

TimeTronics

Manual
VideoTakeOff



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SPORT TIMING SYSTEMS



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Manual VideoTakeOff

Welcome to the "VideoTakeOff" user manual.

May we recommend you to gently browse through the entire manual first, just to have an initial idea of how the book is structured. As we can't possibly explain all details simultaneously, this might help you a bit in understanding and tracing things back. Of course, the table of contents will also help you in doing so.

Please note that all pictures are examples, the delivered version can be different than shown in this manual please inform yourself before purchase.

If you, after reading this document, have any further question regarding the operation or service of this or any other TimeTronics equipment, please contact your local distributor or TimeTronics directly, by email: info@timetronics.be, or call us at +32 (0) 14 23 19 11.

Please also contact us if you have any remarks or advice regarding this user manual: info@timetronics.be

Good luck and thank you for your confidence in the TimeTronics products and services.

The editors

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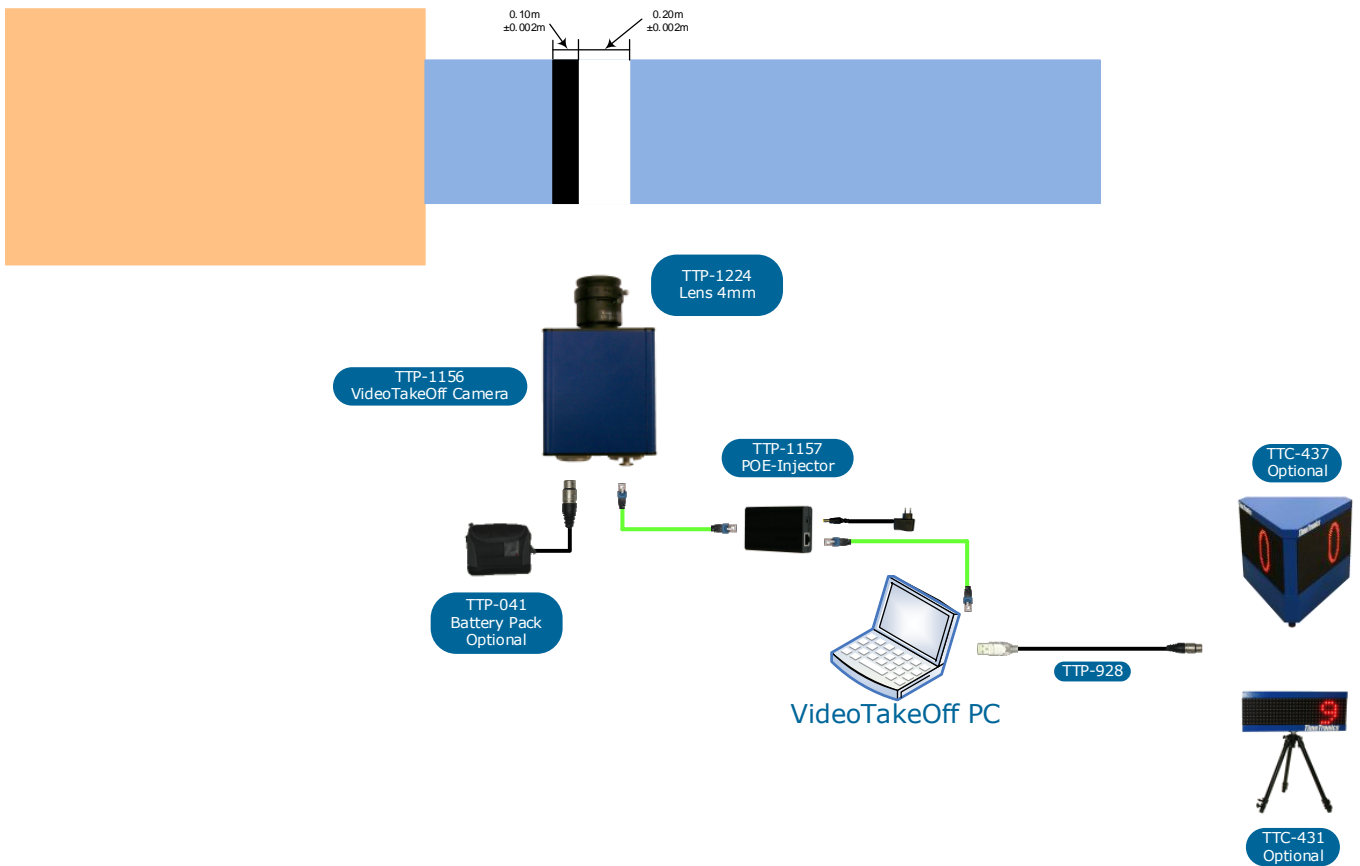
1. Hardware setup

In a complete setup, your system contains the following parts:

