PERCEPT

Expand your senses

PERCEPT Body Camera

User Manual
Document Version 1.6

PERCEPT

The following words and symbols mark special messages throughout this guide:

Warning: Text set off in this manner indicates that failure to follow directions could result in damage to persons or equipment.

Note: Text set off in this manner indicates special instructions which should be paid attention to.

Contents

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1   What is included with the product?

Qty	Description
1x	IONODES PERCEPT Body Camera
1x	3-ft (1m) USB Charging Cable (Type-A male to USB Type-C male)
1x	Klick Fast System Mount Adaptor
1x	Klick Fast Clip-On Dock
1x	Quick Install Sheet

Note: When unpacking, inspect the shipment box and product to identify any possible damages due to shipping. Make sure all items have been delivered and that no items are missing. Contact your IONODES reseller should you find any damages or defects.

Warning: Operation, maintenance, and servicing of this device must be done by a trained professional following proper safeguard to avoid unintended damage

1.1   Optional accessories

1.1.1   Battery Replacement Kit (PERCEPT-BWC-BATTKIT)

The battery replacement kit is useful for replacing the original battery pack inside the body camera when the performance drops below an acceptable level (all batteries degrade with usage over time).

Warning: Please carefully read and acknowledge the safety and charging instructions below before performing any maintenance on the battery of your body camera!

Warning: Using a 3rd party battery (not supplied by IONODES) will void your body camera's warranty.

Battery Safety information

- Do not dismantle, open, or shred the battery.
- Do not short circuit the battery. Do not store batteries haphazardly in a box or drawer where they may short circuit each other or be short circuited by conductive materials.
- Do not remove a battery from its original packaging until required for use.
- Do not expose batteries to heat or fire. Avoid storage in direct sunlight.
- Do not subject the batteries to mechanical shock.
- In the event of a cell leaking, do not allow the liquid to come into contact with the skin or eyes. If contact has been made, wash the affected area with copious amounts of water and seek medical advice.
- Equipment is designed to prevent incorrect insertion of the battery and its connector.
- Store the batteries in a dry place with temperature below +35°C (or +45°C for no more than 30 days to minimize cell degradation.
- Charging the battery outside of the body camera enclosure will void warranty.

Disposal

- When disposing of batteries, keep cells or batteries of different electrochemical systems separate from each other.
- Recycle or dispose of this battery in accordance with local regulations.

Battery Power rating

Below are the PERCEPT Body Camera battery specifications:

- Rated Voltage: 3.8 VDC (nominal)
- Rated Current: 2.8A (max)
- (Internal battery powered device, external DC input only for charging)
- -20°C to 50°C (Operating)
- 0°C to 45°C (Battery Charging)
- -20°C to 60°C (Battery Discharging)

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2 Product Compliance

FCC Statement

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help. Changes or modifications to this product not authorized by IONODES could void the electromagnetic compatibility (EMC) and wireless compliance and negate your authority to operate the product.

Industry Canada Compliance Statement

The product has been tested to comply with *ICES-3(B)/NMB-3(B)*. This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled: "Digital Apparatus," ICES-003 of the Canadian Department of Communications.

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3   Product Overview

The IONODES PERCEPT Body Camera features multiple innovative functions that make it a truly wearable IoT device. It also includes user control interfaces to enable audio/video recording, take still pictures, as well as other auxiliary functions, while providing feedback to the user on the current state of operation. The following images show the different feature elements of the IONODES PERCEPT Body Camera.

Function Buttons
Event Recording
Still Image Capture
Flashlight

Speaker
Action Feedback
Alert Notifications
Voice Comms

Flashlight

Dual Mic
Noise Filter
Spatial Audio

Camera
4K Video
180° FoV

Status
Recording
Health

Power

Function Buttons
Event Recording
Still Image Capture
Flashlight

Mount
Klickfast

Status
Recording
Health

OLED Screen
Alert Notifications
System Status
Network Status

USB-C Port
Charging
Data Transfer

4 Getting started

4.1 Charging the camera

To charge the PERCEPT Body Camera, use one of the two following options:

a) PERCEPT DCK1 Single Unit Docking Station (available as an optional accessory from IONODES)

b) QuickCharge 3.0 USB wall charger or power bank, with a USB Type-A female connector

a)   b)

To ensure optimal battery capacity throughout the life of the product, please follow these recommendations on normal use:

- Always use the camera within the operating temperature range of -20°C to 50°C (-4°F to 122°F).
- Always charge the camera within the charging temperature range of 0°C to 45°C (32°F to 113°F).
- Recharge a camera that is turned off with a low battery signal as soon as possible.

Warning: Do not leave the body camera in a parked vehicle at high or low temperatures. Temperatures in parked vehicles, especially in hot summer days, can exceed the specified temperature range.

To ensure optimal battery capacity throughout the life of the product, please follow these recommendations on storage:

- Always store the camera at the recommended storage temperature, -40°C to 85°C (-40°F to 185°F). Storing the camera outside of the specified temperature may damage the battery.
- Do not store the camera with the battery fully charged. Doing so shortens the expected battery life.
- Do not store the body camera with a depleted battery. Doing so shortens the expected battery life.

4.2 Attaching the universal mount

A standard Klick Fast stud (universal mount) and a Klick Fast Clip-On Dock are included with your PERCEPT body camera.

To attach the universal mount to the body camera, please screw in, using a standard Philips head screwdriver, the 2 mounting screws to the back of the body camera's chassis, as shown below:
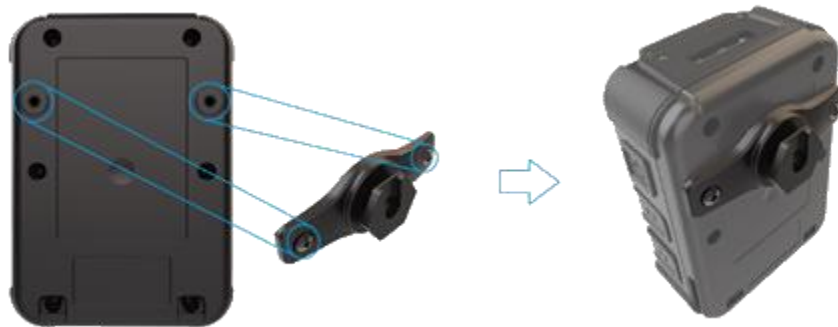
Once the mount is installed, the user can attach different compatible accessories (like the included Clip-On Dock) by simply sliding them onto the hook and then twisting them into the desired position.

Note: Multiple Klick Fast mounting accessories are available as optional items. Please contact your authorized IONODES reseller for more information.

4.3 Care and cleaning

To guarantee optimum performance, as well as a long service life of the product, please follow the recommendations below:

- Keep the product away from corrosive substances.
- Make sure the product is completely dry before charging.

Note: Prior to initiating maintenance cleaning of the Body Camera, conduct a thorough inspection of both the device and any associated accessories to identify potential physical damages. It is crucial to ensure that all components are in optimal condition, devoid of visual cracks or openings that could permit direct exposure to the internal elements. This precautionary step is essential to maintain the integrity of the device and prevent any inadvertent damage during the cleaning process. Contact your IONODES reseller should you find any damages or defects.

Warning: Warning: Avoid using sharp objects in sensitive areas like the USB-C port, speaker, power ports, ethernet ports and microphone ports of the body camera and docking station. Such actions can impair functionality

For external cleaning:

- Apply cleaning solutions to the cloth, soft paper tissues, rather than directly onto the device to control the amount of moisture exposure.
- Use soft, lint-free (microfiber) cloth, soft paper tissues, or non-abrasive sponge to avoid scratching screens or lenses.
- Dry with a soft cloth to prevent water spotting.
- Allow the BWC to air dry in a well-ventilated area.

Warning: Do not use any type of solvent, such as thinner and benzene, as they may damage the surface of the product.

Warning: Do not use abrasives of any kind to clean the camera, as they can scratch the lens cover, leading to degraded image quality.
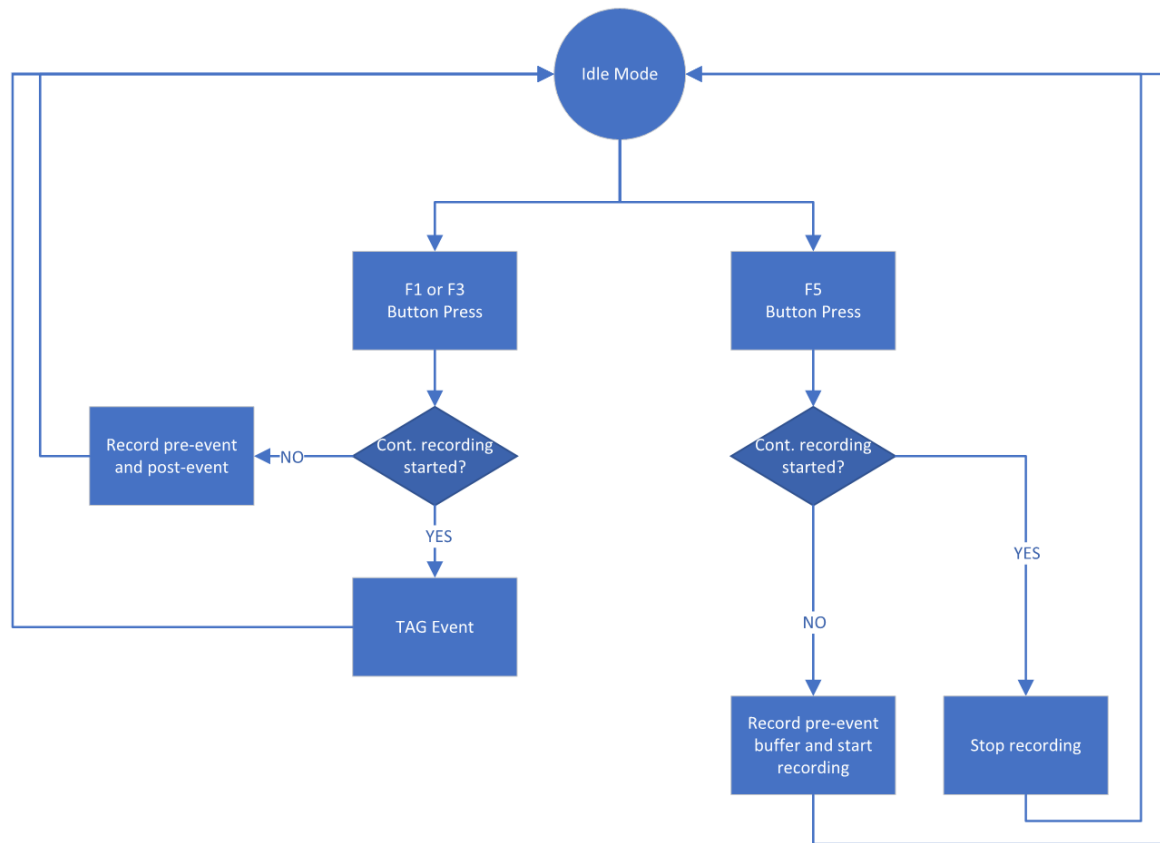
4.4 Maintenance

A consistent maintenance schedule is important for ensuring the longevity and optimal performance of your Body Worn Camera (BWC) and its accessories.

To maintain the best condition of your BWC and docking station, adhere to the following cleaning schedule:

- Daily: Perform a quick visual inspection to check for any noticeable issues or contaminants on the exterior of the BWC. Ensure that the lens of the camera is clean and clear for optimal recording quality.
- Weekly: Use a soft, dry cloth to gently remove fingerprints, dust, and other smudges from the outer surfaces of both the BWC.
- Monthly: Conduct a thorough cleaning of both the BWC and the docking station using recommended cleaning agents. Focus on removing debris from all ports, connectors, and the lens with appropriate tools.
- As Needed: Immediate cleaning should be performed if the devices are exposed to substances that could cause damage, such as liquids, mud, or excessive dust.

5   Basic Operations

The following section describes the basic operations that can be performed on the body camera and their associated user feedback. The body camera has two recording modes: *continuous recording* (records video continuously until instructed to stop) and *event recording* (tags events if already in continuous recording or records a short clip based on pre- and post-buffer if not already in continuous recording mode). The machine state for both modes is presented in the diagram below.

User operation	User manipulation	User feedback	
		Status LED	OLED text
Power On	Press power button for ≥3 sec	Flashing* Cyan	*Booting*
Power Off	Press power button for ≥5 sec		*Shutdown...*
Change Wi-Fi configuration	Press F2 & F4 simultaneously for ≥5 sec then scan new QR code containing Wi-Fi access point information	Heartbeat Flashing*** Blue	*Scan Network QR*
Start/stop continuous recording	Press F5 for <3 sec to start (when body camera is on) Press F1 or F3 or F5 for >3 sec to start (when body camera is off) Press F5 for >5 sec to stop	Heartbeat Flashing*** Red	*Cont. Recording*
Start event recording (or tagging an event when in continuous recording)	Press F1 or F3 for <3 sec	Heartbeat Flashing*** Red	*Event Recording*
Still image capture	Press F2 or F4 for <3 sec		*Snapshot...*
Show current battery charge	Press power button for <3 sec and cycle displayed data		*Level: (%)*
Show SD card status when SD card detected	Press power button for <3 sec and cycle displayed data		*SD Storage Used (%)*
Show SD card status when SD card is faulty or not detected	Press power button for <3 sec and cycle displayed data		*No storage*
Show current date and time	Press power button for <3 sec and cycle displayed data		*Current date and time*
Show WLAN status	Press power button for <3 sec and cycle displayed data		*• Signal: Weak • Signal: Moderate • Signal: Good • Signal: Great • Signal: Disconnected IP address MAC address*
Show cellular status	Press power button for <3 sec and cycle displayed data		*• Signal: Weak • Signal: Moderate*

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User operation	User manipulation	User feedback	
		Status LED	OLED text
			• *Signal: Good* • *Signal: Great* • *Signal: Disconnected*
Show Ethernet status****	Press power button for <3 sec and cycle displayed data		• *ETH: Connected* • *ETH: Disconnected* *IP address* *MAC address*
Show VPN status	Press power button for <3 sec and cycle displayed data		• *Disconnected* • *IP address*
Show GPS status	Press power button for <3 sec and cycle displayed data		• *Signal: Locked* • *Signal: Not Locked*
Show Docker status	Press power button for <3 sec and cycle displayed data		• *Disconnected* • *Auto Online* • *Auto Charging* • *Man. Online* • *Man. Charging*
Change Docker mode	Press F1 or F3 for >5 sec while the camera is docked		Docker status
Silent mode on/off	*Not defined*	Front LED: OFF Top LED: ON	
Privacy mode on/off	Press F1 & F3 simultaneously for >5 sec	Front LED: Steady Orange Top LED: Flashing* Orange	*Privacy Mode*
Reset to factory settings	Press F1 & F2 & F3 & F4 simultaneously for >5 sec		*Reset config...*
Turn flashlight on/off	Press F2 & F4 simultaneously for <5 sec		

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*flashing: alternating ON for 500ms/ OFF for 500ms
**rapid flashing: alternating ON for 250ms/ OFF for 250ms
***heartbeat flashing: ON for 250ms/ OFF for 250ms/ ON for 250ms/ OFF for 1250ms
****Ethernet status will be available when connecting to the network via the docking station

6   Body Camera States

This section describes the user feedback for the various states of the body camera.

