

Quintic Software

Tutorial 6c

1.3MP / 4MP

Camera Set-up & Capture

V35

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1. Camera Driver Installation

In order for Quintic High Speed Cameras to work within Quintic Software, camera drivers need to be installed.

Before installing the relevant camera drivers, it will be prudent to check whether your system type is a 32- or 64-bit operating system. You can do this by following these instructions:

a. System Type 32- or 64-Bit Operating System

Click on the Start menu in the bottom left hand corner of your screen or press the start button on your keyboard.

Go to 'Control Panel' then 'System and Security' then 'System'. This will bring up the basic specification of your computer, where you will find the system type as well as other information regarding the machine, such as the RAM and Processor.

[View basic information about your computer](#)

Windows edition

Windows 10 Home

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Windows 10

System

Processor: Intel(R) Core(TM) i5-7400 CPU @ 3.00GHz 3.00 GHz

Installed memory (RAM): 16.0 GB

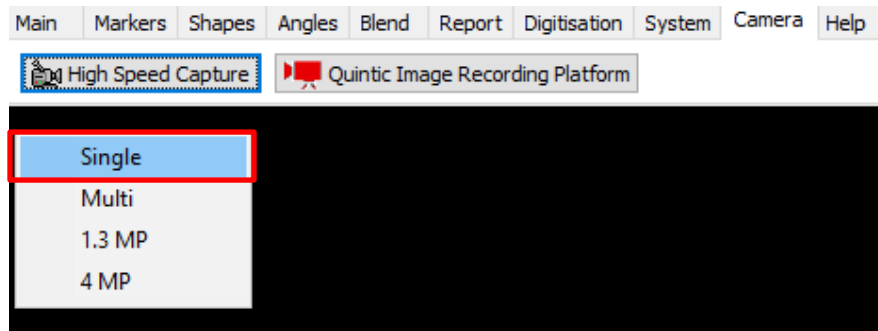
System type: 64-bit Operating System, x64-based processor

Pen and Touch: No Pen or Touch Input is available for this Display

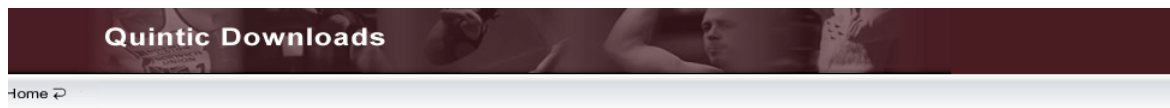
Please make a note of which System type you are using (i.e 32 bit or 64 bit). If the wrong installation is used the camera(s) may not work.

Once the system type has been identified, please begin the Quintic Camera Driver Installation (see the next page for detailed installation instructions).


Once you have correctly licensed your Quintic Software (see your Licence Letter for further information on this process) you are able to access the Camera Drivers by simply clicking on 'High Speed Capture' then 'Single'.



As none of the Camera drivers have yet been installed, this will bring you to the following webpage (secure internet connection required):



Home



Please Note: You may need to unblock the setup exe to complete a full installation. To do this, please locate the saved Install Shield on your machine, right click it and go to "Properties -> General." Click "Unblock" to unblock the exe.

1) Quintic Image Recording Platform (SPORTS / COACHING / BIOMECHANICS) : (Windows 10/11 64-bit operating system) CVB ONLY

- Please read ALL of the following download instructions BEFORE downloading the latest **Quintic Image Recording Platform** - [Please Click Here for Quintic IRP Tutorial](#)
- Click on the **Quintic Image Recording Platform** icon to the right to download the program onto your computer. Once downloaded please unblock and then unzip the folder. Click on **Set-up**. You will be asked to install the following Visual C++ Runtime Libraries (64bit) program. Please click Install. Once completed, close installer and return to Quintic Video Analysis Software, Camera Tab.

Quintic Recording System Setup

The following components will be installed on your machine:


Visual C++ "14" Runtime Libraries (x64)

Do you wish to install these components?

If you choose Cancel, setup will exit.

Install

Cancel




Quintic Image Recording Platform (CVB)

2.0.2b
September 2023

2) Quintic High-Speed Camera : 64bit Quintic USB3 High-Speed Camera - CVB Driver (Windows 10/11 - 64 Bit operating system)

- Click the 64bit Quintic High-Speed Camera Driver - CVB (Common Vision Blox 14)
- Complete Installation
- Supports USB3 high-speed camera for Windows 10/11 64-bit operating system
- Click here to download PDF Guide for : **Installation, Licensing & Camera Configuration**



64bit Quintic USB3 Camera DriverSetup ~683 MB

3) Quintic Image Recording Platform (SPORTS / COACHING / BIOMECHANICS) : (Windows 10/11 64-bit operating system) IDS Cameras ONLY

The user is then able to select which camera drivers they wish to be installed out of the options available to them. Please see the next page for advice on which camera drivers will be required for which camera.

In order for Quintic Cameras to be recognised on your machine, Quintic High Speed Camera Drivers need to be installed. For the Quintic USB3 cameras we would recommend the following driver:

Quintic USB3 1.3MP/4MP Cameras

If using a USB3 1.3MP/4MP Camera, please install option 10 or 11, depending on which System type you are using, which was noted earlier:

EITHER

10) Quintic High-Speed Camera : 64bit Quintic USB3 High-Speed Camera 4.90 Driver
(Windows 7, Windows 8, Windows 10)

OR

11) Quintic High-Speed Camera : 32bit Quintic USB3 High-Speed Camera 4.90 Driver
(Windows 7, Windows 8, Windows 10)

Once you have decided which Camera Driver you require, please complete the installation by following these instructions:

- 1. Please ensure any Quintic Cameras are not connected to the computer at this stage.**
2. Click on the Quintic Logo for the Camera Driver you require (Option 10 or 11) and select Save. Once saved run the install shield.
3. The uEye install shield will now launch. Please select your setup language.
4. Select 'Install Driver' and select option 1, 'Complete', to install the full driver and then select 'Next'.
5. The software will now install to the default location C:\Program Files\IDS\uEye. To continue the installation, click 'Next'.
6. To begin the installation, click on the 'Install' option.
7. Once the installation has completed, deselect the HTML option as this is not needed, then click on 'Next'.
8. Once the set-up has been completed click on the 'Finish' button. The Camera(s) can now be connected to the computer.

2. Quintic High Speed Camera Capture Programs

Now that the Quintic High Speed Camera Drivers have been installed, you will also require the Quintic High Speed Camera Capture Programs to be installed. This depends on which camera type you are using (USB3 1.3MP/4MP). The Quintic High Speed Camera Capture Programs are available on the same webpage where the Quintic Camera Drivers were downloaded from.

We always recommend installing Option 3 & 4:

3. Quintic Image Recording Platform (SPORTS / COACHING / BIOMECHANICS) :
Windows 10/11 64-bit Operating System – IDS Cameras ONLY
4. Quintic Single High-Speed Camera (SPORTS / COACHING / BIOMECHANICS):
(Windows Seven, Eight, Ten)

Quintic USB3 1.3MP High Speed Camera(s) Only

If you are using our Quintic USB3 1.3MP High Speed Camera (regardless of how many you are using), then please install:

- 7) Quintic High-Speed 1.3MP Camera (SPORTS / COACHING / BIOMECHANICS):
(Windows Seven, Eight, Ten)

As well as the following:

EITHER

VisualC++2012Update4_32bit

OR

VisualC++2012Update4_64bit

Again, this depends on which System Type you are using.

Quintic USB3 4MP High Speed Camera(s) Only

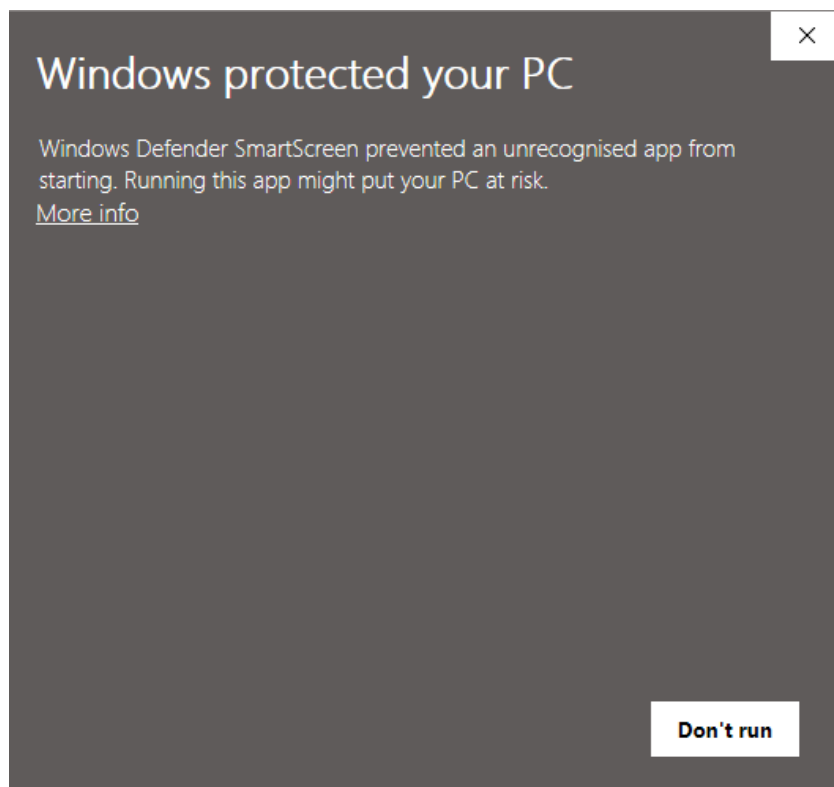
If you are using our Quintic USB3 4MP High Speed Camera (regardless of how many you are using), then please install:

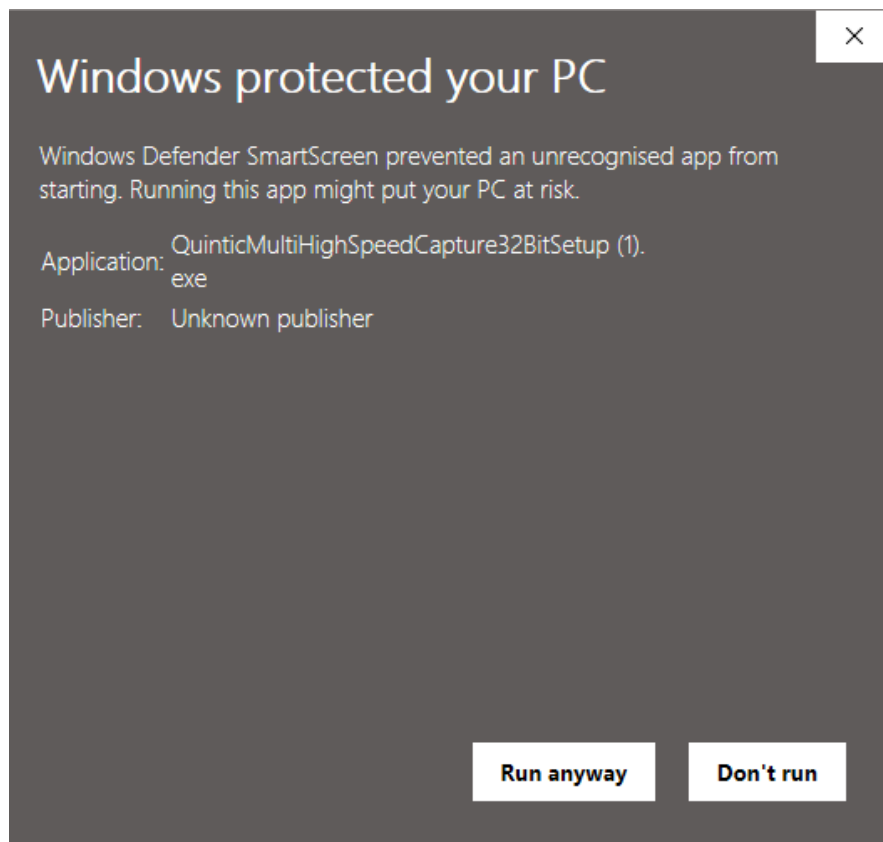
- 8) Quintic High-Speed 4MP Camera (SPORTS /COACHING / BIOMECHANICS) :
(Windows Seven, Eight, Ten)

All of the Quintic High Speed Camera Capture programs are very simple to download and install.

