.2 Container format

The “Container format” pulldown menu chooses the format of a media file.

The list of available formats depends on the combination of selected video and audio codecs.

Default value: mp4.

#### 2.3.6.3 File size limit

The “File Size Limit” input field specifies the maximum media file size in [MiB](#).

Default value: 256.

Since the SD Card is formatted in [FAT32](#), the file size limit is 4 GiB.

It is recommended to specify the size less than 4096 [MiB](#) with a good margin, because upon reaching the limit a few frames more and a format-defined “tail” are written.

If the file reaches the 4096 [MiB](#) limit, it is forcedly closed by the filesystem, and the recording process stops and does not restart automatically.

#### 2.3.6.4 File duration limit

The “File duration limit” input field specifies the maximum duration of the recorded media file in minutes.

Default value: 60.

#### 2.3.6.5 Circular recording

To avoid halting of the recording process caused by an [SD Card](#) overflow, when the free space decreases below the specified limit, the oldest files are deleted.

### Remove old records if free space below

The “Remove old records if free space below” input field specifies the SD Card free space limit in MiB, upon reaching of which the oldest files are deleted.

The file age is derived from its name.

Default value: 512.

### 2.3.6.6 MicroSD card

The “Micro SD card” section is intended for SD Card monitoring and managing.

#### Format

The “Format” button reinitializes the partition table of the card and makes a partition with a FAT32 filesystem.

Before the formatting the recording processes are stopped and started again after completion of the formatting.

For a 64 GB card the formatting takes 2 to 2.5 minutes.

#### Unmount

The “Unmount” button unmounts the card filesystem, stopping the recording processes, and allows you to remove the card from the camera safely.

The other technique of the safe card removal:

Pressing the “Reset” button on the back camera panel for 0.5-1.0 seconds.

If the card is inserted, the “Reset” button changes its function and makes unmounting of the card.

After 30-60 seconds taken for safe termination of the recording process, the card can be removed.

#### Mount

The “Mount” button mounts the card filesystem, starting the recording processes if the recording was enabled before.

The button is needed only as a complement to the “Unmount” button, because upon the insertion of the card with suitable partition types, filesystem, and free space, the card is mounted automatically and the recording process is started, if it is enabled.

## State

The “State” string displays the current state of the card.

Possible values are:

- absent
- inserted

The card is inserted into the slot, but is not mounted for some reason (unsuitable card partition or unmounted by the “Unmount” button).

- inserted, mounted

The card is inserted into the slot and **mounted**.

## Partitions

The “Partitions” section displays the list of partitions of the inserted card.

Example:

| # | MiB   | type      |
|---|-------|-----------|
| 1 | 60906 | W95 FAT32 |

where:

