Helmet Camera IP WiFi Kit
User Manual

IP Helmet Camera
Direct Picatinny Rail Mount

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Document History

Version	Date	Change Summary
v1.0	23/10/2026	Initial Release

About the User Manual

This user manual describes the operation of the HD Helmet Camera.

Initially, the user manual introduces the reader to the camera's operation.

Hardware interfacing, connecting the camera, viewing video and configuration of the camera's functions are all described in detail.

Additionally the use of a range of software tools to both view the video and manage stored recording files is also covered.

This is followed up with a description of mounting options, technical specifications and dimensions.

Warranty and Support

All Visual Engineering products are supplied as standard with a 12 month 'Return to Base' warranty.

In the event of a suspected product failure, users should contact the Visual Engineering support team on the telephone number +44 (0) 1206 211842 or please email us at:

support@visualengineering.co.uk

Should the fault persist or if the support team are unable to resolve the fault, it may be necessary to return the equipment.

Equipment should only be returned using the RMA (Returns Management Authorisation) process. Users should contact the support team on the above number and request an RMA number.

Introduction

The HD Helmet Camera is a HD IP camera which can be connected directly onto a helmet Picatinny rail mount, making it suitable for use in tactical situations.

The camera integrates directly with the Visual Engineering Body Worn Mesh Radio. When coupled with the BWM it provides a complete end to end surveillance system.

The camera has exceptional performance in low light conditions and is supplemented with built in Infrared or white light LED Illumination.

The camera supports variable frame rate and bit rate adjustments as well as video resolutions, which range from 1920x1080 down to 320x240. Integrated trigger capabilities and recording is also supported. All of these parameters can be configured via a web browser interface.

The recording option features secure micro SD card storage. Access to the stored movie files is via FTP transfer using the VE Camera Viewer software or an FTP transfer software tool.

The camera also supports control through the ONVIF protocol such that the camera can be controlled by and viewed on ONVIF compliant VMS platforms.

The outer casing is CNC machined aluminium, this rugged build together with its IP67 environmental rating produces a camera that is fit for deployment into tactical field operations.

The camera is designed to have efficient use of power, all connections including power and IP video are combined into one Fisher connector on the rear.

A button mounted on the top of the camera controls the activation state of the LED Illuminator. At initial power on the LED will switch on in low light levels determined by the integrated ambient light sensor. Following power on if the button is pressed it will disable the LED regardless of light level. Further presses of the button will cycle the LED to first switch back to auto state and then off.

Custom cable assemblies are available on request to interface with body worn radios from DTC, Silvus and TrellisWare.

Connecting the Camera

HD Helmet Cameras are shipped with a custom interface cable as per customer specification.

Once the camera is powered and has an IP connection, users can web browse to the camera to control its functions.

The web browser control of the camera's encoder allows the configuration of parameters such as resolution, bit rate, and network settings, once saved all configuration changes will be retained.

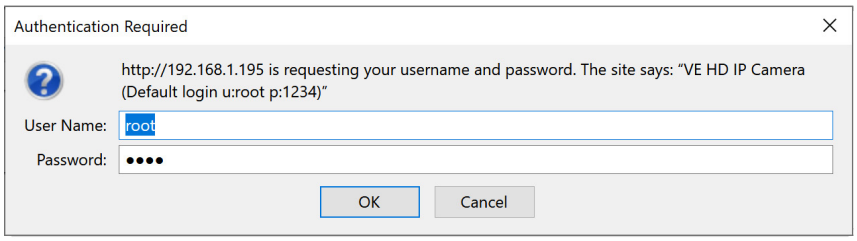
Browse to the camera's web page by typing the camera's IP address into the web browser address bar.

Camera Login

On trying to establish a connection the user will be prompted for the User Name and Password, enter the following details:

Default **User Name** is:
root

Default **Password** is:
1234



Default IP Address

HD Helmet Cameras are by default set with a fixed IP address of **192.168.1.195**

If the camera is not responding on this address it is possible that the IP address has been changed.

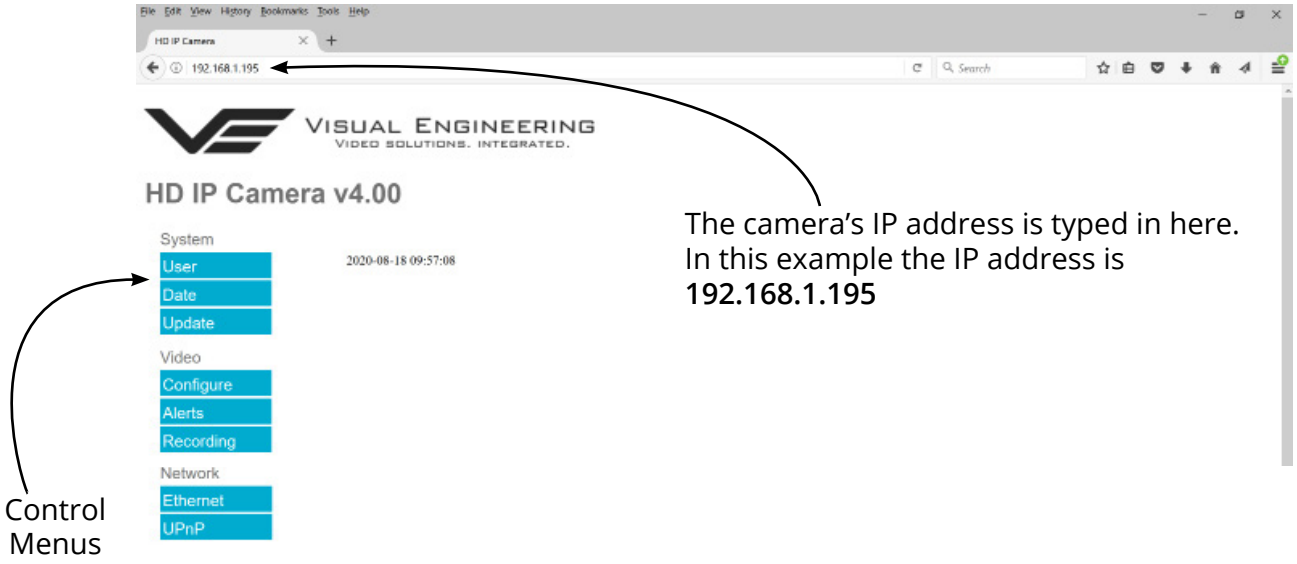
If the new IP address is unknown, the user can use the VE Camera Viewer software application to locate the IP address. This method is explained in the VE Camera Viewer section.

Web Browser Control

The primary mechanism for configuring the camera is its web browser interface.

The example screen below shows what is to be expected once a valid connection between the PC and camera has been established by typing the camera's IP address into the web browser address bar. In this example it is the default address of **192.168.1.195**

On the left side of the screen are the Control Menus which allow the user to configure various settings in the camera. The functions of these menus are described in the following sections.



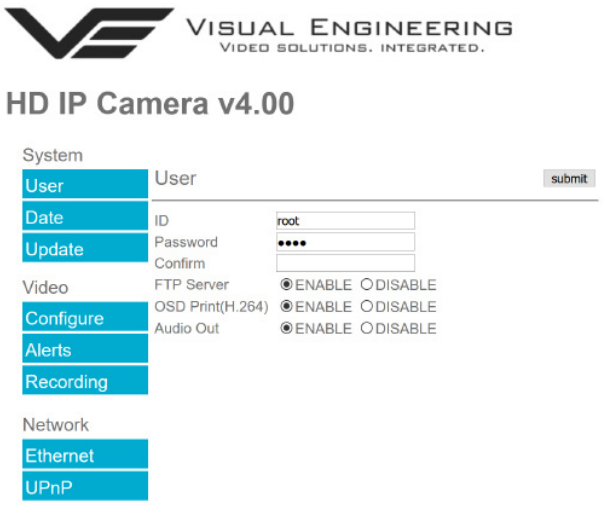
User Menu

The user menu page allows users to configure the user ID and password of the camera. It is necessary to confirm the password to change it.

There is also the option to enable/ disable the following:

- FTP Server Connection
- OSD (On Screen Display)
- Audio Out

Changes are only enabled when the **submit** button is pressed.

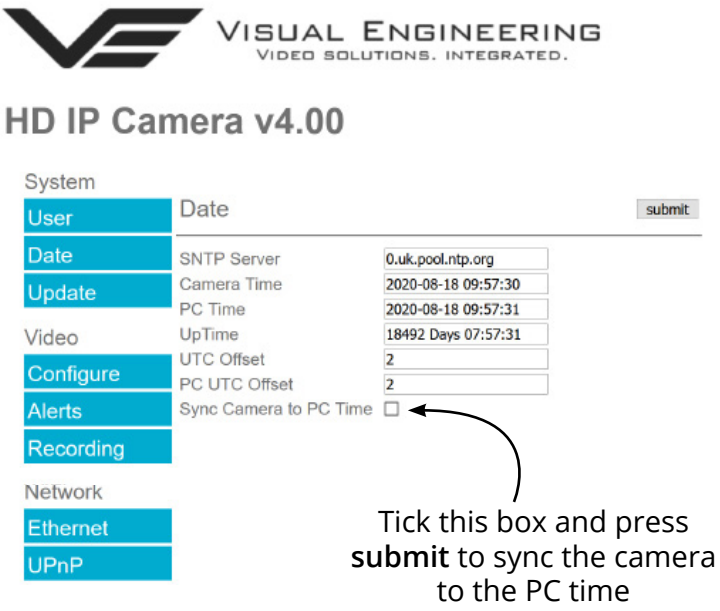


Date Menu

The date menu page allows the user to synchronise the camera time to a SNTP server. In this instance it is necessary to have the PC connected to a network.

If a network connection is not available it is possible to synchronise the camera to the PC time by ticking the "Sync Camera to PC Time" check box and pressing the **submit** button.

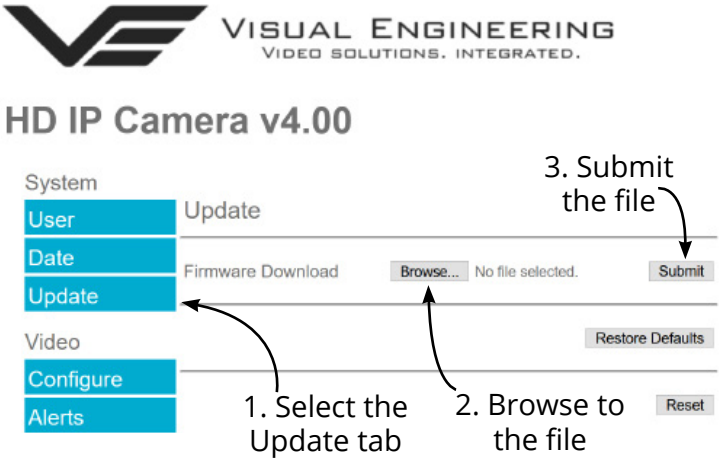
The "UTC Offset" can be altered to align the camera time with the local time zone. To align the camera to the actual PC time the "UTC Offset" should be made same as the value displayed in the "PC UTC Offset" field.



Update Menu

It is possible to update the firmware of the camera. There are three steps to updating the camera firmware, as shown on the right.

⚠ Only update the camera with files that have been approved by Visual Engineering. Use of other files will render the camera inoperable. ⚠



Following a **Submit** the camera will update the firmware and display the following text:
Programming in Progress...Do not remove power
Wait until the web page clears this text before trying to move away from the current web page or powering off the camera. Updates typically take approx 3 minutes to complete.