Simply click on the Quintic Logo of the desired Quintic Camera Capture program and save this program to a location on the machine of your choice. Once downloaded please run the relevant install shield of the relevant Quintic Capture program.

If Windows blocks the program from installing and a pop – up window similar to below appears, please select 'More Info' then 'Run Anyway'





For clients on Windows Operating Systems older than Windows 10 (i.e Windows 7 or 8), you may be required to unblock the setup exe to complete a full installation.

To do this, please locate the saved Install Shield on your machine, right click it and go to "Properties → General." Click "Unblock" to unblock the exe.

Simply follow through all of the installation screens until the Quintic Camera Capture is installed. Once completed, a Desktop Icon will not be created, the software will run in the background once clicked within the Quintic software. If you would like to double check the Quintic Camera Capture software have been installed, you can do this through 'Control Panel' then 'Programs and Features'.

Now that the Quintic Camera Drivers and Capture software has been installed, please see the following pages for information on how to configure your Quintic Camera (USB3 1.3MP/4MP).

3. Quintic USB3 1.3MP High Speed Camera



Compatible with Quintic Sports, Coaching & Biomechanics

- Optional frame rate between 170 and 1000 frames per second
 - *169 fps at an image resolution of 1280 x 1024*
 - *250 fps at an image resolution of 1280 x 650*
 - *300 fps at an image resolution of 1280 x 500*
 - *400 fps at an image resolution of 1280 x 350*
 - *500 fps at an image resolution of 1200 x 300*
- E2v 1.3 megapixel CMOS sensor
- Housing size: 4.2 x 3.4 x 2.9cm (L x W x H)
- Weight: 52 grams

Connect the camera to the PC/Laptop via the 4m cable provided with the camera. Ensure that the cable is inserted into a USB3 port. These are displayed either with a blue chip inside the port, corresponding with a blue chip in the cable adapter, or a label of “SS” which stands for “super speed”.

Your computer will recognise the new USB device and may need to install additional drivers to ensure the USB port functions correctly. It is advisable to connect to the internet at this stage, to obtain the latest Microsoft drivers for the USB port.

If / Once installed, it is recommended to ALWAYS use this updated USB3 port for the Quintic Camera. Follow any further on screen instructions as further Microsoft drivers for the USB port and device may be required.


Once the camera has been connected/recognised by the computer the camera can be opened.

To ensure that your Quintic USB3 Camera is configured correctly, simply click on IDS Camera Manager.



This will show all live cameras that are plugged into the computer and have been recognised.

Your Quintic USB3 Camera should appear 'Yes' to free and 'Yes' to available. This will mean the camera is able to be opened within Quintic Software.

Camera list			
Free	Avail.	Type	Cam.ID
 Yes	Yes	USB	100

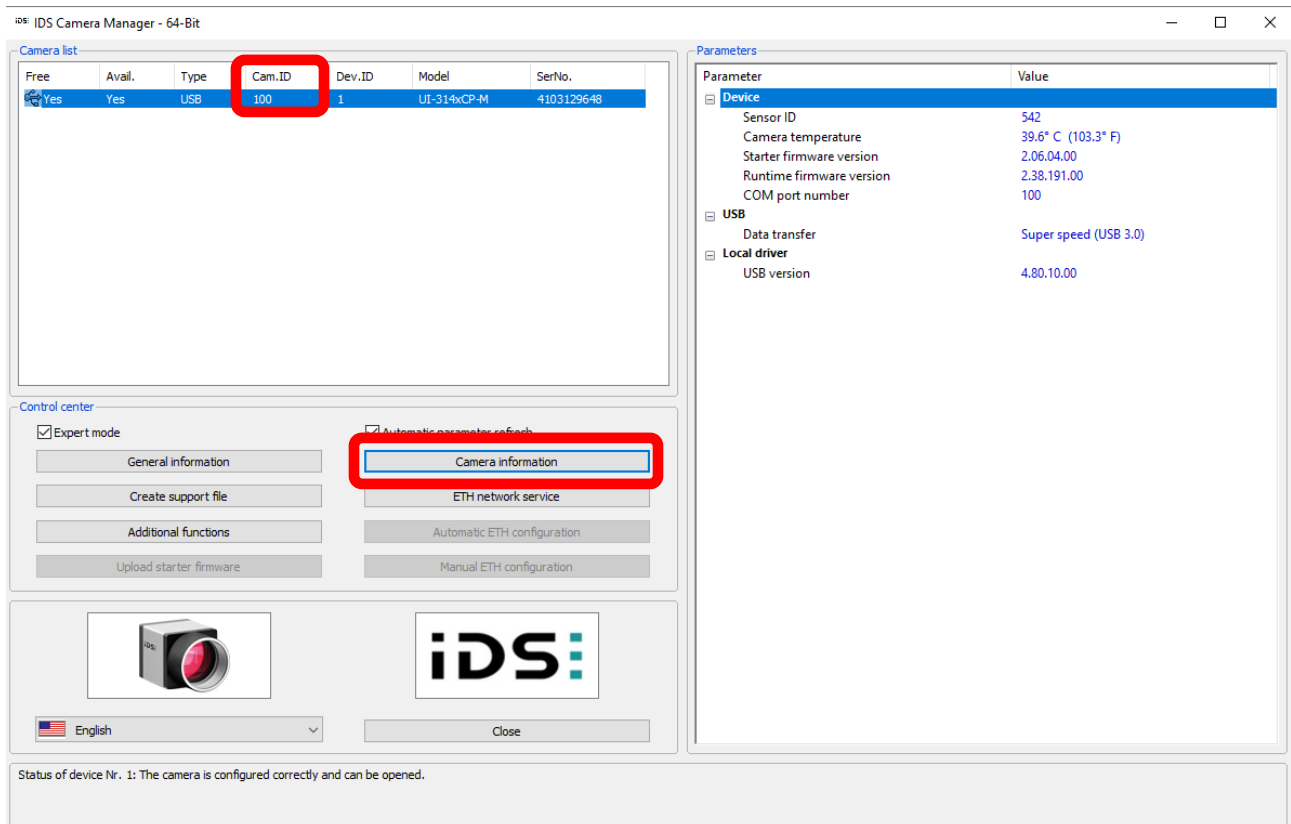
Please Note: You also need to assign the Camera ID: This can be changed manually by using the Camera Information button. In order for the Quintic High-Speed 1.3MP capture to work, the cameras must be in ID order 100, 101, 102, 103, 104, 105. It must start with Camera ID 100!

Once the Cam ID's have been set you can now open up to six cameras in the Quintic High-Speed 1.3MP Camera Capture.

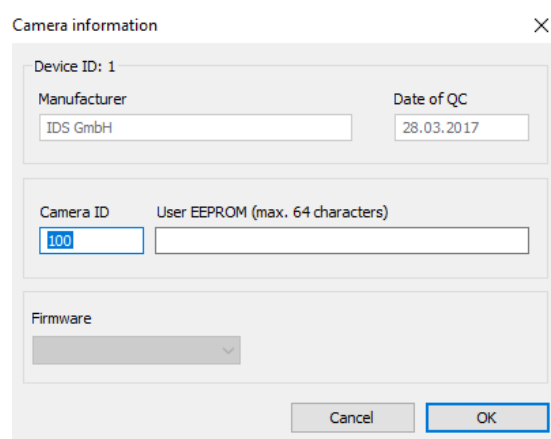
a. Cam ID's

If the 1.3MP camera is not being picked up by the Quintic Software when trying to capture a video this could be due to the Cam ID that is displayed in the IDS camera manager software. For the 1.3 MP camera the Cam ID has to start at 100 then go up by 1 for every camera that is added (e.g. 100, 101, 102).

In order to change the Camera ID, load the IDS camera manager software, which should show the camera that is connected to the computer.



Then click on camera information and edit the Camera ID if necessary. Click OK, which will then save any changes made to camera information.



Additional functions
×

Camera memory

☐ Compatibility mode
☒ Enabled

Bulk transfer size

▼

Camera parameter when camera is opened

☒ Default
☐ Parameter set

Erase parameter set

Boot boost

☐ Enable

Set ID list

Clear ID list

Add ID

Remove ID

Current boot boost IDs:

CPU idle states

☐ Disable (battery power)
☐ Disable (mains power)

☒ Allow thread to optimize image acquisition performance (IPO)

Virtual COM port

COM port

COM100
▼

Install COM port on the computer (COM100)

Save COM port in the camera (COM100)

Delete COM port on the computer (COM100)

Send / Receive

By default the camera is connected to COM port 100. This COM port is not installed on the computer system. You can install COM100 or another COM port on your computer and save the port number in this camera.

Read-only Multicast Configuration

☐ Enable Read-only Multicast

Add read-only Device

Remove read-only Device

Camera Id

100

Error Handling

Refuse incomplete Images

Close

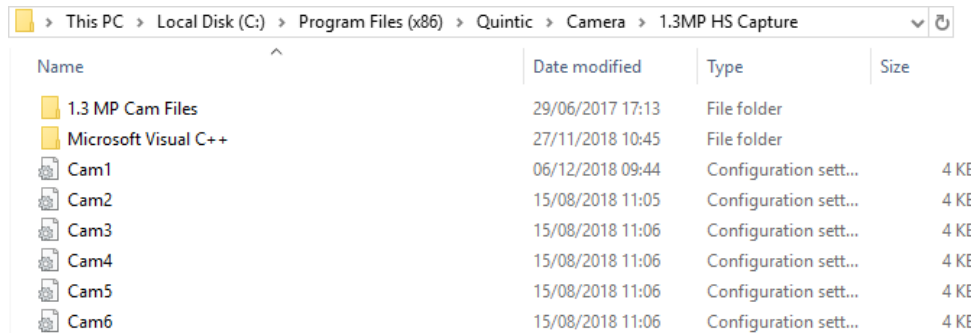
Memory Mode - For the camera to be compatible with Quintic standard 1.3 cams files, memory mode must be enabled. Open IDS camera manager and select “Additional Functions”. A pop-up window will appear. The first box will be labelled “Image memory: This **MUST** be enabled or the camera will resort to default cam settings when opened in our 1.3MP camera capture program.

This can only be done before opening the camera. Once the camera is open in U-eye cockpit, then the memory mode cannot be changed until it is closed.

b. 1.3MP Camera Parameters

There are a range of pre-created camera parameter files (i.e different FPS and image resolutions) which are able to be used with our Quintic USB3 1.3MP High Speed Camera.

The 1.3MP camera parameters are read from the following location: **Local Disk (C:) > Program Files (x86) > Quintic > Camera > 1.3MP HS Capture**. Illustrated below.