Body camera state	User feedback	
	Status LED	**OLED text**
Idle and ready (first boot)	Heartbeat Flashing*** Blue	*Scan Initial QR*
Idle and ready	Steady Blue	
Recording	Heartbeat Flashing*** Red	*Cont. Recording* or *Event Recording* (based on current recording mode)
Media streaming	Flashing* Red/Green	
No storage space		*SD Full*
Critical problem	Steady Red	*Critical Problem*
Charging	Flashing* Yellow	*Charging... Level(%)*
Fully charged	*Returns to previous state*	
Firmware updating		*Firm. Update...*

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flashing: alternating ON for 500ms/ OFF for 500ms
**rapid flashing: alternating ON for 250ms/ OFF for 250ms*
***heartbeat flashing: ON for 250ms/ OFF for 250ms/ ON for 250ms/ OFF for 1250ms*

7 Advanced Operations

7.1 Connecting to the network

The PERCEPT body camera can be integrated via ONVIF to many video management systems, either on-premises or cloud-based (like the PERCEPT Cloud for example). For initial set-up, the PERCEPT body camera needs to be configured prior to using it with your network video management system. In most cases, only network configuration will be required.

The initial configuration can be done locally using a mobile, laptop or workstation connected to the Internet. The user will need to enter his Wi-Fi access information on a dedicated web portal (*https://www.ionodes.com/percept-body-cam-QR*) and generate a specific QR code. When the body camera is ready to scan the QR code, the user will see the message "*Scan Initial QR*" on the OLED screen. By scanning this code with the body camera, the Wi-Fi configuration (alongside the other optional settings configured) will be imported to the device automatically.

After the QR code is scanned, a new message may appear on the OLED, "*E: Wifi Config*" , indicating to the user that the body camera encountered an error when attempting to connect to the Wi-Fi network using the information contained in the QR code. If the Wi-Fi password is incorrect, the body camera will revert back to QR scanning mode after about 15 sec. If the QR code is not recognized at all (for instance if it's not a QR code generated from the dedicated IONODES web portal) the message "*QR Code Invalid*" will appear on the OLED.

Note: Please check the IONODES Support Center for dedicated technical guides on how to integrate the body camera to different video management systems.

Note: During the initial setup the system administrator can optionally define the behavior of the Wearer ID. This is useful for situations where, for instance, the body camera is handed down by the system administrator to a security guard. Once that security guard receives the body camera, he'll need to generate a new QR code with his own unique Wearer ID (so that the captured media files are tagged accordingly).

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The "*Initial camera setup*" QR Code Generator web page is depicted below.

QR Code **Generator**   **PERCEPT**

On first boot up of your PERCEPT Body Camera, the camera will be searching for a QR Code to initialize base parameters needed to connect to your Wifi network. This initial QR code will also allow you to set the default 'administrator' password, select the device's language, set-up wearer ID behaviour and choose whether to enable silent mode or not.

By default, the QR Code Generator is set to generate a full QR code needed for initial settings. You can also opt to generate a QR Code for WiFi settings reset only by choosing the appropriate option below.

Select QR code type to generate:

◉ Initial camera setup
○ Wi-Fi settings (Wearer ID optional)
○ Wearer ID only

Enter your WiFi network name (SSID): [   ]

Enter your WiFi network password: [   ]

Choose the 'administrator' password: [   ]

Repeat the 'administrator' password: [   ]

Choose a language: [English ▾]

Select a Cloud service: [None ▾]

Do you want to enable silent mode? [No ▾]

Is the Wearer ID required? [Yes ▾]

Should the Wearer ID reset when charging? [No ▾]

[Generate QR Code]

Once successfully connected to the Wi-Fi network, the IP address of the device will be displayed on the body camera's OLED screen. The user simply needs to scroll through the presented information on the OLED screen by repeatedly short pressing the power button on the side of the chassis.

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To change the existing Wi-Fi configuration or add a new access point later on, simultaneously press both the F2 and F4 buttons on the PERCEPT body camera for more than 5 sec. The device will display the message "*Scan QR Code*" on the OLED screen. After that the user can scan a new QR code containing Wi-Fi access information (with the option of also specifying a Wearer ID) . This is achieved by selecting the "*Wi-Fi settings (Wearer ID optional)*" in the QR Code Generator web page.

To create a new QR Code just for the Wearer ID, please select the option "*Wearer ID only*".
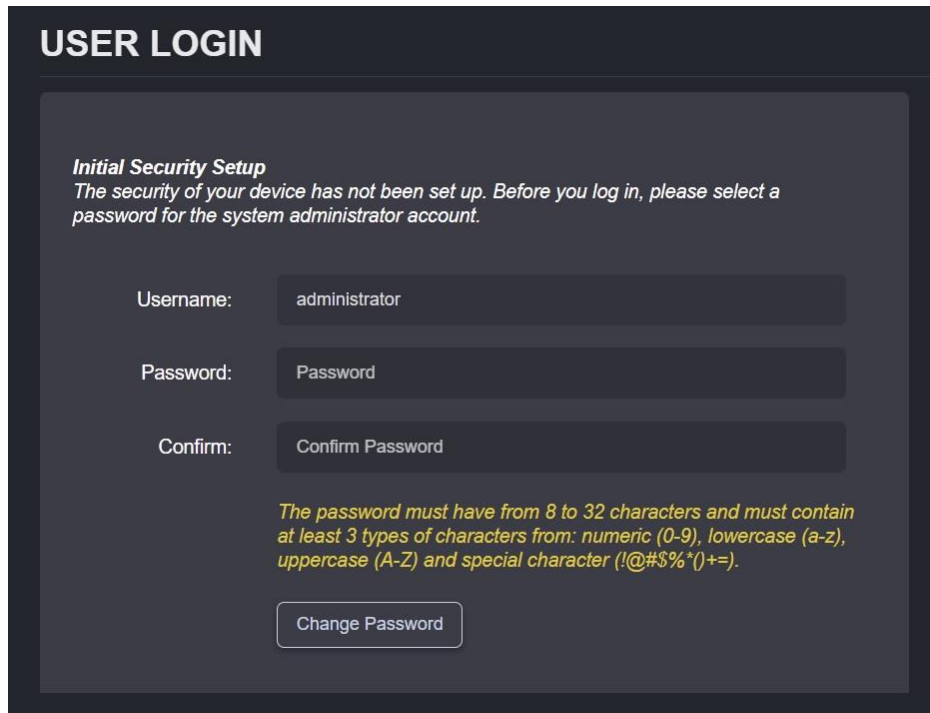
7.2 Motion sensor calibration

Following certain operations, like a complete device reset for example, a message might appear on the OLED that the PERCEPT 9-axis motion sensor must be recalibrated. To do so, simply hold the camera vertically and slowly rotate it 360° and then hold it on its side and repeat the 360° movement as indicated below. Once calibrated, the calibration message will disappear.

7.3 Using the Web Management interface

The web interface is accessed by entering the IP address of the body camera in your favorite browser. The recommended browsers are Microsoft Edge and Google Chrome.

When entering the web interface, you will be asked for a username and password. Upon first access to the web interface, if the password was not configured via the QR code, the user will need to choose a new password for the administrator account. This password must be between 8 and 32 characters in length and contain at least 3 out of 4 types of characters from the following: numeric, lowercase, uppercase and special character (!@#$%*()+=).

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On subsequent access, the following window will be displayed:


The "*online*" indicator in the top-right corner shows that the web interface can communicate with the body camera. During a firmware update or manual reboot, the indicator will turn to "*offline*", until the body camera completes the bootup sequence, making this indicator very useful for troubleshooting purposes.

Right next to the "*online*" indicator there is a small toggle for changing the language of the web interface from English (En) to French (Fr) and vice-versa.

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7.3.1 Dashboard

Upon successfully login to the web interface, a *Dashboard* screen will be presented. This screen shows the device's product information, system status and health status.
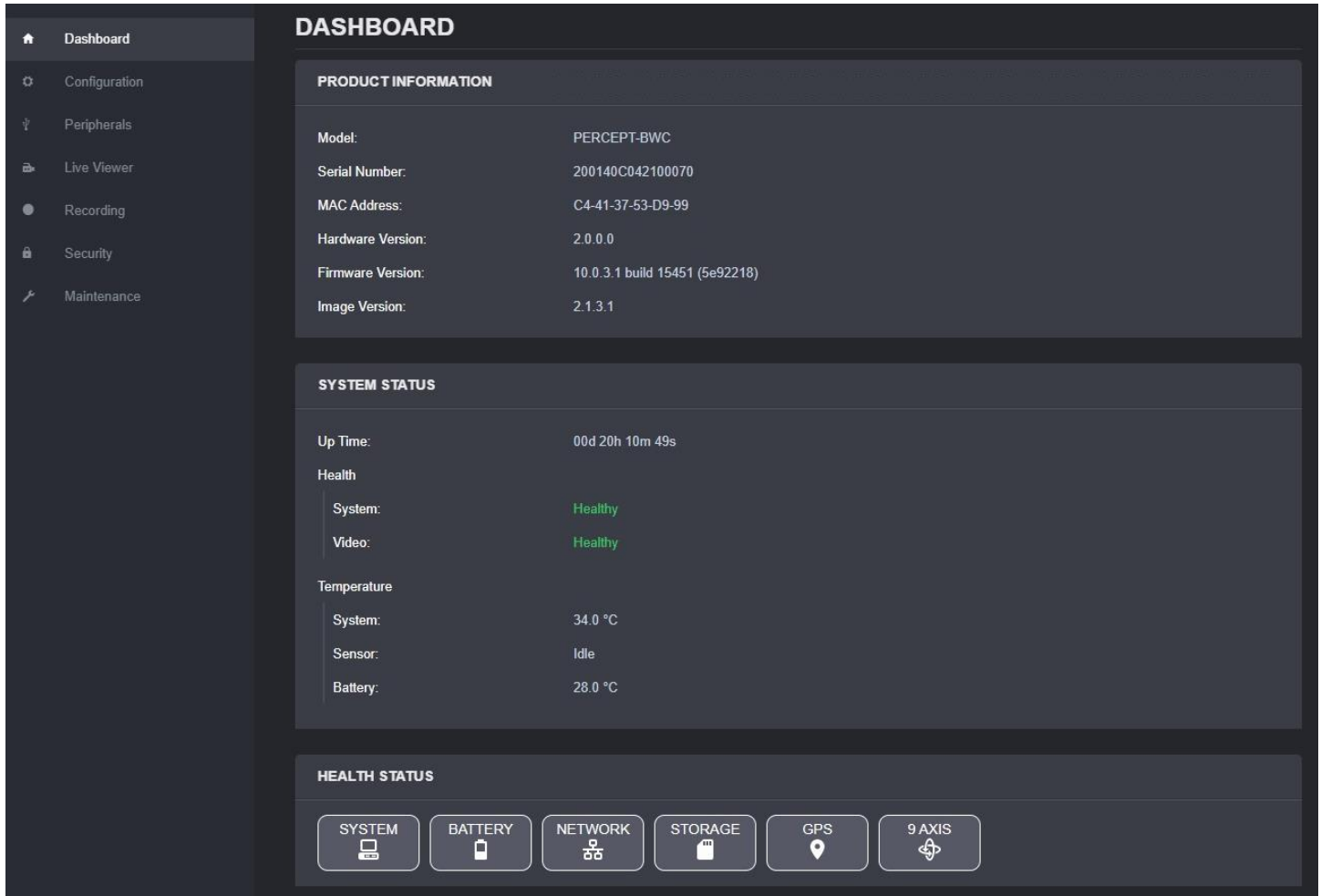
7.3.2 Configuration/System
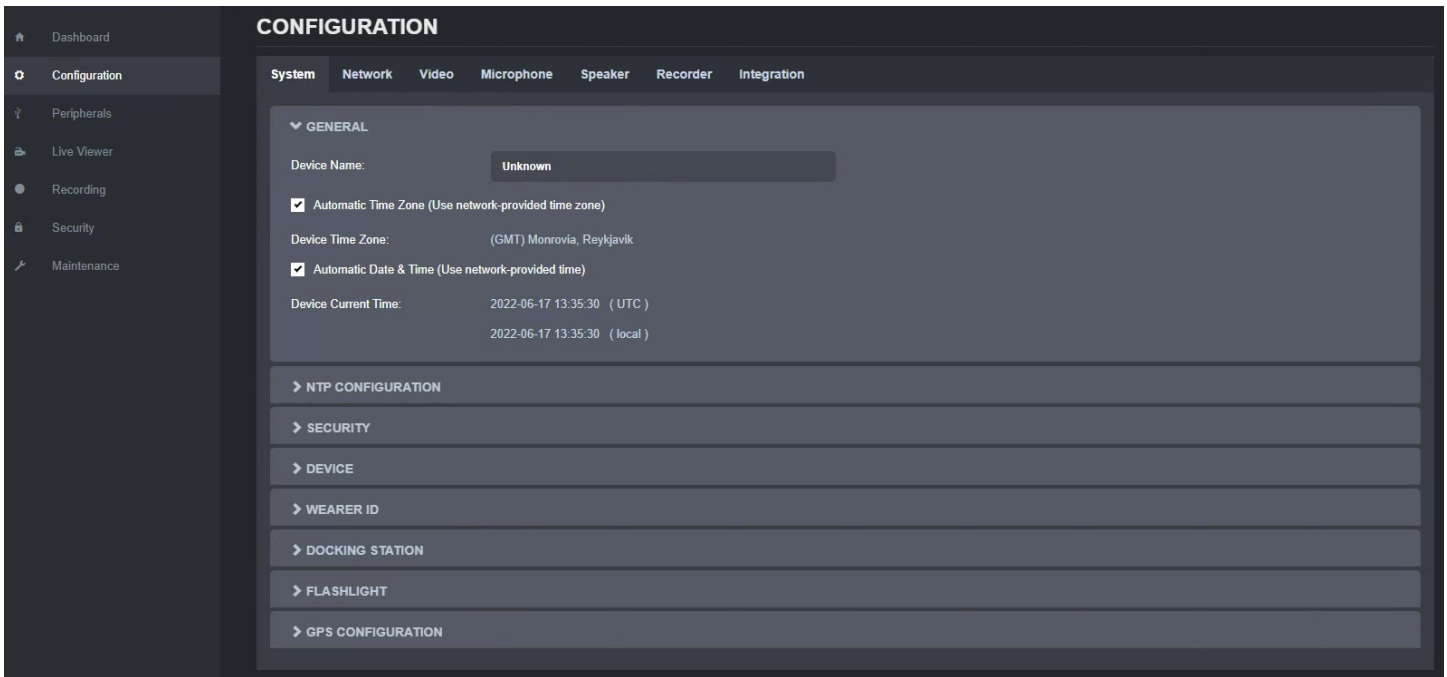
Under the *Configuration* section, select the *System* tab to perform the following operations:

