

Quintic Software

Tutorial 7b

High-Speed Camera Set-up

(Video Capture via GigE or USB)

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1. USB Camera Installation & Set-up



Image for illustrative purposes only

Compatible with Quintic Sports, Coaching & Biomechanics software.

Camera comes with tripod mount and USB cable. No external power supply required.

Quintic USB2 Camera:

- Optional frame rate between 80 and 250 fps (with varying image dimensions)
- Housing Size: 60 x 49 x 34 (L x W x H in mm)
- Weight 125gms

Quintic USB3 1 MPixel Camera:

- Optional frame rate between 60 and 300 fps (with varying image dimensions)
 - 60 fps avi video capture (1280 x 1024 image size dimensions)
 - 100 fps avi video capture (1280 x 600 image size dimensions)
 - 200 fps avi video capture (1280 x 288 image size dimensions)
 - 300 fps avi video capture (1280 x 182 image size dimensions)
- Housing Size: 50 x 35 x 35 (L x W x H in mm)
- Weight 60gms

a. System Type 32 or 64 Bit

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

Highlight the 'Computer' or 'My Computer' option, right click and select 'Properties' this will open the computer system window.

The system type will be illustrated within this window,

If your system is 32bit please use the 32bit Quintic High-Speed Camera Installation.

If your system is 64bit please use the 64bit Quintic High-Speed Camera Installation.

If the wrong installation is used the camera may not work.

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

b. Quintic USB High Speed Camera Set-up Instructions

1. Insert USB Flash Drive into your computer: At this stage do not connect the camera via the USB2 port.
2. Go to My Computer > Open USB Flash Drive > Double click on QuinticHighSpeedCaptureSetup.exe on the Flash Drive to install the program. (Please note; if you are using Quintic Ball Roll Software please ignore this stage)
3. Go to My Computer > Open Flash Drive > Double click on the relevant Quintic High-Speed camera driver install

32bit_Quintic_Highspeed_Camera_Driver_Install.exe

64bit_Quintic_Highspeed_Camera_Driver_Install.exe

4. The uEye install shield will now launch, please select your setup language.
5. Select 'Install Driver' and select option 1 'Complete' to install the correct driver and then select 'Next'.
6. The software will now install at the default location C:\Program Files\IDS\uEye. If you wish to install the program in a different location click on the 'Change' button, to continue the installation click 'Next'.
7. To begin the installation click on the 'Install' option.
8. Once the installation has completed, deselect HTML option as this is not needed, then click on 'Next'.

Once the set-up has been completed click on the 'Finish' button. The Camera can now be connected to the computer.

Connect the USB Camera with the supplied USB cable into a USB port on your computer. If you are using a USB3 camera please ensure you are connecting to a USB3 port. 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.

Alternatively, you can search the USB Flash Drive supplied for the necessary USB driver for your Windows Operating System (XP, Vista or Seven). ALWAYS use this updated USB 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 via your Quintic software.

To view detailed instructions on using the camera within Quintic Sports, Coaching and Biomechanics please see the Quintic Tutorial Download page <http://www.quintic.com/downloads/index>

c. USB configuration / Maximum Speed (fps)

If when running the Quintic High Speed USB camera, record speeds of over 200fps are not being achieved, it may be due to the computers processor not running at full speed.

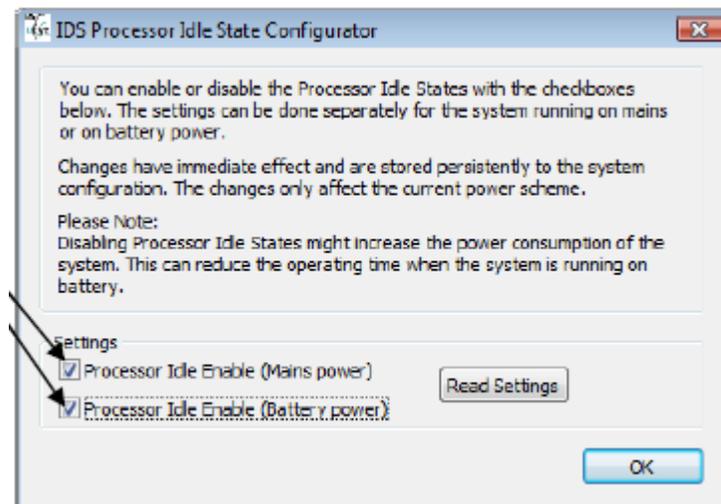
Computers are now being fitted with new power saving or 'Green' Modes, so the processor only works at the rate it requires to try and optimise performance. To achieve the highest video recording speeds possible the processor has to be running at full speed. The computers processor can be forced to run at full speed by using the 'IDSProIdleConfig' program.

To ensure that the camera runs at 200fps + when the Quintic system is used, please follow these instructions.

Connect the camera to the computer and then double click on IDSProIdleConfig (see below) icon which can be found on your desktop or on the Installation Flash Drive (if on Flash Drive please copy the program to your desktop).



This will open the window below. Un-tick the two check boxes, this forces the processor to work at full power.



Once the tick boxes have been unchecked, close the window and load up your Quintic Software. Open the live camera feed, you should now be able to record at higher frame rates.