⚠ **Important**: To fully ensure the upgrade has finished it is advised to refresh the web page and check the banner displays **"**HD IP Camera v4.00**"** or the camera starts to once again stream video before switching off the power.
It is advised that following a firmware update that the **Restore Defaults** button is pressed, this will revert the camera back to a default start state. The IP address of the camera will **revert** to its **default IP address** of **192.168.1.195** following a power cycle.

Pressing the **Reset** button will completely re-start the camera.

Video Menu

The Video Page is where the camera's IP encoder parameters can be configured.

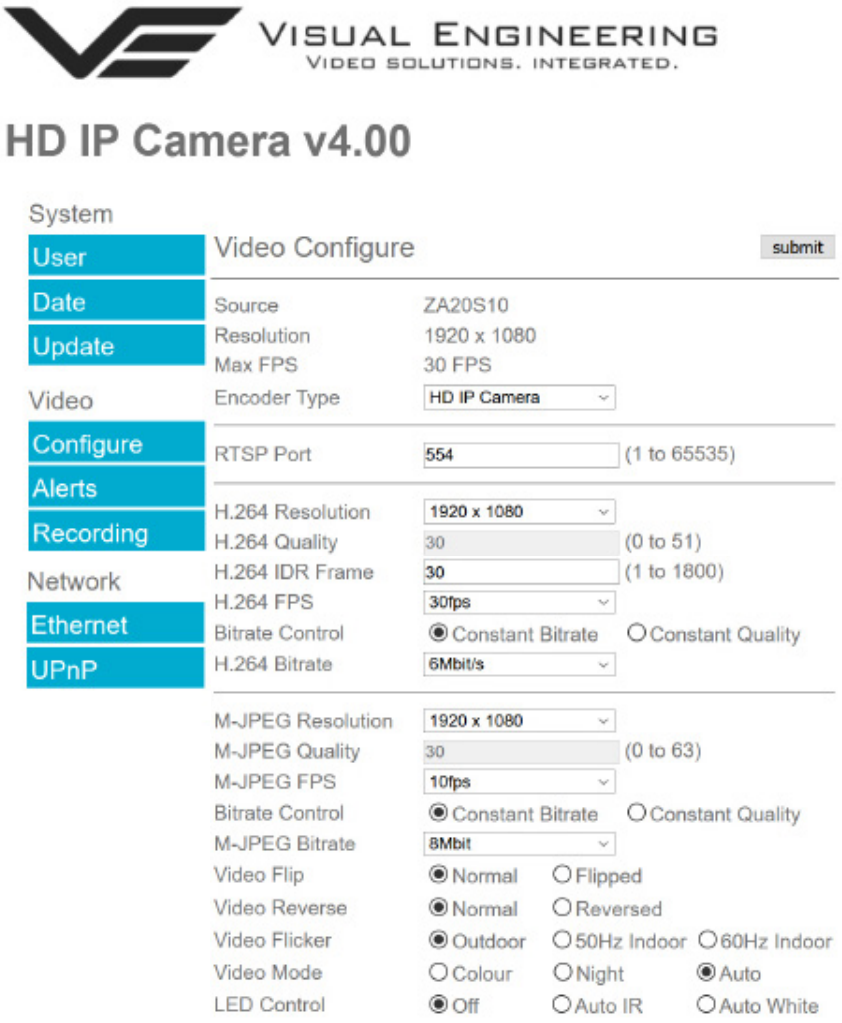
The encoder supports two encoding formats, H.264 and MJPEG. The choice of the format is initiated by the user when the video stream is started.

To initiate a H.264 stream from a camera with an IP address of 192.168.1.195 the URL is:
rtsp://192.168.1.195/h264

To initiate an MJPEG stream from a camera with an IP address of 192.168.1.195 the URL is:
rtsp://192.168.1.195/jpeg

It is possible to change the Encoder Type to any one of the following options:

- HD IP Camera
- PAL Input
- NTSC Input
- Guardian Node
- SWZ HD Camera
- LVDS Input 25Hz
- LVDS Input 29.97Hz
- SDI Input 25Hz
- SDI Input 29.97Hz



For normal operation it is not necessary to adjust the Encoder Type.

For correct camera operation it is important that the Encoder Type matches the hardware configuration. For the Helmet Camera this is always the HD IP Camera type.

The **RTSP Port** is the port number the IP video stream will be transmitted on, this has the default port number 554, which can be configured to another port number as required.

The Camera has two fundamental modes of operation:

- **Constant Bitrate**. This will output a constant bit rate IP video stream, as set in the Bit rate field.
- **Constant Quality**. In this mode the bit rate is varied in a effort to maintain a constant quality. The target quality is set using a number between 0 to 51, the lower the number the higher the quality, this is set in the quality field. Amendments to this value are only allowed when the constant quality mode is enabled. In this mode the 'ceiling' bit rate is controlled by the value set in the Bitrate field, the encoder will attempt to limit the maximum bit rate to this value.

H.264 Resolution
The maximum resolution is 1920x1080, users can select lower resolutions if there is restricted bandwidth available.

H.264 FPS (frames Per Second)
The maximum frame rate is 30fps, users may choose to select lower frame rates, thereby reducing the bandwidth required.

H.264 IDR Frame changes to the I frame interval balances the stream's quality against latency, the lower the number the lower the latency. Lower latency however can incur picture degradation due to the effect of limiting the decoder buffer.

Video Flip can be useful when the camera is installed upside down.

Video Reverse can be useful when viewing the image via a mirror.

Video Flicker can be adjusted to suit the local mains frequency when the camera is used under artificial lighting conditions.

Night Video Mode will increase the sensitivity of the camera under low light conditions.

LED Control Select either Off or Auto mode for the LED type, the LED type will become active as determined by the ambient light level.

Users should press the **submit** button to enable any changes.

Video Frame Preview

It is possible to view a single still image from the camera via a web browser using the following URL format:

http://192.168.1.195/still.jpg

The above URL is applicable when the camera is set to its default IP address.

Example Settings

The bit rate of the IP stream can be adjusted to suit the system bandwidth available. Changes to the resolution and frame rate will adjust the stream's bit rate. The following table shows example bit rates for particular resolution and frame rate values.

Bit rate Available	Resolution	Frame Rate
5-10MB/s	1920x1080	30
4-5Mb/s	1920x1080	15
3-4Mb/s	1280x720	30
2-3Mb/s	800x450	30
1-2Mb/s	800x450	15
512kb/s-1Mb/s	640x360	15
256-512kb/s	320x180	15

Alert Control

Motion and light level triggers can be configured such that an audible tone and a visual alarm alerts the viewer.

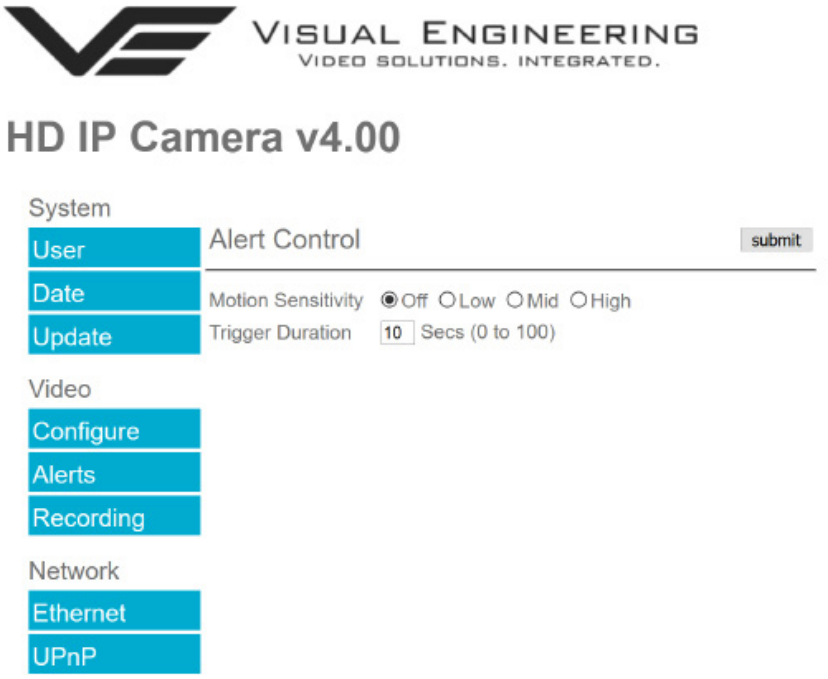
These controls can also be set using the VE Camera Viewer

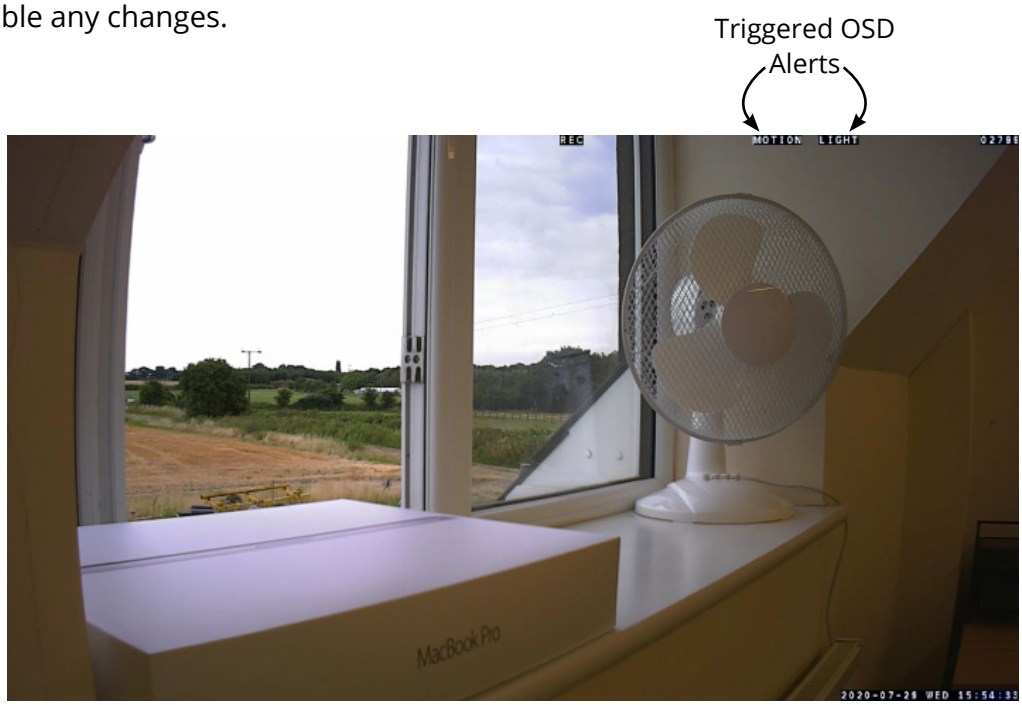
Motion and dark to light level triggers can be used to trigger an OSD (On Screen Display) event. For this to occur users should ensure that the OSD Print option in the User Menu is enabled.

The level of motion required to invoke a trigger can be set with the Trigger Sensitivity between: Off, Low, Mid or High.

The duration of the alarm event will be the duration of the motion event plus the time set in the Trigger Duration field, values from 0 to 100 seconds are valid.

Users should press the **submit** button to enable any changes.