# - partition number

MiB - partition size in **MiB**

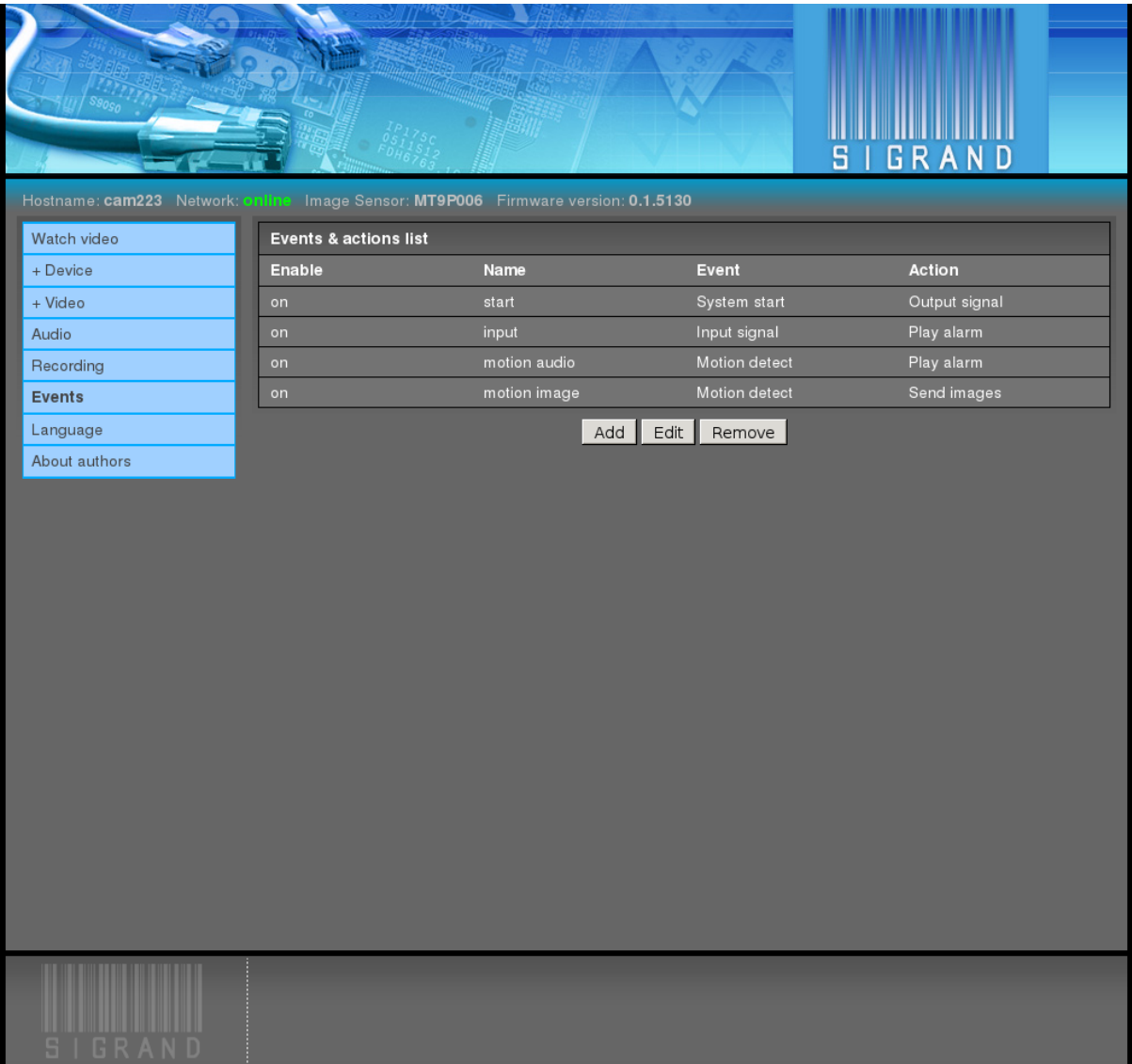
type - partition type

## Browse files

The “Browse files” button opens the file browser at the root of the card filesystem.