- Specify a *Device Name*; this custom name can be used by third-party software to display a friendly name for the device

- Set the device's *Time Zone* and *Date/Time*; these can also be automatically configured by the body camera using information received from the GPS or from the network (Wi-Fi or Cellular) if the corresponding connection is present. Based on this setting, as well as the current UTC time, a local time is calculated and displayed.

- Configure an *NTP* server for real-time clock synchronization. This option is only available when the "*Automatic Date & Time (Use network provided time)*" is enabled.

- Set the device's *Security* policy. Here the user can define the minimum & maximum length of the password for all user accounts. By validating the option "Enable Protection for Multiple Login Failures", the device is instructed to block all login attempts after *X* failed ones, until the timeout of *Y* seconds runs out (*X* and *Y* are user-configurable).

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- Set general *Device* settings like the default OLED display language and activating Silent Mode (which disables the front LED, the haptics, and the speaker).

  The system administrator can also choose to allow or not the Privacy Mode. When the body camera is switched to Privacy Mode the audio and video are disabled, both for live streaming, as well as for local recording (the body camera will only send a Privacy Mode logo ⊘ when being requested the live stream). A typical scenario for activating this feature would be a situation where the camera wearer is entering a restricted or private area or when he is handed over confidential documents.
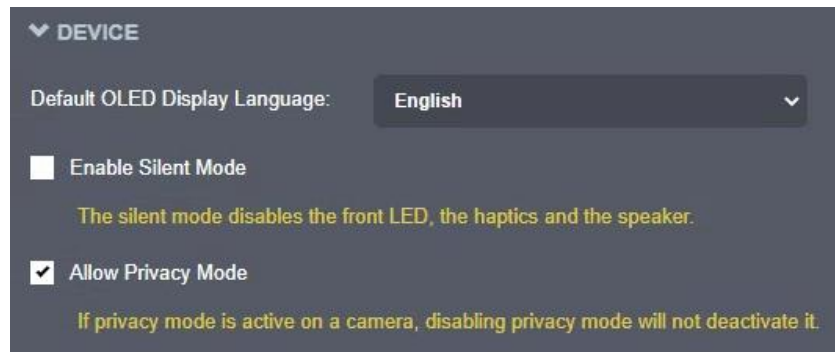

- Set general *Wearer ID* and associated parameters.

  - *Require Wearer's ID*: Each time the body camera is unplugged from the charger, if the Wearer ID is empty, the camera will automatically switch to Scan QR mode and will wait for the user to scan a QR code containing the Wearer ID (the QR code can consist of only the Wearer ID, all other information is optional)

  - *Reset Wearer's ID When Charging*: The Wearer ID is reset each time the body camera is plugged in for recharging

  - *Current Wearer ID*: character string (up to 24 characters) indicating the ID

  - *Wearer Preferred OLED Language*: language used for the information on the OLED screen when the Wearer ID is not empty
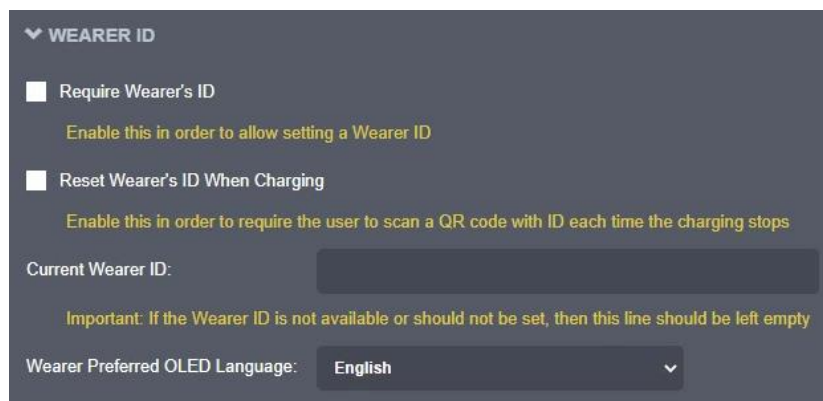
- Set *Docking Station* settings to ensure body camera is ready when accessing recorded clips. To be ready (Online), the docking station must charge the body camera to a certain *Minimum Battery*

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Level + *Starting Online Mode Offset* and for a specific time (*Charging Timeout*). You can also control certain streaming operations when the body camera is docked.
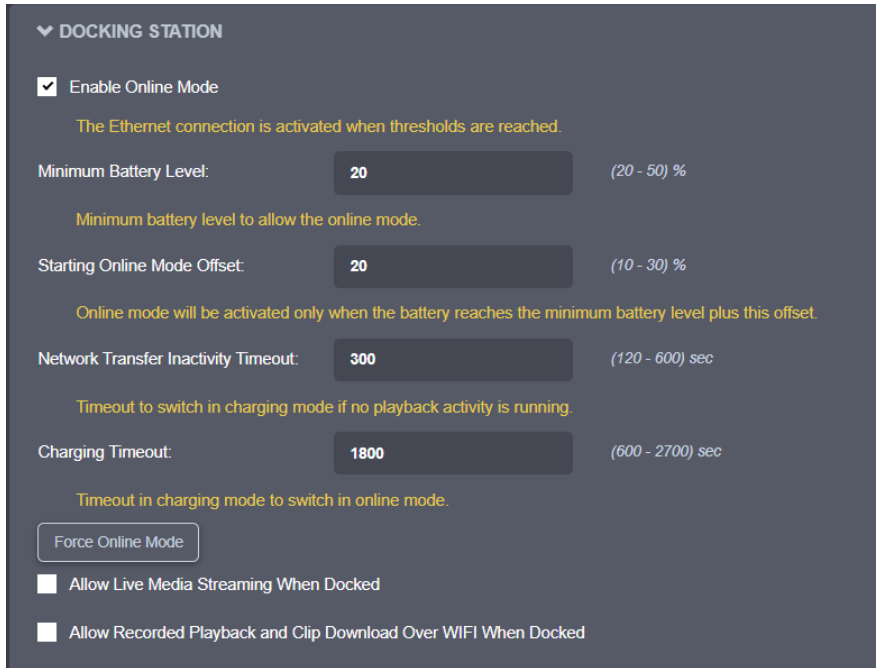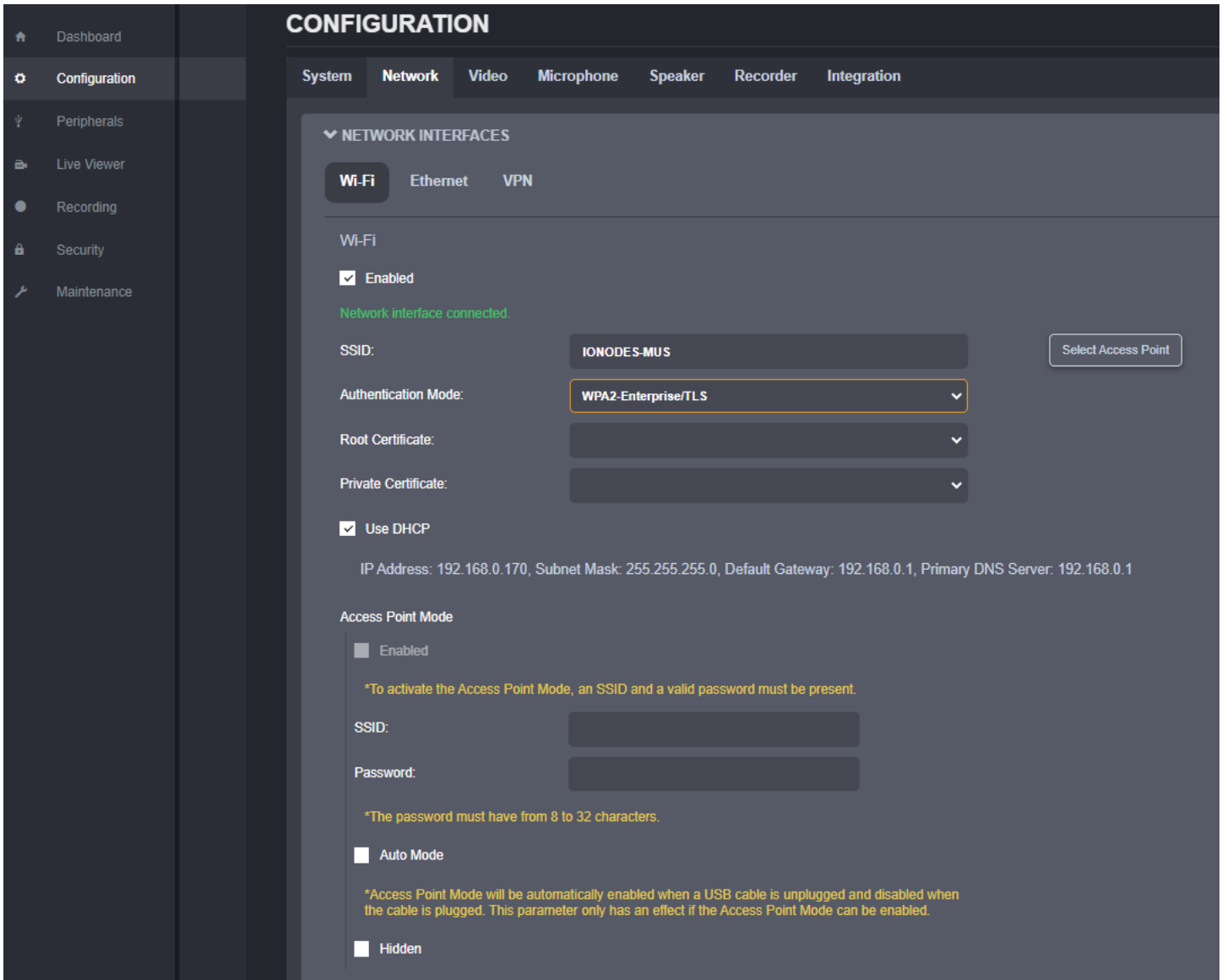

- Enable the front *Flashlight* and set its brightness level. Please note that continuous use of the flashlight can drain the battery very quickly, especially on high brightness levels.
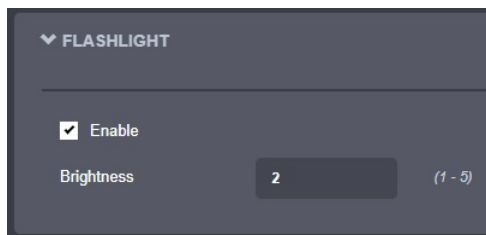
- Set the sampling rate for the *GPS* information (this is the interval between two consecutive GPS position readings).

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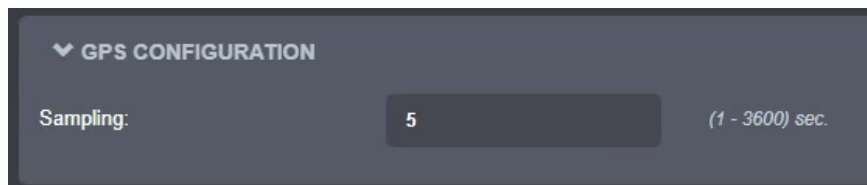
7.3.3 Configuration/Network

Under the Configuration section, select the Network tab to perform the following operations:

- *Network Interface* – Set the body camera's network interface parameters;

    o Wi-Fi / Client Mode: It can be set as a standard client Wi-Fi to connect to different access points. It supports different AEP modes allowing you to choose your network authentication method. Specifically, it includes EAP-PEAP for user credentials authentication and EAP-TLS for certificate-based authentication. For EAP-TLS, you will need to specify the root and private certificate (See Security).

    o Wi-Fi / Access Point: Once enabled, it acts as any typical access point to allow your Wi-Fi clients to connect to it. It has a built-in feature to automatically activate or deactivate this

mode depending on the presence of a connected USB cable. If required, the SSID can be set to be hidden as well.