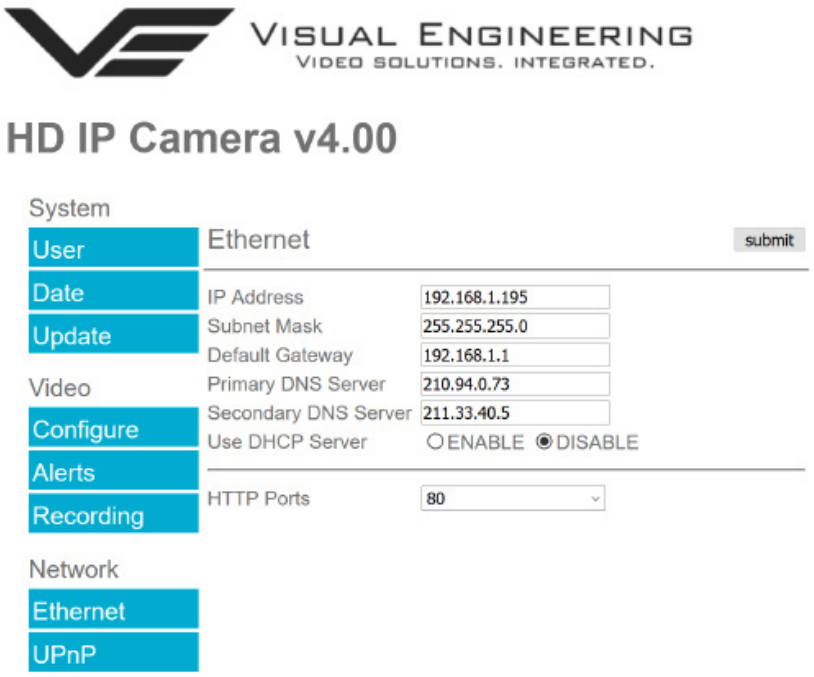




Ethernet Menu

The camera's network parameters can be set by selecting the Ethernet menu.

The camera can operate with a fixed IP address, or can be allocated an IP address from the network. This is configured using the enable/disable Use DHCP Server button.



HTTP Ports

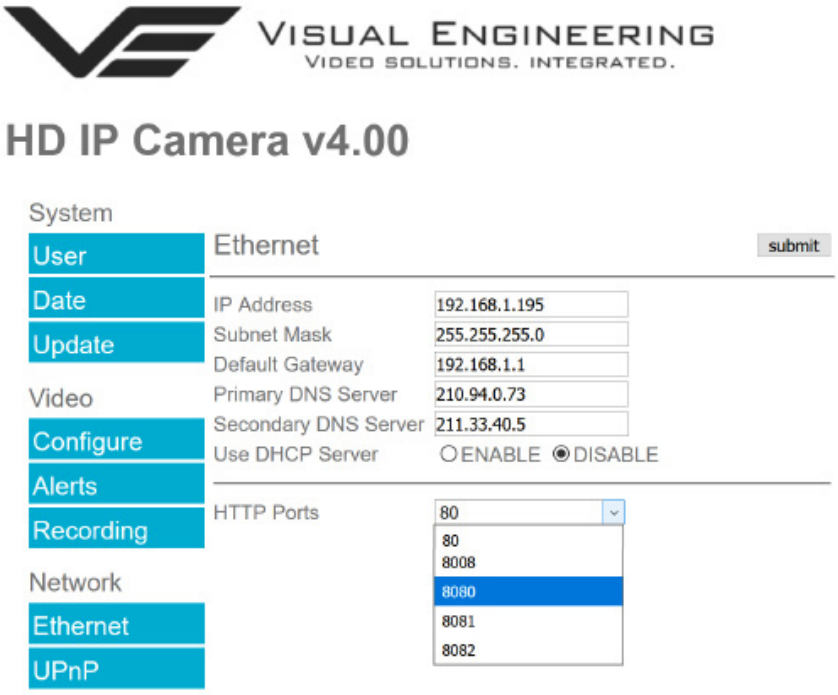
The default HTTP port and ONVIF HTTP port to control and configure the camera is 80.

Selecting one of the five options as shown in the drop down box on the right will set both the HTTP port and ONVIF HTTP port number.

Moving the camera's HTTP port number should only be carried out by users confident of keeping a track on what settings have been applied to the camera.

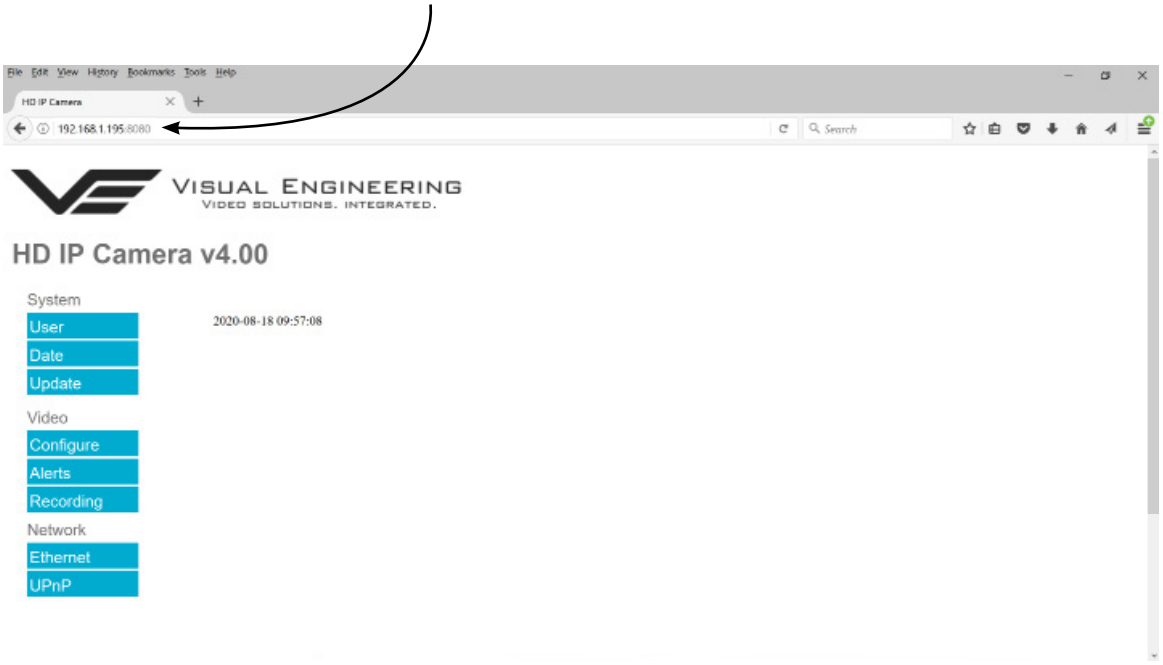
Setting a new IP address and new HTTP port simultaneously should be avoided.

Following changes.....users should press the **submit** button to enable changes.



Once a camera has been set to a new port or IP address the web browser will be automatically re-directed to the camera's new URL.

In the example shown below the camera has been set to an IP address of 192.168.1.195 and port 8080. This extended URL format should be used to address cameras reconfigured to a HTTP port number which is not the default number of 80.



Unreachable Cameras

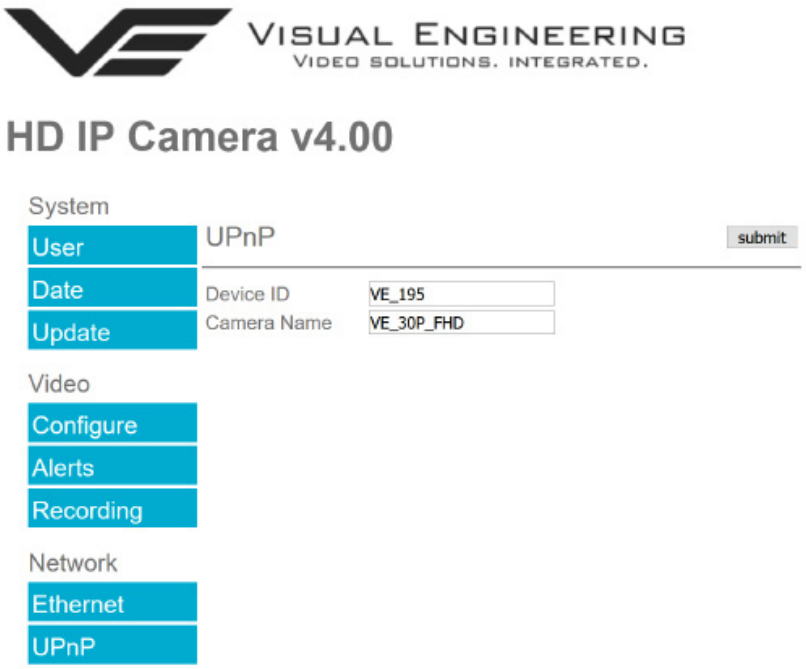
If a camera has been set to an unknown IP address it can be found by using the VE Camera Viewer this will find any camera's IP address regardless of the IP subnet.

If unsure which port the camera has been configured to run a VMS software tool such as the ONVIF Device Manager. More information on VMS tools can be found in the Video Management System section.

UPnP Menu

The Universal plug and play menu allows the user to set the Device ID and Camera Name.

Users should press the **submit** button to enable changes.



Recording Menu

The integral SD card has a capacity of 32GBytes, this offers 17 hours of continuous recording at a total IP bit stream of 4Mb/s or 34 hours at 2Mb/s, etc. If recording capacity is achieved there is a user option to either stop recording or overwrite. The recording web page menu is shown below.

Note: Recording is temporarily paused during activity on the camera's web interface.

Timed Recording

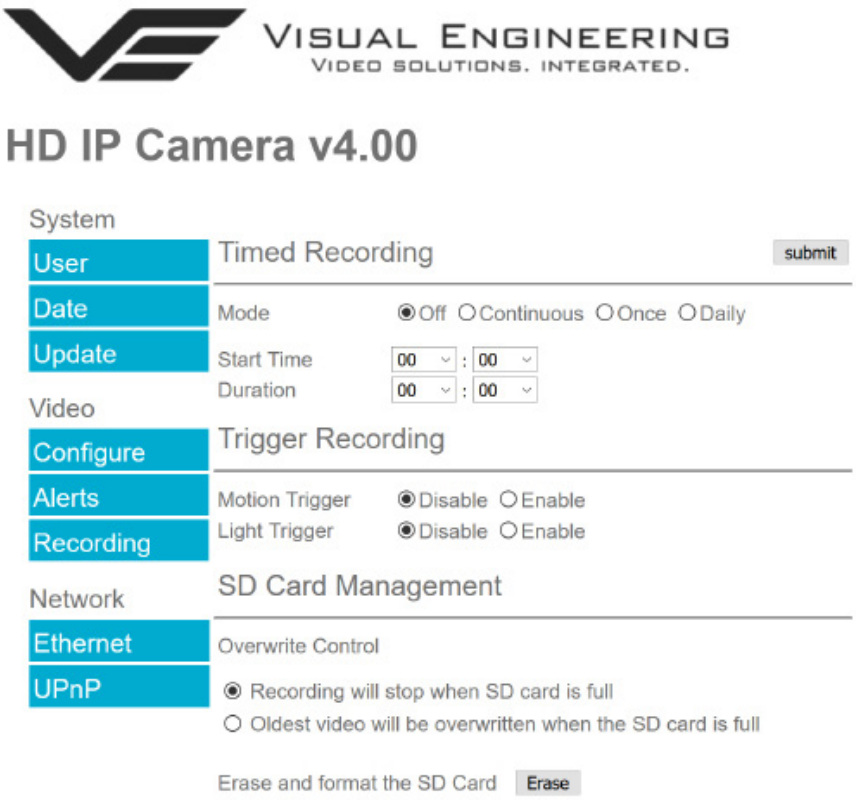
There are 4 options for timed recordings, these are; Off, Continuous, Once and Daily.