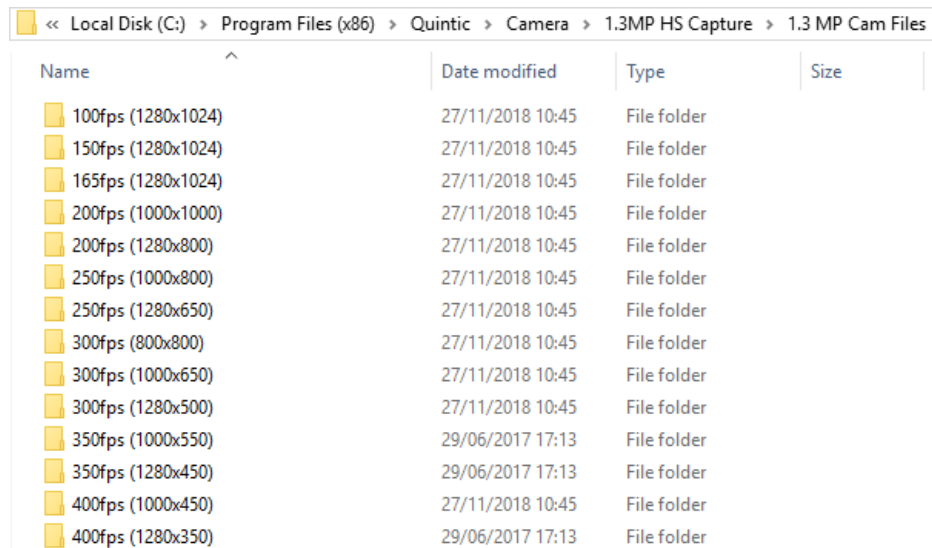


Name	Date modified	Type	Size
1.3 MP Cam Files	29/06/2017 17:13	File folder	
Microsoft Visual C++	27/11/2018 10:45	File folder	
Cam1	06/12/2018 09:44	Configuration sett...	4 KB
Cam2	15/08/2018 11:05	Configuration sett...	4 KB
Cam3	15/08/2018 11:06	Configuration sett...	4 KB
Cam4	15/08/2018 11:06	Configuration sett...	4 KB
Cam5	15/08/2018 11:06	Configuration sett...	4 KB
Cam6	15/08/2018 11:06	Configuration sett...	4 KB

Depending on the number of Quintic USB3 1.3MP Cameras you have plugged in will depend on how many cam files will be read. If you have 1 x Quintic USB3 1.3MP Camera plugged in, it will read Cam1, if you have 2 Cameras it will read Cam1 and Cam2 and so on.

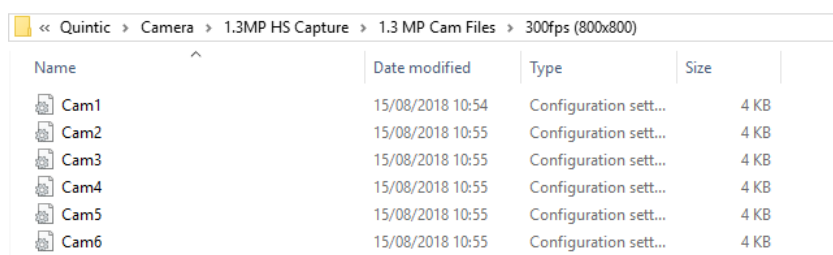
Should you like to change the cam files for the Quintic USB3 1.3MP High Speed Camera, please close any live camera feed you have open.







Find the pre-set cam files in this location: **Local Disk (C:) > Program Files (x86) > Quintic > Camera > 1.3MP HS Capture > 1.3MP Cam Files**. This will bring up all of the pre-set cam files we have for this camera. Highlighted below.



Name	Date modified	Type	Size
100fps (1280x1024)	27/11/2018 10:45	File folder	
150fps (1280x1024)	27/11/2018 10:45	File folder	
165fps (1280x1024)	27/11/2018 10:45	File folder	
200fps (1000x1000)	27/11/2018 10:45	File folder	
200fps (1280x800)	27/11/2018 10:45	File folder	
250fps (1000x800)	27/11/2018 10:45	File folder	
250fps (1280x650)	27/11/2018 10:45	File folder	
300fps (800x800)	27/11/2018 10:45	File folder	
300fps (1000x650)	27/11/2018 10:45	File folder	
300fps (1280x500)	27/11/2018 10:45	File folder	
350fps (1000x550)	29/06/2017 17:13	File folder	
350fps (1280x450)	29/06/2017 17:13	File folder	
400fps (1000x450)	27/11/2018 10:45	File folder	
400fps (1280x350)	29/06/2017 17:13	File folder	

Open the desired cam file folder, then within this folder please copy the desired number of cam files i.e Cam1. Copy this cam file into the same location as point 2. This will then bring up a message to replace the existing cam file in this location - please do this.



Name	Date modified	Type	Size
 Cam1	15/08/2018 10:54	Configuration sett...	4 KB
 Cam2	15/08/2018 10:55	Configuration sett...	4 KB
 Cam3	15/08/2018 10:55	Configuration sett...	4 KB
 Cam4	15/08/2018 10:55	Configuration sett...	4 KB
 Cam5	15/08/2018 10:55	Configuration sett...	4 KB
 Cam6	15/08/2018 10:55	Configuration sett...	4 KB

Now that you have the desired frame rate and image resolution for the analysis you are conducting, please run the 'High-Speed 1.3MP' capture program within Quintic Sports/Coaching/Biomechanics. This will then bring up the live video feed with the new cam file in use.

Please see 'High-Speed 1.3MP Capture' for more information on how to record videos.

4. Quintic USB3 4MP High Speed Camera



Compatible with Quintic Sports, Coaching & Biomechanics

- Optional frame rate between 75 and 1000 frames per second
 - *100 frames per second at an image resolution of 2048 x 1550*
 - *200 frames per second at an image resolution of 2048 x 762*
 - *300 frames per second at an image resolution of 2048 x 504*
 - *400 frames per second at an image resolution of 2048 x 376*
 - *500 frames per second at an image resolution of 2048 x 298*
- 4 Megapixel 1" CMOSIS sensor
- Housing size: 5.0 x 3.5 x 3.5.cm
(L x W x H)
- Weight: 60 grams

Connect the camera to the PC/Laptop via the 4m cable provided with the camera. Ensure that the cable is inserted into a USB3 port. These are displayed either with a blue chip inside the port, corresponding with a blue chip in the cable adapter, or a label of "SS" which stands for "super speed".

Your computer will recognise the new USB device and may need to install additional drivers to ensure the USB port functions correctly. It is advisable to connect to the internet at this stage, to obtain the latest Microsoft drivers for the USB port.

If / Once installed, it is recommended to ALWAYS use this updated USB3 port for the Quintic Camera. Follow any further on screen instructions as further Microsoft drivers for the USB port and device may be required.


Once the camera has been connected/recognised by the computer, the camera can be opened.

To ensure that your Quintic USB3 Camera is configured correctly, simply click on IDS Camera Manager.



This will show all live cameras that are plugged into the computer and have been recognised.

Your Quintic USB3 Camera should appear 'Yes' to free and 'Yes' to available. This will mean the camera is able to be opened within Quintic Software.

Camera list			
Free	Avail.	Type	Cam.ID
 Yes	Yes	USB	100

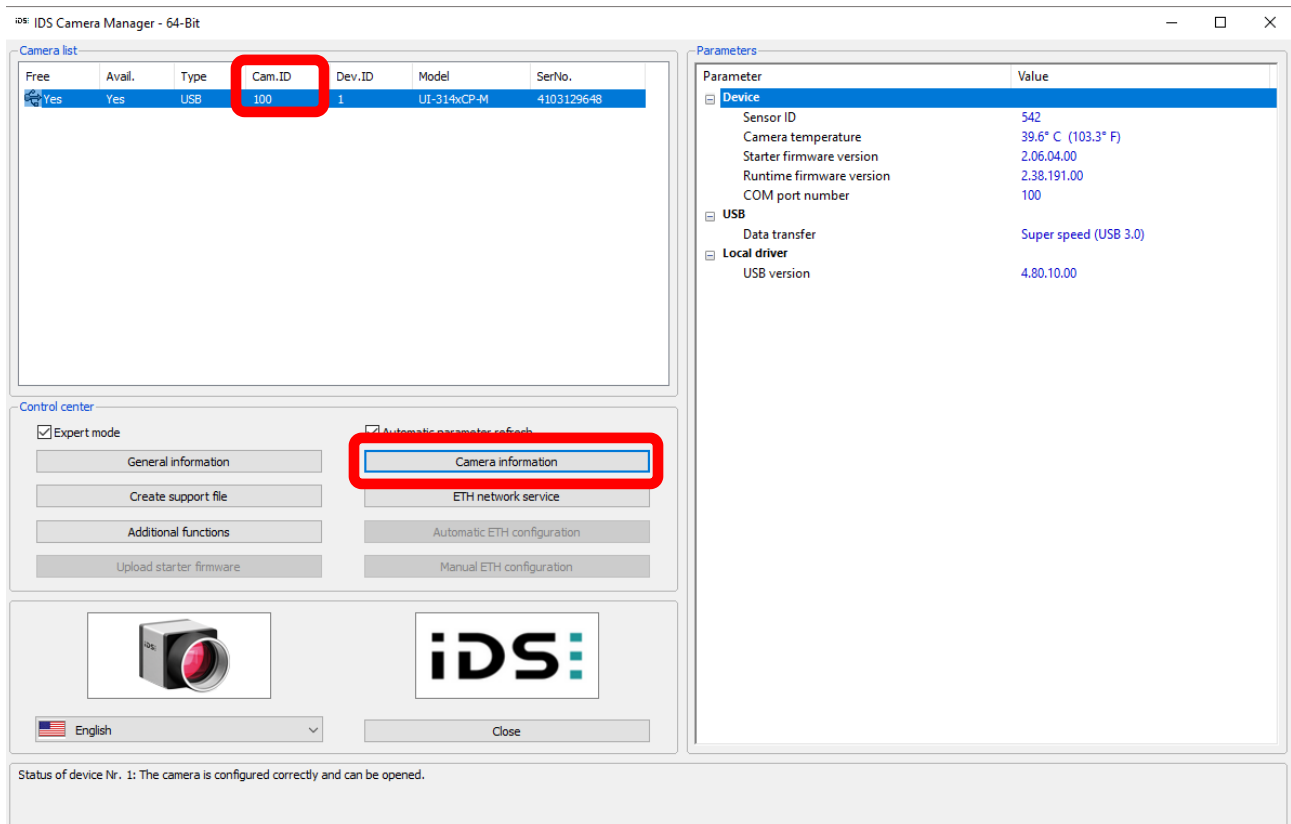
Please Note: You also need to assign the Camera ID: This can be changed manually by using the Camera Information button. In order for the Quintic High-Speed 4MP capture to work, the cameras must be in ID order 100, 101, 102, 103, 104, 105. It must start with Camera ID 100!

Once the Cam ID's have been set you can now open up to six cameras in the Quintic High-Speed 4MP Camera Capture.

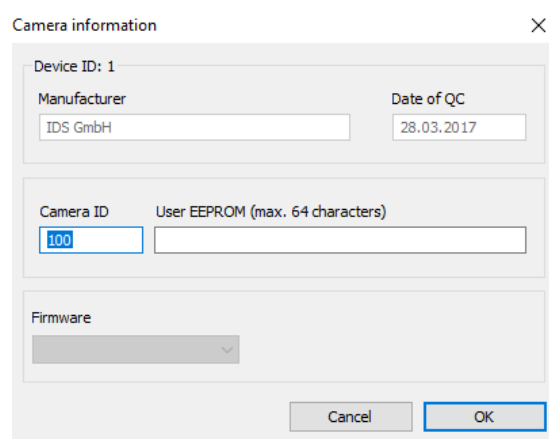
a. Cam ID's

If the 4MP camera is not being picked up by the Quintic Software when trying to capture a video this could be due to the Cam ID that is displayed in the IDS camera manager software. For the 4 MP camera the Cam ID has to start at 100 then go up by 1 for every camera that is added (e.g. 100, 101, 102).

In order to change the Camera ID, load the IDS camera manager software, which should show the camera that is connected to the computer.



Then click on Camera Information and edit the Camera ID if necessary, click OK which will then save any changes made to camera information.



Additional functions
×

Camera memory

☐ Compatibility mode
☒ Enabled

Bulk transfer size

▼

Camera parameter when camera is opened

☒ Default
☐ Parameter set

Erase parameter set

Boot boost

☐ Enable

Set ID list

Clear ID list

Add ID

Remove ID

Current boot boost IDs:

CPU idle states

☐ Disable (battery power)
☐ Disable (mains power)

☒ Allow thread to optimize image acquisition performance (IPO)

Virtual COM port

COM port

COM100
▼

Install COM port on the computer (COM100)

Save COM port in the camera (COM100)

Delete COM port on the computer (COM100)

Send / Receive

By default the camera is connected to COM port 100. This COM port is not installed on the computer system. You can install COM100 or another COM port on your computer and save the port number in this camera.