- o Ethernet: Handles the network wired connection. This setting will be used when the body camera is inserted in a docking station with a wired network interface.

- o VPN: In addition to Wi-Fi and Ethernet, the PERCEPT body camera also features a built-in VPN client that allows you to create a secure connection to another network over the Internet. The only supported VPN type for the moment is "*L2TP over IPSec with PSK*", but more will be added in future firmware releases. Each VPN protocol configuration is different, so please consult with your IT administrator before setting up this feature on your PERCEPT body camera.
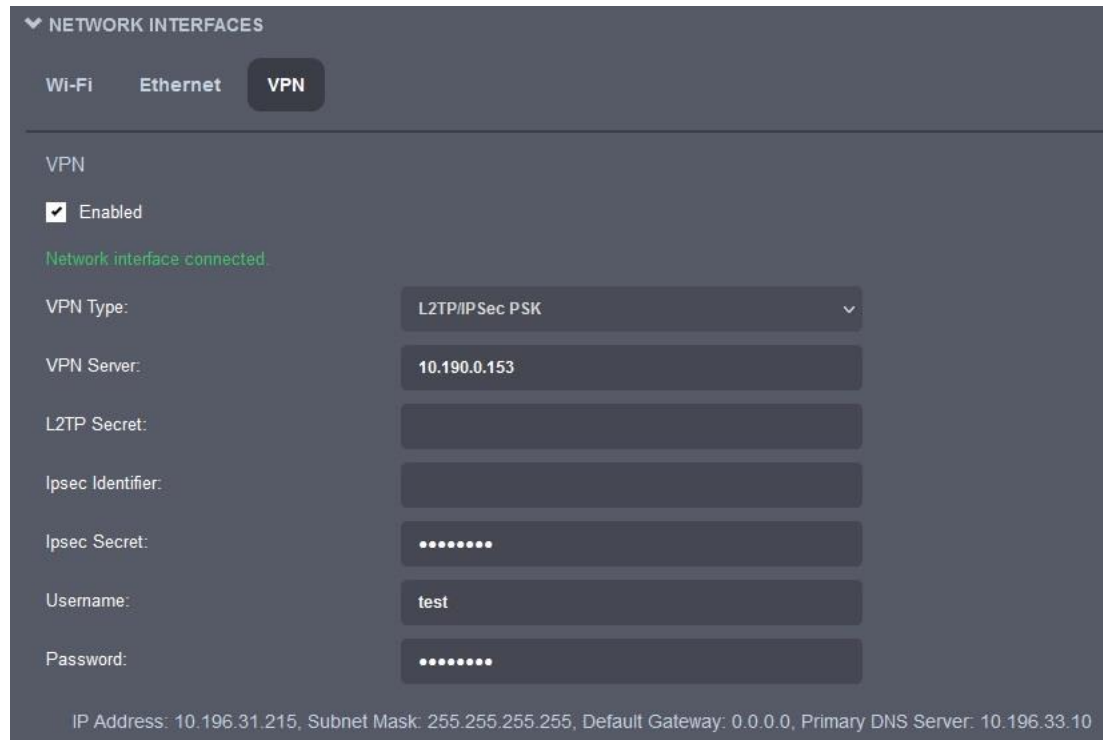
- *Cellular* – Displays information related to the cellular connection. The connection can be disabled if needed. The administrator can configure the type of data that is allowed over the cellular network, such as live audio & video, recorded clips, system information files or firmware updates. For metadata streaming (GPS or system resources usage) the frequency of the updates is also user configurable.

- o Network - The connection can be disabled if needed. Different health check points are displayed to monitor the quality and status of the cellular link, including its associated IP address.

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- o Data Usage - The administrator can configure the type of data that is allowed over the cellular network, such as live audio & video, recorded clips, system information files or firmware updates. For metadata streaming (GPS or system resources usage) the frequency of the updates is also user configurable.
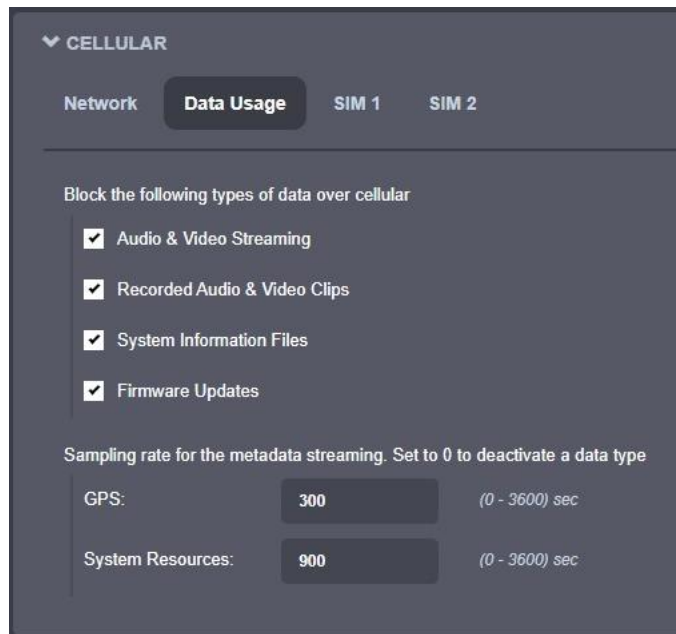

- o SIM 1 (same for SIM2) – Provides SIM card information to the one installed in your PERCEPT body camera. You can also enable or disable mobile data if needed as well as add or select your APN provided by your network operator. Different status points such as SIM presence and Data connectivity are provided for monitoring.
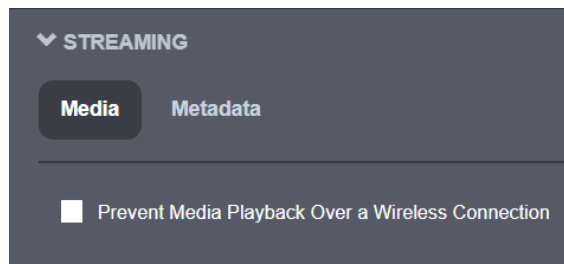
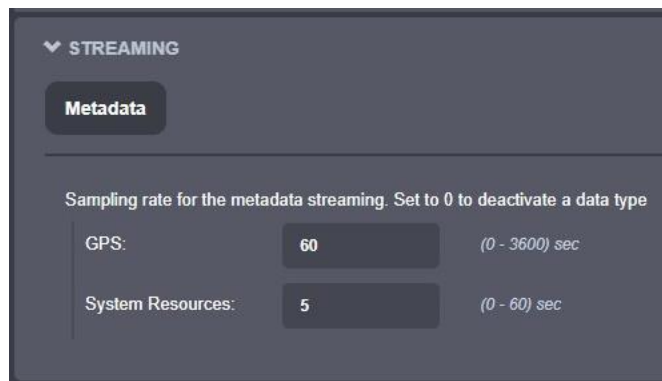**Note:** When using an IONODES SIM card, your APN is JTM2M.
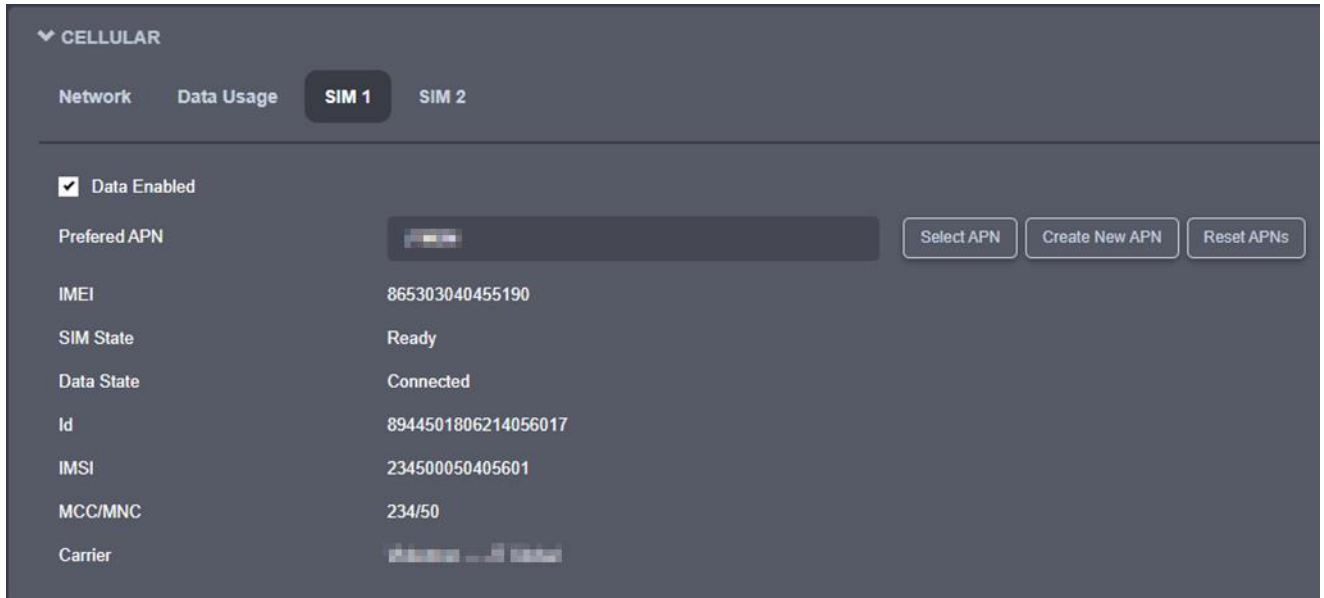
- *Host Name Configuration* – Set the body camera's network name.

- *Streaming* – Provide streaming control points

  o Media – Prevent playback streaming over a wireless link

  o Metadata - Set the sampling rate for the metadata (GPS and system resources usage)

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- *HTTP Configuration* – Change the device's HTTP configuration

    o Accept HTTPS only – Forces the HTTP server to accept only SSL connections

    o Authentication mode – Basic or Digest Authentication for HTTP connections
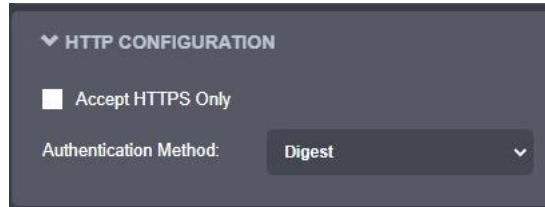
- *Discovery* – Enable the Bonjour discovery protocol and configure search domain.


- *RTSP Configuration* – Change the device's RTSP configuration

    o Authentication method – Basic or Digest Authentication for RTSP connections.

    o Session Timeout – Configure timeout in seconds for RTSP session. The RTSP client will need to send a keep-alive before the timer for the session runs out. As a best practice, please configure your RTSP client to send the keep-alive at around half of the session timeout. If the keep-alive is sent very late and the network performance is degraded (packets are being buffered and arriving late) the keep-alive might not make it in due time to the RTSP server and the streaming session will be closed.

- *Multicast* – Change the global multicast settings for all outgoing multicast streams. By default, the multicast functionality is disabled. Once the user enables it, each outgoing multicast stream will be automatically assigned a multicast IP address and port based on the configured global range.

Manual configuration is also possible on individual media profiles, which will override the global configuration.
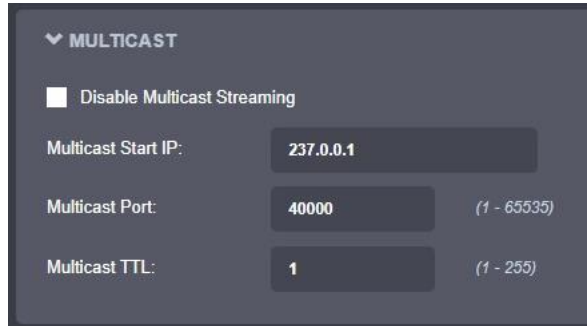

Per profile multicast setting	Global multicast setting		
	Enabled / Port value not-equal-to 65535	Enabled / Port value equal-to 65535	Disabled
Automatic assignation	Multicast available	No multicast available from this specific profile	N/A
Manual Assignation / Port value not-equal-to 65535	Multicast available	Multicast available	N/A
Manual Assignation / Port value equal-to 65535	No multicast sent from this specific profile	No multicast sent from this specific profile	N/A
No assignation possible	N/A	N/A	No multicast possible (RTSP multicast connection refused)

- *Miscellaneous ports* - Enable or disable various system ports used for auxiliary functionality (like system logs and command console)

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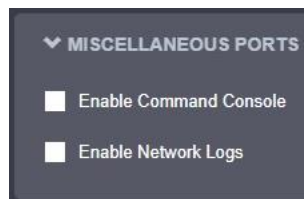
7.3.4 Configuration/Video