Off = No recording takes place.

Continuous = Recording Continuously.

Once = Record once when the start time is reached and record for the set duration.

Daily = Record daily starting when the start time is reached and record for the set duration.



Trigger Recording

Trigger Recordings can be triggered by either motion or light level change.
Trigger recordings are disabled by default, if enabled, a recording will be made.
The duration of the recording will be the duration of the motion event plus the time set in seconds in the trigger duration.

SD Card Management

In the event of the SD card becoming full, there are two options for Overwrite Control. One option is to have the recordings stop when the SD card is full, or the other option is to have the oldest material to be overwritten when the SD card becomes full.

Following any changes made in the menu the user must press the **submit** button . Wait until the camera finishes re-configuring before powering off the camera.

Erase and Format

The SD card will be completely erased and formatted if the **Erase** button is used. The user will be asked to confirm that this is the intention before the SD card memory card is actually erased.

Recovering Recordings

Record Format

Recordings are stored on the SD Card as individual 10 second duration .avi files. This is for a frame rate of 30fps, lower frame rates will increase the length of the stored file proportionately. For example a frame rate of 15fps will create a 20 second video clip.

Video clip lengths are kept intentionally kept short, this allows integration with the VE Camera Viewer so that recent events can be played back with a low data upload overhead.

The file size is proportional to the total bitrate selected by the user.

The files follow the a naming convention of:

YYMMDDHHNNSS

For example a file with the name of: 170801134611 would have the meaning:

YY = Year is 2017
MM = Month is 08, August
DD = Date is 01, the 1st of the month
HH = Hour is 13, 24 hour format
NN = Minutes is 46
SS = Seconds is 11

Additionally files containing motion will have an 'm' appended on the end. This is so any video clips with movement in the video can be easily identified. When searching motion files it is advisable to also check for activity in the video in the file preceding any motion tagged file.

For the file described above with motion in the video it will have the complete file name of:

170801134611m.avi

Recordings are stored in directories for each individual hour, the directory has the form:
YYMMDDHH
Since each file is 10 seconds long there will only ever be a maximum of 360 files in each directory.

Recordings can be accessed and downloaded via FTP (File Transfer Protocol) using either the VE Camera Viewer or an FTP application such as FileZilla.

The VE Camera Viewer is available to download from the VE website at:
www.visualengineering.co.uk/supportdownload/26

FileZilla is a free application and can be downloaded from
http://sourceforge.net/projects/FileZilla/

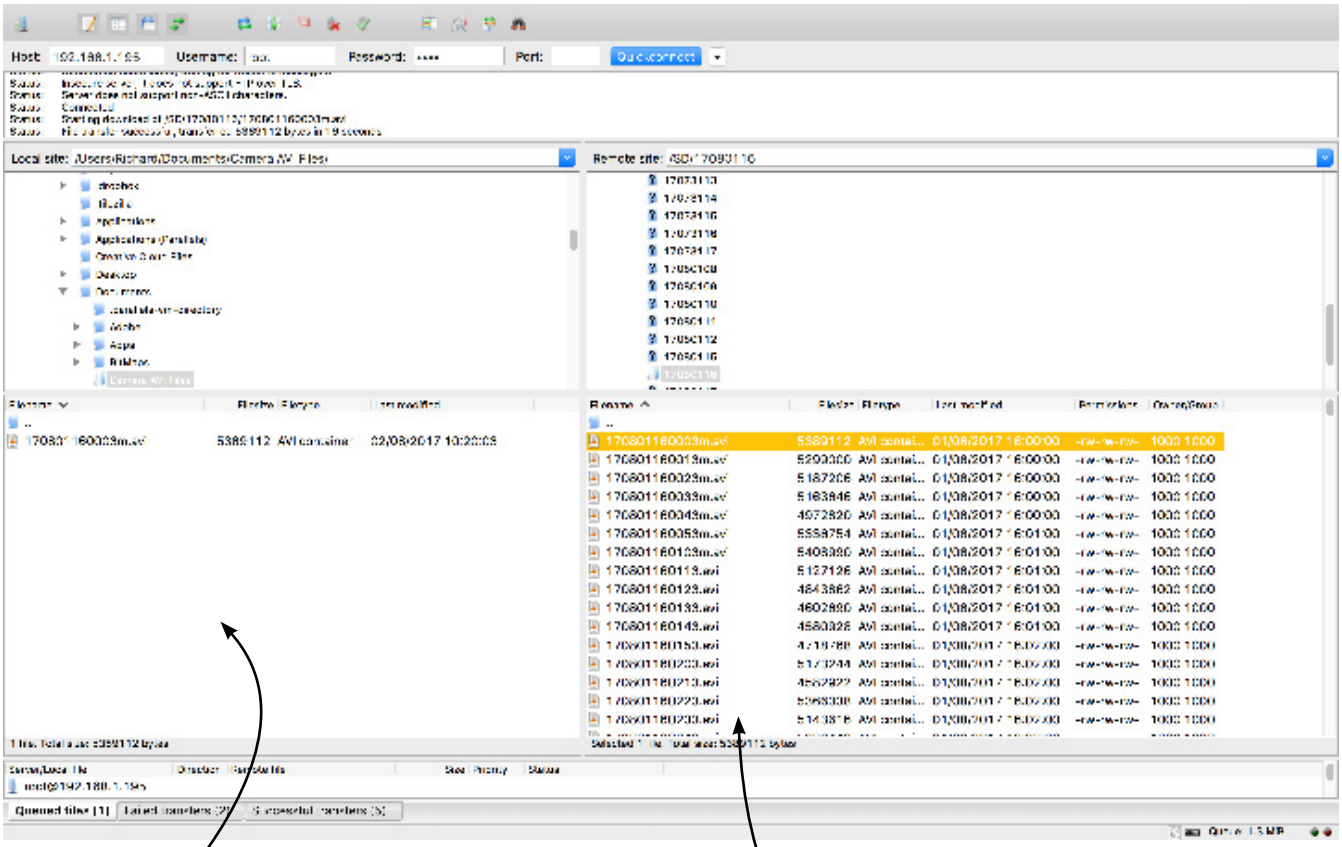
If using FileZilla, downloaded recordings can be played in players such as VLC either individually by selecting Play stored File or in groups by creating a play list.

Using FileZilla

With FileZilla downloaded, installed and running it will appear as shown below.

Set the Host = IP Address of Camera, default IP Address of **192.168.1.195** is shown here
Username = Camera Username, the default is **root**
Password = Camera Password, the default is **1234**

Then press 'Quickconnect'



Files can be dragged across to the location selected on the local computer

File structure on the SD card of the camera

Recordings on the camera will be stored in the directory structure: SD/YYMMDDHH/ as shown above. Individual files can then be selected and downloaded or dragged across to the storage location selected on the local computer.

WiFi Menu

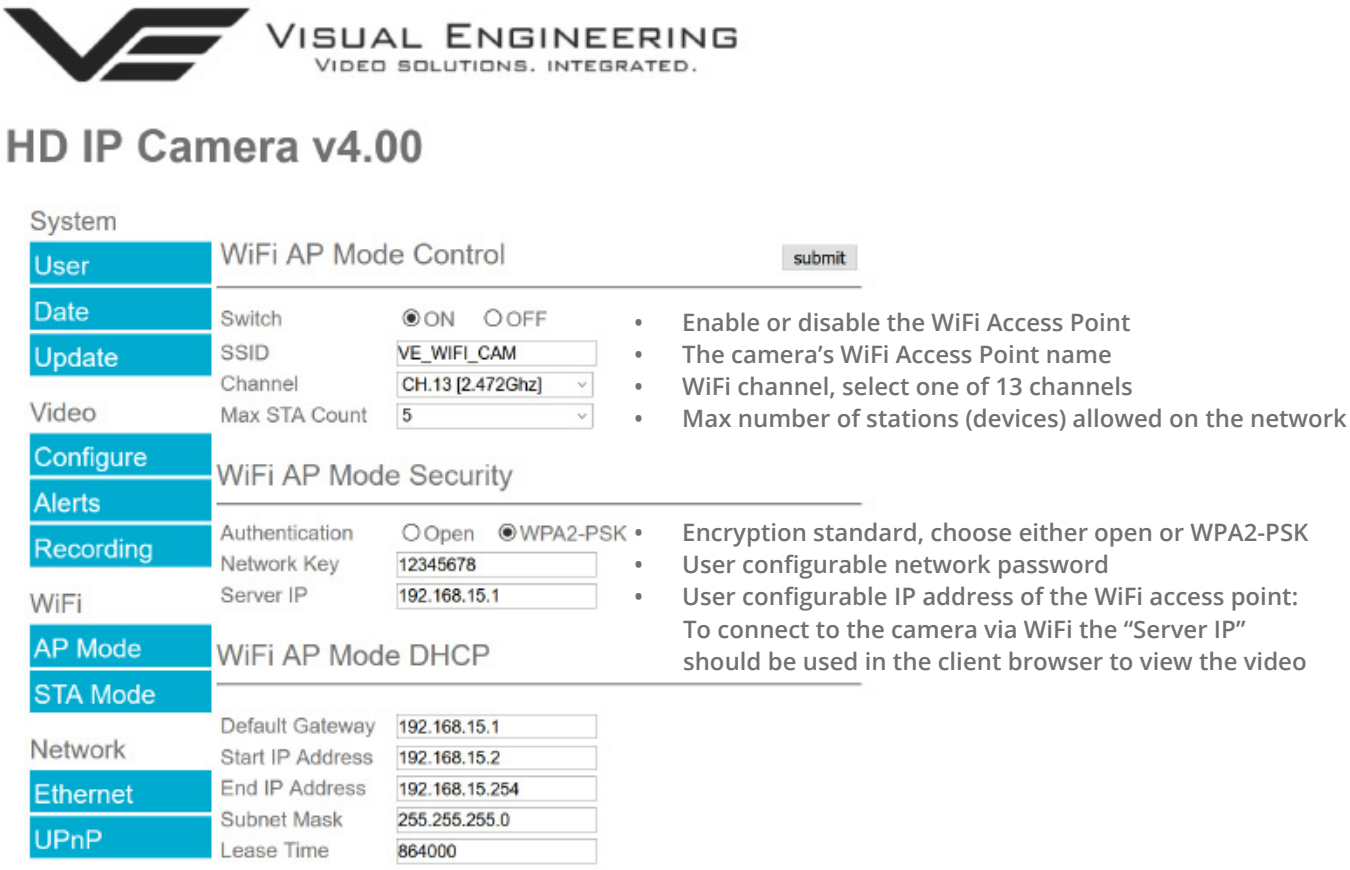
For WiFi capability to be available the Helmet Camera must have the WiFi option included.

The WiFi module requires the WiFi antenna to be connected to the SMA connector on the top of the Helmet Camera as shown on the right.

AP Mode Menu

The Helmet camera has an integrated WiFi Adaptor which supports its own WiFi access point. Using any WiFi enabled device it is possible to connect to the Helmet camera in order to monitor its video and audio.

The WiFi user configurable settings can be found in the WiFi Setup menu. The AP Mode WiFi menu allows the user to configure the WiFi access point settings, this is shown in the web page below along with a short description of the key parameters.