Read-only Multicast Configuration

☐ Enable Read-only Multicast

Add read-only Device

Remove read-only Device

Camera Id

100

Error Handling

Refuse incomplete Images

Close

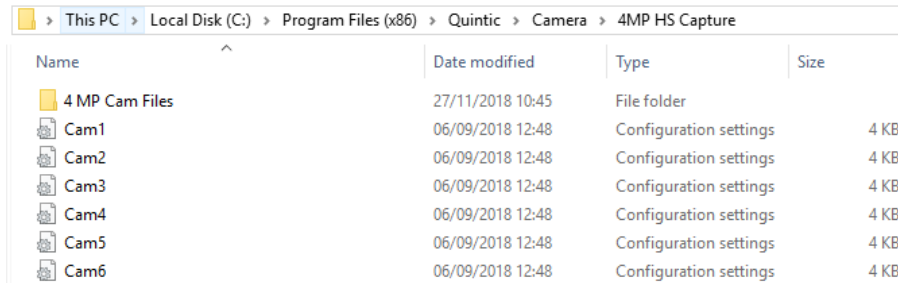
Memory Mode - For the camera to be compatible with Quintic standard 4MP cams files, memory mode must be enabled. Open IDS camera manager and select “Additional Functions”. A pop-up window will appear. The first box will be labelled “Image memory: This **MUST** be enabled or the camera will resort to default cam settings when opened in our 4MP camera capture program.

This can only be done before opening the camera. Once the camera is open in U-eye cockpit, then the memory mode cannot be changed until it is closed.

b. 4MP Camera Parameters

There are a range of pre-created camera parameter files (i.e different FPS and image resolutions) which are able to be used with our Quintic USB3 4MP High Speed Camera.

The 4MP camera parameters are read from the following location: **Local Disk (C:) > Program Files (x86) > Quintic > Camera > 4MP HS Capture**. Illustrated below.

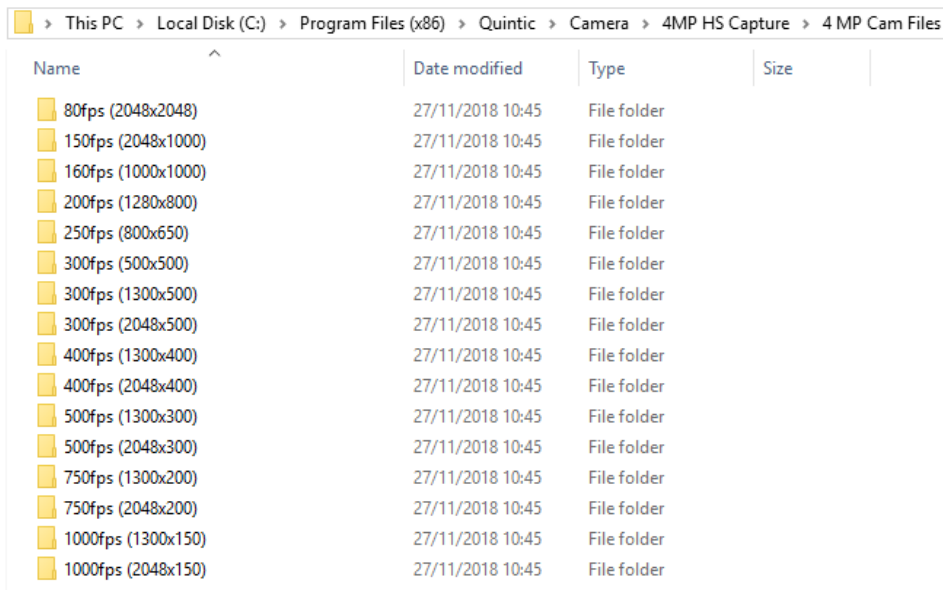


Name	Date modified	Type	Size
4 MP Cam Files	27/11/2018 10:45	File folder	
Cam1	06/09/2018 12:48	Configuration settings	4 KB
Cam2	06/09/2018 12:48	Configuration settings	4 KB
Cam3	06/09/2018 12:48	Configuration settings	4 KB
Cam4	06/09/2018 12:48	Configuration settings	4 KB
Cam5	06/09/2018 12:48	Configuration settings	4 KB
Cam6	06/09/2018 12:48	Configuration settings	4 KB

Depending on the number of Quintic USB3 4MP Cameras you have plugged in will depend on how many cam files will be read. If you have 1 x Quintic USB3 4MP Camera plugged in, it will read Cam1, if you have 2 Cameras it will read Cam1 and Cam2 and so on.

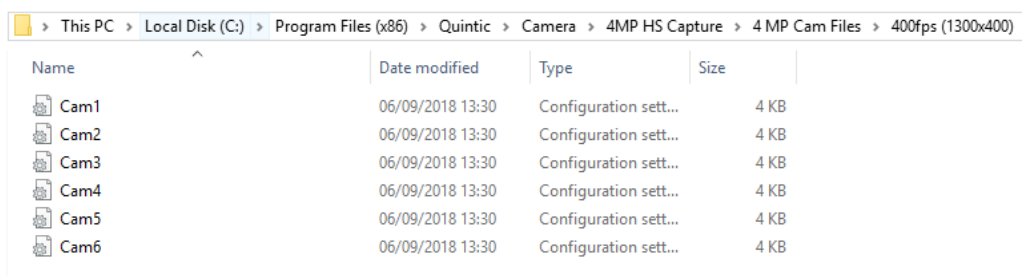
Should you like to change the cam files for the Quintic USB3 4MP High Speed Camera, please close any live camera feed you have open.

Find the pre-set cam files in this location: **Local Disk (C:) > Program Files (x86) > Quintic > Camera > 4MP HS Capture > 4MP Cam Files**. This will bring up all of the pre-set cam files we have for this camera. Highlighted below.



Name	Date modified	Type	Size
80fps (2048x2048)	27/11/2018 10:45	File folder	
150fps (2048x1000)	27/11/2018 10:45	File folder	
160fps (1000x1000)	27/11/2018 10:45	File folder	
200fps (1280x800)	27/11/2018 10:45	File folder	
250fps (800x650)	27/11/2018 10:45	File folder	
300fps (500x500)	27/11/2018 10:45	File folder	
300fps (1300x500)	27/11/2018 10:45	File folder	
300fps (2048x500)	27/11/2018 10:45	File folder	
400fps (1300x400)	27/11/2018 10:45	File folder	
400fps (2048x400)	27/11/2018 10:45	File folder	
500fps (1300x300)	27/11/2018 10:45	File folder	
500fps (2048x300)	27/11/2018 10:45	File folder	
750fps (1300x200)	27/11/2018 10:45	File folder	
750fps (2048x200)	27/11/2018 10:45	File folder	
1000fps (1300x150)	27/11/2018 10:45	File folder	
1000fps (2048x150)	27/11/2018 10:45	File folder	

Open the desired cam file folder, then within this folder please copy the desired number of cam files i.e Cam1. Copy this cam file into the same location as point 2. This will then bring up a message to replace the existing cam file in this location - please do this.



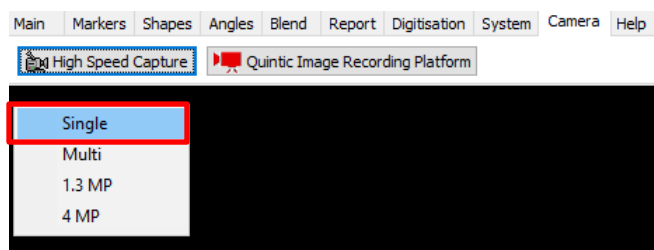
Name	Date modified	Type	Size
Cam1	06/09/2018 13:30	Configuration sett...	4 KB
Cam2	06/09/2018 13:30	Configuration sett...	4 KB
Cam3	06/09/2018 13:30	Configuration sett...	4 KB
Cam4	06/09/2018 13:30	Configuration sett...	4 KB
Cam5	06/09/2018 13:30	Configuration sett...	4 KB
Cam6	06/09/2018 13:30	Configuration sett...	4 KB

Now that you have the desired frame rate and image resolution for the analysis you are conducting, please run the 'High-Speed 4MP' capture program within Quintic Sports/Coaching/Biomechanics. This will then bring up the live video feed with the new cam file in use.

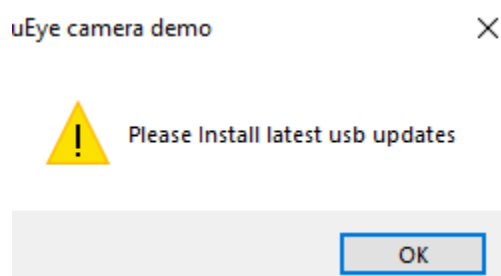
Please see 'High-Speed 4MP Capture' for more information on how to record videos.

5. Bespoke 1.3MP/4MP Camera Parameters

If you would like to create your own bespoke 1.3MP/4MP camera parameters, click on the **'Camera'** tab in the Main window and select **'High Speed Capture'** then **'Single'**.




A pop up saying, 'Please Install latest USB updates' will appear, please click OK.

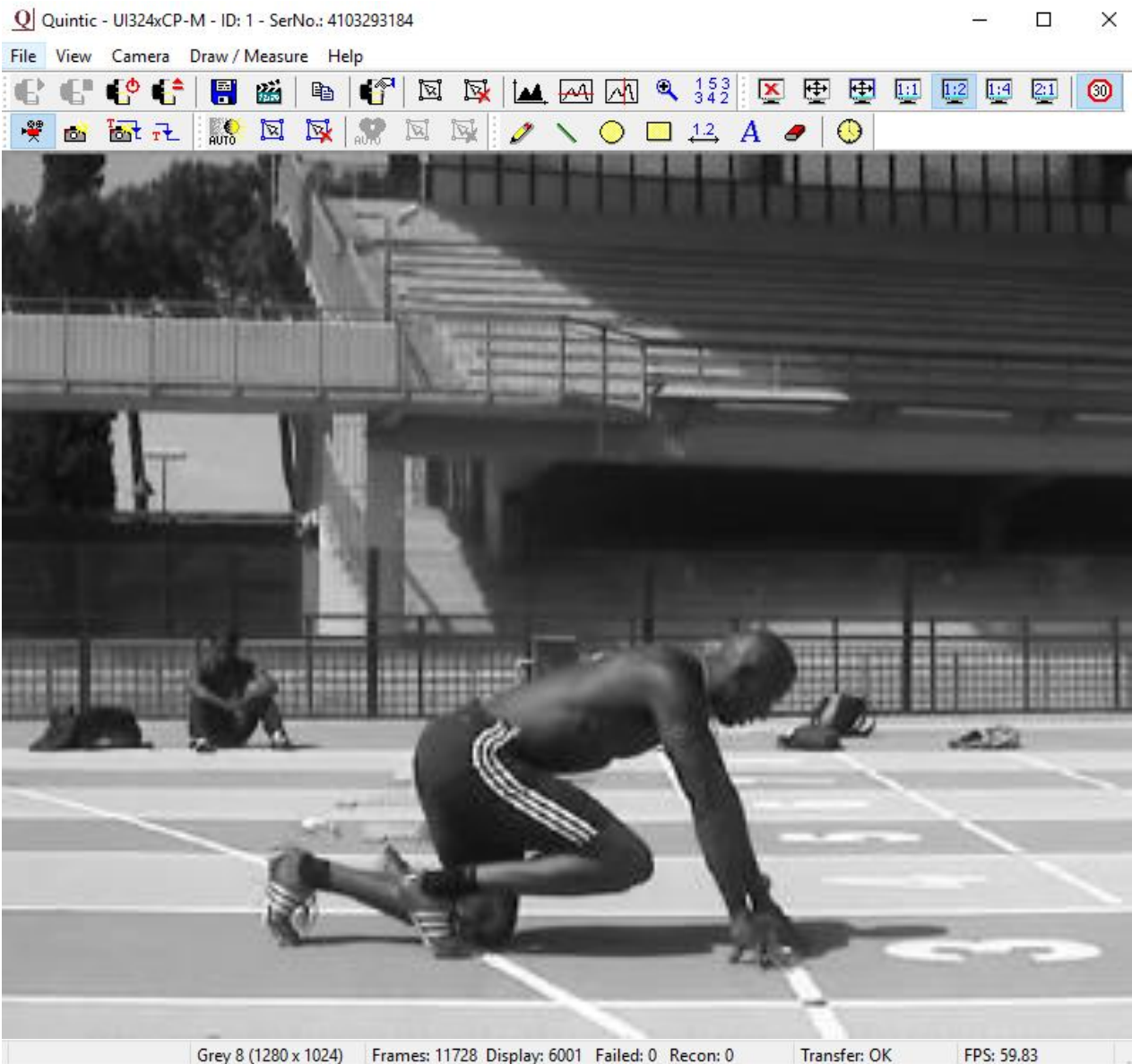


The camera window will open in standby mode.