Once you have finished using your Quintic Software, click on the IDSProIdleConfig icon again and recheck the tick boxes, to return your processor to its normal running state.

N.B. Using the IDSProIdleConfig to force the processor to run at full speed does cause the battery life to decrease. It is advisable that when running this program and the camera that the laptop or computer is plugged into mains power.



2. GigE Camera Installation & Set-up



Image for illustrative purposes only

Compatible with Quintic Sports, Coaching & Biomechanics software.

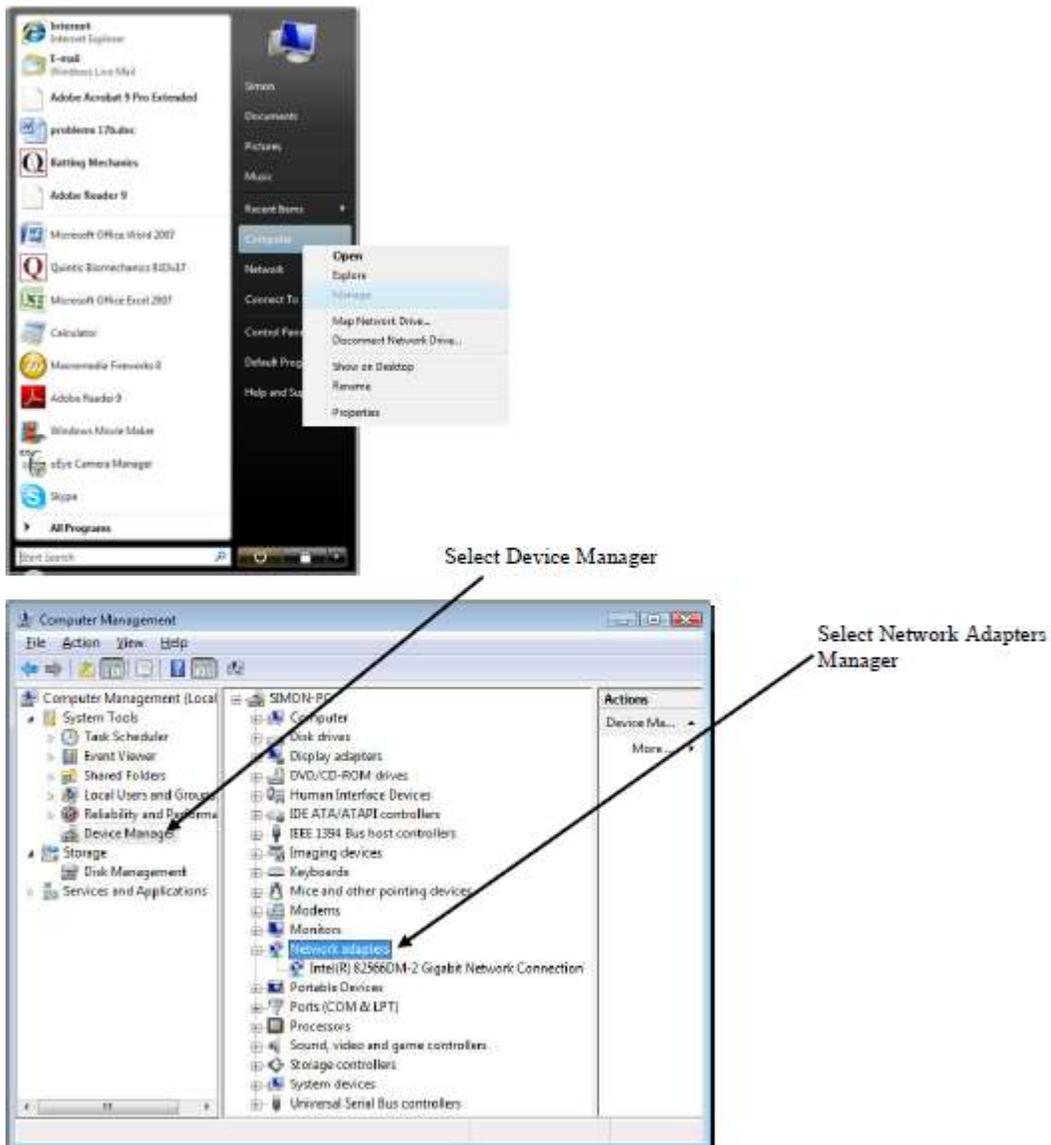
Quintic GigE Camera:

- Optional frame rate between 80 and 250 fps (with varying image dimensions)
 - 100 fps avi video capture (752 x 480 image size dimensions)
 - 150 fps avi video capture (560 x 400 image size dimensions)
 - 200 fps avi video capture (460 x 286 image size dimensions)
 - 250 fps avi video capture (352 x 220 image size dimensions)
- Video output via GigE - 5m length supplied
- External 12v power supply and transformer supplied
- Tripod mount supplied
- Housing Size: 42.70 x 41 x 53 (L x W x H in mm)
- Weight 168gms

a. Hardware Compatibility for GigE High-Speed Camera

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

Highlight the 'Computer' or 'My Computer' option, right click and select Manage' this will open the computer management window.