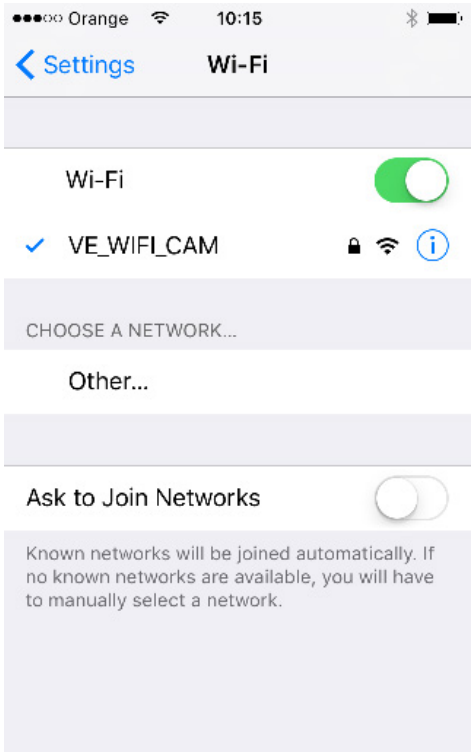


Connecting a WiFi Device

To connect a WiFi enabled device it is first necessary to search for the Helmet camera's WiFi signal.

Select the VE_WIFI_CAM signal as shown on the right.

If prompted for a network key enter the Network Key as defined in the AP Mode Security section, the default is:
12345678

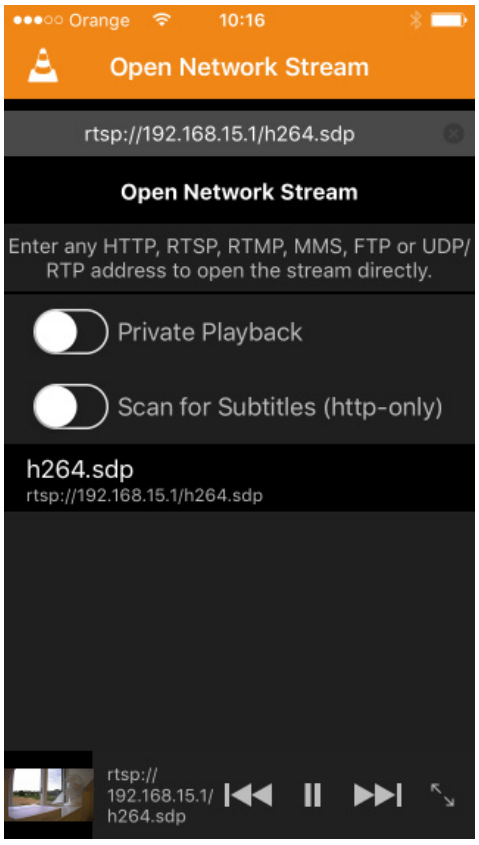


Open a WiFi Video Stream

It is necessary to have a video player application installed on the WiFi enabled device. In the example shown on the right VLC media player has been installed.

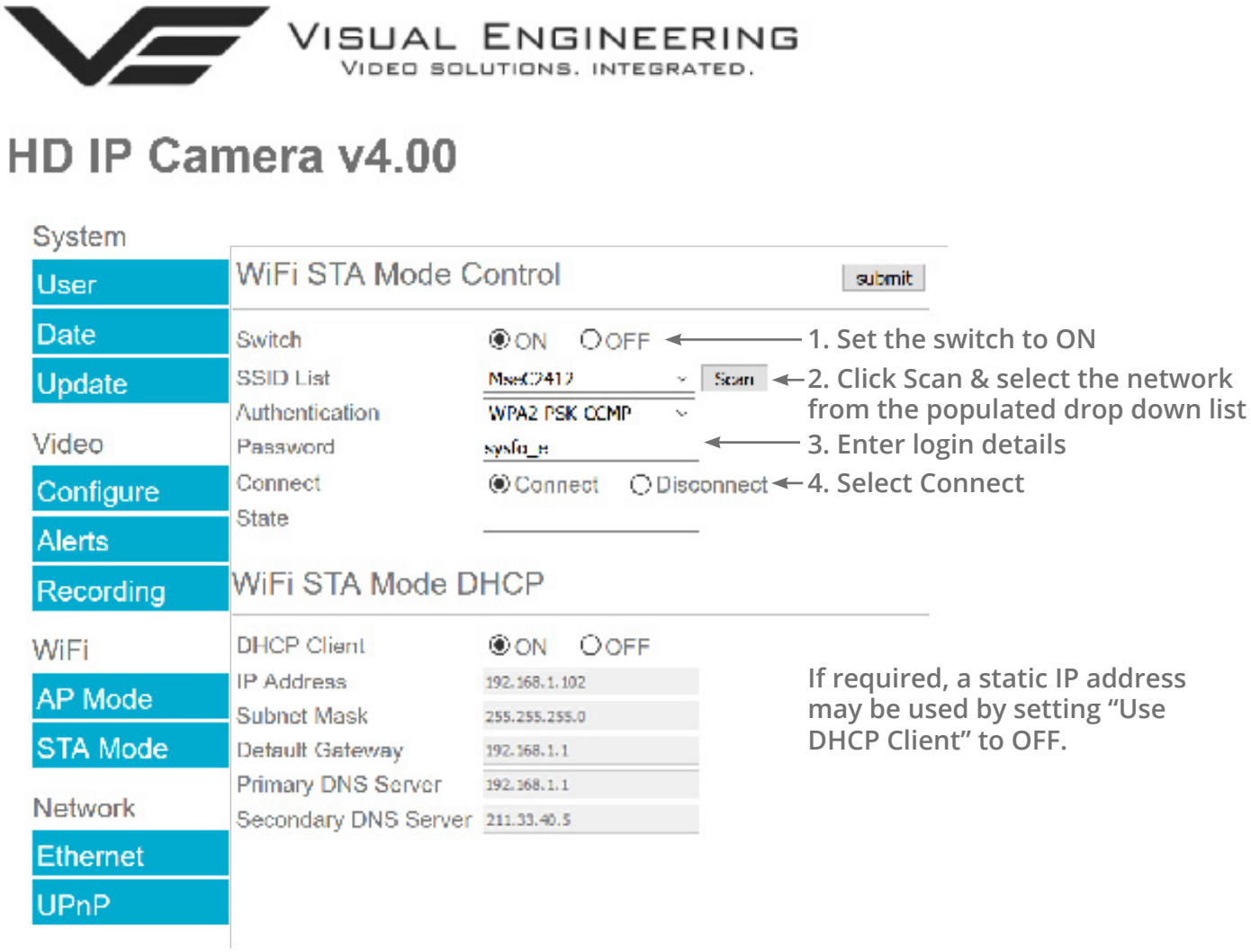
Use the Server IP address of the WiFi Adaptor and open an SDP media stream.

- Type the stream details into the box at the top **rtsp://192.168.15.1/h264.sdp**
- Select the stream here
- Select the video panel for full screen viewing



STA Mode Menu

The STA Mode WiFi sub-menu allows the user to configure the WiFi adaptor in station mode. This can be achieved by following the four steps as described on the right of the STA Mode web page shown below. Following any changes made the user must press the **submit** button. The camera will then save any changed parameters. Wait until the camera finishes re-configuring before trying to move away from the current web page or powering off the camera.



Once the camera is connected in STA Mode the web page control and video stream will be forwarded to the IP Address as shown in the DHCP Client section. For the example shown above this would be 192.168.1.102

In most cases it is possible to view the video feed and control the camera on this STA Mode IP Address and also on the camera’s IP Address as defined in the Ethernet Menu. In certain network configurations it has been observed that the camera may not respond to its Ethernet IP Address once STA Mode is connected. If this is found to be the case use the STA Mode IP Address (192.168.1.102 in this case) to gain back control of the camera and view the video feed.

If the STA Mode is disconnected on a web page using the STA Mode IP Address it will be observed that there is no web page confirmation of task and further control will be lost on that particular IP Address.

Using VLC to Play Streams

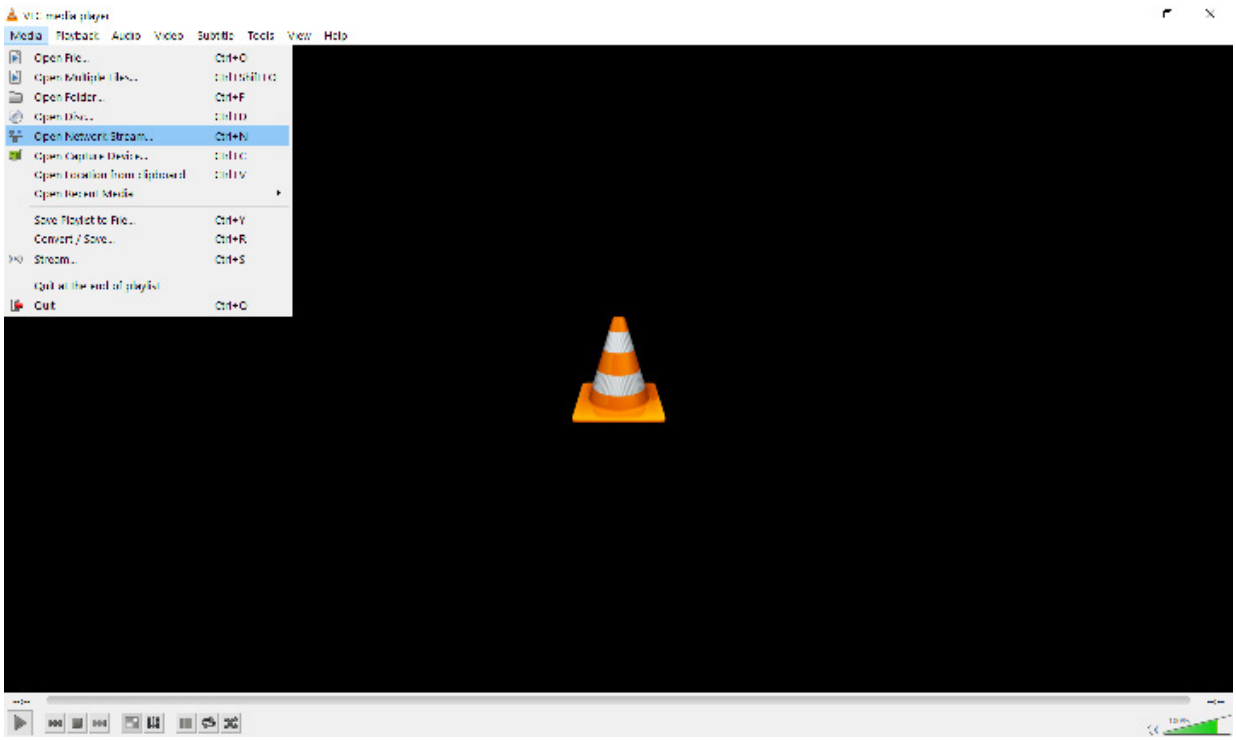
Users wishing to access streaming video from the camera will need a video player application.

The camera is compatible with many players, a simple freeware player is VLC Media Player. Users should download VLC Media Player and run the application.