(The high-speed camera interface window in standby mode)

To start the live camera preview, click on the  button. A live preview will now load, at full resolution of the camera.




Displays the current
video resolution

Information on how
many frames are being
delivered and dropped

Displays the video
capture speed

a. Camera Parameters

To change the camera parameters, click on the  button or select the '**Camera**' tab and then the 'properties' option from the drop-down menu. This will open the properties window.

Quintic - UI324xCP-M - ID: 1 - SerNo.: 4103293184

Trigger	Input / Output	HDR	AES / AGC	AWB	Miscellaneous	Scaler
Info	Camera	Image	Size	Format	Color	Hardware LUT

Timing

Camera peak bandwidth: 89.0 MB/s
Camera average bandwidth: 86.7 MB/s
Sensor (max. bandwidth): 86.0 MP/s

Pixel clock 86

☐ Optimum 7 MHz 86 MHz

Auto pixel clock test period (s)

Frame rate (Freerun) 59.82

☐ Hold 0.95 fps 59.82 fps
☐ Max
☐ Auto

Exposure time 2.427

☐ Hold 0.009 ms 16.700 ms
☐ Max
☐ Auto
☐ Long-term (Trigger mode)

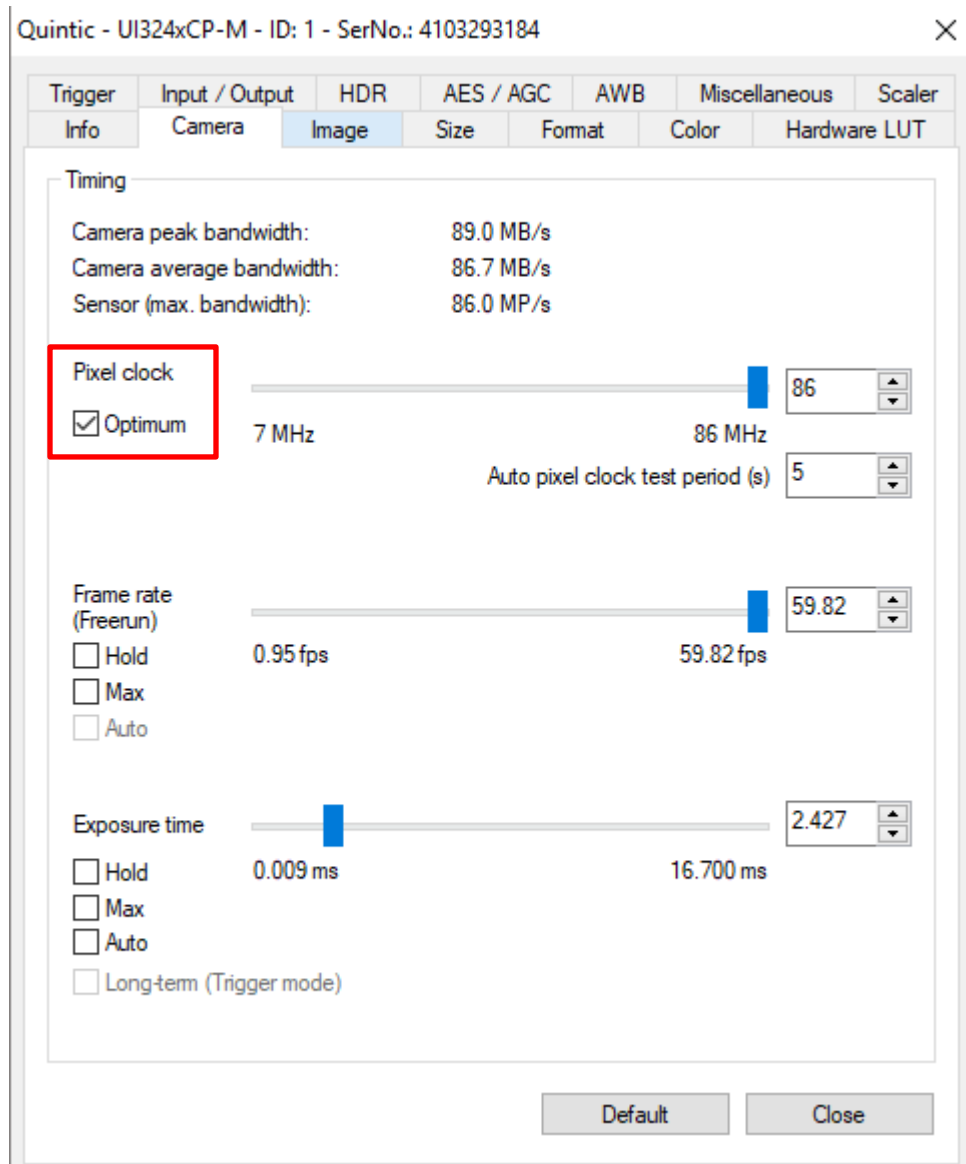
Default Close

Parameters can be saved as an .ini file so that various frame rate, resolution settings etc can be saved for ease of use.

b. Camera Tab (frame rate & exposure)

The camera tab allows the pixel clock frequency, frame rate and exposure time to be altered.

Firstly, check the '**Optimum**' selection box, this will allow the software to run at the optimal highest Pixel Clock Rate. This will improve/increase the maximum frame rate at which the camera can capture at.



Timing

Camera Peak Bandwidth is the maximum required bandwidth in MB/sec (Peak). If the bandwidth is exceeded this is displayed in red.

Camera Average Bandwidth is the average bandwidth required in MB/sec. If the bandwidth is exceeded this is displayed in red.

N.B. Make sure that these values don't exceed the bandwidth limit, otherwise performance will be impaired. You are able to ensure the bandwidth is not exceeded by adjusting the parameters below.

Pixel Clock

Sets the clock rate at which the image data is read from the sensor. Altering this setting affects frame rate and exposure time.

Frame Rate

Depending on your bandwidth value there are varying maximum amounts of frames per second that can be captured. This value will decrease as the resolution value increases. When setting the frame rate in freerun mode, the camera will capture one image after another at the set frame rate.

Hold: When this check box is selected the frame rate will remain at the set rate, if the pixel clock changes.

Max: when this box is selected the camera will record at the maximum rate that is possible. Frame rate depends on the capture resolution and the pixel clock.

Auto: This option selects the Auto Frame Rate Function. This is only available when Auto Exposure is selected.

Frame rate will change when the user sets a new area of interest (AOI) of image.

Utilising the highest frame rate possible is especially important when capturing fast movements (e.g. the golf swing). A typical golf swing can occur at 100mph or 150ft/sec, so if your camera is sampling at 30Hz the club will move 5 feet per 1/30 of a second.

In order to ensure that all actions are accounted for you must sample fast otherwise the subtle movements will be lost.

Exposure Time

This is the amount of time the shutter remains open to allow light into the sensor in order to form an image.

This option sets the exposure time. The available exposure time depends on the pixel clock setting and the frame rate. A low frame rate setting allows long exposure times, where as a high frame rate reduces the maximum possible exposure time.

Hold: When the check box is selected the exposure will remain at the desired setting if the frame rate changes.

Max: The camera runs at the maximum exposure time that is possible at the current frame rate.

Auto: this option selects the Auto Exposure Function. The exposure time changes automatically depending on the selected frame rate.

See the table below which illustrates exposure time and shutter speed settings. As the shutter speed increases, the exposure time decreases as the image is exposed to light for a shorter period of time. As the shutter speed decreases, the exposure time increases as the image is exposed to light for a longer period of time.

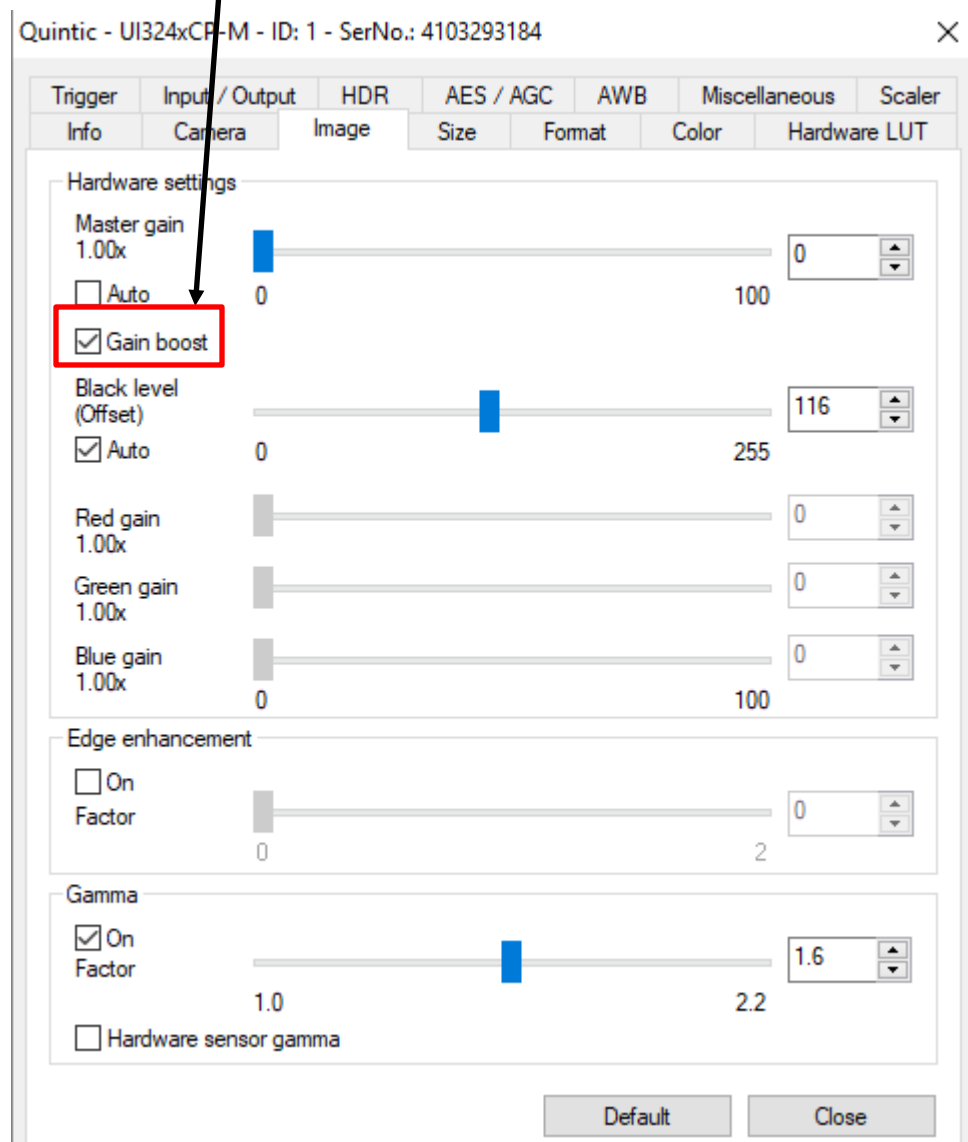
Shutter Speed	Exposure Time (ms)
1/503	1.985
1/672	1.487
1/800	1.249
1/1010	0.99
1/1257	0.795
1/1457	0.686
1/1555	0.643
1/1666	0.6
1/1869	0.535
1/2032	0.492
1/2232	0.448
1/2469	0.405
1/2941	0.34
1/3367	0.297
1/3952	0.253
1/5319	0.188
1/6896	0.145
1/9803	0.102
1/12500	0.08

c. Image Tab (gain boost)

In digital imaging a voltage proportional to the amount of incident light is output at the sensor. To increase image brightness and contrast, this signal can be amplified by an analogue gain and offset before the digitising process.