Once you've clicked on network adapters a list of all the network adapters installed on your machine will be shown. To ensure that the GigE camera works at full speed the network adapter must be 100mb or state Gigabit Network connection.

b. System Type 32 or 64 Bit

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

Highlight the 'Computer' or 'My Computer' option, right click and select 'Properties' this will open the computer system window.

The system type will be illustrated within this window,

If your system is 32bit please use the 32bit Quintic High-Speed Camera Installation.
If your system is 64bit please use the 64bit Quintic High-Speed Camera Installation.

If the wrong installation is used the camera may not work.

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

c. Quintic Single GigE High Speed Camera Set-up Instructions

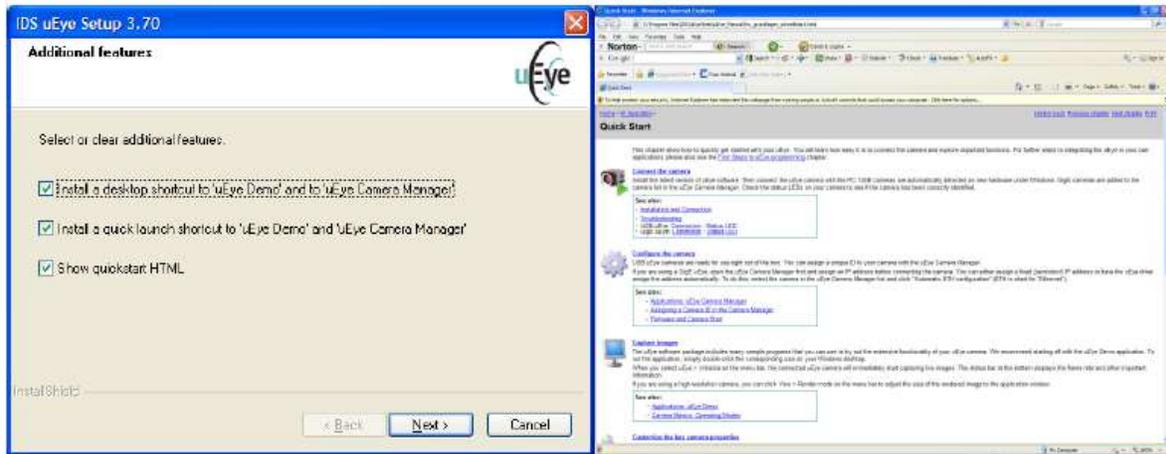
1. Insert USB Flash Drive into your computer: At this stage do not connect the camera.
2. Go to My Computer > Open USB Flash Drive > Double click on QuinticHighSpeedCaptureSetup.exe on the USB Flash Drive to install the program. (Please note; if you are using Quintic Ball Roll Software please ignore this stage)
3. Go to My Computer > Open USB Flash Drive > Double click on the relevant Quintic High-Speed camera driver install

32bit_Quintic_Highspeed_Camera_Driver_Install.exe

64bit_Quintic_Highspeed_Camera_Driver_Install.exe

4. The uEye install shield will now launch, please select your setup language.
5. Select 'Install Driver' and select option 1 'Complete' to install the correct driver and then select 'Next'.
6. The software will now install at the default location C:\Program Files\IDS\uEye. If you wish to install the program in a different location click on the 'Change' button, to continue the installation click 'Next'.
7. To begin the installation click on the 'Install' option. A warning box will now also appear stating that all network connections will be disconnected for a moment during the installation. A progress bar will then indicate the installation process.
8. Dependent on you Operating System you may get a message stating hardware compatibility, all of the uEye software is compatible with Windows XP, Vista, Seven and Eight. Please click on the 'Continue Anyway' option.

Installation has now completed and the following screen will be shown, please install either the desktop or quick launch shortcuts for the uEye demo and Camera manager, these are needed for the next steps of installation. Deselect the Quick Start HTML option.



Once the set-up has been completed click on the 'Finish' button. The Camera can now be connected to the computer.

After the software/hardware installation has completed the Quintic GigE camera needs to be configured. Please connect the camera to the computer via the Ethernet port and plug the camera into the mains power.

3. Single GigE High-Speed Camera Configuration

To start the configuration click on the camera manager icon via the desktop or quick start menu. This will launch the ETH network service window.



The ETH network window will now load, this window shows all of the available networks on your computer.

The screenshot shows the 'IDS Camera Manager - M-EH' window. At the top, there is a table with columns: 'Proc', 'Avail', 'Type', 'Cam-ID', 'Dev-ID', 'Model', and 'Serial'. The first row is highlighted in yellow and contains the following data: '1', 'Yes', 'No', 'ETH', '1', '1091', 'UE-522wRE-M', and '4902782509'. Below the table, there are several buttons: 'General information', 'Camera support file', 'Additional functions', 'Close uEye network service', and 'ETH network service'. The 'ETH network service' button is highlighted with a black arrow. At the bottom, there is an 'IDS' logo and a 'Done' button.

Highlight the GigE camera you wish to change.

Once you have selected the camera you wish to use Click on 'ETH Network Service'.

Quintic advise that the uEye network service is disabled on all the networks APART from the one you wish to use the camera on. The screen shot below shows a laptop with a Bluetooth connection, a wireless connection, an internal PCI-E Ethernet port and express card Ethernet port. For this example the Quintic GigE High-Speed camera will be configured with the express card port (Highlighted on illustration). All other network ports should be disabled, if other networks ports are not disabled this can effect internet connectivity!