- Portable or desktop computer with VideoTakeOff software

The minimum specs:

- HDD— 128Gb
- OS—Windows (32- and 64-bit)
- CPU—Intel I5, or higher
- RAM—8 GB RAM
- Video—128 MB
- Ports—Gigabit Ethernet. Not USB converter. Also all devices in between should be Gigabit.
- VideoTakeOff (**POE = Power Over Ethernet**) camera with suitable tripod for mounting
- An Ethernet network (ethernet cables and POE-switch or POE- injector)





VideoTakeOff Camera with Lens, Head and Tripod Mini

2. Software installation

Note: If you buy the PC for VideoTakeOff from TimeTronics (which we advise), the VideoTakeOff software and all driver(s) will be already installed, and software installation is tested! You can directly start using the system.

Follow the next steps to correctly install the VideoTakeOff software:

- Download and unzip the latest software from our website (<http://www.timetronics.be/support>) to your local hard drive.
- Start the installation by double-clicking the INSTALLER
- Browse through the screens to install the VideoTakeOff software. Wait for the installer to do its job and finally click on "Finish". The installation is successfully completed.

3. Using the VideoTakeOff software

You can start the software by double-clicking on the shortcut on the desktop, or in the startmenu folder, or if this is not the case you can find the program in the folder **C:\Program Files (X86)\TimeTronics\VideoTakeOff**

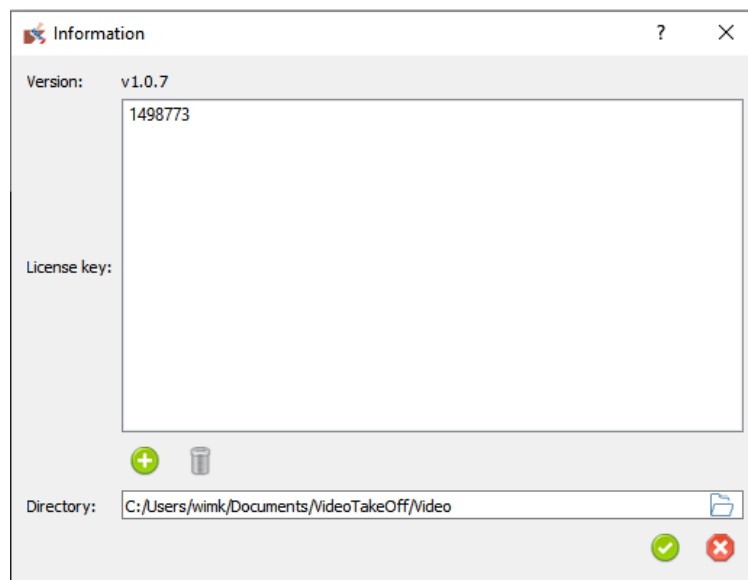
4. Overview of the application

After starting the software, you will see the following layout of the application.

At the top of the window, you can select the language you prefer. In case your language is not available, you can contact TimeTronics to create a language file for your language.

Next to the language button, there is the information button. Under this menu you can find the About menu item.

The "About" item shows extra information and settings of this software.



- a. "Version" of the software
- b. "License key": Your license key (code); Without the correct code for your camera, you cannot use the VideoTakeOff software. The correct code is delivered by TimeTronics with your system. Press the + button to add a license key. You can add multiple licenses if you have multiple VideoTakeOff cameras and want to use them (only 1 camera at the time) on a single computer. A license can be removed by selecting it and pressing the garbage button. Confirm the changes by pressing the OK button.

If you have just entered a license key and confirmed the About dialog, *press the "Offline" button (on the bottom-left of the screen) to link the license key with the attached camera, and to start using the camera.*

- c. "Directory": This is the folder where the videofiles are saved. Press the button "Open" icon to select the directory. It is advised to set a new directory for each meet. This will speed up the startup of the application and the displaying of requested video files.

The most important fields you should notice are the 2 "TAB" buttons **on the top**, named Calibration and Measurement:

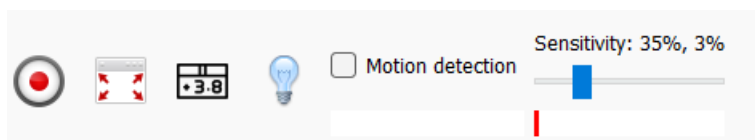
1. The "Calibration" tab is used to adjust the camera + lens, and choose your desired recording settings in the software, for an optimal quality of the recorded video. Here you will also calibrate the software to measure an accurate distance to the take-off board. The details of the software "recording"-settings are explained in the next chapter.
2. The "Measurement" tab is used most of the time for automatic playback of the recorded video. You will later notice that this VideoTakeOff software will automatically switch to another file if you perform a new measurement and automatically spool the video to the time which corresponds with the moment of triggering the measurement.