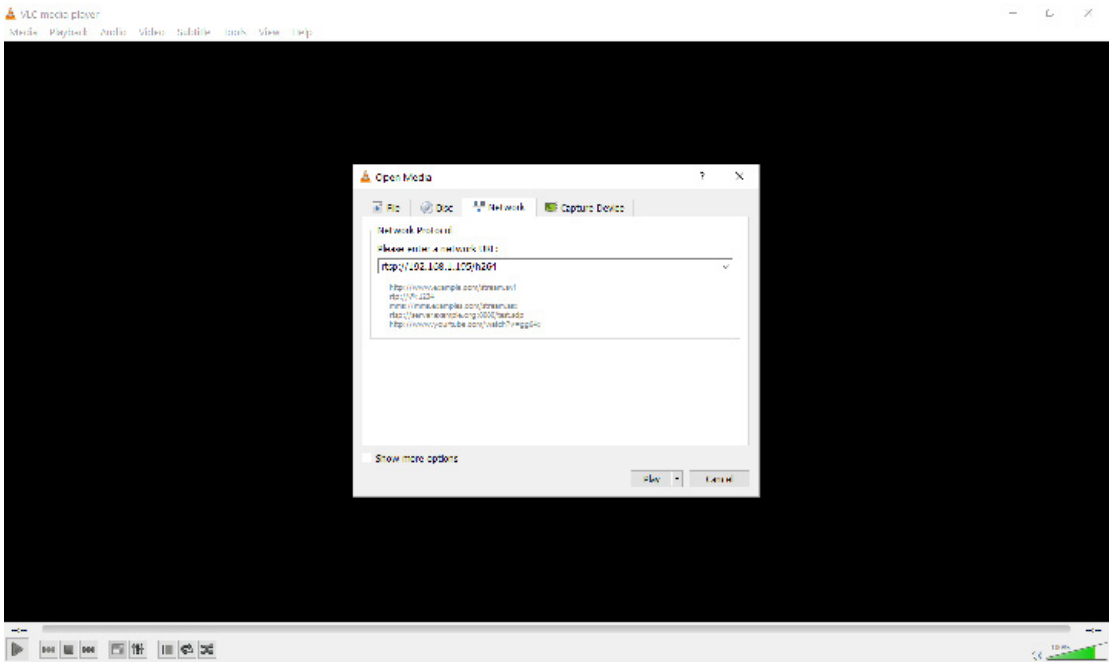
VLC is a free media player and can be downloaded from:

http://www.videolan.org/vlc/index.en_GB.html

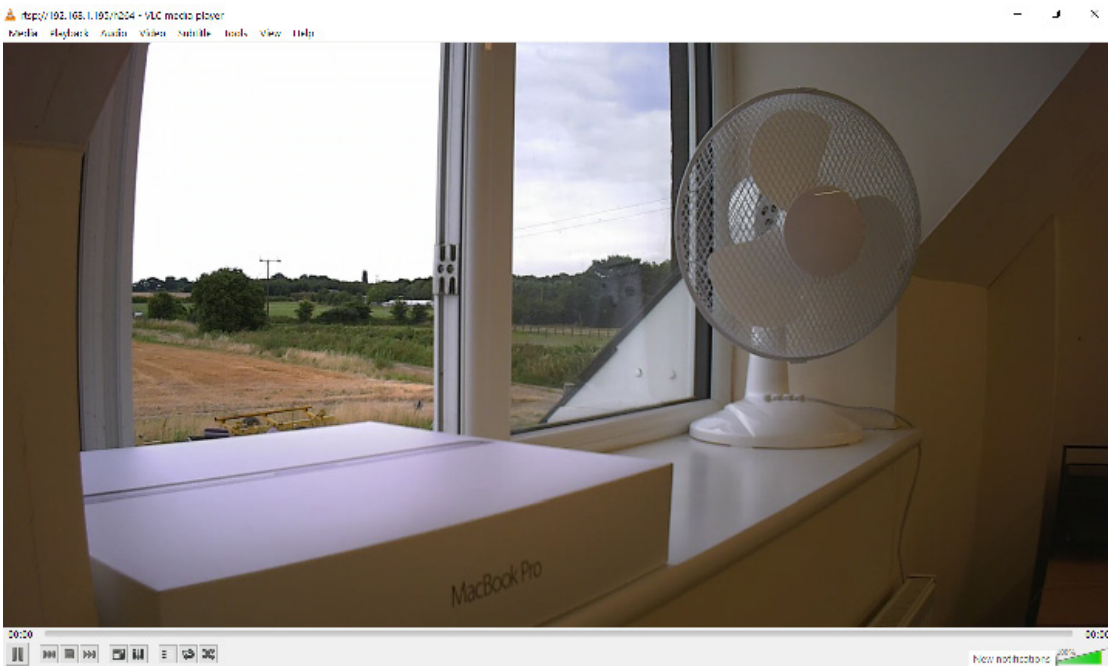
- Enable the VLC Media Player application.
- From the Media menu select the 'Open Network Stream' as shown below.



- Enter the camera URL and stream type, eg: **rtsp://192.168.1.195/h264**
  The URL depends upon the IP address of the camera and the stream type, eg: h264 or jpeg. This is shown below



- Press play and the video stream will appear, as shown below.



The VE Camera Viewer

The VE Camera Viewer is a software application used to display the video from all cameras in the system. It will auto detect any VE cameras that are on the network and populate a list on the left hand side of the player.

The VE Camera Viewer software can be downloaded from the VE website support page:

www.visualengineering.co.uk/supportdownload/26

Viewing Video

The VE Camera Viewer is intuitive and simple to use. Any camera on the network will be displayed in a list on the left hand side of the player. The video can be viewed by clicking the “Eye Icon” next to the camera’s name. The video panel selector can be used to select how the video panels are arranged, this is useful when several video feeds are in the system.

Video Panel Options

The top of the video panel displays information on the playback mode of the displayed video. In the above instance the video playback is a Live stream, it can also be noted that the camera is currently recording since the REC OSD icon is shown. Since the HD IP camera does not contain an integrated battery the power source will be displayed as a DC input.

If the mouse is hovered between the video panel and the above information the player will offer the user the three options, Refresh the video session, Play a Recording or edit the Settings.

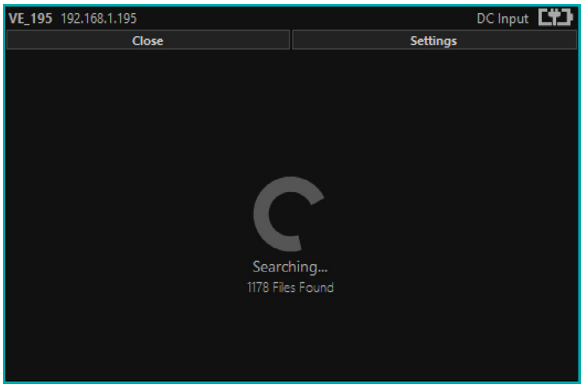
Settings

- The video can be orientated as required using the Flip Video and Mirror Video options
- The Motion Sensitivity can also be set to: Off, Low, Mid or High
- The Trigger Duration sets the alarm time (in secs) following the end of the triggered event
- The audio can be enabled and disabled as required

Play Recordings

If the Play Recording option is selected the player will allow the user to select a recording to playback.

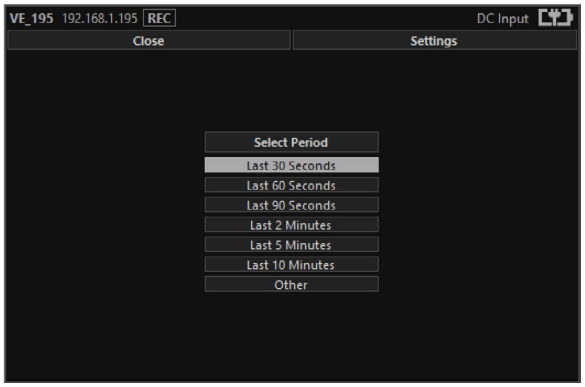
The player will find all available files that are stored on the SD card in the camera. The update screen as shown on the right will be displayed until all files are discovered.



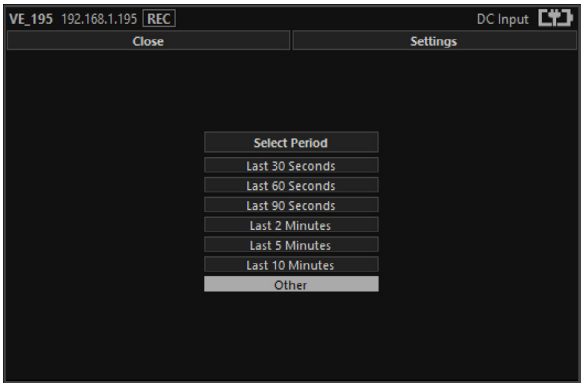
Users can then select a segment of recorded video to be played back from memory. Options are from 30 seconds to 10 minutes.

The full range of download periods is only available in advanced mode.

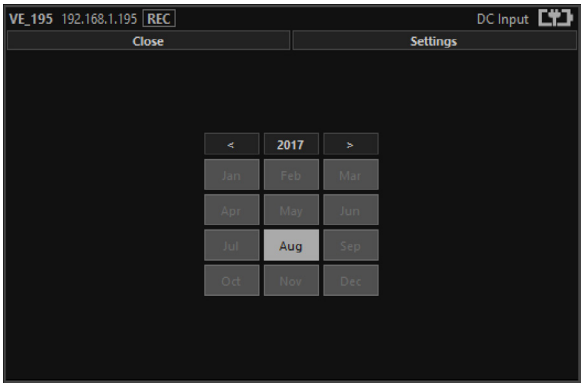
To access the advanced mode the user needs to hold keyboard keys “A”, “D”, and “V” then click on the padlock icon next to the Advanced User text.



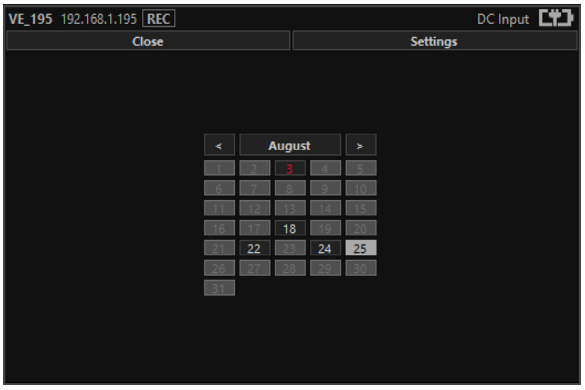
Select “Other” to choose a specific period of timed recording.



Select the required month, months that don’t hold recordings are greyed out.

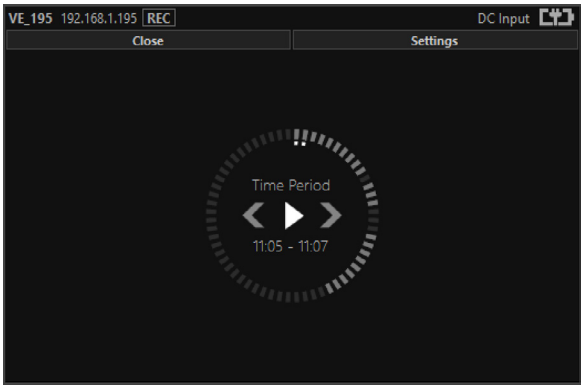


Select the required date, days that don’t hold recordings are greyed out.

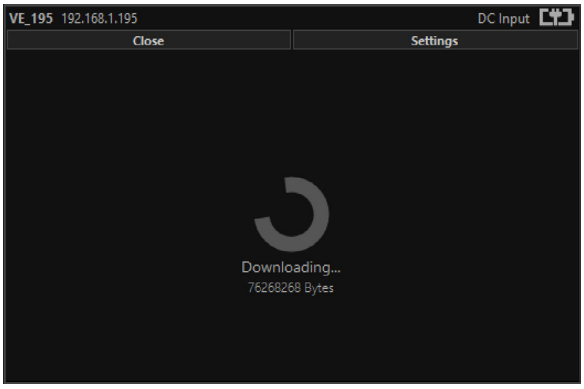


Select the required hour of day, hours that don’t hold recordings are greyed out.