To disable a network select the desired network and select 'Disable uEye network service'

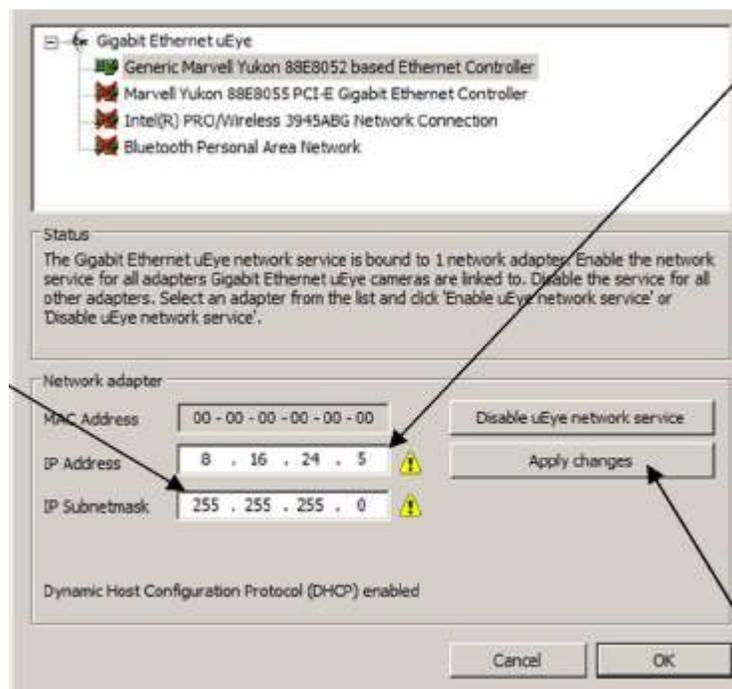
Once the network has been disabled it will be identified by a red cross, if the network is still available the symbol will remain green.

Once a network has been selected an IP address and IP Subnetmask need to be allocated. Quintic recommends that the following IP address is used, 8. 16. 24. followed by a random number of the users choice.

Insert the IP address into the boxes as illustrated; the last number is up to the user. N.B. DO NOT LEAVE BLANK!!

The random number used for this example was '5' so the full IP address is 8.16.24.5.

An IP Subnetmask must now also be allocated, Quintic recommends using 255.255.255.0.



Once an IP address and an IP subnetmask have been allocated click on the 'Apply Changes' button. A window will now appear asking if you wish to assign a static IP address click on 'YES'.

A confirmation window will also load stating that the IP address and Subnetmask of the adapter have been changed successfully.

Now that the IP Address and IP Subnetmask have been allocated the camera now has to be configured. To configure the camera select 'Automatic ETH Configuration' and this will automatically configure the camera.

Once the ETH configuration has been completed, click on 'OK' then the following window will appear.

The Camera manager status will now show that the camera has been configured correctly and can now be used.



Click on the close button, and now open the camera via your Quintic Software.

After the ETH configuration is complete, a window may appear asking you to update the firmware this will take place automatically on opening the camera through Quintic. After the Firmware update is completed, please reopen the Camera Manager and select 'Automatic ETH configuration' again.

The camera can be opened via your Quintic software. To view detailed instructions on using the camera within Quintic Sports, Coaching and Biomechanics please see the Quintic Tutorial Download page <http://www.quintic.com/downloads/index>

4. Multi GigE High-Speed Camera Configuration

a. Configuration

To start the configuration click on the camera manager icon via the desktop or quick start menu. This will launch the ETH network service window.



Highlight the GigE camera you wish to change. Once you have selected the camera you wish to use Click on 'ETH Network Service'. The ETH network window will now load. Insert the IP address into the boxes using the process previously explained for 'Single GigE High-Speed Camera Configuration'.

For multiple (up to six) GigE cameras, please use 1 as the last digit in the IP address and change the 3rd value...

100.100.50.1
100.100.100.1
100.100.150.1
100.100.200.1
100.100.250.1
100.100.300.1

The last number is to be 1 - DO NOT LEAVE BLANK!

The third value must change - DO NOT HAVE THEM THE SAME!

An IP Subnetmask must now also be allocated, Quintic recommends to use

255 . 255 . 255 . 0

Once an IP address and an IP subnetmask have been allocated click on the 'Apply Changes' button. A window will now appear asking if you wish to assign a static IP address click on '**YES**'

A confirmation window will also load stating that the IP address and Subnetmask of the adapter have been changed successfully.

Now that the IP Address and IP Subnetmask have been allocated the camera now has to be configured. To configure the camera select 'Automatic ETH Configuration' this will automatically configure the camera.

The status the camera can be seen in the status box at the bottom of the uEye Camera Manager window. Once the status box illustrates that the camera is configured correctly the camera can be opened via Quintic.

Once the ETH configuration has been completed, click on 'OK'. The Camera manager status will now show that the camera has been configured correctly and can now be used.

You need to repeat the process for Cameras 2, 3, 4, 5 & 6. Remember, for multi cameras, please use 1 as the last digit in the IP address and change the 3rd value for each camera.