Under the *Configuration* section, select the *Video* tab to perform the following operations.
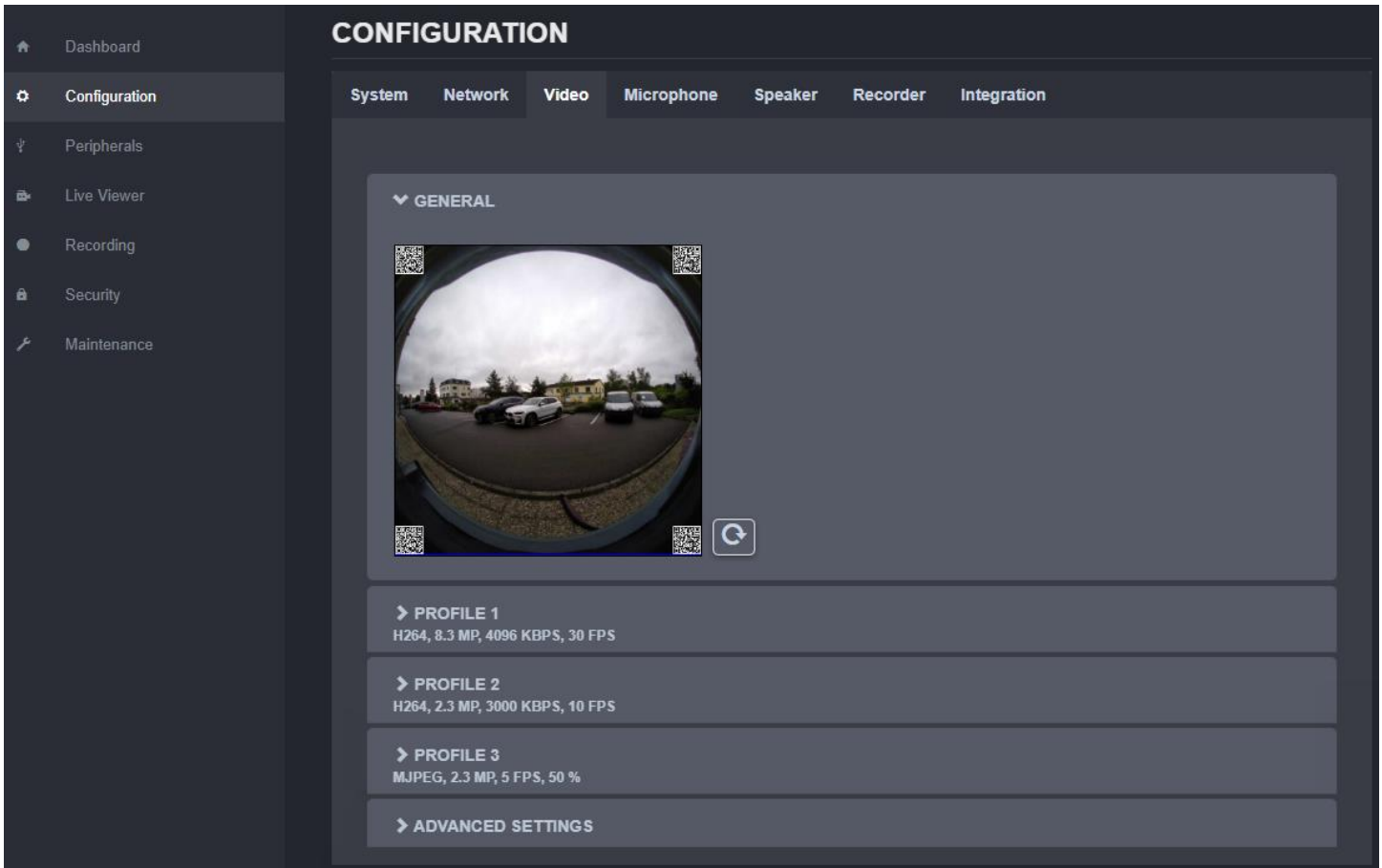
Preview snapshot (still image) in the GENERAL section using the refresh button. Configure the primary, secondary, and tertiary profiles in the corresponding section.

Note: The primary and secondary profiles can be configured to H.264 or H.265, while the tertiary profile can only be configured to MJPEG. All three profiles can operate simultaneously.

Note: The capture resolution & frame rate from the sensor are automatically adjusted based on the configuration of the three encoding profiles (the new capture parameters need to be sufficient for all profiles). This is done on-the-fly by the body camera and may lead to an increase in the sensor's temperature.

For the **primary and secondary profiles,** the following settings are available:

- o *Enable Encoder* – Allows you to enable/disable the specific profile.
- o *Encoder type* - Allows you to choose your profile type (H.264 or H.265)
- o *Resolution* – Select the video resolution (expressed in MP)
- o *Frame rate* – Select the frame rate (expressed in fps)
- o *Target bit rate* – Select the desired target bitrate (expressed in kbps)
- o *Set Optimal Target Bit Rate* – Sets an optimal value (based on IONODES experience) for the target bit rate, considering the current resolution and frame rate
- o *Intra interval* – Defines the GOP (Group-Of-Pictures) size (expressed in number of frames)
- o *Rate control* – Select between Constant Rate or Variable Rate
- o *Profile* – Select the profile for H.264 or H.265
- o *VBR aggressiveness* is unique to IONODES products and proposes various levels (disabled to aggressive) of motion triggered rate control. The more aggressive the setting, the more variation motion will have on the rate control. It is strongly suggested to disable VBR aggressiveness for low bit rate scenarios (below 1Mbps) as this parameter may negatively affect perceived video quality.
- o *URL* – displays the URL that can be used for direct streaming from this specific profile.

o *Multicast Assignation* – This section will only appear if the Global Multicast setting is enabled. It allows you to manually configure the Multicast IP & Port for the specific outgoing stream; when the automatic setting is enabled the encoder will automatically assign the Multicast IP & Port based on the global range defined under *Configuration > Network > Multicast*.
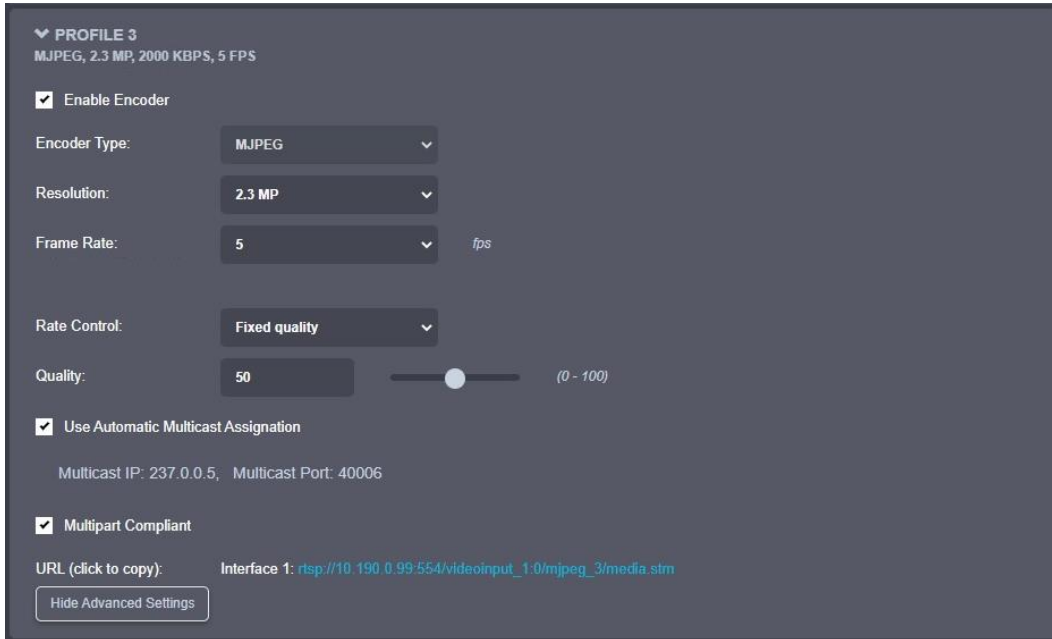
For the **tertiary profile**, the following settings are available:

- o *Enable Encoder* – Allows you to enable/disable the specific profile.
- o *Encoder type* – Only MJPEG is available here
- o *Resolution* – Select the video resolution (expressed in MP)
- o *Frame rate* – Select the frame rate (expressed in fps)
- o *Rate control* – Select between Fixed Quality or Variable Rate
- o *Quality* – Set the image quality (expressed as a percentage from the maximum)
- o *Multipart Compliant* - informs the client to expect several parts (frames) in response to a GET request for the MJPEG stream.
- o *URL* – displays the URL that can be used for direct streaming from this specific profile.
- o *Multicast Assignation* – This section will only appear if the Global Multicast setting is enabled. It allows you to manually configure the Multicast IP & Port for the specific outgoing stream; when the automatic setting is enabled the encoder will automatically assign the Multicast IP & Port based on the global range defined under *Configuration > Network > Multicast*.

Note: When in manual assignation mode, the multicast settings for a specific stream will override the global settings.

The following ADVANCED SETTINGS are available:

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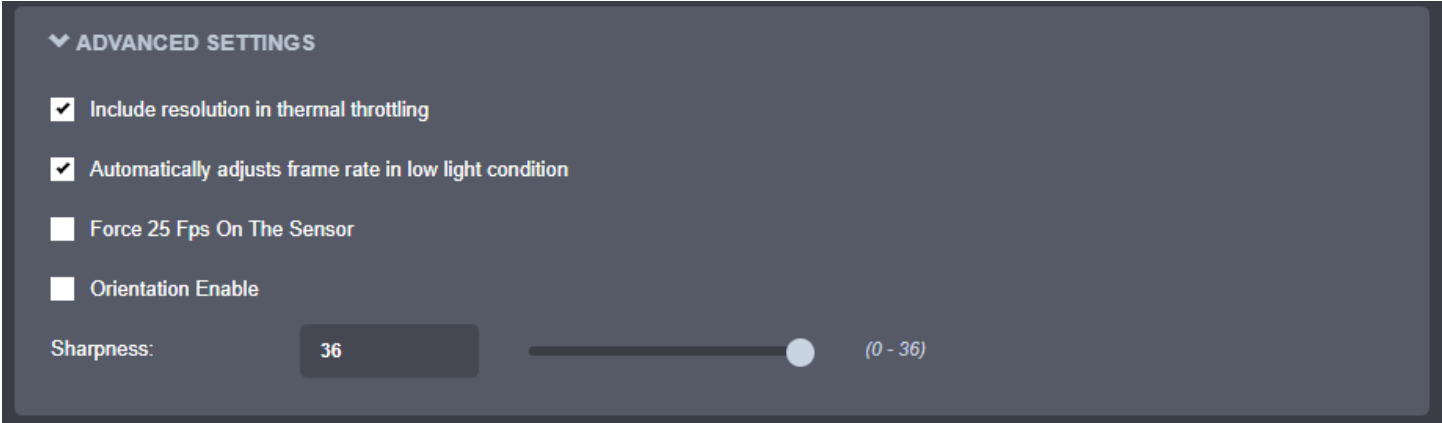
- *Include the resolution in thermal throttling* – CPU throttling prevents damage to the body camera when high temperature is detected (for system, video sensor or battery). To lower the unit's temperature, the body camera automatically scales down the resolution/frame rate/bit rate according to a pre-configured algorithm. There are several throttling stages. First-stage and device shutdown thresholds are listed below.

	First Threshold	Device shutdown
System	71°C	80°C
Video Sensor	61°C	80°C
Battery	51°C	60°C

- *Automatically adjusts frame rate in low light condition* – Enabling this feature will improve image quality during low light conditions by maximizing the sensor's exposure to light. To support this, the actual frame rate may be lower and not correspond the one configured in the video profiles.

- *Force 25 Fps On The Sensor* – Locks the sensor's frame rate to 25 FPS. This setting is useful with some integrations where the frame rate is limited to 25 fps.

- *Orientation Enable* – If the option is ticked, the orientation information from the body camera is embedded into the QR codes. Disabling this will remove the orientation information from the QR codes, which could help with the dewarping in some specific cases (with some VMS).

- *Sharpness* – Adjust video sharpness using slider or numeric input box.

7.3.5 Configuration/Microphone
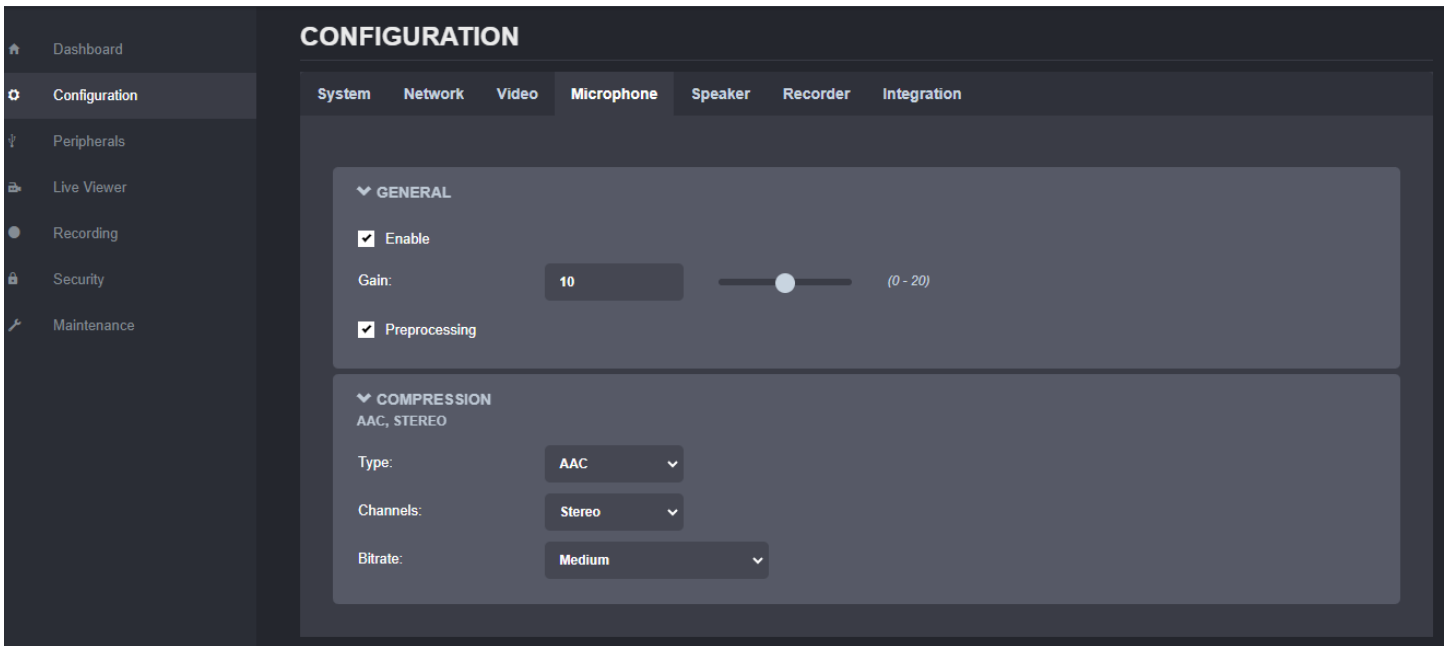
Under the *Configuration* section, select the *Microphone* tab to perform the following operations:

- Enable or disable the onboard dual microphone system.
- Control the audio gain.
- Enable or disable the audio pre-processing to reduce noise levels in your environment.
- Configure the compression for the audio (type/ channels/ bitrate)

7.3.6 Configuration/Speaker
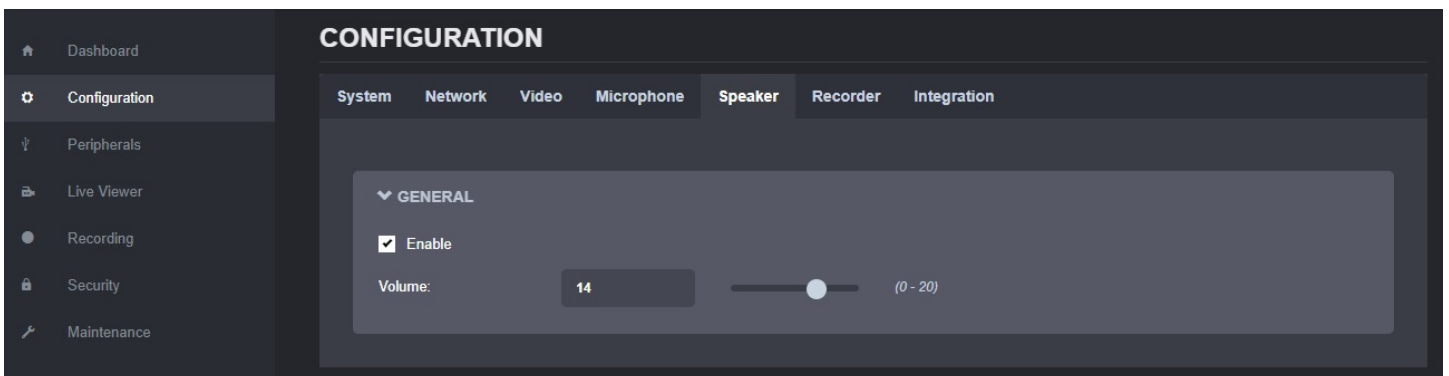
Under the *Configuration* section, select the *Speaker* tab to perform the following operations:

- Enable or disable the onboard speaker
- Configure the output volume

7.3.7 Configuration/Recorder

Under the *Configuration* section, select the *Recorder* tab to perform the following operations:

- View the total and currently available capacity of the onboard SD card
- *Reinitialize Storage*: this will delete all user recorded data on the SD card and return it to factory state
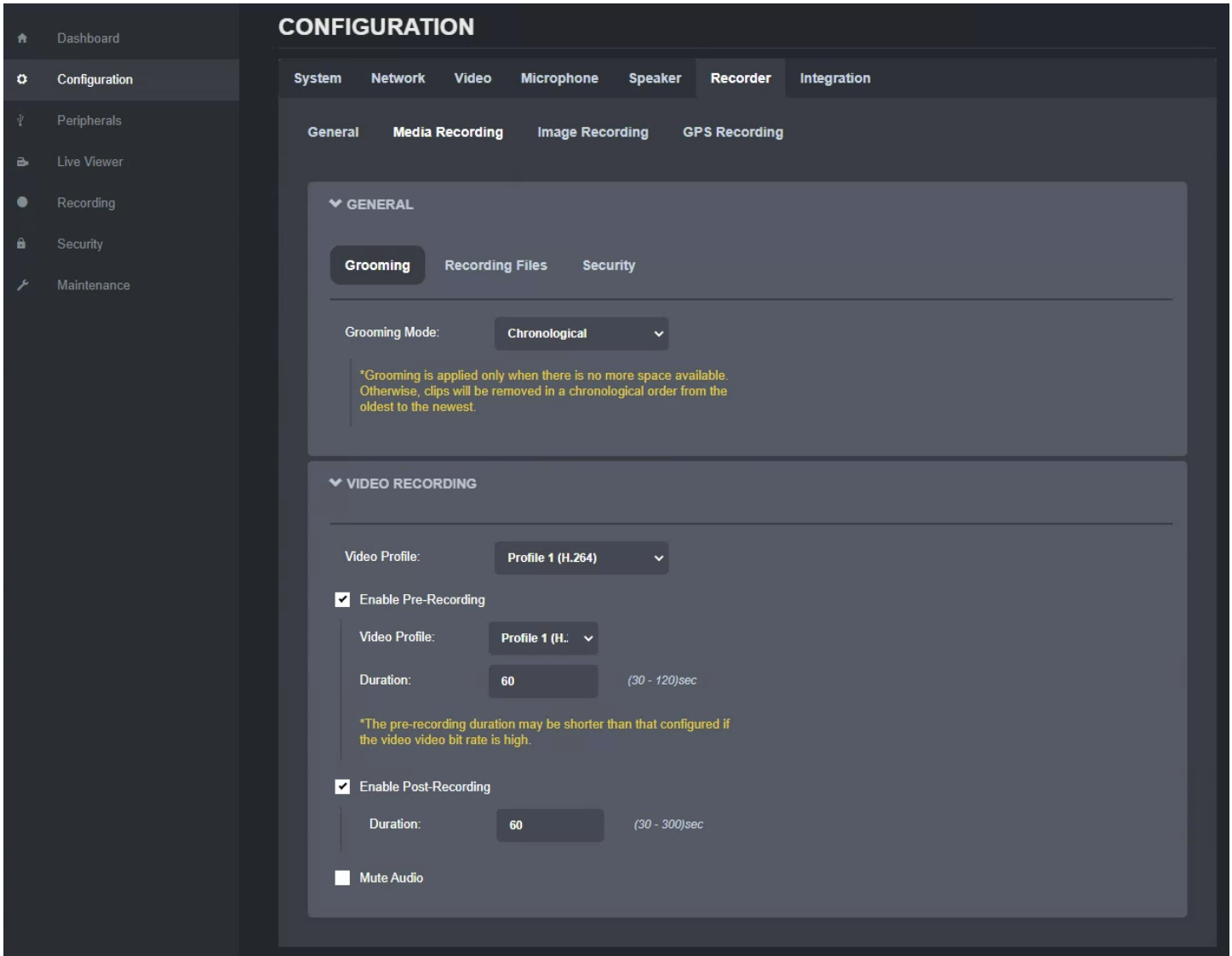
- Configure the Media Recording parameters
  - *Grooming Mode*: defines what files will be overwritten when there is no more available space on the SD card
    - Chronological: clips are deleted in chronological order from the oldest to the newest
    - Manual: a manual intervention is needed to delete the clips
    - By retention time: clips are automatically deleted when the retention time is met
 - *Recording Files*: defines the maximum recording file duration and file size

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- o *Security*: the system administrator can define the key used for encryption of the locally recorded video + audio. The PERCEPT body camera uses the industry standard AES-256 for the encryption.


- Video Recording parameters

  - o *Video Profile*: the profile to be used for recording purposes

  - o *Enable Pre-Recording*: enables the body camera to record buffered video before the recording is triggered

    - ▪ Video Profile: the profile to be used for Pre-Recording

    - ▪ Duration: the duration of the Pre-Recording

  - o *Enable Post-Recording*: enables the body camera to record video after the recording is ended

    - ▪ Duration: the duration of the Post-Recording

  - o Mute Audio: disables the audio recording

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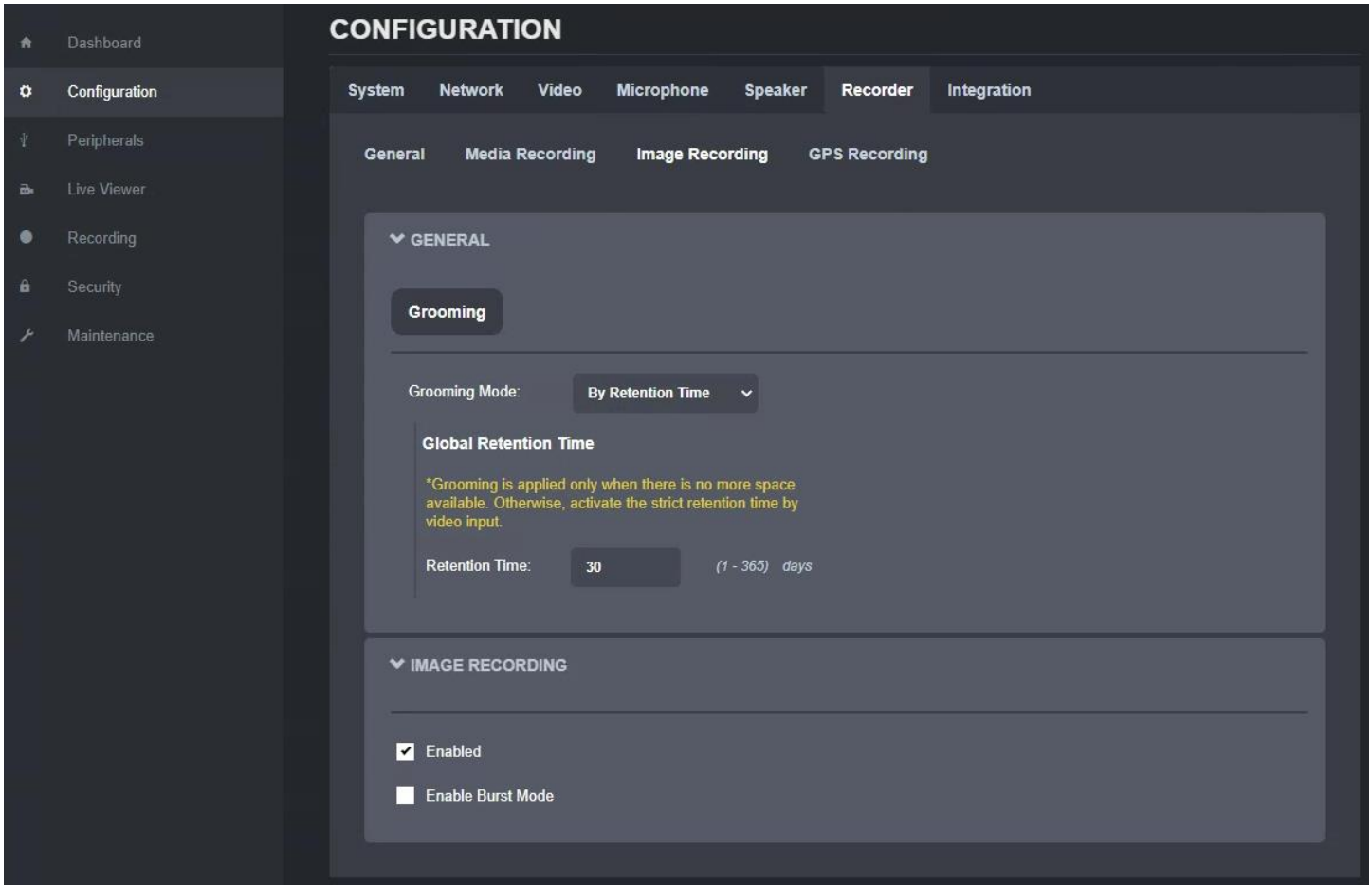
- Configure the Image Recording parameters
  - *Grooming Mode*: defines what files will be overwritten when there is no more available space on the SD card
    - Chronological: images are deleted in chronological order from the oldest to the newest
    - Manual: a manual intervention is needed to delete the images
    - By retention time: images are automatically deleted when the retention time is met
  - *Retention Time:* defines the duration of time that recorded images must be maintained when grooming in retention mode

