FireVu Manual

Version History

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Introduction

FireVu from AD Group, market leaders in Video Smoke Detection (VSD) is an advanced embedded VSD server.

FireVu overcomes detection challenges such as smoke stratification, varying air flow and contaminated environments. FireVu “sees” the source of smoke and/or flames, identifying them anywhere within its field of view, on any of its 8 camera channels and at any height or direction of flow.

“At source detection” is faster than other forms of detection as there is no need to wait for the smoke to reach the detector. It works by using standard CCTV cameras as sensors, with the video information fed into the FireVu processing system where extensive algorithms are used to analyse movement. Should the motion patterns be recognised as smoke and/or flames, the system will alarm. Each FireVu system can simultaneously identify smoke from each of its cameras using up to 16 separate detection zones per camera.

Relevant Governing Bodies & Standards

Fire detection systems are governed by codes and standards to ensure safety and reliability. FireVu video smoke and flame detection is often specified as a supplementary system providing early detection and going beyond the mandated legislative requirements. Despite this where ever possible FireVu should be installed in accordance with any relevant sections of local codes and in keeping with the intent of standards.

The National Fire Protection Association, (NFPA), publishes standards which regulate fire detection equipment. NFPA codes relevant to FireVu are:

- NFPA 72 – The national fire alarm code for the application, installation, location, performance, testing, inspections and maintenance of fire detection systems.

- NFPA 502 – Tunnels and Bridges which contains fire protection and life safety requirements for such structures.

- NFPA 70 – The national electric code, provides guidance on the installation of electrical conductors. Wiring practices within this code apply to FireVu systems.

Features

FireVu is equipped with an array of valuable features designed to enhance the End users experience:

- 8 Camera inputs
- Bespoke embedded Smoke and Flame detection algorithms
- Visual confirmation of any alarm
- Camera recording from QCIF to 4CIF resolution
- Per Camera MultiMode Recording - Dynamically-switch able resolution, record-rate & compression, (MPEG4/JPEG)
- Easy remote configuration web pages
- Internal video storage
- Up to 16 configurable detection zones per camera
- 22 configurable relay outputs
- 20 alarm inputs
- Evidential quality event recording
- Single and multi-way camera displays
- Live and playback viewing locally and over Ethernet
- Embedded NetVu Console functionality
- Easy to use on-screen, colour coded “soft-key” menu options
- Built in DVD-R writer and USB ports to allow for download of video, archive to external flash memory and upload of software updates
- Configuration via USB mouse
- Meets BS 5839 part 1 requirements
- EN 50130-4 certification

System Applications

FireVu video fire detection will function in almost any environment or application, the factor which limits its use is therefore not performance but often cost. There are many applications where a FireVu system will perform well but so too will other more conventional and often lower cost products.

However there are applications where conventional fire detection systems are less effective, and it is in those applications where FireVu offers the end user a solution to fire detection where previously there has not been one.

Characteristics which frequently present a problem for conventional fire detection technologies are large volume properties where ceiling mounted detectors are too high to respond to smoke in a reasonable time scale, often waiting for the fire to provide sufficient heat that the smoke can reach the detectors having first stratified at a level below them.

Additionally FireVu can be used externally in areas where conventional detection cannot if for no other reason than there being no ceiling upon which to secure conventional detectors.

Utilising and detecting smoke flame or both within the field of view of a camera FireVu not only provides early detection not needing to wait for smoke to reach the detector itself and instead “seeing” it, but also because of the architecture of the technology FireVu provides detailed real time video footage of any alarm allowing the end user or fire authorities to full situational awareness from which they can visually assess the incident, define the risk and take the most appropriate action in dealing with it.

Typical Applications

Power Generation: Turbine Halls present large volume areas where turbine components can get hot and potentially lead to fire. FireVu offers an early warning system protecting both the valuable turbines themselves and avoiding high cost down time by limiting damage as a result of early detection.

Waste Management: Ever increasing environmental awareness has resulted in a significant increase in waste to resource operations. Such facilities present high volume areas with costly plant and equipment, often involving processes where heat is present and in many cases turning waste material into fuel which will burn effectively. FireVu offers such facilities a viable fire detection system which will not only work where other conventional systems won’t but which provides an early warning offering the best chance of dealing with an incident before it gets out of control.

Airports: FireVu offers protection both in large volume high ceiling passenger terminals as well as aircraft hangars containing high value Aircraft. Providing an early warning system is essential within a hangar environment but equally important is the ability to confirm any alarm is legitimate and avoid a costly use of the foam suppression system often present in such applications.