100 . 100 . 50 . 1
100 . 100 . 100 . 1
100 . 100 . 150 . 1
100 . 100 . 200 . 1
100 . 100 . 250 . 1
100 . 100 . 300 . 1

N.B. THE THIRD VALUE MUST CHANGE: DO NOT HAVE THEM THE SAME!!

Please Note: You also need to assign the Camera ID and Device number: This can be changed manually by using the Camera Information button. In order for the Quintic Multi capture to work, the cameras must be in ID order 1, 2, 3, 4, 5 & 6. It must start with Camera ID 1!

After the ETH configuration is complete, a window may appear asking you to update the firmware. This will take place automatically on opening the camera through Quintic.

Click on the close button, and now open the camera via the High-Speed camera tab within the Quintic Software.

After the Firmware update is completed, please reopen the Camera Manager and select 'Automatic ETH configuration again.

You can now open six cameras in Quintic Multi Camera Capture.

b. Setting Camera Parameters

Once you have the six cameras working, it is then a case of setting up the field of view for each camera one at a time. Please refer to 'Tutorial 7c - High-Speed Video Capture' for details on how to alter frame rate and area of interest within Quintic Single Camera Capture.

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

This will create an *.ini file.

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

NB: Cannot save directly to 'Programme Files'.

It is possible to use the default settings for all cameras contained on your Quintic USB Flash Drive or they can be downloaded from

<http://www.quintic.com/downloads/QuinticHSCamera.htm>

Please note: All six cameras need to have the same frame speed, along with the following characteristics within each .ini file (Cam1.ini / Cam2.ini / Cam3.ini / Cam4.ini / Cam5.ini / Cam6.ini) in order for the multi camera capture software to pick up the cameras.

Start x absolute = 0

Start y absolute = 0

Offset divisible by 4

Width divisible by 8

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

NB: Cannot save directly to 'Programme Files'.

See an example Cam1.ini file below.

[Versions]

ueye_api.dll=3.82.0010
ueye_eth.sys=3.82.0007

[Sensor]

Sensor=UI522xRE-M

[Image size]

Start X=0

Start Y=0

Start X absolute=0

Start Y absolute=0

Width=496

Height=480

Binning=0

Subsampling=0

[Scaler]

Mode=0

Factor=0.000000

[Multi AOI]

Enabled=0

Mode=0

x1=0

x2=0

x3=0

x4=0

y1=0

y2=0

y3=0

y4=0

[Shutter]

Mode=0

Linescan number=0

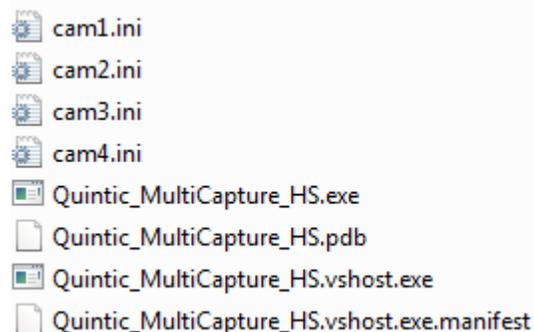
[Timing]

Pixelclock=46

Framerate=125.002717

Exposure=2.343848

In order for the Quintic Multi Capture Software to read from these files, copy all .ini files you have created, along with the following files, into C: Program Files: Quintic: Biomechanics v29 (or earlier version number).



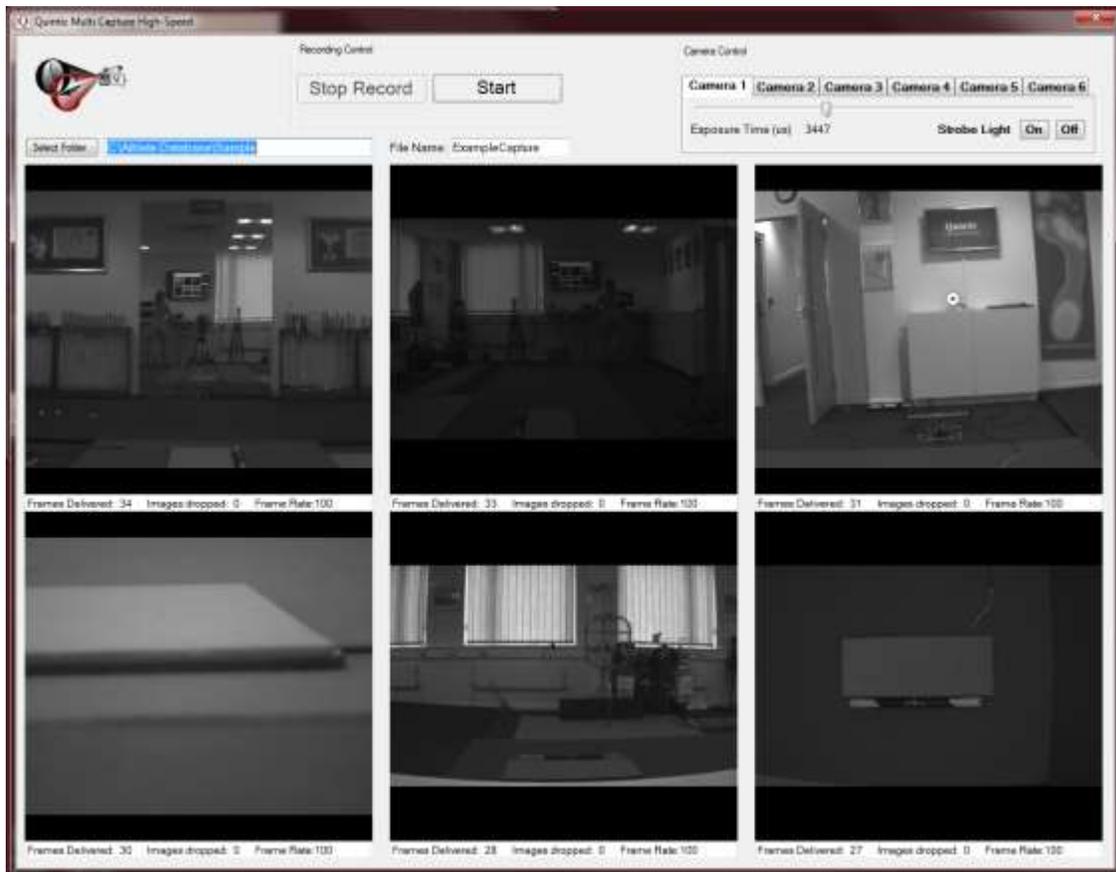
Note: Please ensure you have copied the 32bit or 64bit versions depending on your computer.