Analogue amplification of the read-out pixel values increases overall image brightness and contrast allowing for a height exposure value/shutter speed to be applied.

Click on the '**Gain Boost**' option within the Image tab, to automatically increase the brightness and contrast of the image.



1.3MP Only

When using the 1.3MP camera the sensor is susceptible to noise affecting the image quality, most commonly displayed as dark vertical lines causing the image to appear grainy. These lines can become darker when the pixel clock is optimised and the aperture of the lens is low.

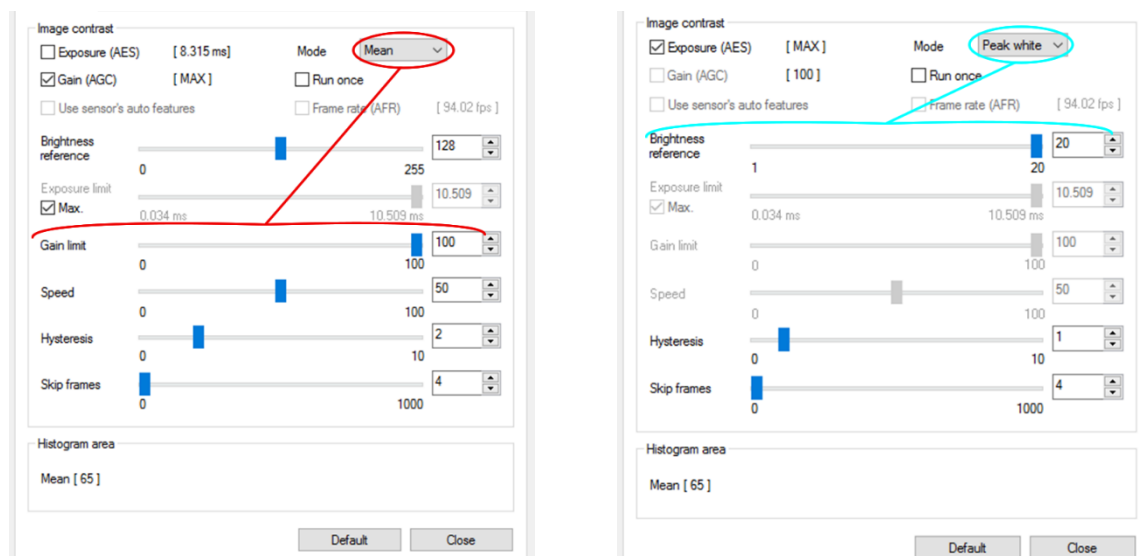
Auto Gain is a default setting that manages the brightness of the image according to the light in the scene. This is useful as it artificially creates a brighter image when control over external lighting is limited (for example, an outdoor scene).

However, in an indoor environment the algorithm used to control brightness is constantly trying to find a mean brightness for the pixels, often resulting in dark vertical lines.

The gain limit can be altered in the AES/AGC tab. The gain limit controls the extent to which the gain is allowed to artificially brighten the image. This only affects the image quality when the mode of control for image brightness is displayed as “mean” in the top right (below, left). In this case, auto gain can either be deselected, or the gain limit can be reduced until the image quality is sufficient for purpose.

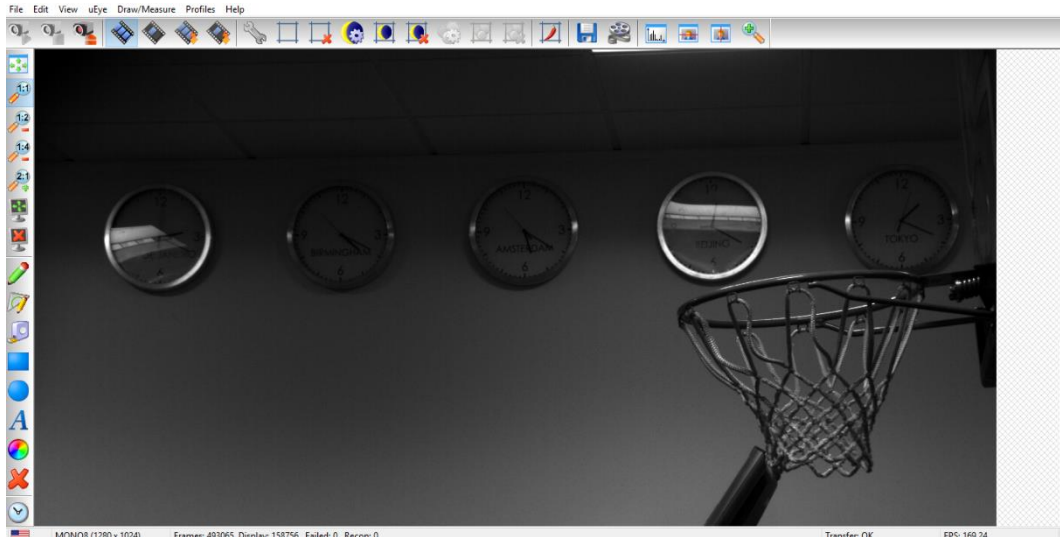
However, reducing the gain will result in a darker image. This can be combated by increasing light in the scene, the gain boost function or increasing the aperture.

Gain Boost - To increase the brightness of the image, gain boost (to be found in the “image” tab) can be enabled. However, this can result in a more grainy image.



Peak White Limit - The increased light from an opened aperture will result in the overexposure of the light pixels in the scene. This can cause a problem if the use of reflective markers is required for auto tracking, as overexposure can affect their spherical appearance.

This can be reduced by changing the “Mode” option from “Mean” to “Peak white” (above, right). This is associated with the “Brightness Reference” slide bar, which controls the amount of pixels over exposed at any one time.



d. Format Tab

Ensure that the colour mode is set to “Mono 8” in the Software column.

When you are happy with the parameters of your camera, click “File”, select “Save parameters” and then “to File...” and select a relevant folder to save the cam file. For filing purposes this should be named Cam1 for camera 1, Cam2 for camera 2 etc...

N.B Please note that you are unable to save directly to Program Files (x86).

e. Size Tab (video size, area of interest)

On this tab the user can set the image size parameters for their camera.

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Trigger	Input / Output	HDR	AES / AGC	AWB	Miscellaneous	Scaler
Info	Camera	Image	Size	Format	Color	Hardware LUT

AOI

☐ Show only AOI

Width 16 1280

Height 4 1024

Left 0 0

☐ Center

Top 0 0

☐ Center

Horizontal format

☒ Normal ☐ Mirror left/right

Binning ☐ 2x ☐ 3x ☐ 4x ☐ 5x ☐ 6x ☐ 8x

Subsampling ☐ 2x ☐ 3x ☐ 4x ☐ 5x ☐ 6x ☐ 8x ☐ 16x

Vertical format

☒ Normal ☐ Mirror up/down

Binning ☐ 2x ☐ 3x ☐ 4x ☐ 5x ☐ 6x ☐ 8x

Subsampling ☐ 2x ☐ 3x ☐ 4x ☐ 5x ☐ 6x ☐ 8x ☐ 16x

Area of Interest (AOI)

The area of interest function allows the user to concentrate the camera on the action they wish to film by altering the resolution the camera captures at. These parameters allow the user to select the size and position of the Area of Interest (AOI). AOI sets the camera so that only data included within the specific area is captured. Using the AOI function to create a smaller resolution also enables the camera to capture at a higher frame rate. To change this, go back to the camera tab after altering the AOI.

Selecting the **'Show Only AOI'** box sets the camera preview to only display the AOI, without a black border. This function saves memory and processing time when rendering the image and ensures the video is recorded with no unwanted black borders.

Width/Height

Sets the AOI width and height.

Left

Sets the left-hand edge position of the AOI.

(Selecting the **'Centre'** box centres the AOI horizontally).

Top

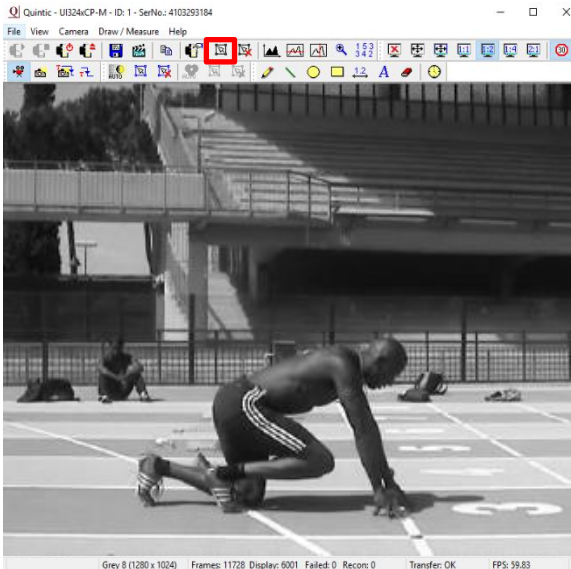
Sets the top edge position of the AOI.

(Selecting the **'Centre'** box centres the AOI vertically).

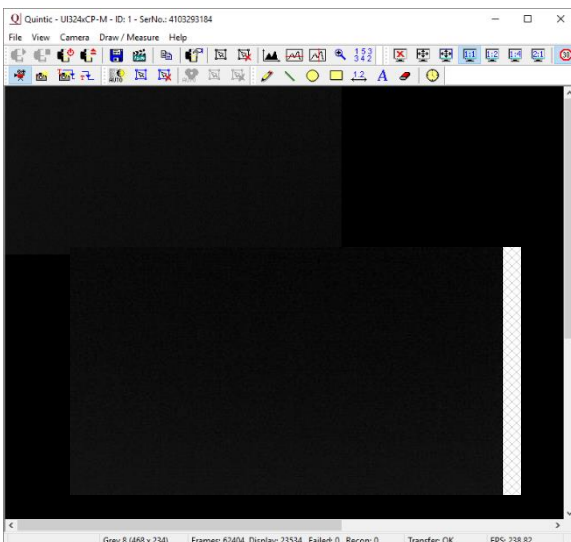
f. Other Functions

Set New AOI

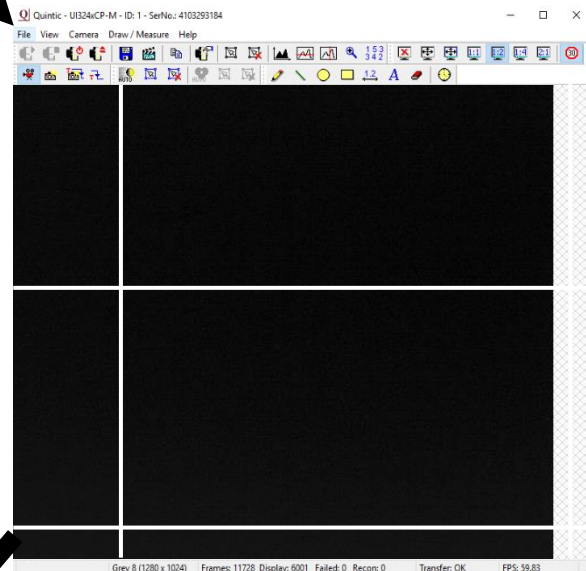
An alternative to setting the AOI in the size tab, is the Set AOI function.



To set the area of interest click and hold the left mouse button down, and drag over the desired area you wish to set as the AOI. A white grid will illustrate the selected area.



To use the AOI function, select '**Set New AOI**' from the camera tab or click on the '**Set New AOI**' button on the toolbar. The original preview is 1280 x 1024 resolution and capturing at a max frame rate of 60fps.

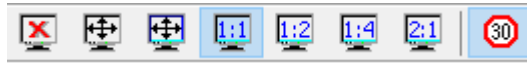


Only the AOI is now shown on the preview screen and will be captured.


The new video resolution is 468 x 234 and the maximum recording speed is now 238fps.

Image Preview Controls


The user can control the size of the video preview screen by clicking on the **'View'** tab and selecting render or by using the display function buttons located on the menu.



Disable the video preview


To disable the camera preview, click on the  button. This will disable the preview screen.

