The SportReTiNA video analysis toolkit
https://sportretina.com

Product User Guide v2

(Last updated: 29 March 2023)

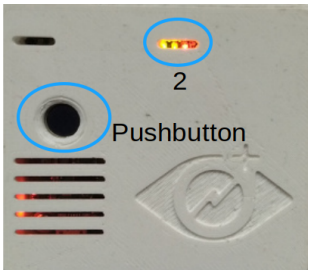
Content of the toolkit

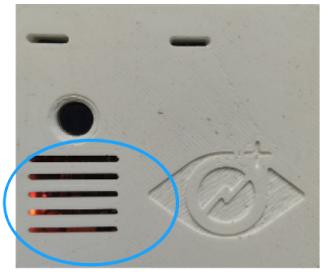
- two, three or four wireless cameras with mounts and thumb screws
- spare camera mount and thumb screw
- portable hub with wifi hotspot
- wrist-worn remote button
- spare CR2032 battery for wrist remote
- USB WiFi adapter (optional)
- slim portable carry case
- camera attachments
    - selfie stick
    - mini tripod
    - 2 x flat mounts
    - clamp
    - wrist strap
    - strap
    - J-hook buckle
    - strap buckle (flat)
    - strap buckle (curved)
    - 2 x curved mounts
    - 6 x thumb screws
    - 2 x adjustable pivots
    - 4 x adhesive pads
    - pouch

Operation manual

1) Switching on the hub

Switch on the hub first. Press and hold the black pushbutton on the case lid for 1-2 seconds until all 3 status LEDs (red, amber and green) from slot 2 are switched on. At this point, you can safely release the pushbutton and the hub's operating system will start booting. When the booting process is close to completion, the 3 status LEDs will turn off. Within 10 seconds, the hub will be ready for use. You can still tell the hub is switched on by the red/green LEDs that are visible through the air vent.





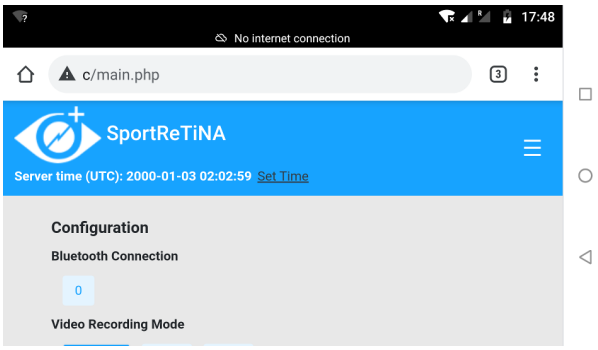
2) Connecting your computing device to the hub via WiFi

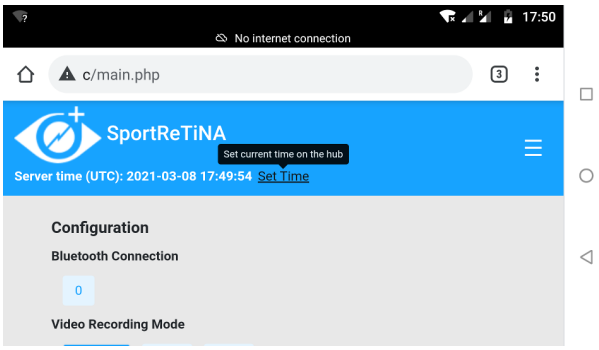
Using your phone, tablet or laptop:

a) Enable the WiFi on your device and look for an access point (hotspot) called "coachye1" and connect to it. The WiFi password is "12345678".

b) Open a web browser and type "c/" in the address bar. On some browsers, that doesn't seem to work well. In that case, you can enter "10.0.1.1" instead. It is recommended to bookmark the web page.

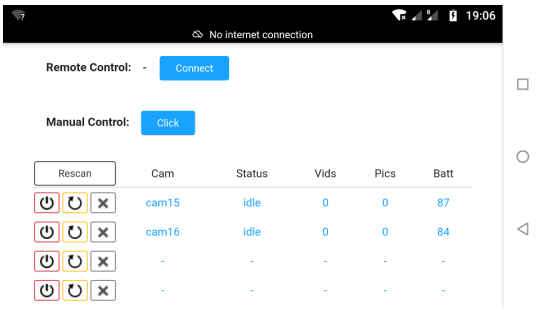
c) You should now be presented with the SportReTiNA web user interface - this will be described in more detail later in this guide. The first thing to do is to check that the "Server Time" shown on the top left of the screen is correct. If the time is incorrect, click on the "Set Time" link and the hub will be updated with the web browser's current time.





3) Switching on the cameras

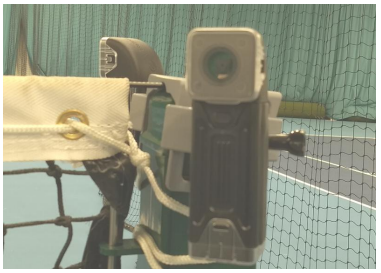
One by one, switch on all the cameras by pressing and holding the smaller rubber button for ~3 seconds until the power LED starts flashing red and green, alternatively. Release the button now. After a few seconds, the power LED will turn solid green. The camera will take about 25 seconds to boot. When it is ready, the camera will display the battery level (0% to 100%) by flashing the yellow LEDs. One yellow LED means the battery level is <20%, two LEDs means <40% and so on until 5 LEDs, meaning >80%. After a few seconds, all yellow LEDs will stop flashing to save battery power. The camera will shut down automatically when the battery level is around 20%. Once in operation, the battery level on each camera can be checked at any time by short-pressing the larger rubber button, the yellow LEDs will flash as per the previous description.



As the cameras are started (you don't need to wait until a camera has completed booting before switching on the next one), they will get listed on the web user interface in the "Operation" tab. This is a confirmation that the cameras are up and running and connected to the hub.

4) Placing the cameras in the sportsground

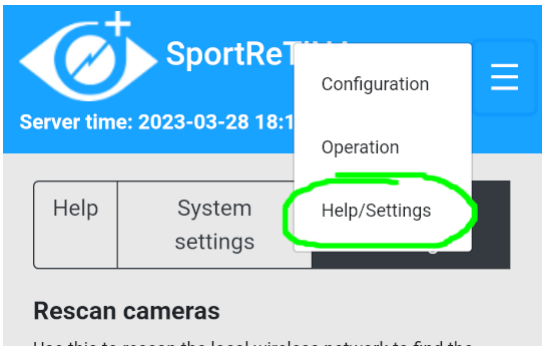
First, attach the Go-Pro style mount on the back of the camera using the small thumb screw that you find in the toolkit case.

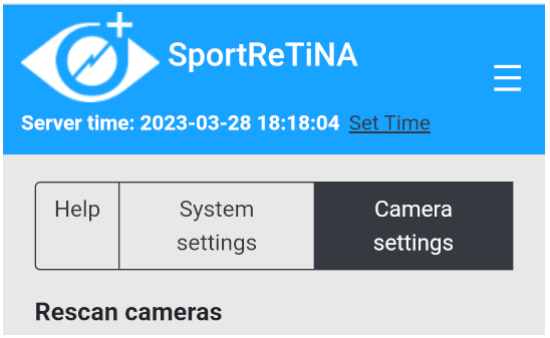


Then, choose the most suitable mounts for your set-up amongst the ones provided with the toolkit to attach the camera to a fixture. The toolkit comes with a selfie stick, a large clamp, a mini flexible tripod, flat and curved mounts, various straps and adhesive pads for flat surfaces; you are pretty much covered for every situation. If you need more mounts, you can easily and inexpensively purchase additional GoPro accessories from several online retailers and marketplaces.