Finally, you are ready to open the software and start capturing via Quintic Coaching (up to 2 cameras) or Quintic Biomechanics (up to 6 cameras).

Open the Quintic software, then the Camera tab, followed by Multi High-Speed Capture.

Depending on the number of cameras present, you will see that number in the screen below.

If however, you have a blank screen, you will need to ensure you have followed the installation and set-up process correctly. Please check Camera ID numbers within the IDS Camera Manager software first.



Select the destination folder you wish to save the video files, enter a file name, and start recording.... It is possible to pause and continue, or stop recording. The maximum recording time for one file is 5 minutes.

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

It is possible to change the Camera exposure time using the slider bar should you require.

Once recorded, please return to the Quintic Coaching or Biomechanics main tab and click on file - open to view your recorded images.

Using v21/v26/v29, if you open *Cam1.avi you will have the option to open all the camera views, and they will automatically be synchronised.



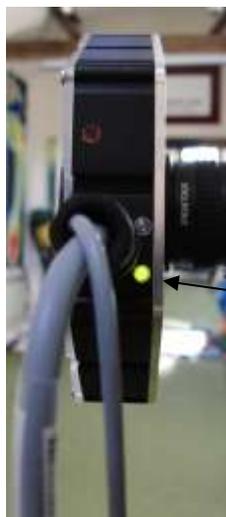
5. Infrared (IR) LED Ring Light Set-up

Infrared (IR) light is a form of electromagnetic radiation which sits outside of the wavelength of that of visible light, and thus cannot be detected by the human eye.

IR is responsible for most of thermal radiation, and is emitted and absorbed by molecules. It is used in many different applications such as industrial, scientific and medical, as well as in night vision equipment where it is important that the observer is not detected. We have utilized the properties of IR light, thus ensuring that the reflective markers are still visible to the camera even though to the naked eye there is no light emitted. This we feel is very important when working in close proximity to the cameras (i.e. athletes are not blinded by spotlights).

The following information will guide you through how to set up and configure your IR LED light to work with Quintic.

Connect the IR LED light and the Quintic High-Speed camera via the power supply provided. Connect the camera to your computer as normal, and open up the Quintic software.

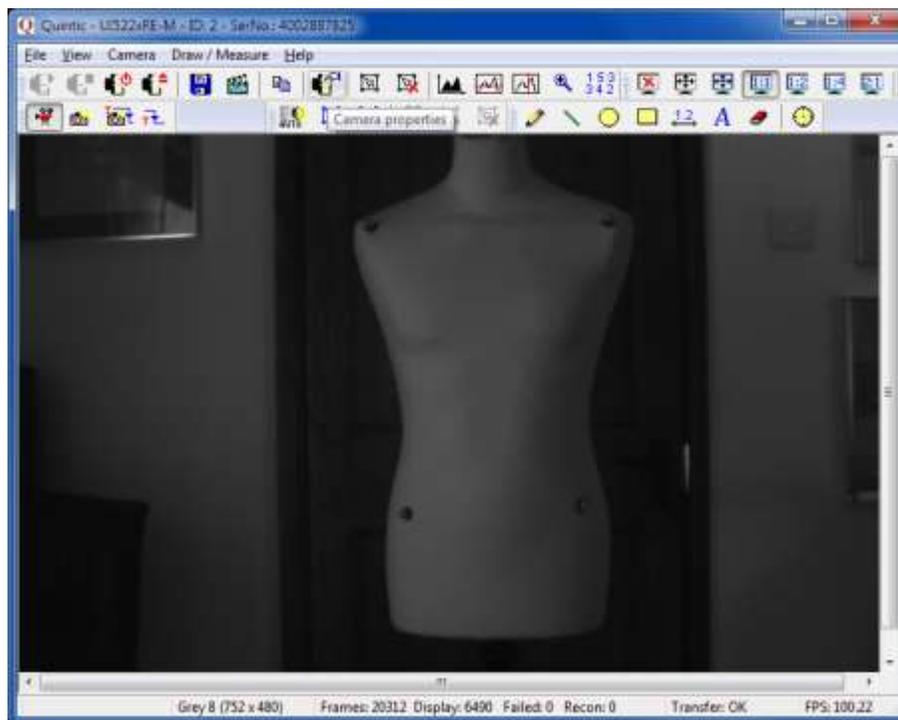


Check the lights on the back of the high-speed camera are flashing to ensure it is connected and powered properly.