Enable full screen video preview

To enable a full screen preview, click on the  button. To exit out of full screen mode click on the **'Esc'** button.

N.B. in order to use this function Direct X 3D may need to be installed.

Scale the video preview to the window size

To fit the preview video to the open window, click on the  button. This will scale the open video preview to the current window size.

Scaling the display

The preview display can be scaled down to $\frac{1}{4}$ of the original size or up to twice the original display size.



Displays the video preview at original size



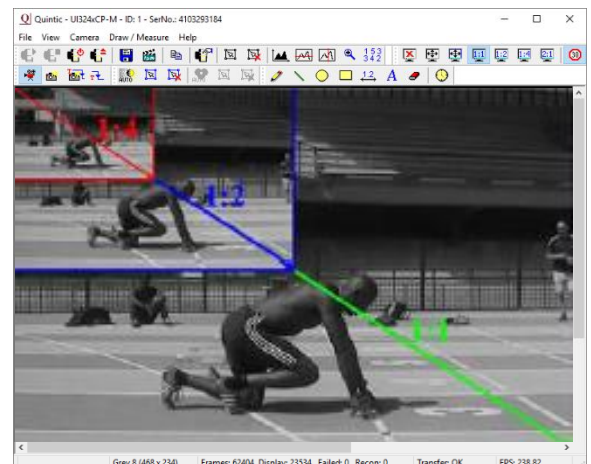
Scales the video preview to half size



Scales the video preview to quarter size

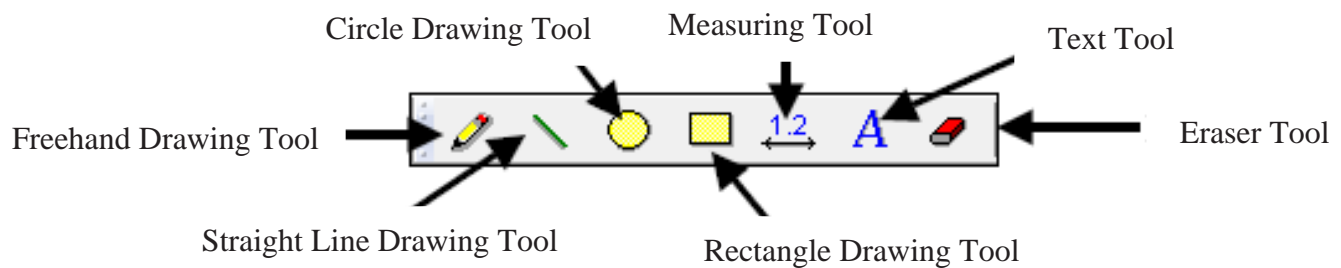


Scales the video preview to double size




Drawing tools


When using the preview screen, drawing tools can be used to highlight key areas on the screen, although these shapes and lines **won't be saved to the video**. Draw any of the shapes by clicking on the shape button you require, moving the cursor over the screen to where you want the shape to be, then holding down the left mouse button and dragging the shape across the screen. To add text to the video preview screen, click on the area of the screen where you want the text to appear and use the keyboard to type the desired text.



Screenshot

When using the preview screen, a screenshot can be captured and exported into another program. To export a screenshot, click on the  button - this will save a copy of the frame to the internal memory. To export the screenshot into another program, click on the paste function or press the Ctrl button + the 'V' button.

Display Rate

The video frame rate can be limited to 30fps. To set the display rate to 30fps click on the  button.

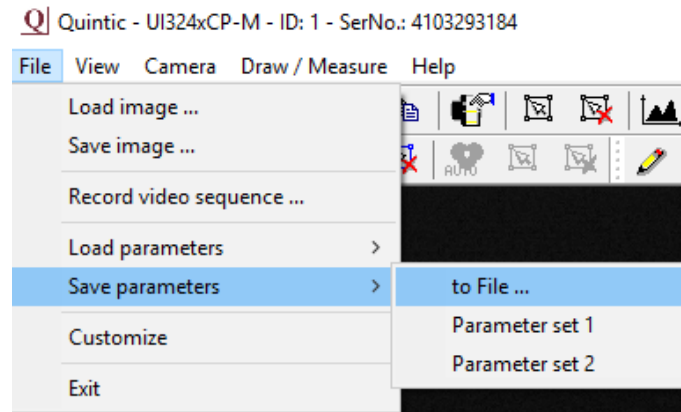
Standby / close camera

To close or set the camera on to standby mode click on the  button.

g. Saving Camera Parameters

Once you have the correct area of interest, frame rate and other parameters setup for that specific camera, the parameters need to be saved.

This can be done by going to 'File' then 'Save Parameters' then 'to File'



This will create an *.ini cam file.

Save this file onto the desktop or in a folder on the C drive.

NB: Cannot save directly to 'Program Files (x86)'.

h. Cam Files

In order for your Camera Parameters to function correctly within Quintic software, there are certain characteristics within the Cam file (.ini file) that have to be present. These are as follows:

- Start x absolute = 0
- Start y absolute = 0
- Offset divisible by 4
- Width divisible by 8
- Colormode = 6
- Camera Memory Mode = 1

It is possible to open and amend the .ini cam files within Notepad if necessary.

To check that your cam file has the correct characteristics, please open the .ini cam file. This will open the cam file in Notepad.

Please find the characteristics mentioned above and ensure that they are correct. If not, please alter the cam file accordingly by simply editing the text.

Once altered, please press Ctrl + S to save the cam file settings. Alternatively, press 'file' then 'save'.

NB: Cannot save directly to 'Program Files (x86)'.

NB: It is not recommended to alter the Width, Height or the offset in the ini cam file. We would recommend altering this within the Single High-Speed Capture software so that the frame rate is automatically calculated and is achievable.

6. Loading Custom Cam Files for 1.3MP/4MP

As mentioned in both the 1.3MP/4MP Camera parameters section earlier on in this tutorial, the camera parameters are read from a specific location for the 1.3MP/4MP Camera capture.

This is as follows:

1.3MP Cameras

Local Disk (C:) > Program Files (x86) > Quintic > Camera > 1.3MP HS Capture.

4MP Cameras

Local Disk (C:) > Program Files (x86) > Quintic > Camera > 4MP HS Capture.

The user is also able to use their own custom cam files. For more information on how to create these, please see above 'Camera Set-Up / Parameters'. All that would be required is the cam files to be renamed Cam1, Cam2 (and sequentially) for how many Quintic Cameras you are using at once.

Once renamed, please copy, paste these into the required location mentioned above for the Quintic Camera that you are using i.e either 1.3MP or 4MP.

It may bring up a pop-up window asking to overwrite the existing cam files in this location - please do this. It is recommended to take a copy of the original cam files in this location before so they are not lost.

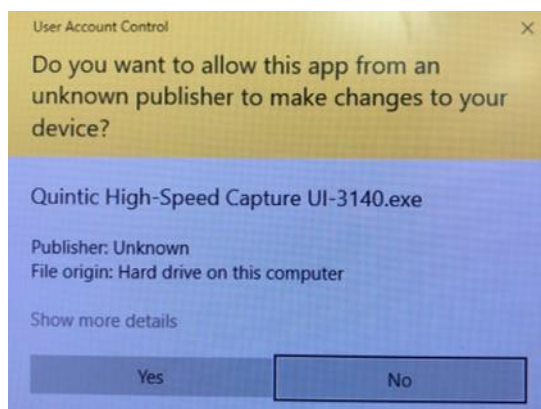
Please note: All cameras you are hoping to use together need to have the same frame speed, along with the above characteristics within each .ini cam file (Cam1.ini / Cam2.ini / Cam3.ini / Cam4.ini / Cam5.ini / Cam6.ini) in order for the 1.3MP/4MP capture software to pick up the cameras.

7. Quintic USB3 1.3MP/4MP High Speed Camera Capture

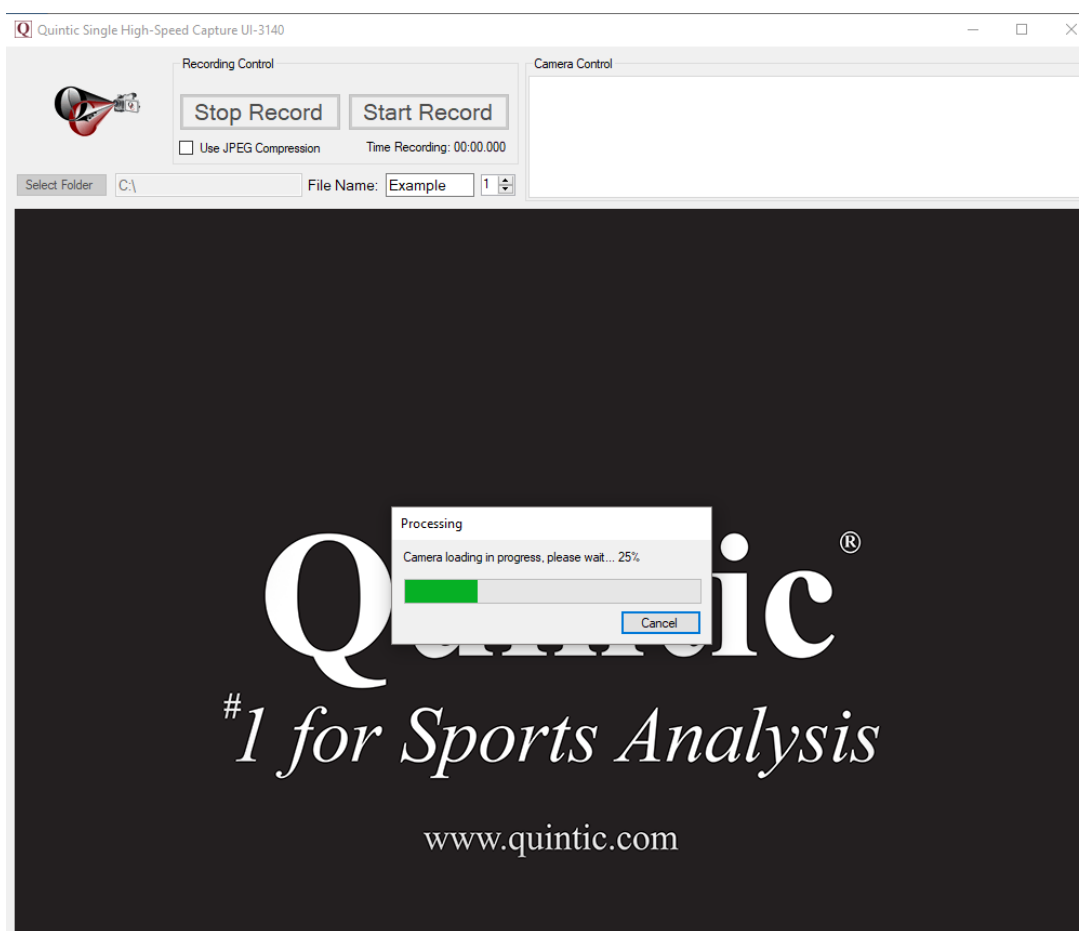
Open Quintic and select the “Camera” tab. Then click the relevant camera capture program for the camera(s) you are using. This will be either:

- ‘High Speed Capture’ then ‘1.3 MP’
- ‘High Speed Capture’ then ‘4 MP’