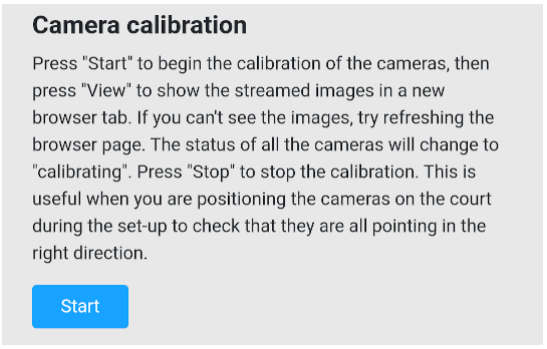
5) Calibrating the cameras using the video streaming function

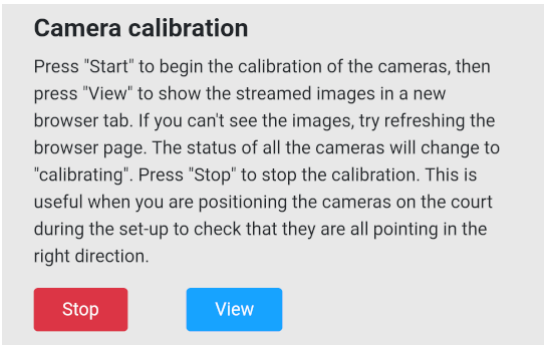
After the cameras have been positioned, use the streaming function from the web user interface to ensure they are pointing accurately in the desired direction. Go to the “Help/Settings” tab, click the “Camera Settings” button and do:

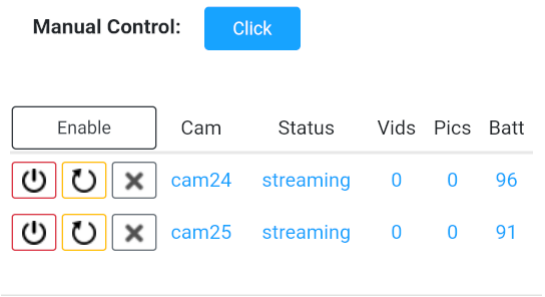




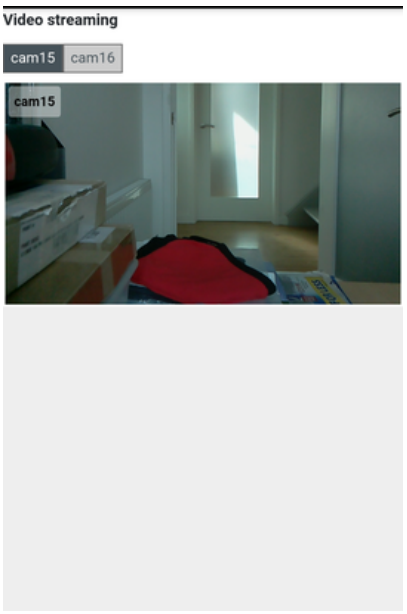
a) Press the “Start” button under the “Camera calibration” section. A “Stop” button and a “View” button will appear shortly. After 2-3 seconds (depending on your browser), the status of the cameras will change to “streaming”.







b) Press the “View” button. This will open a new browser tab. You can now view the live streams from all the cameras at a low framerate (this does not affect the frame rate of the video recording later on). On some browsers, you may need to refresh the page to view the images. Adjust the angle of your cameras to your liking using the web browser’s view to monitor the changes. If you are using a small screen, it might be easier to enable the view of one camera at a time using the tabs at the top with the camera ID’s (eg. cam15, cam16, …). Pressing each tab will enable/disable the corresponding camera.

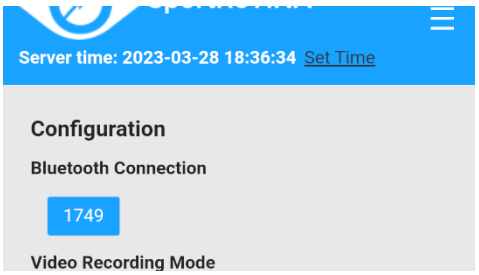


c) Once you are happy with the positioning of the cameras, you can close this browser tab and press the “Stop” button. The cameras will stop streaming and return to the “idle” status.

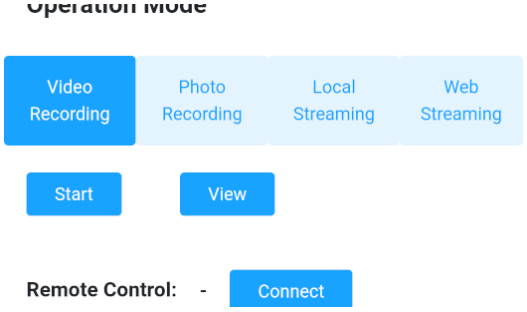
6) Connecting your wrist remote

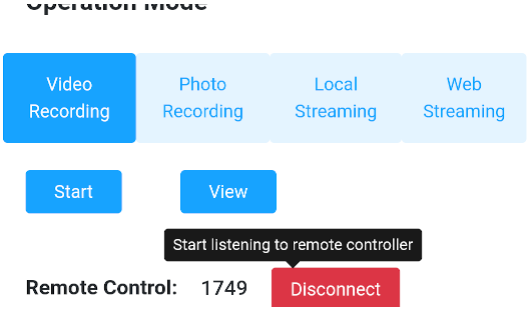
Your wrist remote allows you to trigger the recordings remotely. To do that, you simply press the top of the remote until you hear a click and a blue LED flashes for ~1 second. There are two things you need to do to use the remote:

a) Check the remote is connected to the hub. Simply go to the “Configuration” tab of the user interface and double-check that the Bluetooth connection is enabled. The highlighted 4-letter code is a unique identifier telling you the remote is connected to the hub. If the button is not highlighted, pressing it once should establish the Bluetooth connection.



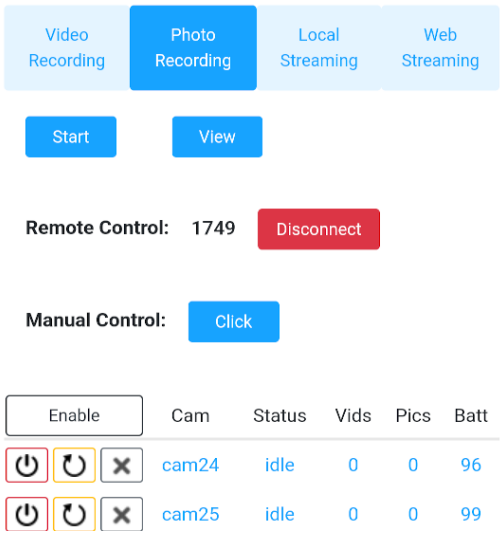
b) Go to the “Operation” tab and press the “Connect” button. Within a few seconds, the remote ID and a “Disconnect” button will appear. At this point, you are ready to use your wrist remote.