- Image Recording parameters
  - *Enable:* Enables recording of a single image
  - *Enable Burst Mode:* Enables recording of a quick series of images; the duration of the burst is user-configurable between 1 and 5 sec and rate of image capture is the frame rate of the MJPEG codec (Profile #3)
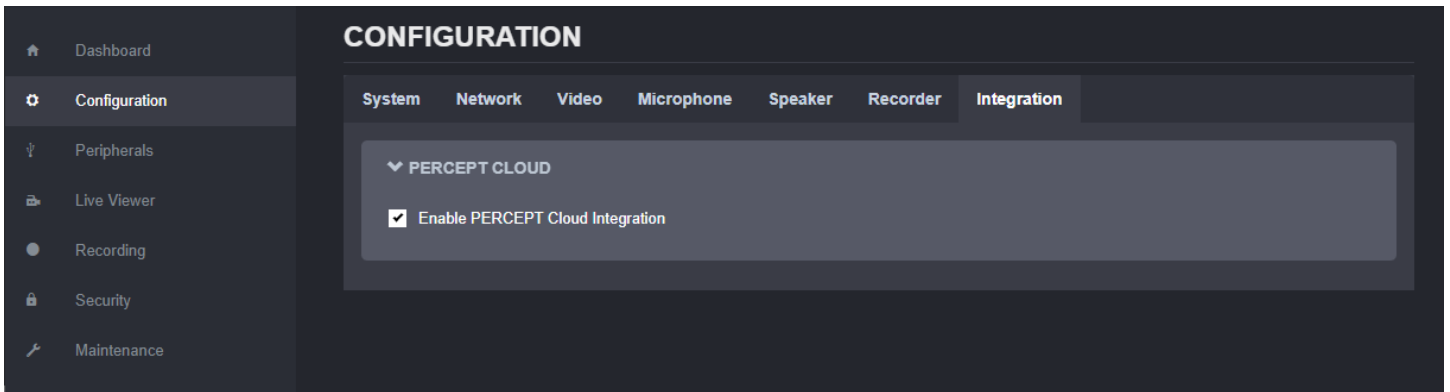
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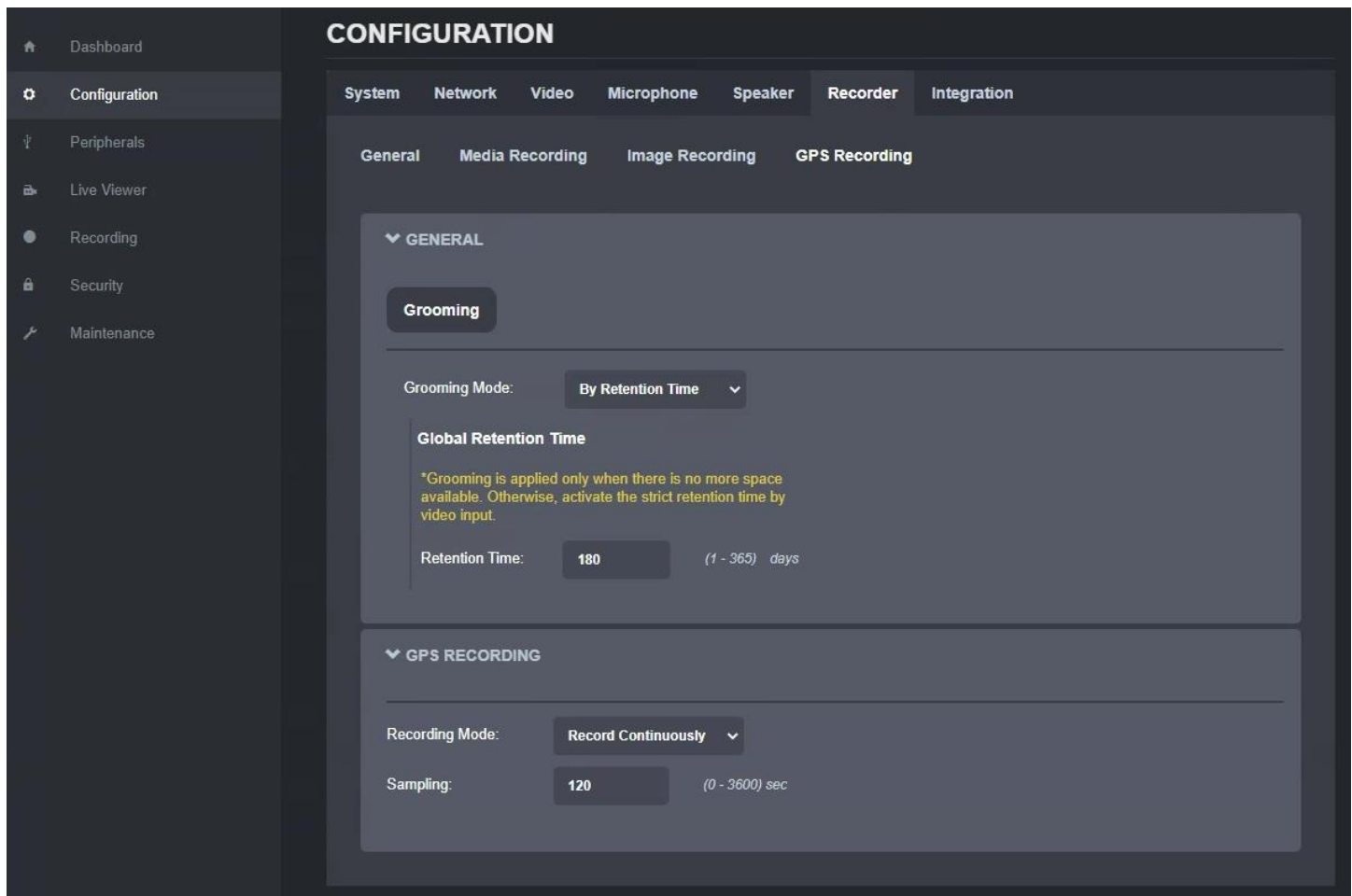
Note: This section only controls the GPS data recording to a separate file. The corresponding file (*.gpx) can be trimmed (based on a specific time interval) and downloaded from the "*Recording*" menu in the web interface.

Note: The bodycam automatically adds GPS information to the QR codes that are then embedded into the corners of each full-frame warped image. This feature cannot be deactivated.

- Configure the GPS Recording parameters
  - *Grooming Mode*: defines what files will be overwritten when there is no more available space on the SD card
    - Chronological: GPS data is deleted in chronological order from the oldest to the newest
    - Manual: a manual intervention is needed to delete the GPS data
    - By retention time: GPS data is automatically deleted when the retention time is met
  - *Retention Time:* defines the duration of time that recorded GPS data must be maintained when grooming in retention mode

- GPS Recording parameters
  - *Recording Mode:* Determines when the GPS data should be recorded
    - *Record Continuously:* GPS data is recorded all the time
    - *On Video Recording:* GPS data is only recorded while video is being recorded
    - *Do not record:* GPS data is not recorded at all (even if available)
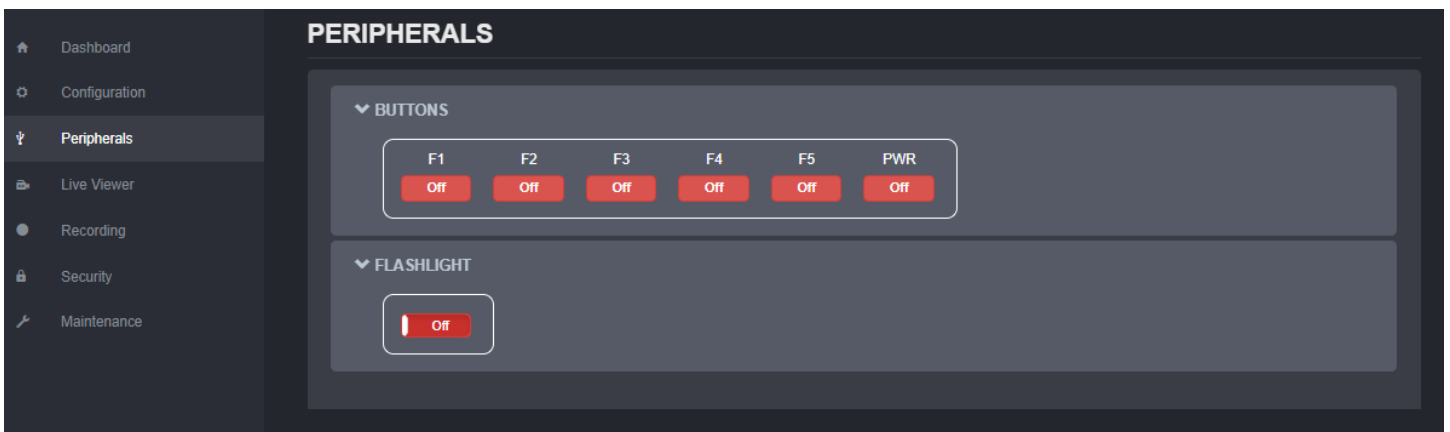 - *Sampling:* Defines the frequency of GPS data recording

7.3.8 Configuration/Integration

Under the *Configuration* section, select the *Integration* tab to enable the integration of the body camera to PERCEPT Cloud platform.
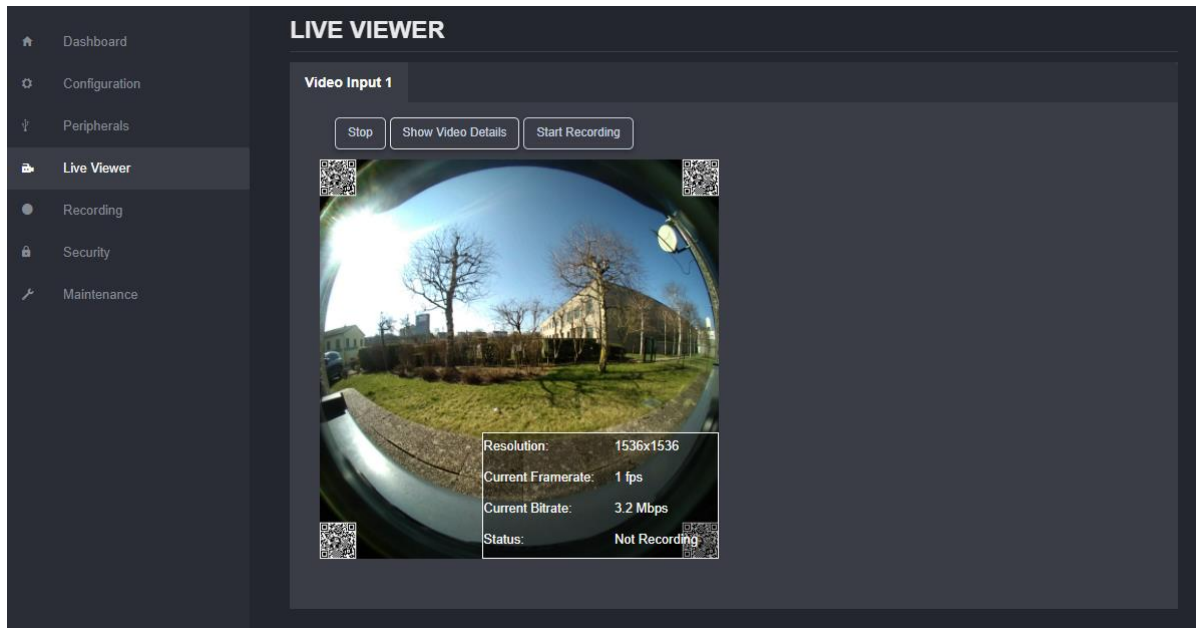
Note: Enabling the integration to PERCEPT Cloud will change the microphone from stereo to mono.

7.3.9 Peripherals

The *Peripherals* section offers the user an overview of the current status of the onboard function buttons and flashlight.

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7.3.10 Live Viewer

The *Live Viewer* page allows you to display an MJPEG video stream preview of the captured scene (MJPEG profile needs to be enabled), as well as starting/stopping an on-demand recording session.

By pushing on the "Show Video Details" button, the user can see the parameters (resolution, frame rate, bitrate) of the MJPEG stream that is currently playing. It also shows if the body camera is currently recording video or not.

Note: The recording session triggered from the Live Viewer tab will always use the configuration set under Configuration > Recorder > Media Recording section in the web interface. So, either the Profile #1 or #2 (H.264 or H.265) stream will be recorded, not the live MJPEG stream that is being displayed in the Live Viewer section.


7.3.11 Recording
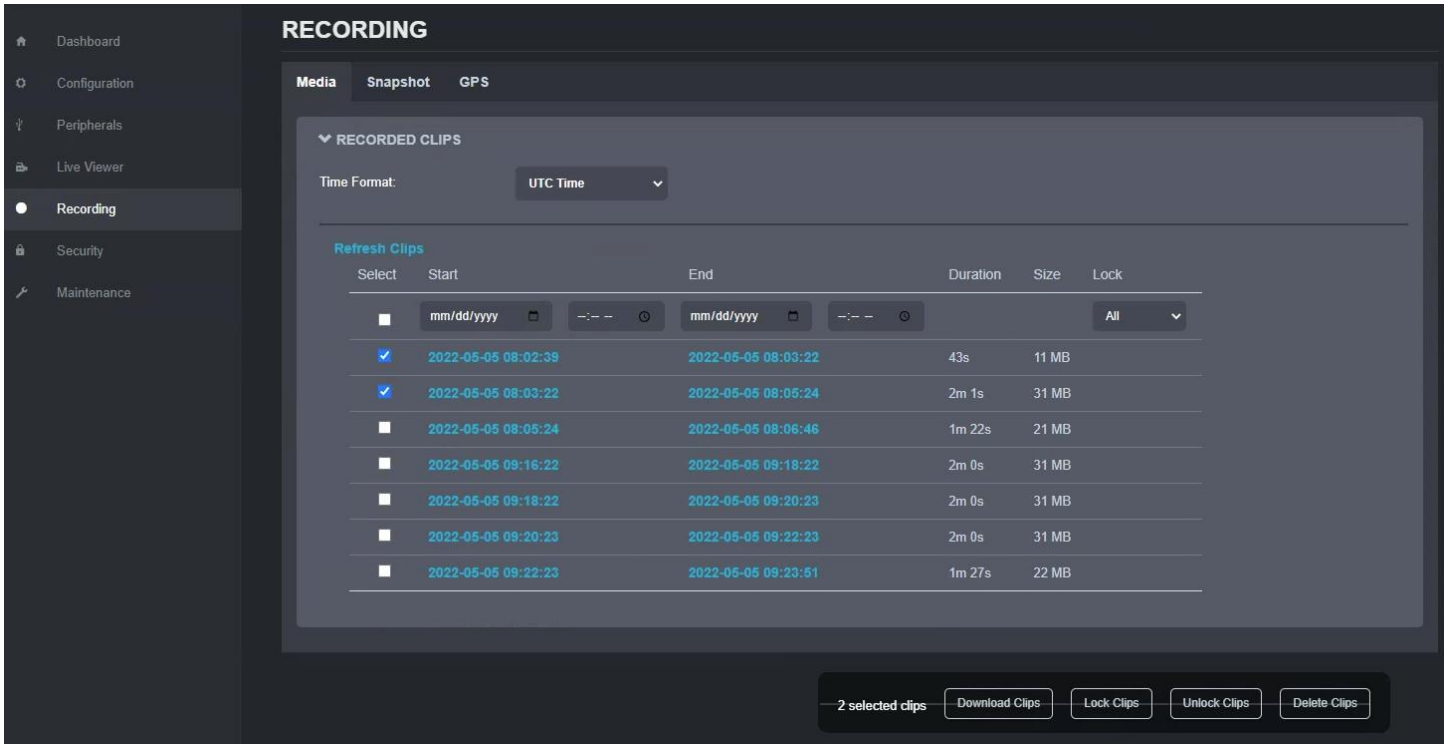
The *Recording* page provides access to all recorded clips, snapshots, and GPS data on the internal SD card. The user selected clips/images can be downloaded, locked (to prevent them from being groomed), unlocked or deleted.

Note: If the list of recorded clips/images is very long, it might take a few seconds for the body camera to display it to the end user.