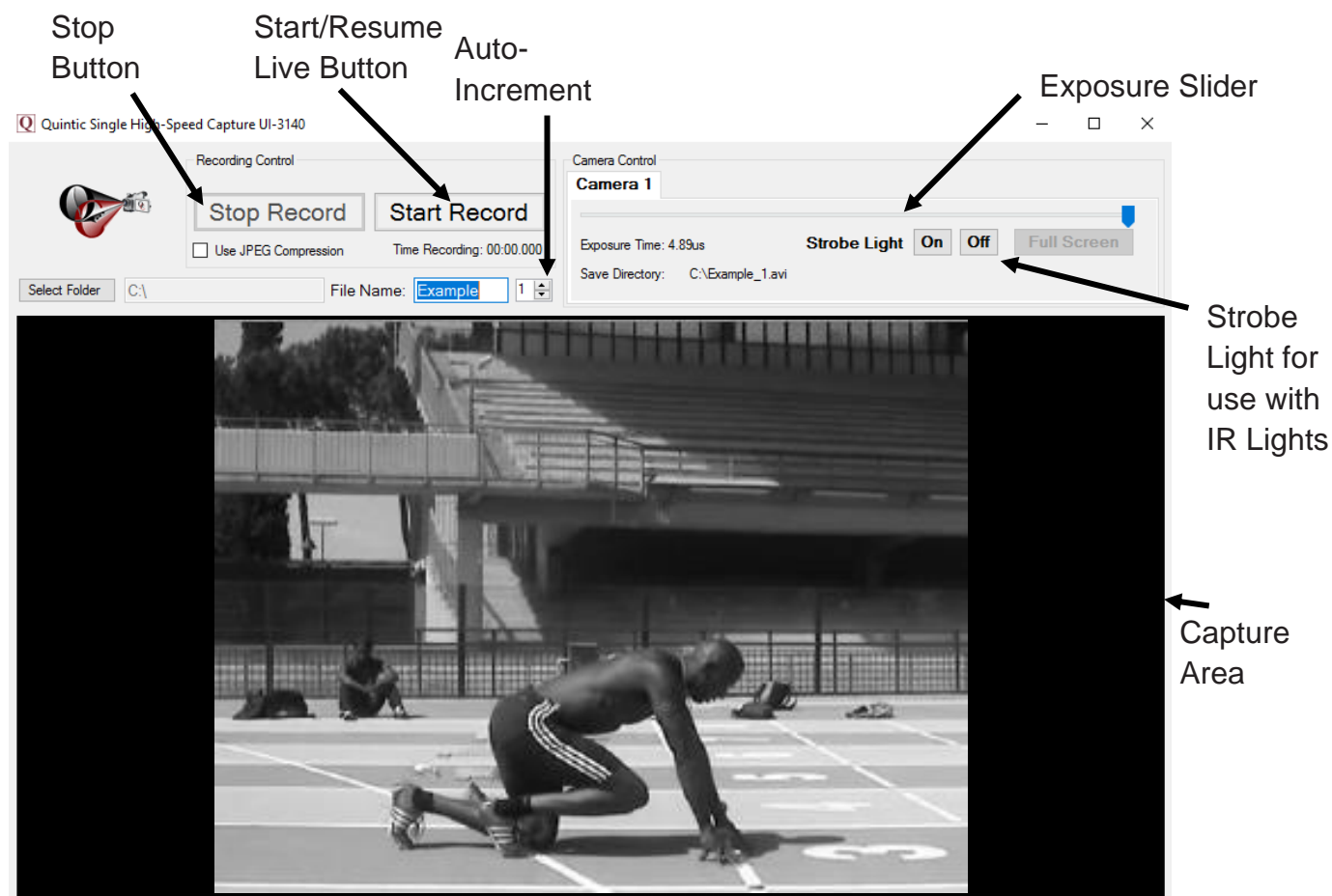
Once pressed a Windows message window may appear as follows. Please click Yes.



This will then open the live capture window. The camera will now load and read the camera parameters which are in the default location.



Once the camera is loaded, the live video feed will then be displayed:



Select the folder where you wish to save the video file. Then enter a valid name into the “File Name” box.

NB: do not use commonly unaccepted symbols such as ‘&’ or ‘/’ as this may result in the file not saving correctly.

The exposure slider is set relative to frame rate when creating the camera parameters file. However, if you wish to alter the exposure manually, slide the slider to a relevant setting for the activity you wish to record.

When you are ready to record, click the “Start Record” button. Then click the “Stop Record” button when you wish to end the recording. When using a 1.3MP camera, the video length limit is 15 seconds, whilst the limit for the 4MP is 10 seconds.

Once you have clicked “Stop Record” a progress bar will appear in front of the window. This progress bar represents the time the computer uses to write the video file to the Hard Disk/SSD from RAM, where it was written during capture.

At the same time, the “Start Record” button changes into a “Resume Live” button. Selecting this button will again display a live image in the capture area. The camera is now ready to record again.

Every time a video is saved, the Auto-Increment will increase by 1.

8. Infrared LED Right Light Set-up

Once the Infrared LED Right Light has been set up there is a process to follow so that the Infrared LED Ring Light is synchronised with High-Speed camera capture. If you are unsure on how to set-up the Infrared LED Light Ring please follow the instructions which are available at: <http://www.quinticsports.com/ir-led-ringlight/>



Open IDS Track Manager, then click on the camera that you want to set up the Infrared LED Ring Light with from the camera list.

IDS Camera Manager - 64-Bit

Camera list

Free	Avail.	Type	Cam.ID	Dev.ID	Model	SerNo.
Yes	Yes	USB	100	1	UI-314xCP-M	4103129648

Control center

☒ Expert mode ☒ Automatic parameter refresh

General information Camera information

Create support file ETH network service

Additional functions Automatic ETH configuration

Upload starter firmware Manual ETH configuration

IDS

English

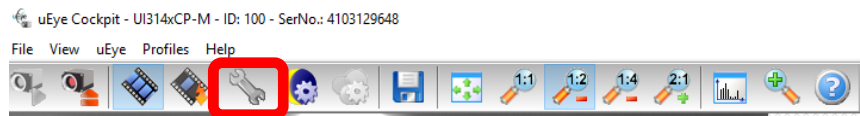
Close

Parameters

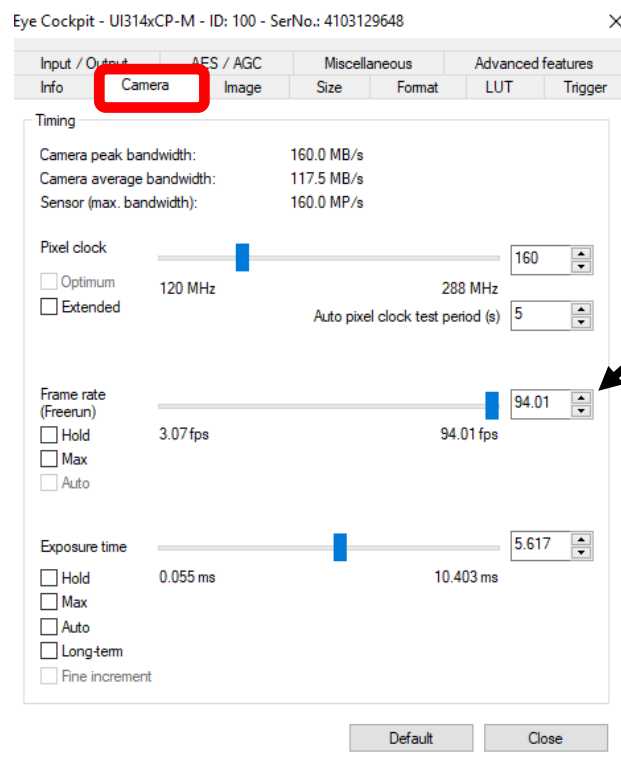
Parameter	Value
Device	
Sensor ID	542
Camera temperature	39.6° C (103.3° F)
Starter firmware version	2.06.04.00
Runtime firmware version	2.38.191.00
COM port number	100
USB	
Data transfer	Super speed (USB 3.0)
Local driver	
USB version	4.80.10.00

Status of device Nr. 1: The camera is configured correctly and can be opened.

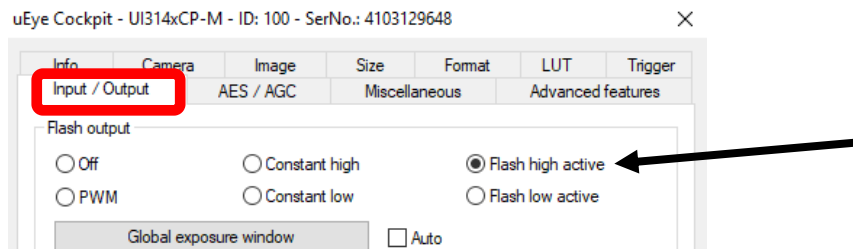
This will then open the camera window showing the live feed from the High-Speed Camera, please then click on Camera Settings



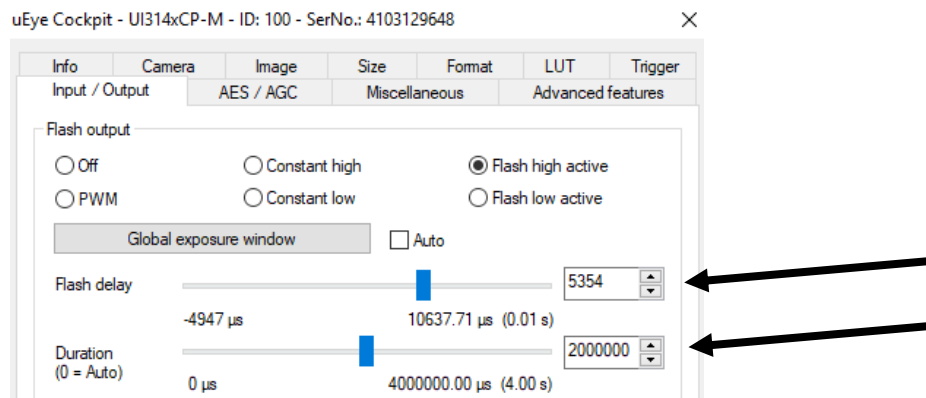
It is now recommended to change the frame rate to what is required for your specific data collection, so that this does not need to be changed whilst setting up the Infrared LED Ring Light.



Once the frame rate has been set, click on the 'Input / Output' tab, then under the Flash output section change the default setting from 'Off' to 'Flash high active.'

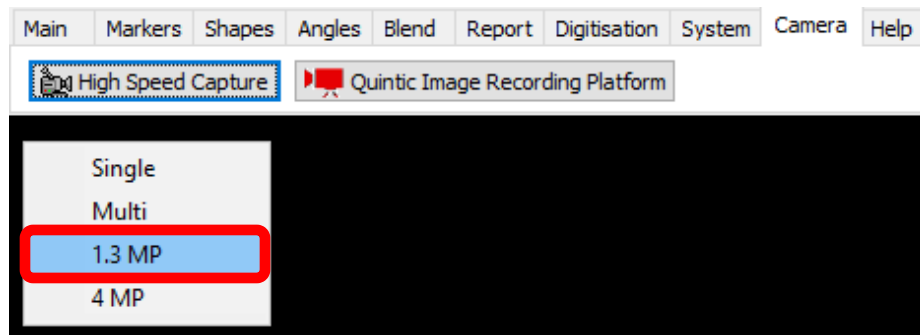


This may make the live camera feed start flashing - this is completely normal. This is then changed by the 'Flash delay' and the 'Duration' sliders. It is recommended that the 'Duration' slider is in the middle. The 'Flash delay' is then dependent on the user's own High-Speed camera set up. This should be raised or lowered until the flickering in the Live Camera feed stops and the markers are visible and constantly in picture.

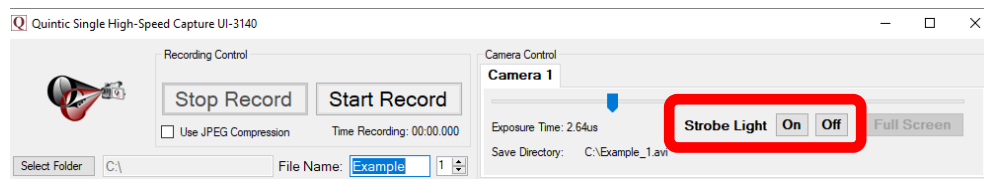


It is now recommended that a cam file is now created to ensure that the Camera and Infrared LED ring light settings are not lost. This process is explained above in the tutorial in section 5.

Now within the Quintic software, click on the 'Camera' tab and then the 'High-Speed 1.3 MP' button.



This will then open the live feed in the 1.3MP Camera Capture software, which also has the option to make the markers visible or non-visible by switching the Strobe Light either 'On' or 'Off'.



Below highlights the use of switching the 'Strobe Light' function to either 'On' or 'Off' as the picture on the left is with the Strobe light set to off, whereas the picture on the right is with the Strobe light set to on.