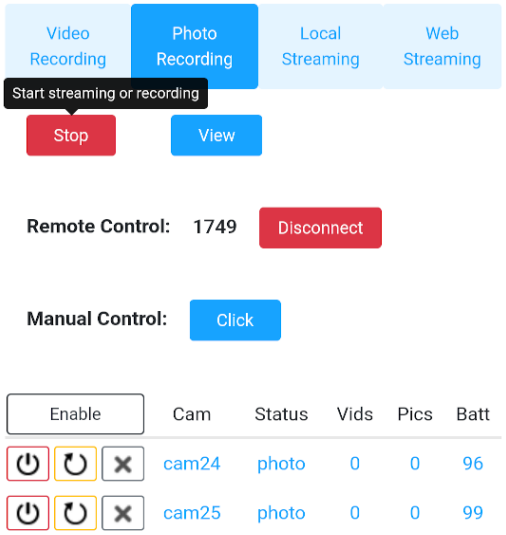




7) Capturing photos

You can use the SportReTiNA toolkit to also capture snapshots from all the cameras simultaneously. To do that, simply go to the "Operation" tab and select "Photo Recording", then press the "Start" button. The status of the cameras will change to "photo". It might take a few seconds for the information to be displayed on your web browser.





At this point, you can take a simultaneous snapshot from all the cameras by short-pressing on the remote (blue LED will flash through the rubber cap). Alternatively, you can press the "Click" button next to "Manual Control" on the user interface. The "Click" button simply simulates the remote presses. This is useful when the remote is more than 8-10 metres away from the hub as it will not work for longer distances than that since it uses Bluetooth® BLE technology .

As you take photos, you can see the "Pics" column in the camera listing increment by one. This column tells you how many photos are stored on each camera.

Press the "View" button to view the photos. This will open a new browser tab and you will be able to view all the sets of photos captured in a single screen. The user interface is very simple to use and a "Page help" is also available with details of what each control does.

Once you have finished with the viewing, close the tab and return to the main user interface. If you want to leave the "Photo Recording" mode, press the "Stop" button. The status of the cameras will return to "idle".

8) Capturing videos

The system has 3 video recording modes:

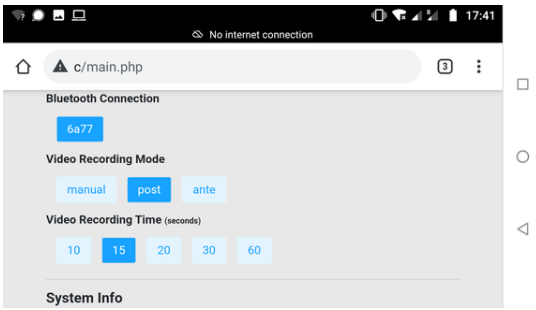
(1) manual: press the remote (or the "Click" button on the user interface) a first time to start the recording, press it a second time to stop; in this mode, you can record any length of time (up to the capacity of the camera's micro SD card).

(2) post: it will record a specified amount of seconds (selected on the "Configuration" tab of the user interface) from the moment you press the remote once; the recording will stop automatically.

(3) ante: the ninja mode! Press the remote once and this will save the last few seconds (eg 15 or 30 seconds) prior to the press. The most useful mode, in our opinion, as it allows you to see an action first before deciding whether you want to save it for later viewing.

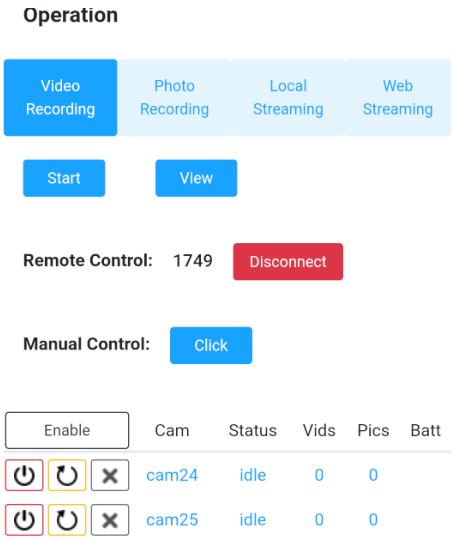
To start video recording, do:

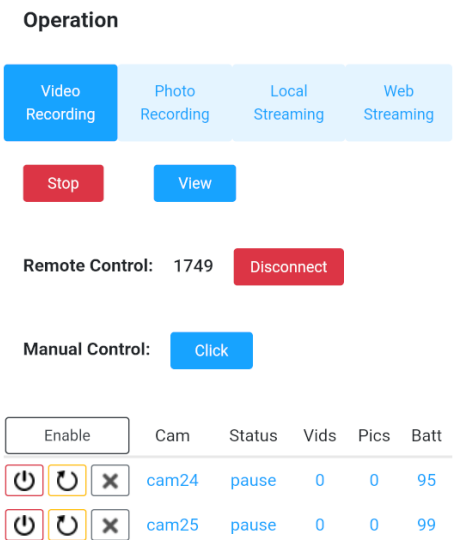
a) Go to the "Configuration" tab and select an option from "Video Recording Mode" (VRM) and "Video Recording Time" (VRT). In "manual" video recording mode, the recording time value will be ignored.



b) Go to the "Operation" tab and ensure that all the cameras are in "idle" mode. If they are not, press the "Stop" button.

c) Still in the "Operation" tab, select "Video Recording" and then press "Start". The status of all the cameras will change to "pause". Only in the "ante" mode, press the remote a first time to change the cameras' status to "recording" (you don't need to do this for the other two modes). You are now ready to capture synchronised videos from all the cameras in the system. As usual, you can use either the wrist remote or the "Click" button on the web interface to trigger the recordings.





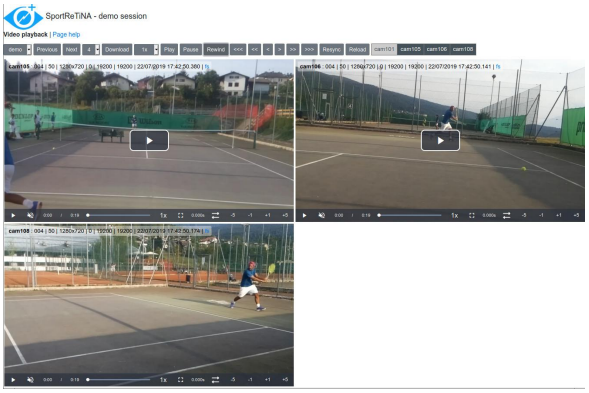
As you press the remote, the status of the cameras will change as following:

Mode	Start	Ready	Remote press	2nd press	After processing time	Ready
Manual	pause	-	recording	processing	pause	-

Mode	Start	Ready	Remote press	After VRT seconds	After processing time	Ready
Post	pause	-	recording	processing	pause	-

Mode	Start	First remote press	Ready	Remote press	After processing time	Ready
Ante	pause	recording	-	processing	recording	-

As you capture your videos, you can see the “Vids” column in the camera listing increment by one. This column tells you how many videos are stored on each camera.



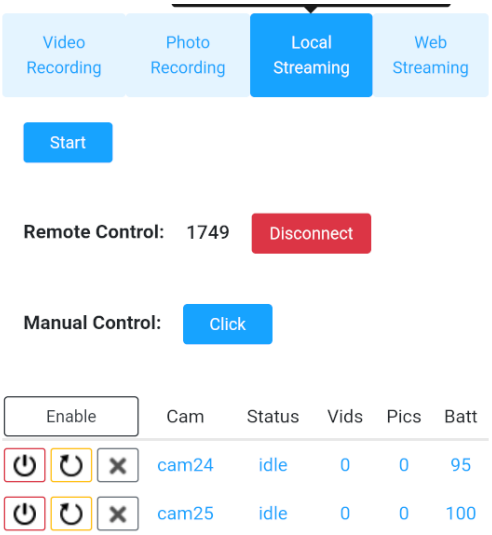
Before you can trigger the next recording, you need to allow time for the previous video to be fully “processed” and copied on the camera’s SD card. This will take an amount of time proportional to the length of the video, from a few seconds to a few minutes. When the videos are being processed, any remote press is ignored. Please wait until the cameras are ready and showing “pause” in “Manual” and “Post” mode and “recording” in “Ante” mode.