Select the required start and end time from the time dial. Press the play icon.



The files will then be downloaded, after which time the video recording can be viewed in the video panel.



Video Panel Coloured Border

The video panel is edged in a colour, the meaning of which is described in the following table.

Video Panel Edge Colour	Meaning
Red	A trigger alarm has occurred
Blue	The panel has been selected for Pan Tilt Zoom Control
Grey	No trigger alarms & not selected for PTZ Control

Trigger Alarms

The trigger alarms are enabled either via the player or the web interface. Once a trigger event occurs it will be displayed and sounded in the player. The video panel will have a red edge border and an icon will be shown in the bottom left corner. The trigger icon is either a motion trigger or a low to high light level change as described in the table below.

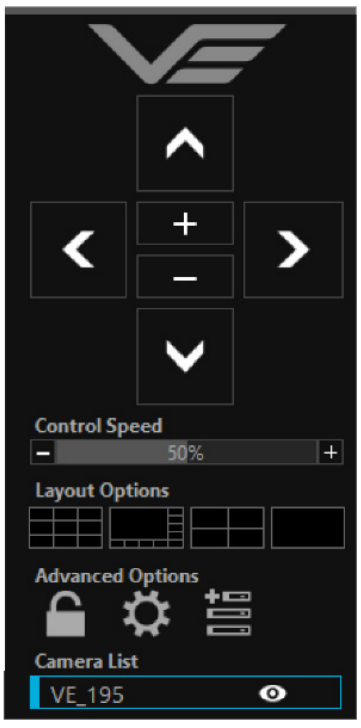
Trigger Icon	Trigger Source
	A low light level to high light level transition has been detected.
	Motion has been detected in the video.

Pan, Tilt & Zoom Control

PTZ is not supported in the HD Helmet Camera.

Select a camera from the Camera List, this will cause the selected camera description being edged in blue, as shown on the right. The video panel for the camera will also be edged in blue.

- Pan Control: left & right arrows
- Tilt Control: up & down arrows
- Zoom in: + symbol
- Zoom out: - symbol

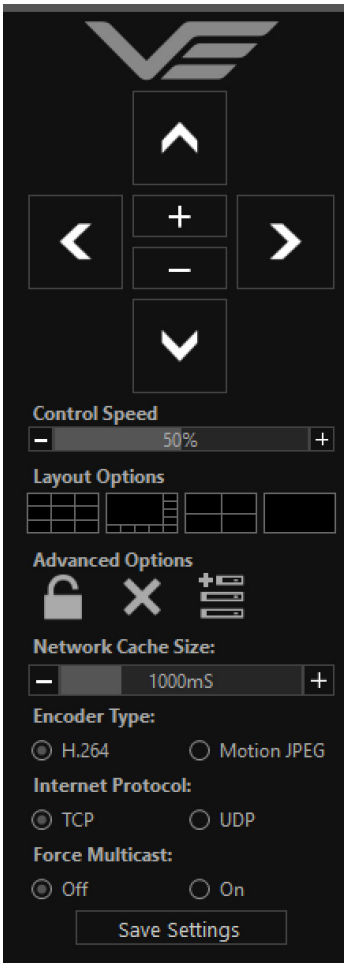


Advanced User

To access the advanced mode, which allows full access to the stored recordings, the user needs to hold keyboard keys “A”, “D”, and “V” then click on the padlock icon next to the Advanced User text.

Selecting the centre settings icon allows access to several player settings including:

- Network Cache Size
- Encoder Type
- Internet Protocol
- Multicast

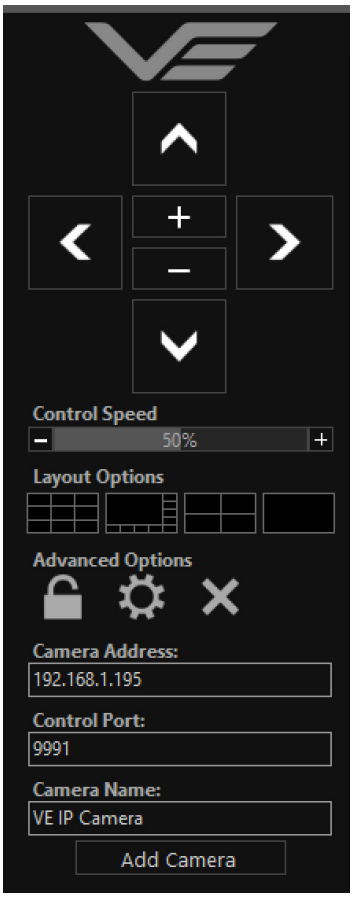


Increasing the Network Cache Size will cause the player to cache more data before streaming video. Decreasing this value will result in the latency of the video stream being reduced, values below 350mS are not recommended.

The camera is capable of transmitting H.264 and MJPEG video streams, select the preferred stream to be viewed.

The video stream packets can be sent over TCP or UDP, select the preferred transport method. More information on these methods is described in the TCP Vs UDP section.

Select Multicast to On sends a request to the camera to send a multicast video stream. Currently the camera does not support multicast streaming.



Selecting the right hand side icon allows the user to manually add a camera by IP address.

Adjustment to the TCP/IP control port and camera name settings can also be made.

Multiple Viewing

Multiple Viewers

It is possible to connect multiple instances of a video player to a single camera.

There is however a maximum limit at which the encoder bit rate can be set to whilst streaming video to multiple viewers using the unicast method of transmission. Bit rates set to a value greater than the allowed maximum value for a given number of clients will result in video breakup.

With the camera set to constant bit rate mode, the table below describes the maximum bit rate the camera can be set to for a given number of connected viewing clients using the unicast method of network transmission.

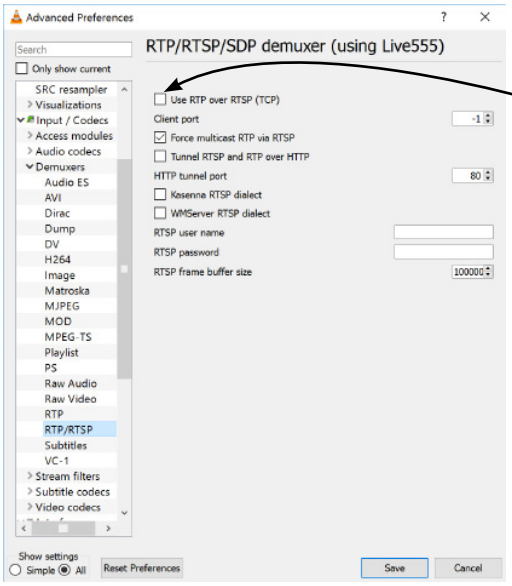
Client Count	Maximum Camera Bit rate
1	10Mb/sec
2	8Mb/sec
3	6Mb/sec
4	4Mb/sec

TCP Vs UDP

The camera is capable of transmitting a video stream over either UDP or TCP transmission protocols. The benefits of each protocol is particular to the specific deployment of the camera. In general terms UDP is a more efficient method which carries less overhead than TCP but lacks some reliability as not all video frames are required to be received in full.

For example, if the camera is used in a scenario where the video is being monitored in real time and the stream is being sent across an RF link that is susceptible to break up, UDP would be the best choice. The reason for this is that re-sending any missed video packets using the TCP method will result in out of date video frames being reconstructed, which will ultimately result in an increase to the video latency.

TCP/UDP in VLC



If this checkbox is ticked VLC will request that the camera sends video packets over TCP, otherwise it will request that the camera sends video packets over UDP.

ONVIF

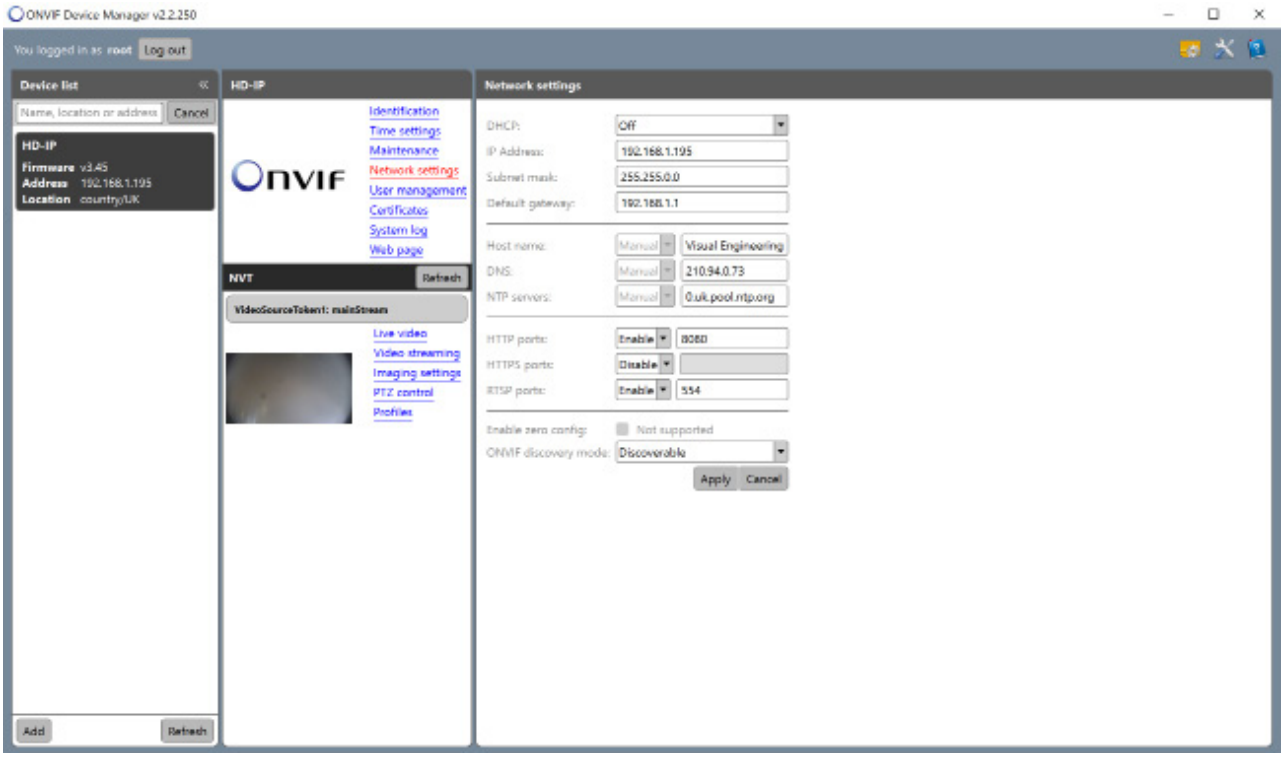
Video Management Systems

The HD Helmet Camera supports the ONVIF protocol such that it can be controlled and viewed on ONVIF compliant VMS platforms such as the ONVIF Device Manager, Milestone and Airship.

ONVIF Device Manager is available as a free download available here:

https://sourceforge.net/projects/onvifdm/

The software will locate cameras on the network. Click the Network settings tab to display the port that the camera is currently configured to. In the example shown below camera's port is set to 8080, therefore the camera's URL is 192.168.1.195:8080



If the controlling PC and camera are on separate IP subnets and the camera's IP address is unknown run the VE Camera Viewer application, which will find the IP address of the camera.