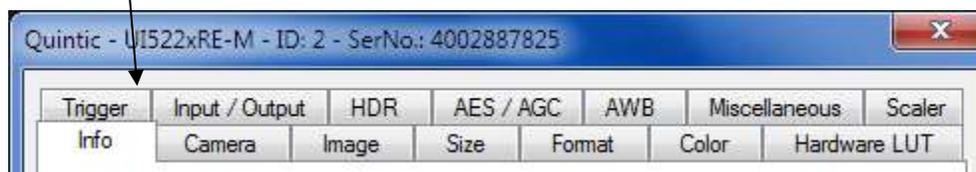
Additionally, check there is a green light illuminated on the side of the LED.



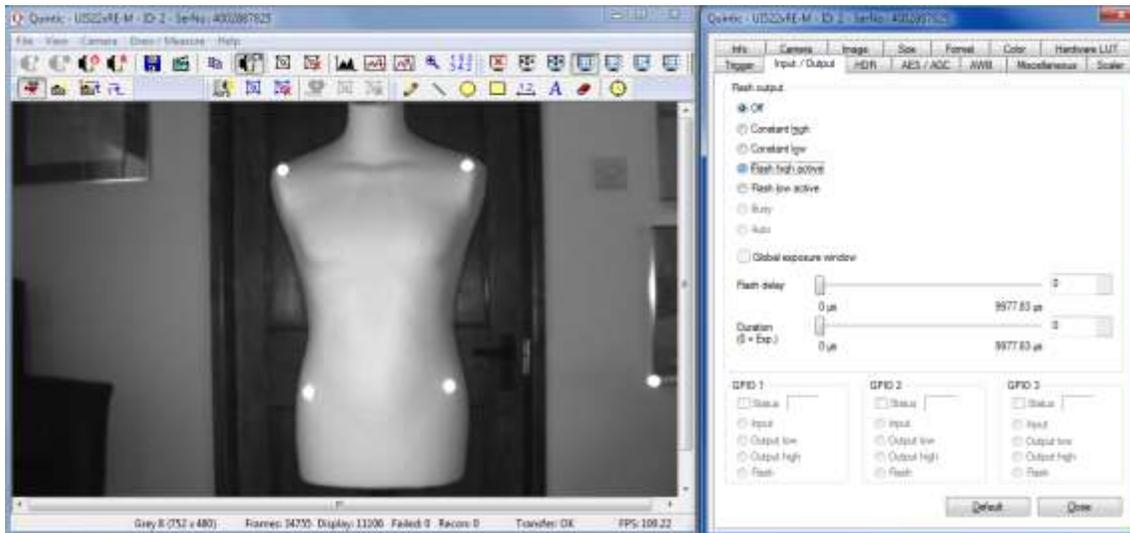
1. Open up the **'Single High-Speed Capture'** window under the **'Camera'** tab as normal.
2. Click on the **'Camera Properties'** button 



3. Click the **'Input/Output'** tab on the camera window that appears.



4. The following screen will appear. This is where the LED light is controlled.



5. Click on the setting '**Flash High Active**'. You will notice (as shown in the screenshot above) that the image will flash once. This confirms that the LED light is now turned on.

6. You then need to adjust the '**Flash Delay**' slider. You will notice that the markers will start to flicker, and the further you move the slider to the right, the more frequent the flashes. In order for the markers to reflect continuously, you must keep moving the slider right until the markers no longer flash.

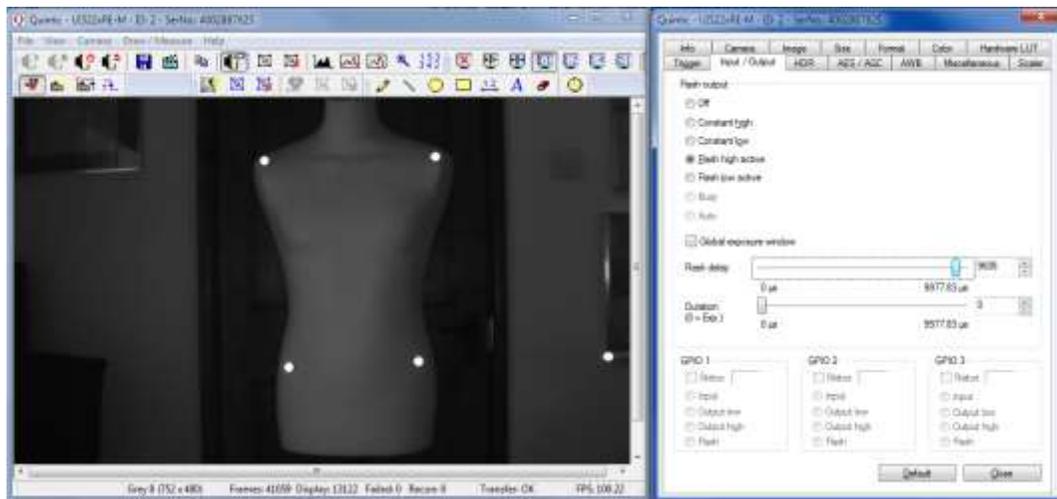
7. Once the flash delay slider is set so as the markers are no longer flashing, click '**Close**'.