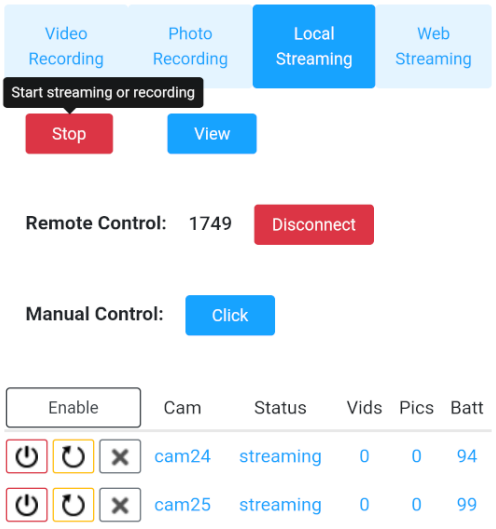
Press the “View” button to view the videos. This will open a new browser tab and you will be able to view all the sets of videos captured in a single screen. The user interface is very simple to use and a “Page help” is also available with details of what each control does.

Once you have finished with the viewing, close the tab and return to the main user interface. if you want to leave the “Video Recording” mode, press the “Stop” button. The status of the cameras will return to “idle”. Also, every time you change the “Video Recording Mode” and/or the “Video Recording Time” in the “Configuration” tab, this will “Stop” the current operation mode first. If this is not happening, press the “Stop” button manually.

9) “Local” video streaming

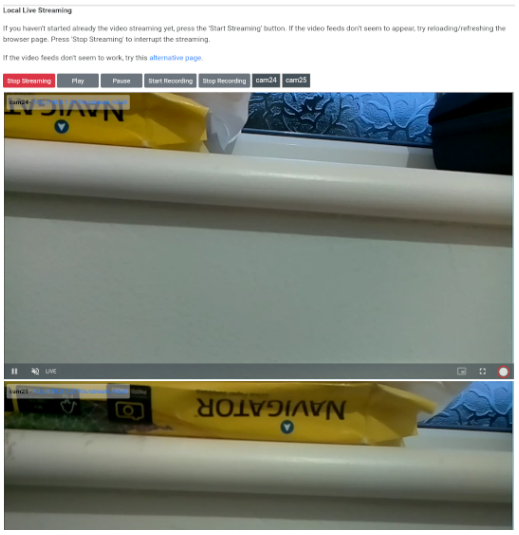
The “local streaming” button allows you to live stream all the active cameras on the local “coachye1” wifi network, no internet connection is required. Any device connected to this local network will be able to view the live streams using any web browser at the URL http://c/video-stream-hls.php or http://10.0.1.1/video-stream-hls.php. Go to the “Operation” tab, press the “Local Streaming” button, then press the “Start” button.





The status of the cameras will change from “idle” to “streaming”. At this point, you can view the streams by pressing the “View” button, this will open a new browser tab.

In the new tab, you have the option to select which cameras to view from the “cam” toggle buttons located on the right side of the button menu. From this menu, you can simultaneously pause/restart the streams, start/stop the recording of all the active streams, you can also stop the streaming from all the cameras by clicking the “Stop Streaming” button.



By tapping on each video, the local video control bar will appear. From it, you can pause, enable PiP (picture-in-picture), maximise and start/stop the recording for that stream.

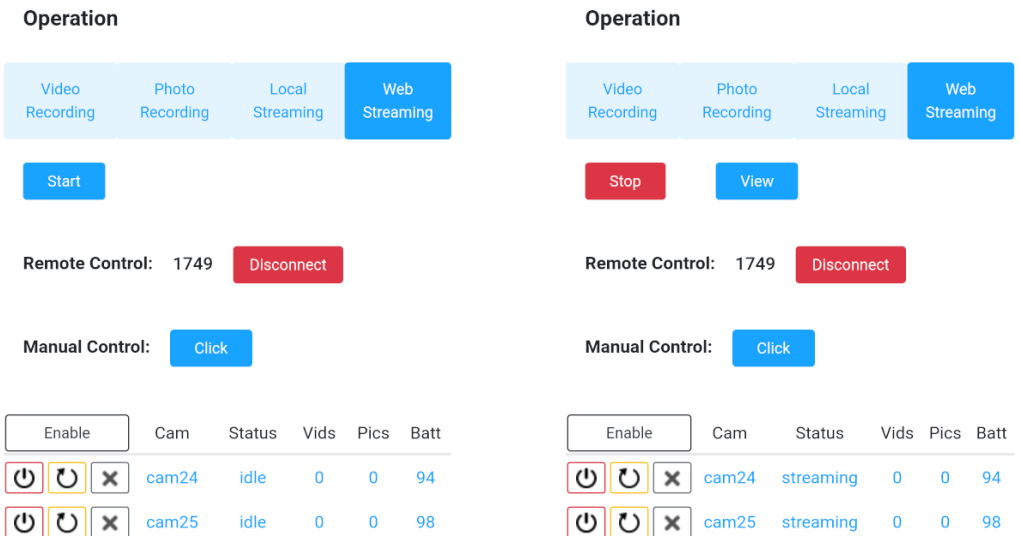
To stop the streaming, either press the “Stop streaming” button or close the tab and press the “Stop” button from the “Operation” pane in the main page. The status of the cameras will change to “idle”.

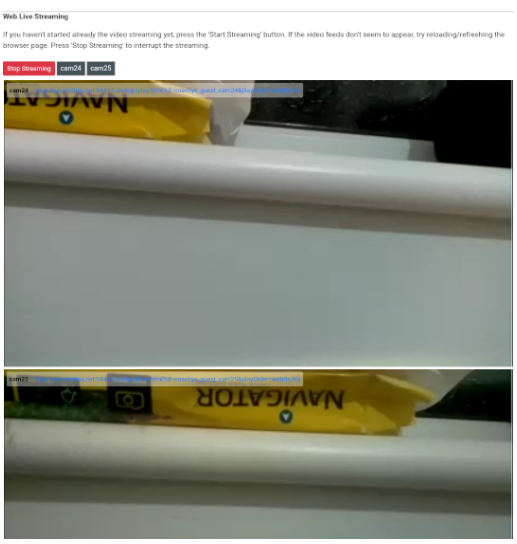
To view any recording of the streams, select the “Video Recording” button, then “View”. The videos will be listed alongside any other short recordings created from the video recording mode and explained in the previous section.

10)“Web” video streaming

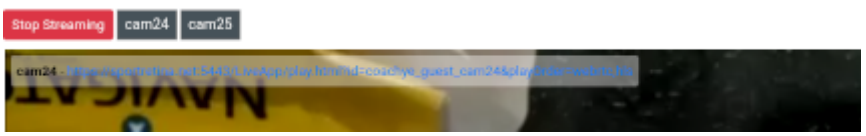
The “web streaming” button allows you to live stream all the active cameras on the internet. This functionality requires the hub to be connected to the internet either through a wifi router or using a phone as a Hotspot. More detailed instructions can be found in the “Connecting the hub to the internet” section of this document.