5. Overview of the VideoTakeOff software controls

Like already mentioned, the software contains two 'TAB' controls, on the top of the VideoTakeOff software: Calibration and Measurement. Each TAB will show a different screen content, for the corresponding functions.

6. Calibration window

At the top of the window, you can notice a "row" of controls, which we will explain more in detail here below:



From left to right you see the controls and indicators for:

1. The button (red circle) is to 'start' and 'stop' a **manual video recording**. Press the button when the athlete steps on the take-off board to start the measurement.
2. The 'Calibration' button sets the calibration points for the software. The software will use these points to measure the distance of the shoe to the take-off board. The calibration procedure is described in a lower section of this document.
3. The filled scoreboard button sends a result to a 1-line scoreboard. If there is only 1 COM port available, the application will automatically select this port. If more COM ports are available, you will see a dialog to select the correct port. Pressing the scoreboard button again will stop sending results to a 1-line scoreboard.
4. The (blue or yellow) light bulb displays the status of the motion detection. If the light bulb is blue, the motion detection system is not activated (armed). There will be no recording when a person passes the camera. If the light bulb is yellow, you have activated (armed) the motion detection system. Be aware to also enable the motion

detection system by checking the Motion detection checkbox next to this button. Pressing a yellow light bulb will reset the motion detection system to inactivate status.

If you arm the motion detection system, the application will automatically move to the calibration window so you can look at the live video. When motion detection is armed and motion is detected, the application will automatically move to the measurement window and jump to the first frame where motion was detected.

- The motion detection slider sets the sensitivity of the system. The more left the slider is, the more sensitive the system is to notice motion. The more right the slider is, the less sensitive the system is. There is a red area under the slider to indicate the current detection level. The red area will be updated constantly. If the marker passes the sliders current position, a green area is displayed under the checkbox of the motion detection. This means motion is detected and a recording could be done.



More details about setting the motion detection parameters are given below.

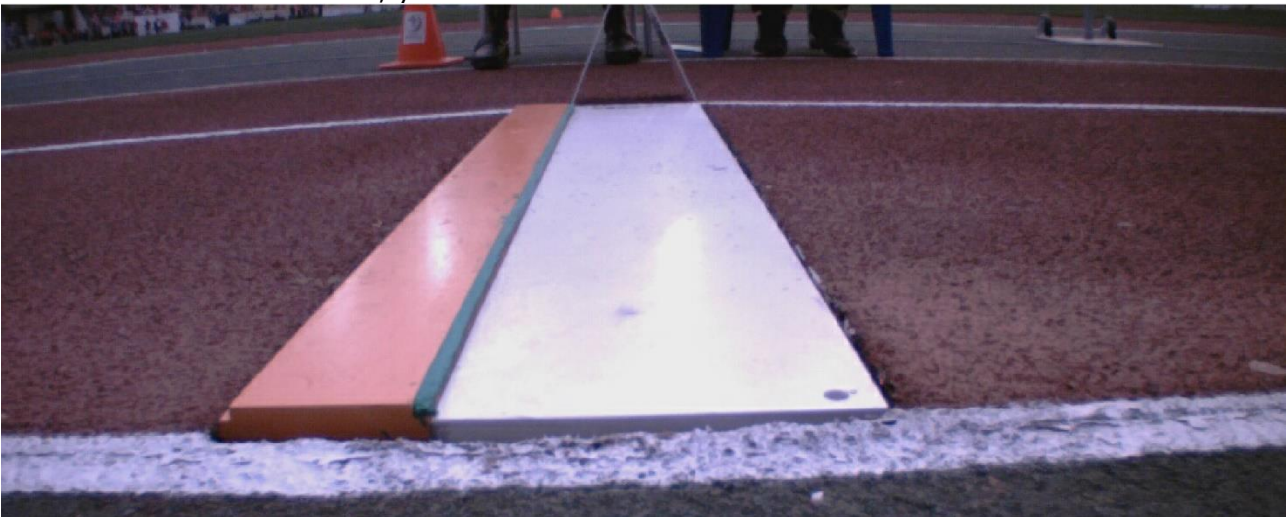


From left to right you see the controls for:

- The WIDTH of the recording window, in number of pixels. Default value = 800 pixels, maximum is 1280 pixels (depending on the camera).
- The HEIGHT of the recording window, in number of pixels. Default value = 400 pixels, maximum is 1024 pixels (depending on the camera).
- The FRAME RATE of the recorded video, in number of frames/sec. Default value = 30 frames/sec. Be aware that setting a high resolution (width and height) will result in a lower frame rate. If a higher frame rate is desired, please lower the width and height of the image.
- The BRIGHTNESS intensity. This control can display the recorded video with higher or lower intensity. Default value = 0.
- The CONTRAST. This control can display the recorded video with higher or lower contrast. Default value = 100.
- The PERIOD of recording BEFORE and AFTER each athlete arrival. Default value = 2 sec.
- The SHUTTER SPEED of the recording: a **smaller value makes the video sharper** for fast moving objects, but also makes the video darker when there is insufficient light (nighttime recording). Default value = 0,8 msec.