8. You can now record as normal, and the markers should be clearly visible.

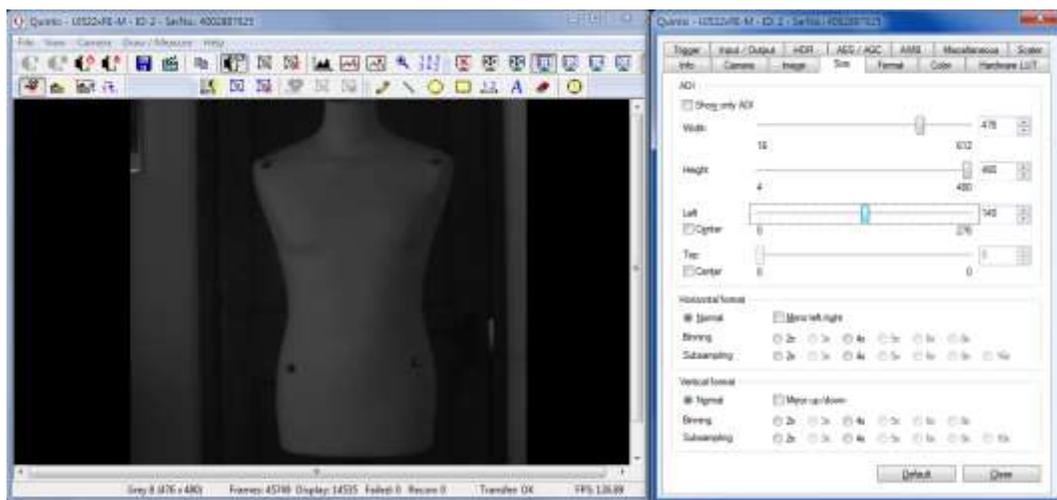
N.B. The Flash Delay value you set the LED to keep the markers constantly illuminated depends upon the frame speed the camera is set to. You need to marry up the frame speed of the camera to the frequency of the LED so that they are pulsing at the same time. Below are some examples of different frame speeds.

N.B. If you are using Multi Camera High- Speed capture, you will need to save the camera parameters as 'cam1', 'cam2', etc. to ensure that the LED remains on during Multi camera capture. To do this, click '**File**', '**Save camera parameters**'. Save these to the desktop first, then copy into: **C:\Program Files \ Quintic \ Biomechanics**.

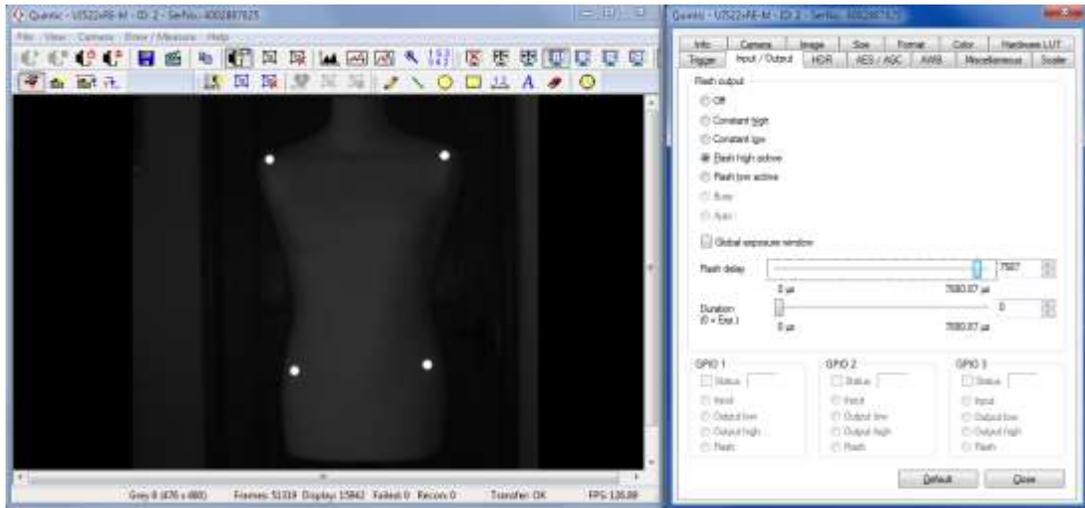
Frame Speed: 100 fps; Flash Delay: 9606 μ s



If the camera is already running at its maximum frame speed, you may need to adjust the size of the image / the area of interest in order to increase the frame speed. The window for this is shown below.



Frame Speed: ≈ 125 fps; Flash delay: $7587 \mu\text{s}$



Frame Speed: 200 fps; Flash delay: $4896 \mu\text{s}$