Go to the “Operation” tab, press the “Web Streaming” button, then press the “Start” button. The status of the cameras will change from “idle” to “streaming”. At this point, you can view the streams by pressing the “View” button, this will open a new browser tab.





In the new tab, you have the option to select which streams to view by toggling the “cam” buttons located in the short button menu. You can share the streaming URL for each camera by copying the blue link inside the video banner that is located on the top left of the window view.



To stop the streaming, either press the “Stop streaming” button or close the tab and press the “Stop” button from the “Operation” pane in the main page. The status of the cameras will change to “idle”.

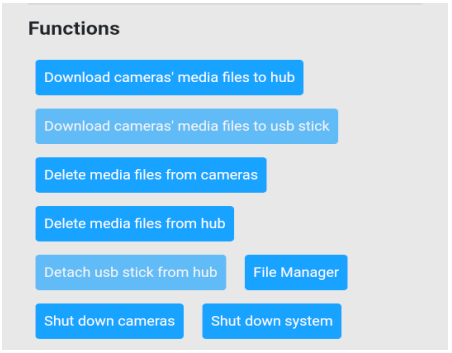
11)Remote LED notification

When using the remote to trigger the video recording, the user receives some visual feedback of the status of the cameras using the in-built LEDs that are visible through the rubber cap. The LED notification function is activated as soon as the “Connect” button is pressed and deactivated when pressing “Disconnect”. An LED will flash as follows:

LED on remote	Cameras’ status
Off	Idle
Green	Pause
Red	Recording
Blue	Processing

There is an option to disable this feature from the “System settings” tab of the user interface.

12)Downloading captured photos and videos



To transfer the videos and photos captured by the cameras, you can use the functions in the “Configuration” tab to copy all the media files from the cameras to the hub’s internal storage or directly to a USB stick connected to the USB port on the side of the hub. This operation can take several minutes, depending on the size and number of your media files. You can monitor the progress of the download from the “System Info” section of the “Configuration” pane.

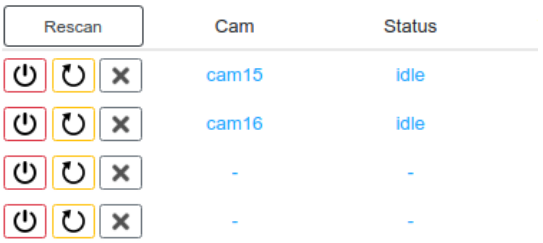
If you download the files to the hub, you can also make a copy on a USB stick by using the “File Manager” function. After you have finished with the copying, use the “Detach usb stick from hub” button before physically removing the USB stick to prevent any data corruption. To free up disk space, you can also use the “File Manager” to remove the media files from the hub and from the USB stick. There is also a similar “File Manager” function for each camera which is accessible from the “Camera Settings” section.

To download individual sets of captured photos and videos, you can also use the “Download” button in the top toolbar from the “Photo view” or “Video playback” web pages. This function will download a zip file containing the selected video/photo set on your local device storage.

13)Switching off the hub and the cameras from the user interface

The simplest way to shut down the whole system is by using the “Shut down system” button in the “Configuration” tab of the user interface. With a single click, all the cameras and the hub will shut down. You can also shut down just the cameras by clicking the “Shut down cameras” button.

Finally, you can shut down, restart and disable individual cameras from the “Operation” tab, where the cameras are listed.

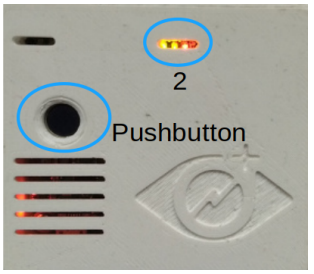


IMPORTANT: Do not use this method to switch off the cameras if they are being recharged. Instead, use the manual method explained below.

14)Switching off the cameras manually

To switch off the cameras manually, press and hold the small rubber button for ~3 seconds until the power LED starts flashing red and green, alternatively. At this point, release the button. After ~20 seconds, the power LED will turn off completely indicating the camera has turned off.

15)Switching off the hub manually

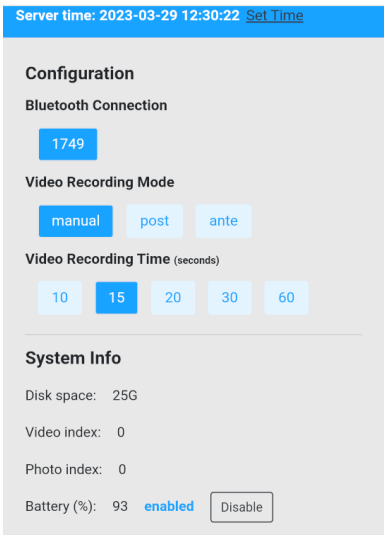


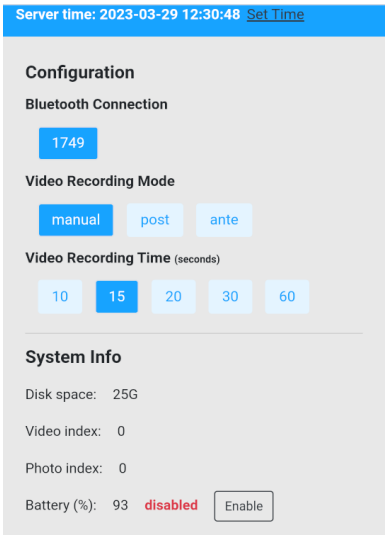
To switch off the hub manually, just press and hold the black pushbutton on the case lid for ~4 seconds until all 3 status LEDs (red, amber and green) from slot 2 are lit. At this point, you can safely release the pushbutton. The hub will start shutting down and after a few seconds the LEDs will switch off. After 3-4 seconds the hub will be off completely.

16)Powering the hub with a DC adapter or a power bank

To provide longer autonomy, you can also power the hub with a +5V DC 1A adapter or a portable power bank. With the hub switched off, simply plug in the micro USB cable in the port labelled with an “A”, as shown in the figure. The hub will switch on automatically without the need to press the black pushbutton.

However, when the hub is powered with an external supply, it is recommended to disable the internal battery, to prevent it from draining. To do that, go to the “Configuration” tab of the user interface and click the “Disable” button as shown below. If, at any time, you want to remove the external supply and power the hub with the internal battery again, you first need to press the “Enable” button before unplugging the USB cable.





IMPORTANT: To prevent data corruption on the SD card, make sure you only disable the battery when the external power supply is connected.

If the “A” port is not present in your hub model, then use the other port labelled with a “B” (see section below). In this model, when plugging in the external supply, it will both power the hub and recharge the battery so you don’t need to disable it in this case.

17)Powering a camera with a DC adapter or a power bank

In a similar way, you can power the cameras with a +5V DC 1A adapter or a portable power bank. This is effectively done by using the same procedure for recharging its battery (see next section). When using an external power supply, it will also recharge the battery automatically.

18)Recharging the battery in a camera

With the camera switched off, lift the rubber dust proof cover on the side. This will expose the HDMI and two micro USB ports, one labelled “USB” and one labelled “POWER”. Plug in a micro USB charging cable to the “USB” micro USB port (placed in the middle) and connect it to a good and stable +5V power supply. The power supply should deliver at least 1A. You can also use a portable +5V power bank. After the cable is plugged in, you should be able to see a green LED light through the “POWER” USB port. This is indicating that the main camera board is powered.