1. The GLOBAL GAIN. This control can display the recorded video with higher or lower amplification of the colors making it brighter (but also increasing the distortion of the pixels). Default value = 12,0 dB.
2. The AUTO WHITE BALANCE. This control will try to correct the colors of the recorded video, so a white color looks like white. You only must press it once to perform the auto white balance procedure.
3. The RED GAIN. This control can display the recorded video with higher or lower amplification of the red pixels. Default value = 1,2 dB.
4. The BLUE GAIN. This control can display the recorded video with higher or lower amplification of the blue pixels. Default value = 1,5 dB.
5. The BLACKLEVEL. This control can display the recorded video with higher or lower brightness of the black part of the image resulting in a pure black color. Default value = 0 dB.
6. The GAMMA. This control will adjust the recorded video so dark tonal levels will be redistributed closer to how our eyes perceive them, therefore becoming brighter. So, gamma can be used to adjust dark images to become brighter.
7. The FILENAME. This control will display the file path of the current recorded video file.
8. The FILE DURATION. This control will display the duration of the current recorded video file.

In the middle of the window, you can notice the video container with the recorded video files.



At the bottom of the window, you can notice the calibration status and info of the application.

Not calibrated

Calibration required to measure the distance.

Ready

0

86%

From left to right you see the controls and indicators for:

1. The calibration status. The application needs to be calibrated to do a correct distance measurement to the take-off board. If the status is "Not calibrated", you should press the "Calibration" button to start the calibration procedure.

Next to the calibration status, you can read details of the required action.

- The colored circle button displays the network status between the camera and the application.



If there are no frame errors detected, a green circle will be displayed.



If there are less than 10 frame errors detected in the past 10 seconds, a yellow circle will be displayed.



When there are more frame errors, a red circle is displayed. In this situation, it is advised to check the network cable and connections to the VideoTakeOff and your computer.