Control Across The Internet

Port Forwarding

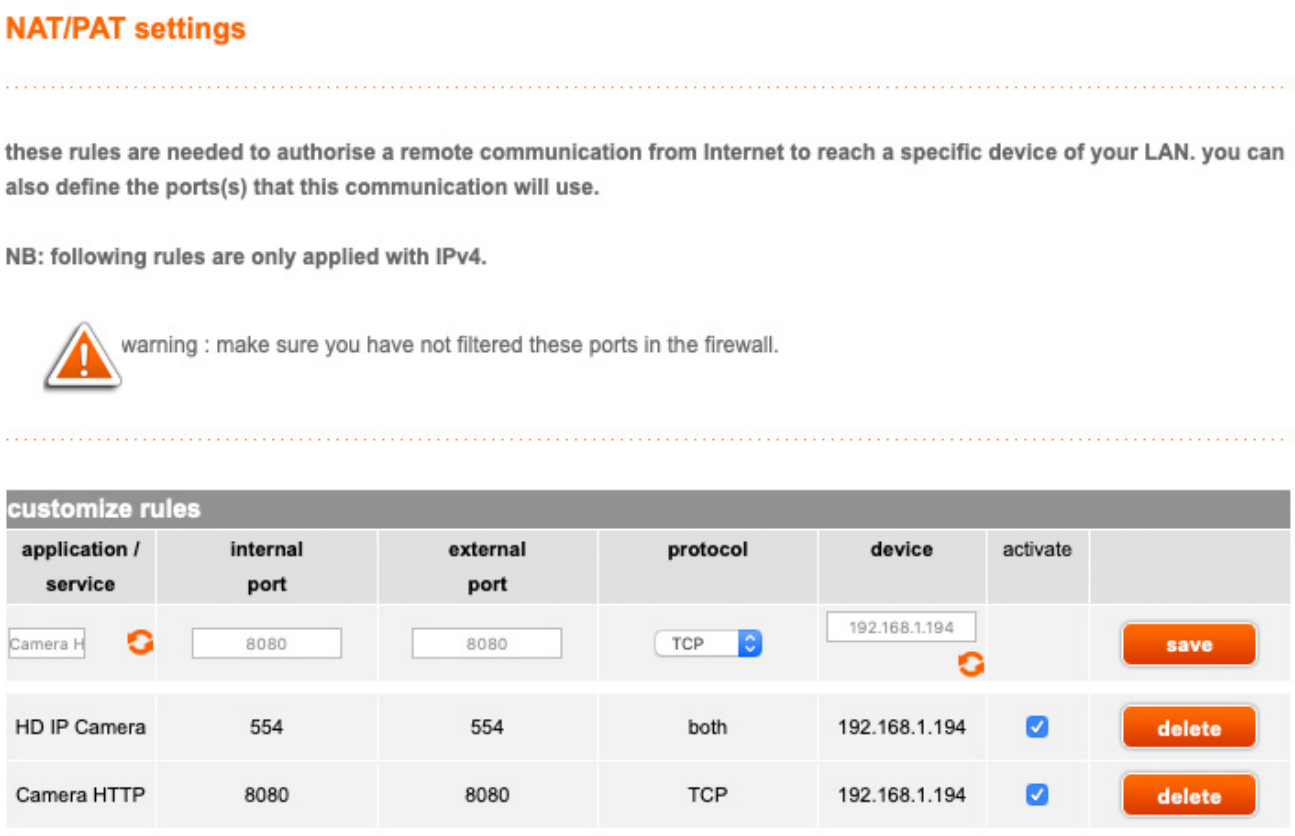
It is possible to control the HD Helmet Camera and view its video remotely through an internet connection. One way of achieving this is through port forwarding on a router that is connected to the internet and also connected to the camera.

As many internet enabled routers are capable of providing this gateway, the settings and control interface will differ dependant on manufacturer and model.

The example below shows a router's NAT/PAT (Network Address Translation/Port Address Translation) configured to forward port 8080 (the HTTP port) and port 554 (the RTSP port) of the camera which has an IP address of 192.168.1.194

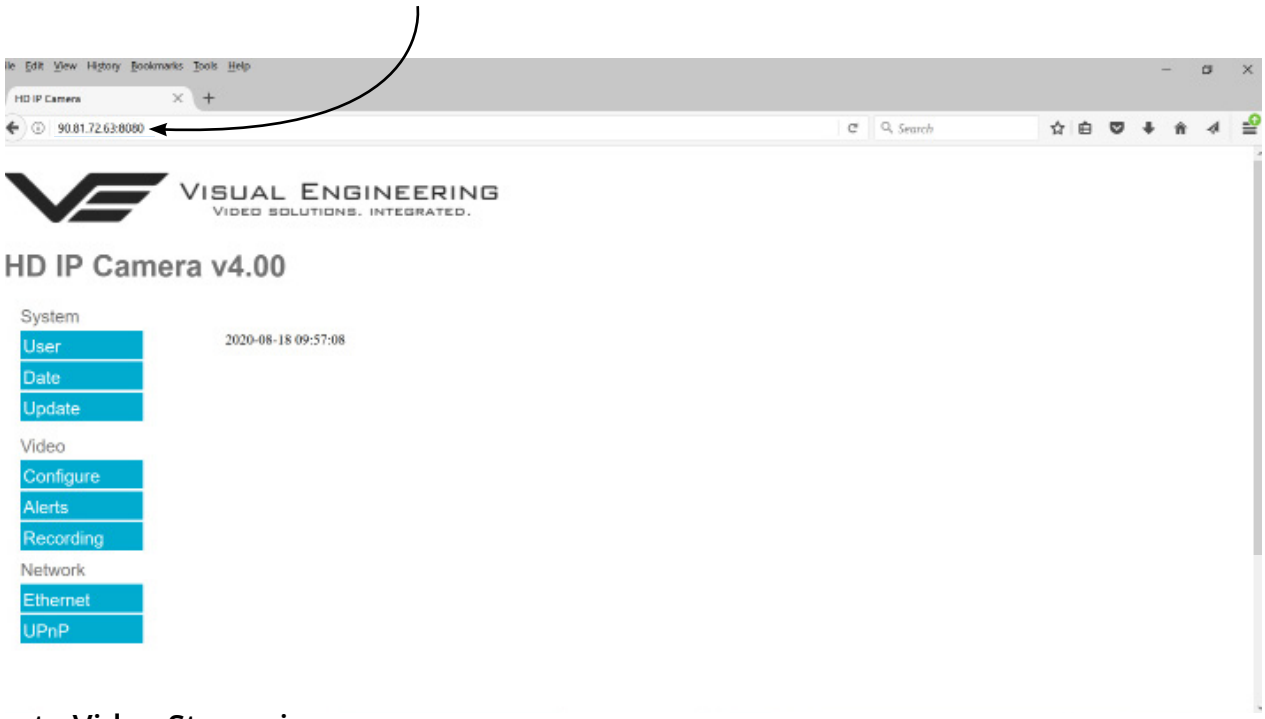
Both of these ports can be configured in the camera through the following camera web pages:

- The HTTP port can be configured in the Ethernet Menu
- The RTSP port can be configured in the Video Menu



Remote Configuration

Access to the remote camera's web pages are addressed by using the gateway IP address of the router along with the HTTP camera port that has been forwarded.



Remote Video Streaming

To stream the camera's video across the internet a URL similar to the ones described below should be used.

- **rtsp://90.81.72.63:554/h264**
- **rtsp://90.81.72.63:554/jpeg**

In the above URL examples the internet router's gateway IP address (90.81.72.63) and the camera's RTSP port (554) should be substituted where relevant.

Ensure that the video bit rate of the camera is matched to the available connection capacity.

LED Illumination Control

The button which is mounted on the top of the HD Helmet Camera controls the activation state of the LED Illuminator.

At initial power on the LED will switch on in low light levels determined by the integrated ambient light sensor.

Following power on if the button is pressed it will disable the LED regardless of light level. Further presses of the button will cycle the LED to first switch back to auto state and then off.

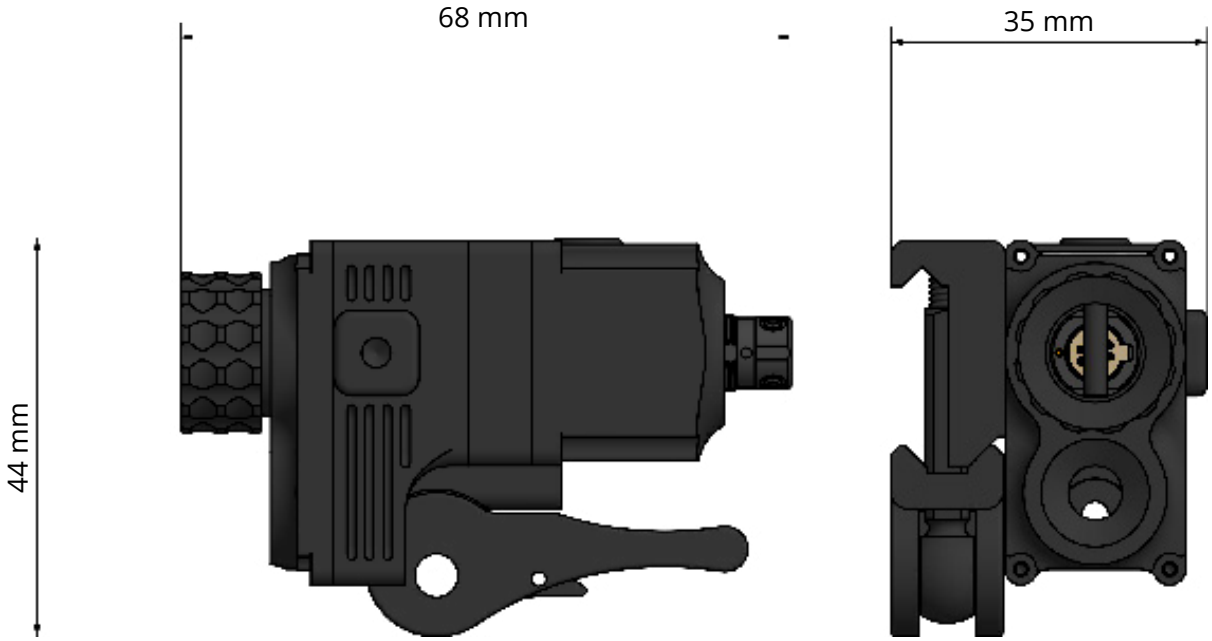
Mounting

The camera is designed to mount directly onto a Picatinny helmet rail mount, as shown below.

Specifications

Specifications			
Camera Sensor	1/3” CMOS	**Connector**	Fisher
Camera Sensitivity	0.05 Lux, no IR Filter 0.1 Lux, with IR Filter	**Power**	12v, 1.4W (IR Off)
Resolution	Max: 1920 x 1080 Min: 320 x 240	**Recording**	32GB SD card
Video Encoding	H.264 and MJPEG Dual Streaming	**Weight**	96g
Streaming Protocol	RTSP over TCP or UDP	**Environmental**	IP67
IR LED	2W, 940nm 5 to 10m Range	**Casing**	Aluminium
Field of View	90° or 60° optional Changeable M12 lens	**Dimensions**	68 x 44 x 35 mm

Dimensions



Visual Engineering Technologies LTD
Kemps Farm
Stanway
Colchester
Essex
CO3 8NB
UK

ISO 9001 CERTIFIED
British Assessment Bureau

Tel: +44 (0)1206 211842
Web: www.visualengineering.co.uk
Email: sales@visualengineering.co.uk