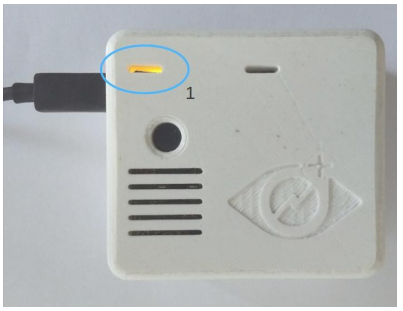
At this point, the power LED on the camera control board will turn on, indicating the battery is charging. The battery level during charging is shown through the power LED in the following way:

Power LED	Battery level
Off	100%
Solid Green	> 95%
Flashing Green	50% to 95%
Flashing Red	10% to 50%
Solid Red	< 10%

IMPORTANT

1) Ensure the camera is switched off before recharging it.
2) By design, when recharging the battery, the camera board will also be powered. This allows you to access the camera media files, for instance, whilst recharging the camera at home. When you decide to stop the recharging, **DO NOT** simply remove the USB cable as by doing so may result in your micro SD card getting corrupted. Please do the following:
    a) Press and hold the small rubber button for ~6 seconds.
    b) Once the button is released, the power LED will start flashing red and green.
    c) Wait for ~20 seconds until the power LED stops flashing red and green. The camera is now switched off and the power LED will be lit according to the battery level (see table above).
    d) You can now unplug the USB cable, the power LED will turn off.
3) If at any point the camera becomes unresponsive or the power LED doesn't turn off after removing the USB cable, you can force a complete camera shutdown by pressing both rubber buttons on the control board for ~6 seconds or until all LEDs are turned off.
4) Whilst recharging, DO NOT switch off the cameras from the web user interface.
5) As with all other devices using rechargeable batteries, you should use common safety practice. Never leave the cameras unattended whilst recharging, particularly overnight.

19)Recharging the battery in the hub

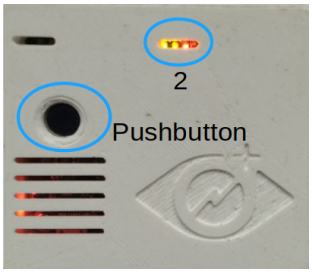


To recharge the hub's battery, connect your +5V 1A power supply to the micro USB port labelled "B" on the side where the micro SD card slot is also located. The hub can be either switched on or off but it will recharge faster if it is off. An amber LED from slot 1 will turn on indicating the battery is charging. When the battery is fully charged, a green LED will turn on instead. You can unplug the USB cable at any time. In the hub models with only one USB port, when you plug in the USB power supply, the hub will also be powered (if it wasn't already on) and will stay on after you remove the cable. To power off, simply use the same method as described previously.

`During normal operation, to monitor the hub's battery level, short press the black pushbutton. The battery level will be displayed through the LEDs from slot 2 as follows. The hub will automatically shut down when the level goes below 10%.

The battery level on both the hub and the cameras can also be monitored at all times from the web user interface.

LEDs turned on	Battery level
Green	>80%
Green & Amber	60% to 80%
Amber	40% to 60%
Amber & Red	20% to 40%
Red	< 20%

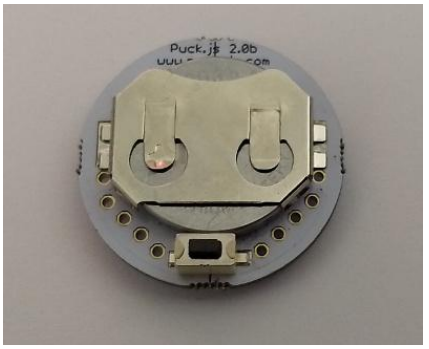


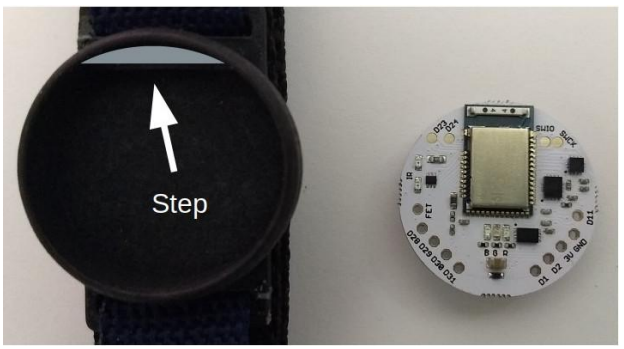
20)Replacing the battery in the wrist remote

The wrist remote uses a CR2032 coin battery. Depending on how frequently the remote is used, the battery will last 2-3 months. To replace it, follow these simple steps:

1) Gently remove the rubber cap from the case
2) Remove the loose circuit board from the case
3) Remove the battery from the circuit board by pushing it with a non conductive tool (eg a pencil)
4) Insert the new battery (the in-built red LED will flash briefly during the insertion)
5) Insert the circuit board in the case again making sure the small pushbutton on the bottom side of the board is at the opposite side of the small step in the case
6) Replace the rubber cap



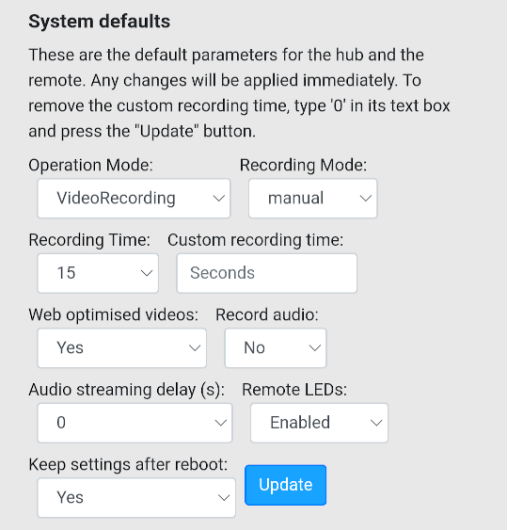


One spare battery is included in the toolkit case.

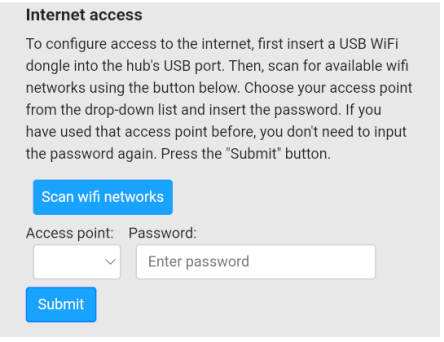
21)System defaults

You can modify the default values of the system parameters from the “System defaults” section of the “System settings” page. You can, for instance, customise your recording time for the “ante” and “post” video recording modes. If you want to retain these changes at the next reboot of the system, ensure you select “Yes” for the “Keep settings after reboot” option.