## 2.3.7 Events

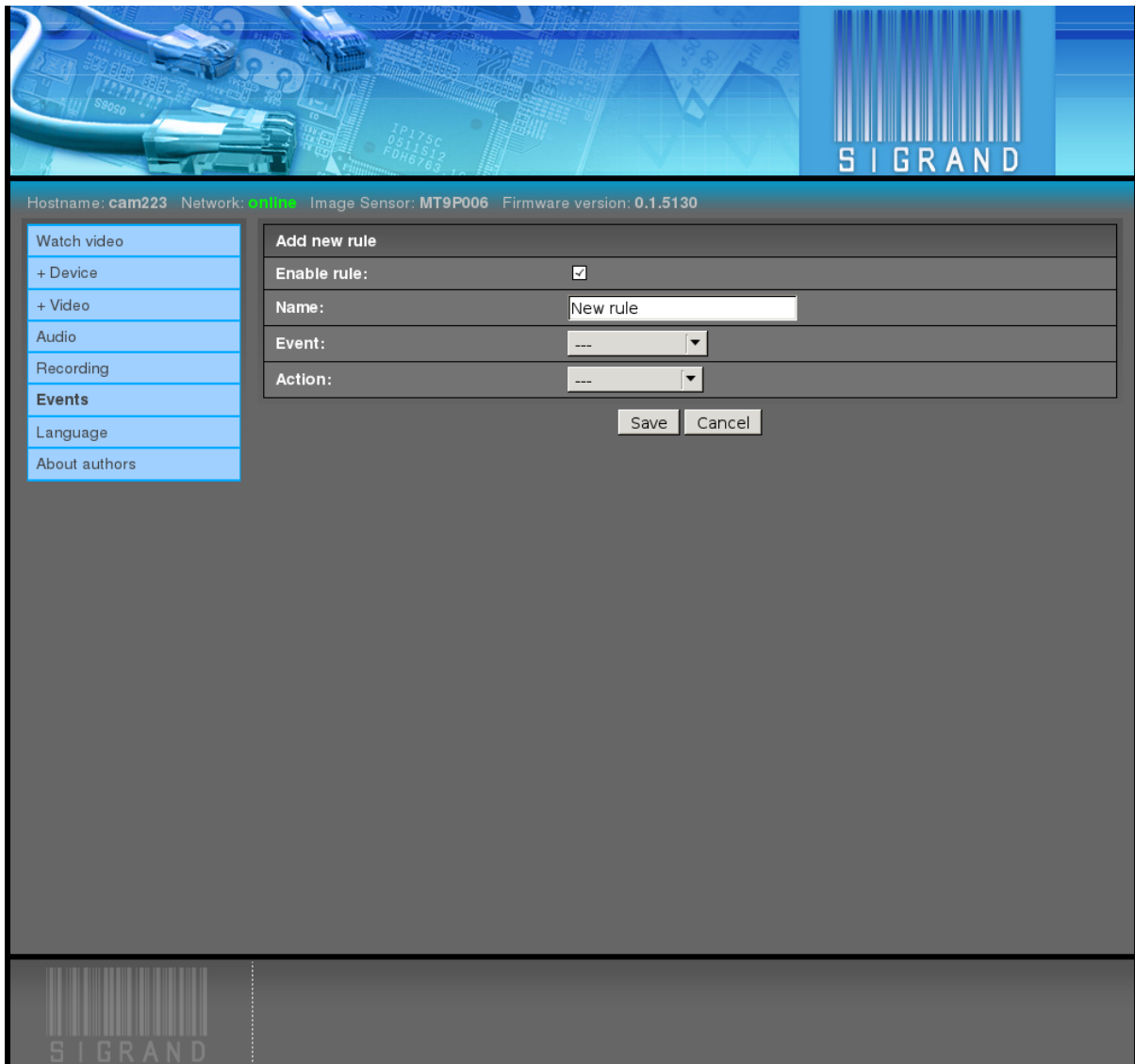
The “Events” tab allows to define a reaction to incoming events:



The result of the configuring is the set of rules connecting an incoming event (motion detector, input signal, system startup) to an action (output signal, alarm sound playing, sending of a picture).

2.3.7.1 Add

The “Add” button creates a new rule, opening the rules editor:



### Enable rule

The “Enable Rule” checkbox enables the rule.

Disabling the rules allows you to save them without applying.

### Name

The “Name” input field defines the name of the rule.

It exists only for user’s convenience and performs no function. It can be left empty.

### Event

The “Event” pulldown list specifies one of the available incoming events:

- System Start

The “System Start” event arises upon starting of the camera.

- Input Signal

The “Input Signal” event arises when the corresponding pin of the *back panel* connector is closed to the ground.

The front of the pulse is considered as an event.

The “Input Signal Number” pulldown menu specifies one of the two available inputs, 1 (pin 14) or 2 (pin 7).

- Motion Detector

The “Motion Detector” event is caused by a motion detection signal.

Note: for motion detection an MJPEG codec is required for one of streams.

### Action

The “Action” pulldown list specifies one of the available actions:

- Output Signal

A logic ‘1’ pulse (about 3.3 V) is applied to Pin 13 of the *rear panel* connector.

The duration of the pulse is specified in milliseconds by the “Output Signal Duration” input field.

The default state of the output signal is logic ‘0’.

- Play Alarm

An alarm audio signal is applied to the (analog) line output of the camera.

- Send Picture

A single JPEG frame is sent to the URL defined by the “Destination Address” input field.

scheme://user:pass@someserver.com/some/path/

where:

- scheme - “ftp” or “http” URL scheme
- user:pass - optional username and password of the server
- someserver.com - server address
- /some/path - an existing path on the server, where the file with a JPEG picture will be placed.

The file has a name derived from the time of the shot in the local timezone:

YYYY-MM-DD\_hh-mm-ss-msc.jpeg

**where:**

- YYYY - year
- MM - month number
- DD - day of month
- hh - hours
- mm - minutes
- ss - seconds
- msc - milliseconds

For example:

2013-10-25\_19-25-33-153.jpeg

Usually a few frames are sent by a motion detection event.

#### **2.3.7.2 Edit**

The “Edit” button changes an existing rule chosen by a left click of the [mouse](#), by opening the rules editor.

#### **2.3.7.3 Remove**

The “Remove” button deletes an existing rule chosen by a left click of the [mouse](#).