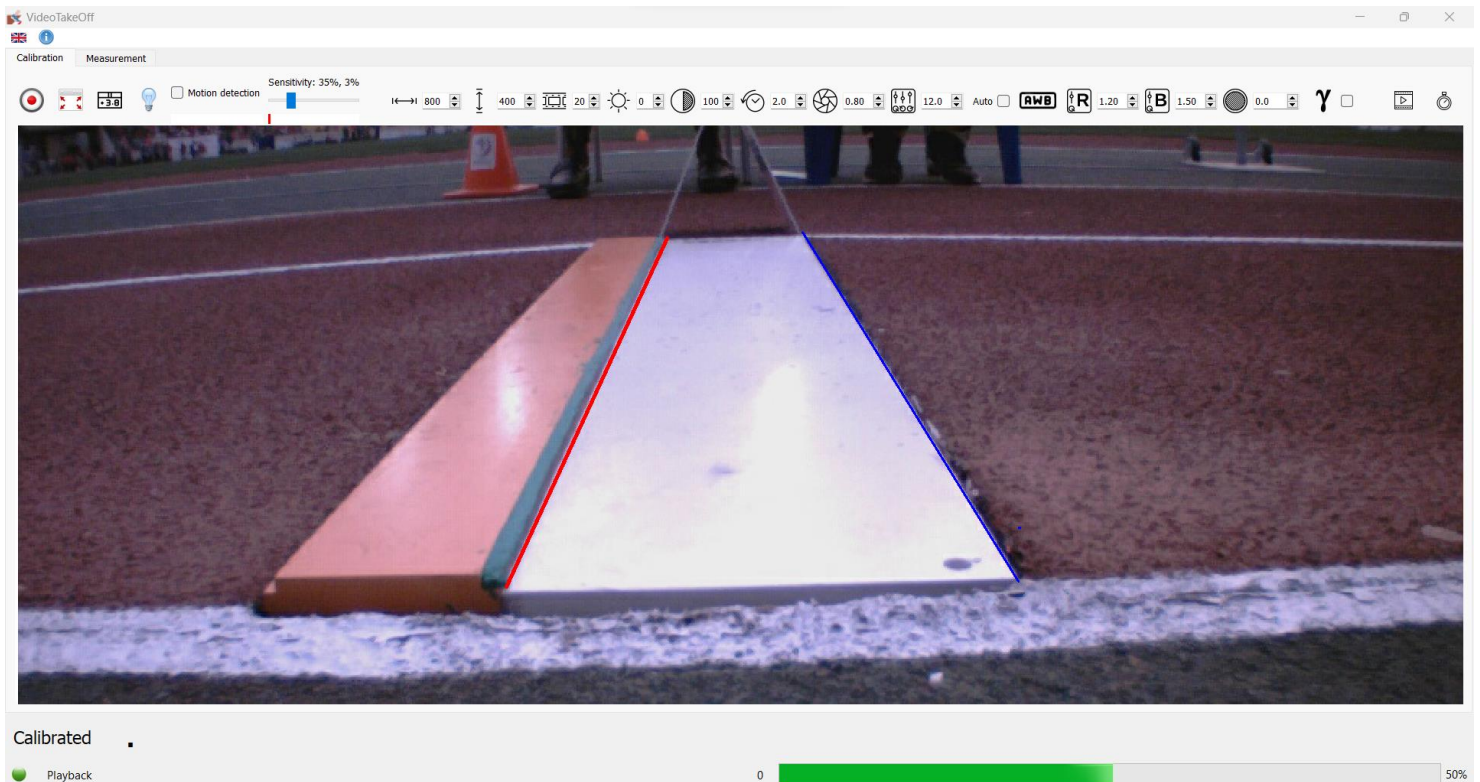


If no camera is connected, an Offline icon will be displayed.

You can click on this item to reconnect your camera in case of e.g. network connection loss or entering a new license key.

- The amount (%) of free memory on your PC hard disk.

An overview of the application when the camera is connected and calibrated can look like this. In this setup, the athletes will run from right to left. You can see the position of the red reference line and the blue scaling line at the beginning of the take-off board.



7. Measurement window

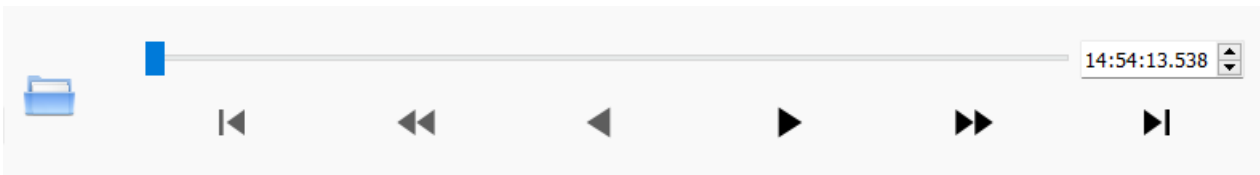
1. At the top of the window, you can notice a "row" of controls, which we will explain more in detail here below:



From left to right you see the controls and indicators for:

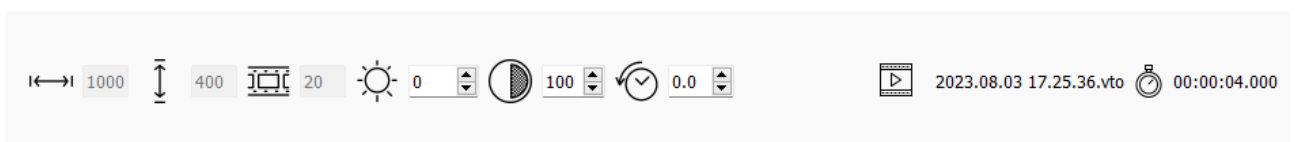
The first 4 buttons have the same functionality as the buttons in the calibration tab.

1. The blank scoreboard button to clear the scoreboard
2. Auto checkbox to automatically clear the scoreboard after x seconds (set in the spinbox) after a result is send.



From left to right you see the controls for:

3. Button to MANUALLY 'Open' any **previously recorded videofile**.
4. Button to show the FIRST frame of the selected Videofile.
5. Button to show the PREVIOUS frame of the selected Videofile.
6. Button to PLAY the selected Videofile in BACKWARD direction.
7. Button to PLAY the selected Videofile in FORWARD direction.
8. Button to show the NEXT frame of the selected Videofile.
9. Button to show the LAST frame of the selected Videofile.
10. Slider to indicate the position of the open frame in the video file. You can scroll will the slider to display another video frame. The end of the slider displays the recording time of the displayed video frame.



From left to right you see the controls and indicators for:

11. The WIDTH of the measurement window, in number of pixels. Cannot be changed in measurement.
12. The HEIGHT of the measurement window, in number of pixels. Cannot be changed in measurement.
13. The FRAME RATE of the measurement video, in number of frames/sec. Cannot be changed in measurement.

14. The BRIGHTNESS intensity. This control can display the measurement window with higher or lower intensity. Default = 0.
15. The CONTRAST. This control can display the measurement window with higher or lower contrast. Default value = 100.
16. The PLAYBACK OFFSET. This control will add an offset to the image in the measurement window.
17. The FILENAME. This control will display the file path of the open video file.
18. The FILE DURATION. This control will display the duration of the open video file.

In the middle of the window, you can notice the video container with the open video files.

At the bottom of the window, you can notice the calibration status and info of the application.