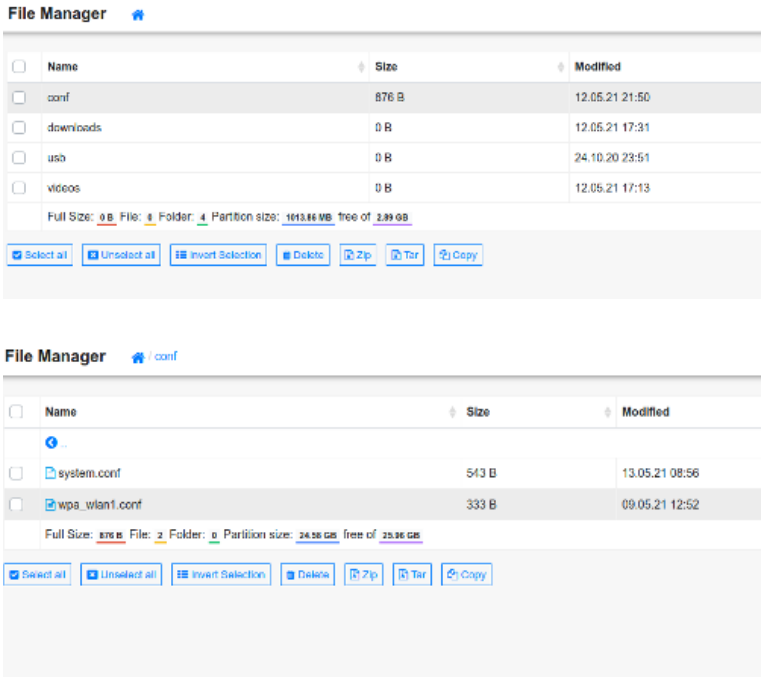
22)Connecting the hub to the internet

You can connect the hub to the internet using a compatible USB WiFi dongle. Insert the dongle in the USB port on the side of the hub and connect to your access point (e.g. your smartphone as a hotspot or your home router) from the “Internet access” section of the “System settings” tab of the user interface.

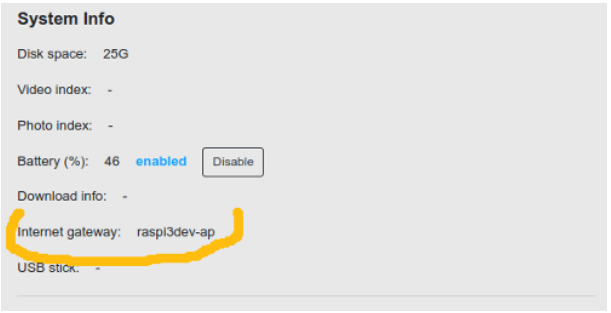


To connect, press the “Scan wifi networks” button and select your access point, then insert its password. If you have used that access point before, the password is not required again. Press “Submit”.

You can have multiple access points in the wifi configuration file. To reset the configuration, use the File Manager accessible from the “Configuration” tab and delete the file called “wpa_wlan1.conf” in the “conf” folder.

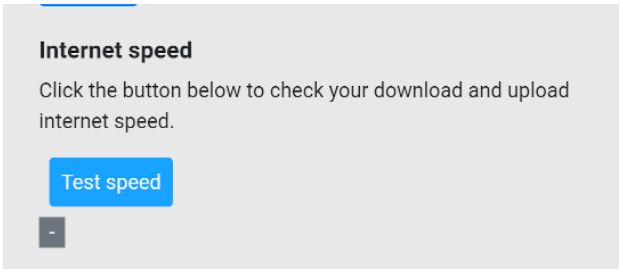


Within a few seconds, the name of your access point will appear in the "System info" section ("Internet gateway") of the "Configuration" tab of the user interface indicating the hub is now connected to the internet.



23)Hub internet speed

This is used to test the download/upload speed of your hub. Find the "Internet speed" section within the "System settings" page and press the "Test speed" button. The results will be displayed below the button. This may take some time so please be patient.



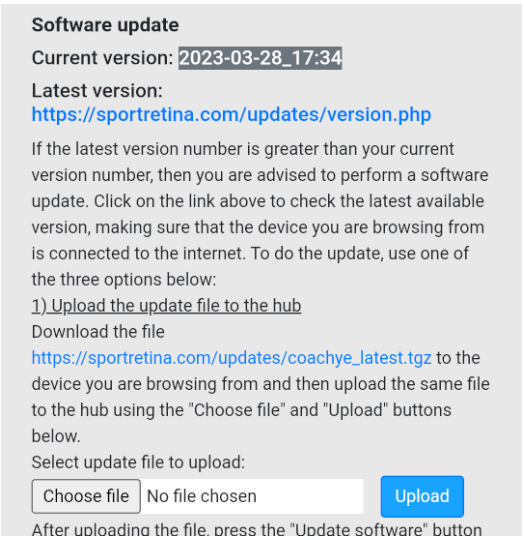
24)Updating the system software

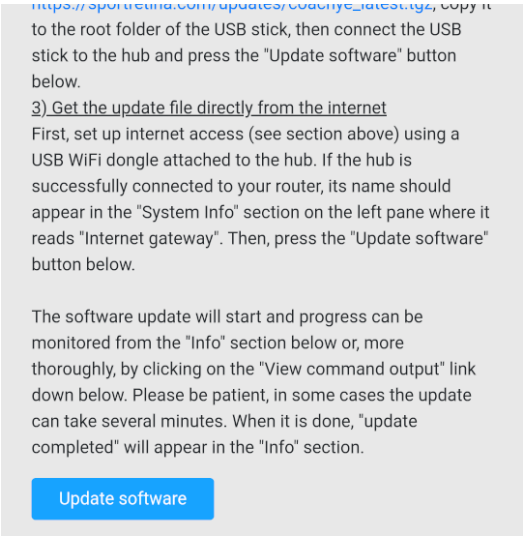
As we constantly endeavour to improve the product's functionality, we recommend you update the software running on the hub and on the cameras on a regular basis. This can be done from the "Software update" section of the "System settings" tab in three ways:

1) Connect your device to the internet. Download the file https://sportretina.com/updates/coachye_latest.tgz and save it to your device's local storage. Then, connect your device to the hub ("coachye1") and use the upload function choosing the file you have just downloaded. Finally, click the "Update software" button.

2) From another device, download the file https://sportretina.com/updates/coachye_latest.tgz, copy it to the root folder of a USB stick, plug the stick into the USB port of the hub and, after this has been recognised (check the "System info" tab), click the "Update software" button.

3) Connect the hub to the internet with a USB WiFi dongle (as per above) and click the "Update software" button.

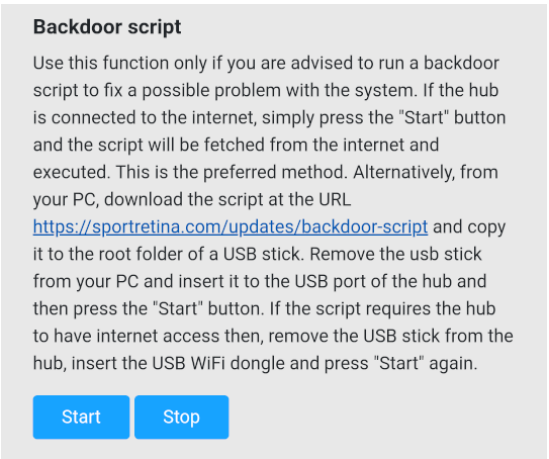




Please note the update can take several minutes, so be patient. You can monitor the progress of the update from the "Info" section at the bottom of the "System settings" tab.

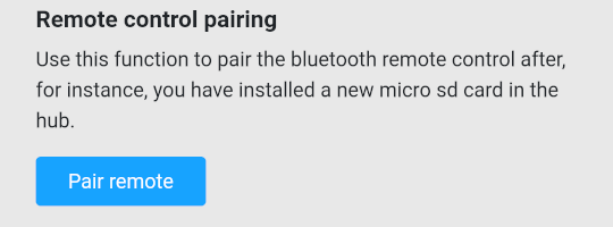
25)Running the backdoor script

This is used when you receive remote assistance if something is not working with the system. Our support team will try and fix the problem remotely. In order to do that, you need to connect the hub to the internet and start the backdoor script from the "Backdoor script" section of the "System settings" page. Press the "Start" button to allow our support team to access the hub remotely. When finished, press the "Stop" button.