A GPS data information file (*.gpx) can be exported based on a specific time interval.
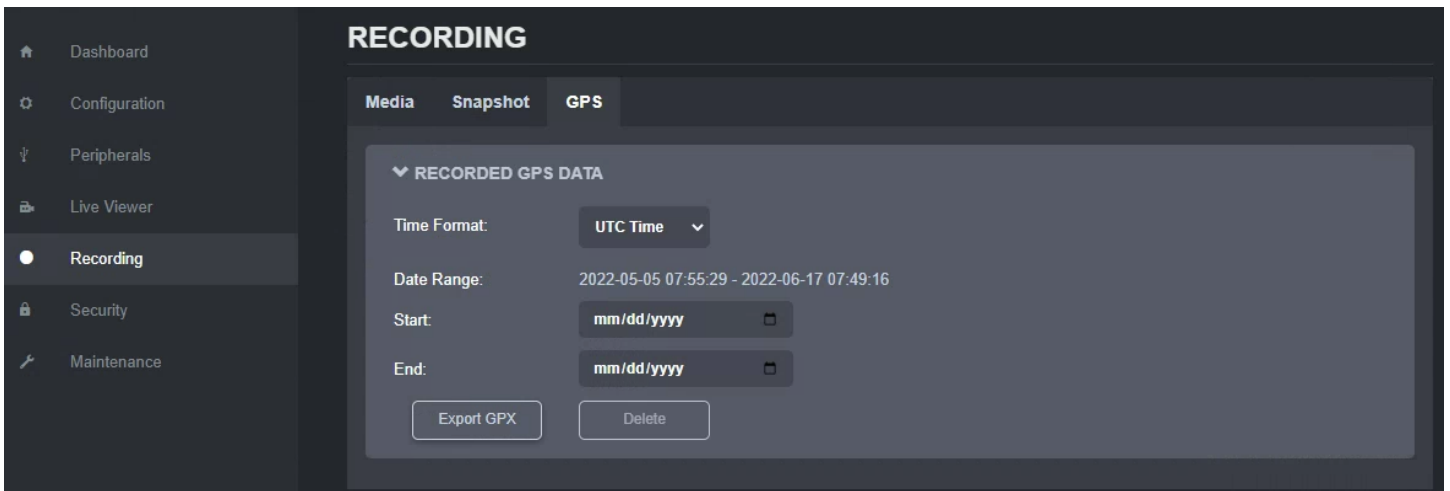
7.3.12 Security
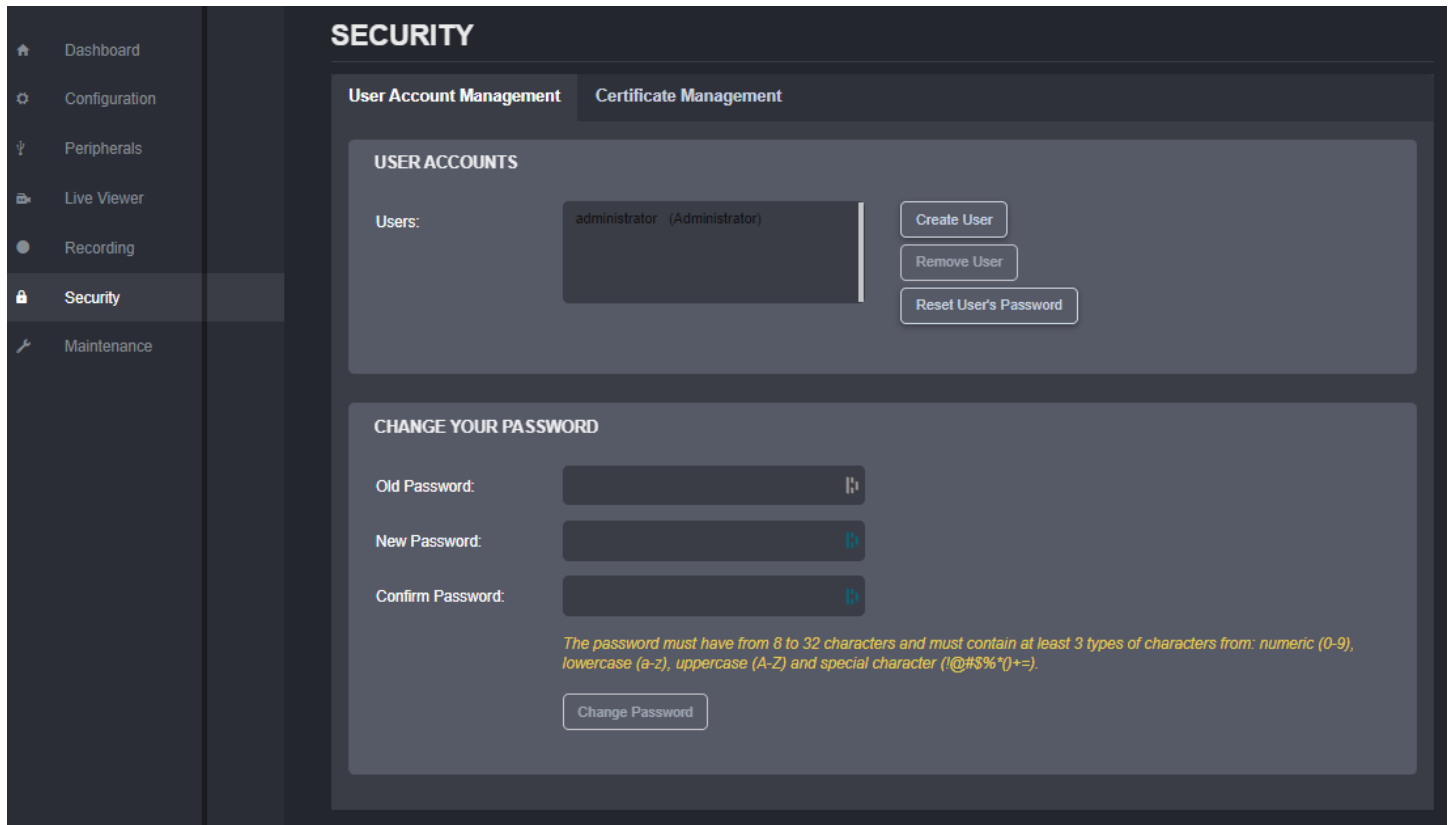
This section allows you to manage user accounts which have access to the device as well as manage digital certificates.

User Account Management - A description of permissions for the different roles is provided below.

Role	Description
User	• can access Dashboard (Product Info/System Status sections only) • can access Live Viewer • can change his own password
Poweruser	*in addition to the User role: • can access Dashboard (Health Status section) • can change all configuration settings • can initiate On-demand Recording • can access the Maintenance section, but cannot perform a firmware update or reset to factory default settings
Superuser	*in addition to the Poweruser role: • can access the Maintenance section and can perform a firmware update and reset to factory default settings
Administrator	*in addition to the Superuser role: • can create or modify all user accounts

Certificate Management – Allows to add & remove your own X.509 digital certificates in the device's local database. They allow for Wi-Fi passwordless authentication (See Configuration/Network) as well as web SSL stream encryption. The expiration date allows you to see the end of the validation period of the digital certificate. Once expired, any new Wi-Fi connections will fail, and any new web SSL connection will revert to its original SSL certificate for stream encryption.
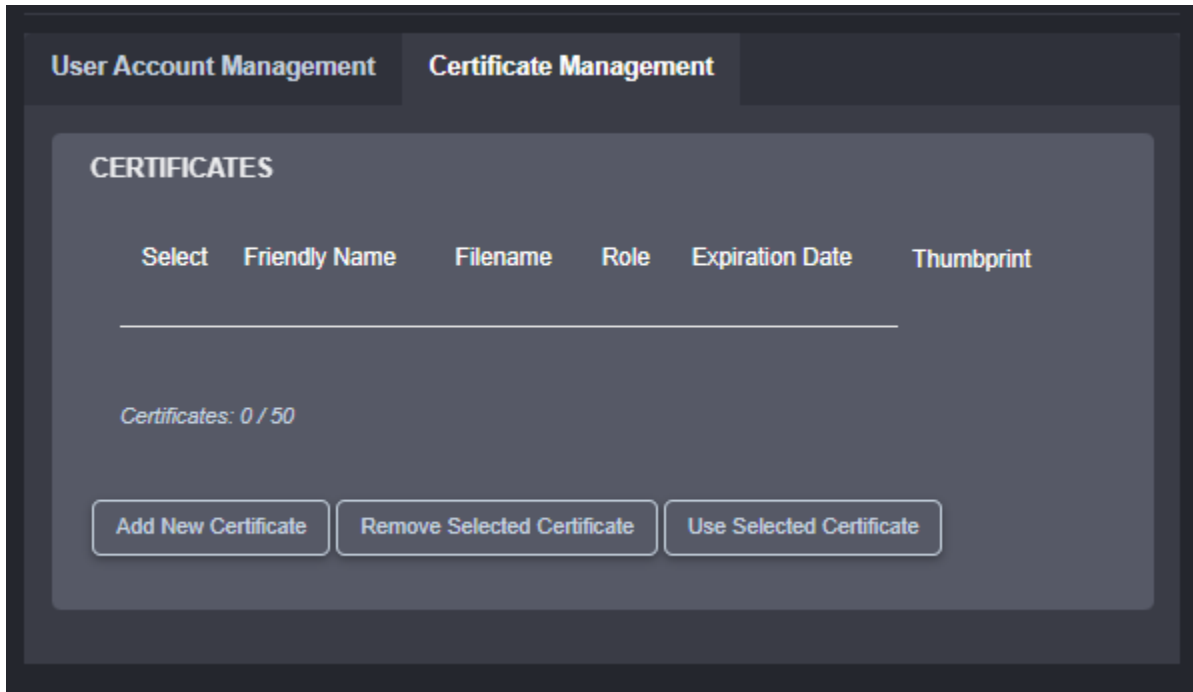
7.3.13 Maintenance
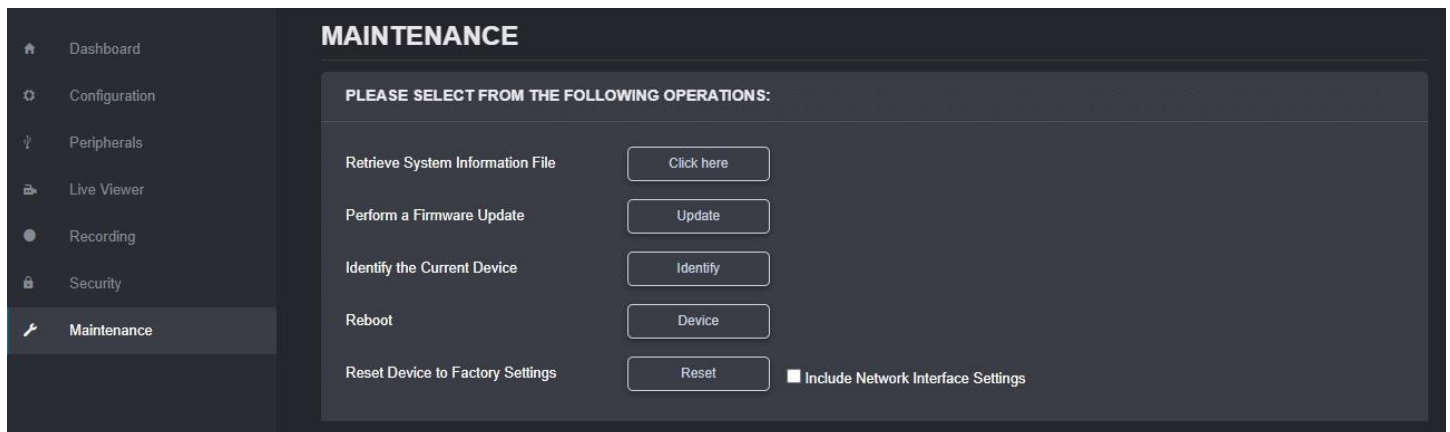
The *Maintenance* page allows you to retrieve the system information ("SysInfo") file, perform a firmware update, reboot the unit, and perform a factory reset (with or without including the network settings). You

can also identify the current device (if you have multiple units of the same type in the same location) by flashing its status LED and vibrating.

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8 Troubleshooting

8.1 Common issues & resolutions

Symptoms	Possible cause	Resolution
Body camera does not power up	The battery is depleted	Charge the camera
	The battery is faulty	Replace the battery. The operation can be performed by a service technician, using the battery replacement kit & instructions provided by IONODES.
Body camera does not charge when connected to the dock	Dock is not connected to mains power or it is connected via an incompatible power adapter	Connect the dock to a power outlet via a compatible power adapter. A Green status LED on the dock will confirm that everything is ok.
No status LED feedback	The battery is depleted	Charge the camera
	Silent mode is enabled	Disable silent mode
Body camera does not record video, still pictures or audio	SD card is full	Offload the data from the internal storage (user). Verify the grooming strategy (admin).
	SD card is faulty	Body camera needs to be returned on RMA, to have the internal SD card replaced. The end client cannot replace the card on his own, as this will void the warranty.
Time and date are inaccurate	NTP not active	Check time & date synchronization settings in the web interface and configure an NTP server (admin).
No streaming over LTE	Data Usage blocked	Unblock desired data traffic under the cellular data usage settings of the web interface.
	Data State not connected, using an IONODES-issued SIM card	Contact IONODES customer service to purchase a PERCEPT connect plan.

Symptoms	Possible cause	Resolution
	Data State not connected, using third-party SIM card	Verify your cellular signal strength and your configured APN settings. SIM card must be unlocked before inserting in the camera, there is no means to enter unlock PIN from the camera. If the issue persists, contact your cellular service provider technical support.

8.2   Contact IONODES Support

For more information, please contact our technical support team:

- Call: 450-696-1060 or 1-844-696-1060 (North America Toll Free)
- Send an email to: support@IONODES.com
- Web request: https://support.IONODES.com/supportcenter/s/contactsupport

Annex – Statement Limited Warranty

Please visit https://www.ionodes.com/limited-hardware-warranty/ for the latest warranty information.