From left to right you see the controls and indicators for:

1. Calibration status indicator

The result of distance measurement. A negative value means the distance (in mm) before the reference line. A positive value means the distance (in mm) after the reference line (an invalid attempt).

8. VideoTakeOff adjustments

8.1. Alignment

- Place the camera in the middle of the take-off board so you have clear view of the take-off board with left and right some extra video about 30 to 50cm
- The distance from the take-off board will be about 40cm but you have to see on the video itself. Later in this manual you will see images what you should see on the video recording.
- Tilt the camera so you do not see too much background, especially when the camera is positioned towards the running track. You do not want to detect the movement of track athletes as it will annoy you during the competition.
- Ask the referee in case you take place opposite the camera not to move during the take off of the athlete because he could otherwise activate the recording by his movement. Ask the referee at the same time to hold the flag in the hand so it does not make a movement either.

8.2. Settings

Now that you have positioned the VideoTakeOff, you need to do some settings to optimize the video quality.

- Start by adjusting the resolution of the video. Set sufficient width so you have a visual on athletes already jumping before the take-off board. It is advised to set a width of 1000 pixels and a height of 500 pixels. The number of pixels in height can vary depending on the position of the VideoTakeOff to the take-off board.

- The exposure time (shutter speed) will determine how much time an image is exposed. A smaller value makes the video sharper for fast moving objects, but also makes the video darker when there is insufficient light (nighttime recording). The combination of the iris of the lens and the exposure time will determine how dark the image will be. It is best to set the iris as open as possible and control the darkness of the image by setting a small exposure time.
- To have a better image during dark/night conditions, you can enable the gamma setting. Also, during daylight conditions, the gamma setting can improve your image quality as it makes the image look brighter.
- Set the gain to a value so that you have a clear image. Gain will amplify the digital pixel values. Setting a higher gain value will create pixelation so you need to find a balance for this value. It is advised to set the gain in the middle of the range so you can increase it when it gets darker.
- Now you need to do the white balance to balance the color temperature in the image. Simply press the AWB (auto white balance) button. This is a single shot procedure that will automatically correct the colors. The button gets enabled once the procedure is done.
- Finally, set the frame rate as high as possible. For VideoTakeOff we advise having at least 60 frames per second. This way you have enough frames to evaluate which frame is the correct one when the foot leaves the take-off board. You can set a certain frame rate and the application will automatically adjust this number to the maximum fps it can handle. If this number is low, please check your network cables to see that they are of good quality and they are locked in the connectors of the VideoTakeOff and the computer.

As the day progresses, you might get darker or brighter images due to the weather conditions. Then there are a couple of things you can do to get back a better image.

	Dark	If your image is too Bright
Then you can in following order...		
Iris	Open	Close
Gamma	On	Off
Exposure time	Increase	Decrease
Gain	Increase	Decrease

8.3. Zooming

When you click with the RIGHT MOUSE BUTTON in the video window, you will see the ZOOMING function of the software. This can **help you to identify** the position of the shoe for the distance calculation.