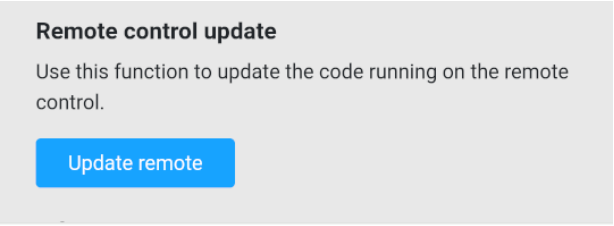
26)Pairing the remote control to the hub

If the remote doesn't seem to connect to the hub, first check that the battery is not flat. If it is, just replace it as explained above. If the battery is not the issue, you may be able to fix the problem by re-pairing it to the hub by simply clicking on the button "Pair remote". Check the "Info" section at the bottom of the "System settings" page to verify the operation has completed successfully.



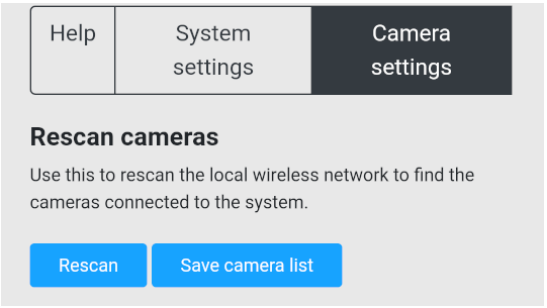
27)Updating the remote control software

If re-pairing the remote to the hub did not fix the problem or a new update is available, use this function to reload or update the software on the remote. Simply click on the button "Update remote". Check the "Info" section at the bottom of the "System settings" page to verify the operation has completed successfully.



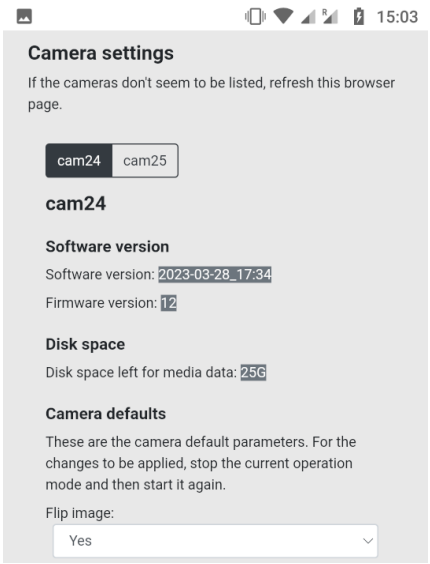
28)Camera rescan

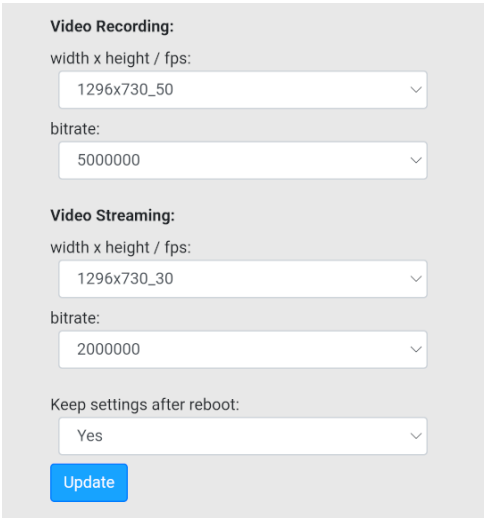
In the situation when a camera temporarily disconnects from the wifi access point created by the hub, the camera will disappear from the table in the "Operation" page. In most cases, as soon as the camera re-connects to the wifi, it will be listed again. If that is not the case, you may be able to recover it by using the "Rescan" button in the "Rescan cameras" section of the "Camera settings" page. Before you can do that, you need to save the camera list (you can do that at any time whenever all your cameras are correctly listed). This is done by clicking the "Save camera list" button. You only need to do that once (unless you purchase additional cameras). This list will be stored on the hub and used during a rescan operation.



29)Camera defaults

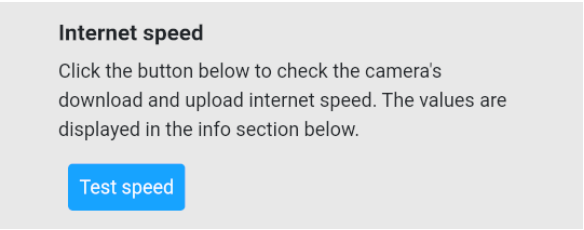
You can change the camera parameters from the “Camera defaults” section of the “Camera settings” page with each camera having its own parameters. Select the camera first, change the parameters and then press the “Update” button. You can, for instance, change the video resolution and the frame rate of the camera independently for each operation mode (e.g. photo, recording and streaming). If, after a software update, the camera image looks upside down, change the setting for the “Flip image” parameter. If you want these changes to be retained at the next reboot, make sure you select “Yes” for the “Keep settings after reboot” parameter. If the camera does not appear to be listed, try refreshing the browser page.





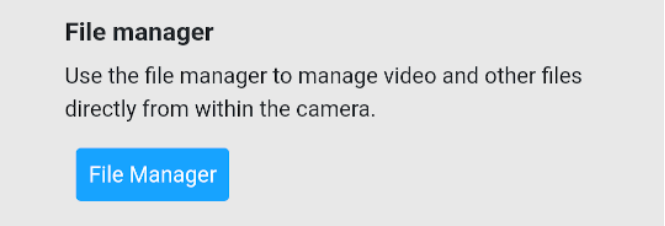
30)Camera internet speed

This is used to test the download/upload speed of your cameras. Find the “Internet speed” section within the “Camera settings” page and press the “Test speed” button. The results will be displayed below the button. This may take some time so please be patient. Please note that the internet speed achieved by a camera will normally be lower than the one measured on the hub.



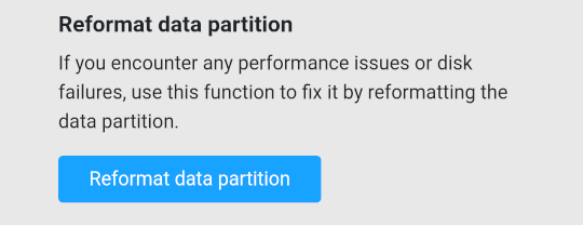
31)Camera file manager

Use this function to browse the files (configuration, videos and photos) saved locally on each camera. You can, for instance, download a video file directly on your connected device (tablet, laptop or phone).



32)Reformatting the data partition of the camera's SD card

Use this function if you encounter any performance issue or SD card failure with the camera. Press the "Reformat data partition" button and wait for the operation to complete. This may take some time, please be patient. Please note that any media files previously recorded will be lost.



33)Using the toolkit outdoors

Please take care when using the toolkit in an outdoor set-up, particularly when it is wet. The current product is not classed as waterproof, although it does have some protection from rain.

The cameras are splashproof, meaning they are protected from light rain. Because of the air vent, the hub is not splashproof. If it is raining, please ensure the hub is placed in a sheltered location or inside your bag.

Product videos

https://youtu.be/XvwPzHRE48g
https://youtu.be/dnAGfyEpSdM