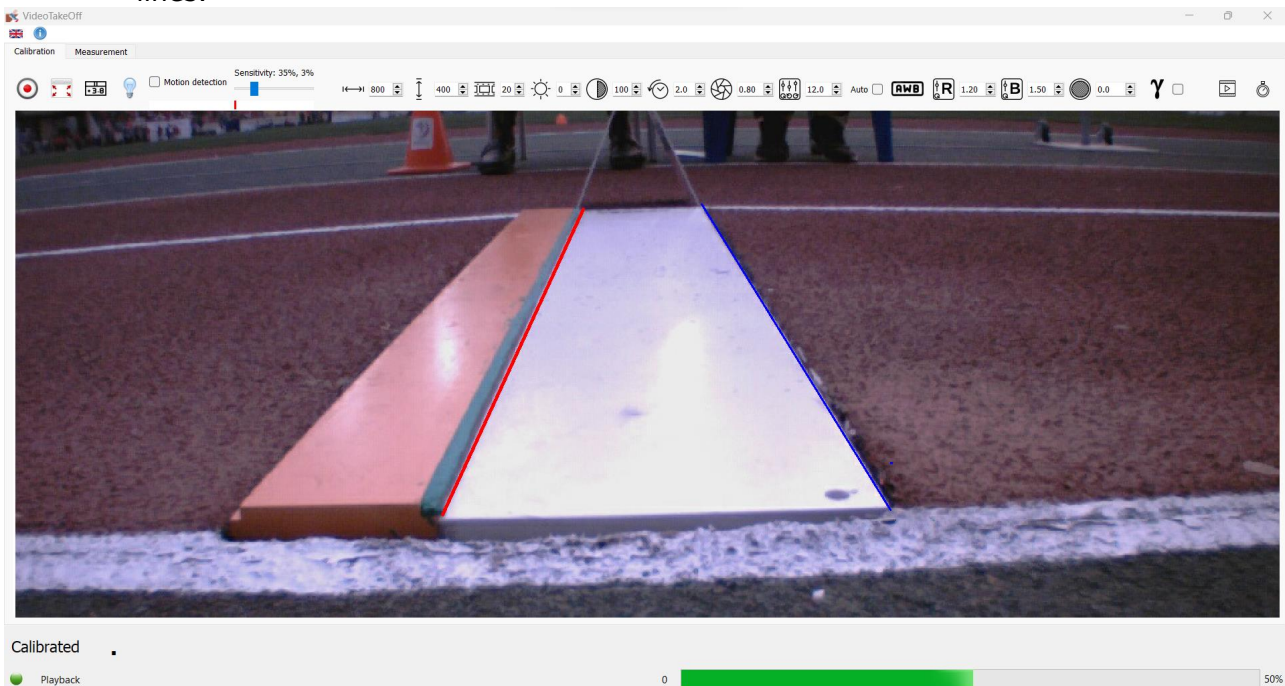
8.4. Calibration procedure

Start the calibration procedure by opening the calibration window and pressing the "Calibration" button. The application will ask you to point out the 4 calibration points on the take-off board. Click in the video frame on the corresponding point.

1. 'Top reference point': This is the highest point of the take-off board next to the plasticine.
2. 'Bottom reference point': This is the lowest point of the take-off board next to the plasticine.
3. 'Top scaling point': This is the highest point of the take-off board the most removed from the plasticine. In other words, the highest point of the take-off board the closest to the athlete.
4. 'Bottom scaling point': This is the lowest point of the take-off board the most removed from the plasticine.

When the calibration is done, the software will draw a red line indicating the reference marker and a blue line indicating the scaling marker. Setting the calibration markers will also (re)initialize the motion detection parameters. The selected area of the calibration points is the area for performing motion detection.

The application will detect motion on the full horizontal image of the calibration lines.



9. Distance measurement

After you have set the camera to the optimal position near the take-off board, set the recording parameters to have the best image according to the circumstances and calibrated the application, your camera is ready to do a measurement.

There are a couple of options to record an attempt.

1. Manual recording

An athlete will start his attempt by running towards the take-off board. You should press the "Record" button when the athlete jumps for his attempt. The application will record x seconds (according to the period setting) before and after the moment of

pressing the "Record" button. When all frames are recorded, the software will move to the measurement window and open the frame when the "Record" button is pressed. Try pressing the button the moment the athlete jumps.

2. Function keys of the keyboard

A 2nd option to start the recording of an attempt is by using the function keys F7 or the space bar. You also need to press 1 of these keys when the athlete jumps for his attempt. The recording and displaying of the video frames are the same as using the manual recording option.

3. Motion detection

After calibration, set the motion detection sensitivity. First check how far the red area is drawn if there is no movement on the image. This will be the zero point. Move the sensitivity slider a bit further then the red area of the zero point. Now test the setting by running over the take-off board to verify how far the red area deviates. It should fully exceed the slider if the shoe is clearly on the image. The green motion indicator should be visible to indicate motion detected. Repeat this procedure until you have the best sensitivity for the current circumstances.

The slider may not be set too low as this could trigger false motion detection. Setting the slider too high may result in not detecting motion when an athlete jumped from the take-off board. A balance should be searched.

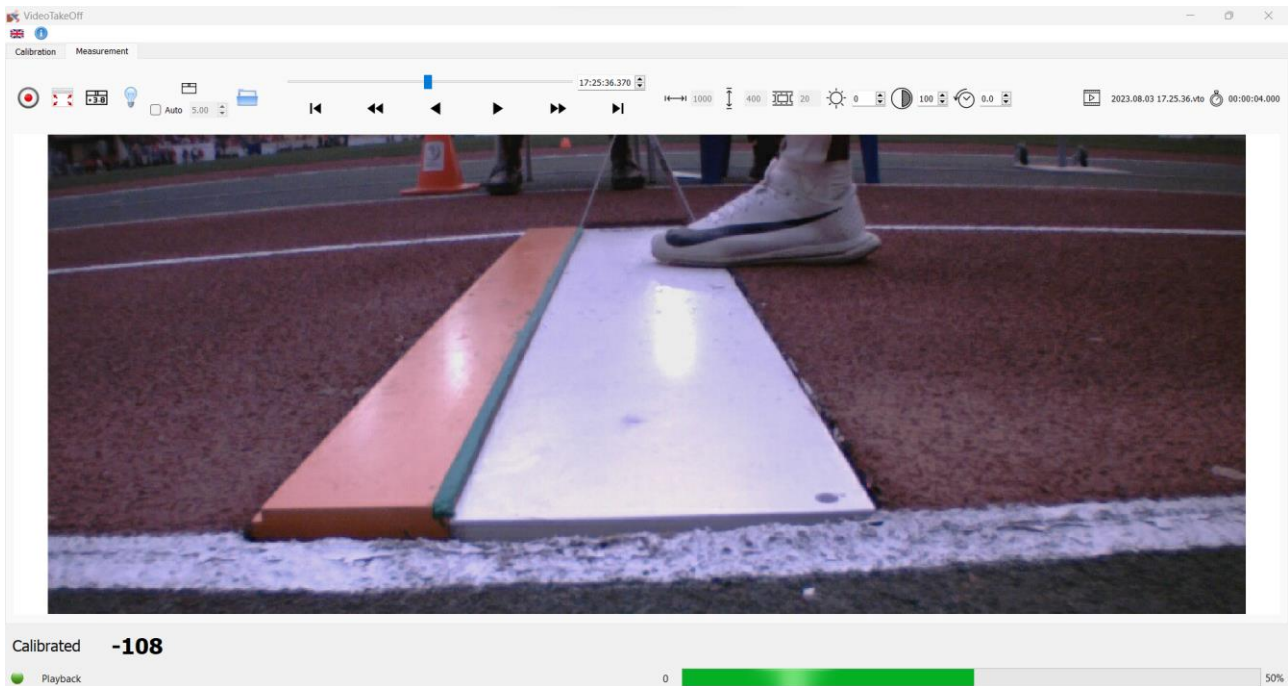
Be aware that changing weather conditions (sun, clouds) could trigger a reinitialization of the motion detection parameters. Currently the initial motion detection parameters are not updated in time. A shortcut to do so is to click on the green area which indicates motion detection. The green area is drawn in a (hidden) button.

To use the motion detection, you should enable the checkbox when the sensitivity is set.

Now you need to arm the motion detection when the lane is free to jump for the athlete. Active the system by pressing the light bulb or by pressing the F4 key. Repeating this will revert the status of the system. When the motion detection is activated, you can wait until the athlete makes his attempt. The application will detect motion (verify the red area), move to the calibration window and display the video frame where the motion was detected.

In case the opened video frame is not exactly the moment when the foot of the athlete leaves the take-off board, you can search for the correct video frame by moving the slider or pressing the "Show backwards frame" and "Show forwards frame". To go backwards 1 frame, you can also use the function keys F5 or B.

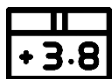
To go forward 1 frame, you can also use the function keys F6 or N.



When you have found the correct video frame, click on the tip of the shoe of the athlete to measure the distance to the take-off board. The result is displayed at the left bottom of the screen and can also be sent to a 1-line scoreboard.

10. Scoreboard control

To send a result to a 1-line scoreboard, you must connect a serial cable to the scoreboard. Set the scoreboard in TEXT5 mode to display the result correctly. Next you must select the COM port for the serial communication. If there is only 1 COM port available, the application will automatically select this port, no settings need to be done. If more COM ports are available, you will see a dialog to select the correct port. The following buttons will trigger a scoreboard action:



Activate sending a result to the scoreboard.



Deactivate sending a result to the scoreboard.

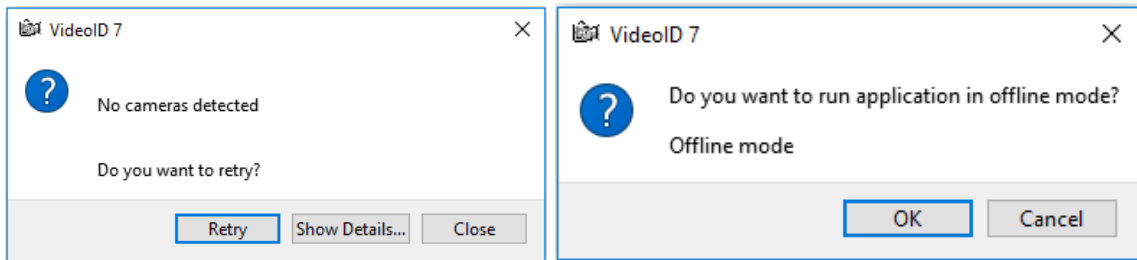


Clear the scoreboard.

11. No VideoTakeOff detected

If you see the window like on the picture here below, this means that NO VideoTakeOff camera was found in the network. First check if you have correctly connected the camera and have NOT forgotten to use a POE (Power over Ethernet) switch or "POE power injector" and try again (press "Retry" button). There are NO IP-address or other settings you must make for the camera connection, because this is done completely automatic.

Perhaps you do not want to use the camera, but want to playback older video files? In that case press the "Close" button of the first window and click on "OK" in the second window to use the VideoTakeOff soft without camera ("Offline mode").



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