Transportation: Railway stations, underground systems and tunnels all present environments where conventional fire detection systems may struggle. FireVu provides a solution offering a flexible detection system where different sensitivities can be utilised in different areas and where all alarms can be visually verified through the full situational awareness offered by the video which inherently accompanies each alarm.

Manufacturing: High volume areas, expensive plant and machinery and conveyors which may transport flammable material around or even between buildings present a number of difficulties when looking to detect fire. FireVu offers a solution, able to monitor these areas effectively.

Retail: Warehousing and distribution centres are ideal applications for FireVu often being large volume areas with valuable stock present.

External Areas: FireVu Detectors can be mounted on building exteriors or CCTV poles and as result external use is possible. Building yards, tyre storage yards, car dealerships and construction sites are just a few of the external applications where FireVu has been considered.

Server Installation

Any FireVu installation must be in accordance with NFPA 70 and 72 as well as with the needs of any Local Authority having Jurisdiction.

Server Location

The FireVu central processing unit should be located in a clean dry and temperature stable environment. If the unit needs to be housed in a dirty or otherwise hostile environment it should be first housed in a suitable rack/filter ventilated enclosure. The standard unit is either free standing or 19" rack mounted. The unit is powered by 230/115 Volts AC. If a mains connection is to be used it should be connected via an un-switched fused spur.

AD Group do not supply UPS or battery backup equipment, however it is strongly recommended that provision for such be made using an FM approved UPS or battery backup solution ensuring continued operation of the FireVu system in event of power failure. This must cover all required aspects of the system and not just the FireVu server/cameras, lighting and storage devices must also be supported. AD Group will provide data on power consumption requirements on request.

The cameras are connected into the back of the FireVu by means of standard BNC connectors.

Front Panel Connections

DVD-R - Internal CD/DVD-R drive (located under central hinged flap)
USB - USB2.0 connector (located under right hand hinged flap)
LED's:
Power - The Power LED will light green to indicate power is connected to the unit
Alarm - The Alarm LED will light red to indicate a connected input is in alarm
Fault - The Fault LED will light red to indicate a fault has been detected

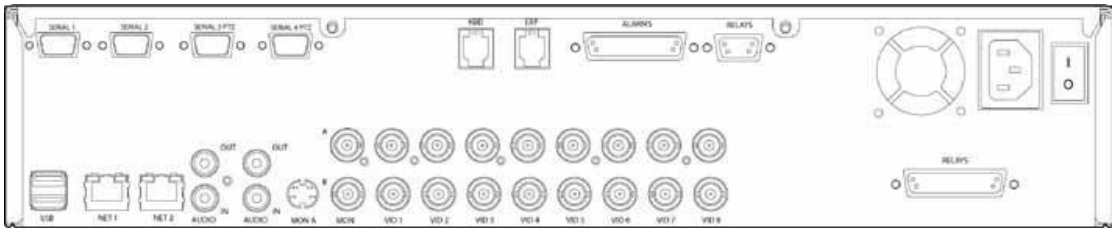
In the context of the front panel LED's the red LED does not light for all "trouble" signals, only for actual hardware troubles or faults, this is limited to camera failures whereby the FireVu server is no longer receiving a viable video stream from the camera or an HDD failure whereby the FireVu server can no longer detect its internal

hard disk drive and Not Recording where either the hard drive is not allowing itself to be written to or the FireVu server is not receiving video to write to it.

Trouble signals generated when the FireVu server detects that a video image from any connected camera are not suitable will be reported as an “Alarm state” and the red Alarm LED will light.

These LED’s are an indication of an issue only and all events including faults and alarms should be annunciated and controlled by an FM approved fire alarm control panel, (FACP) with latching relay contacts for trouble and alarm signals.

Rear Panel Connections



Video:

VID1 to VID8 75Ω BNC composite video input, 1V pk-pk with loop through
MON A - BNC connector 75Ω composite monitor output, 1V pk-pk
MON B - BNC Spot Monitor output
MON A - S Video Connection
HDMI Connector – Main Monitor

Audio:

Audio IN (Dual) Inactive
Audio OUT (Dual) Inactive

Serial:

SERIAL 1 - RS-232
SERIAL 2 - RS-232
SERIAL 3 - RS-485 or RS232
SERIAL 4 - RS-485 or RS232

USB & Network:

USB - 2x USB2.0 connectors
NET1 - RJ45 Ethernet network connector, 10/100Mb/s Ethernet Network
NET2 - RJ45 Ethernet network connector, 1//100/1Gb/s Ethernet Network

Power:

IEC mains power socket & switch. Both ends of the FireVu server power connection and power connections to any associated cameras MUST be mechanically secure to minimize unintended disconnection of any part of the system and must be installed in such a manner as to be protected from any physical damage.

Alarms In:

25-way female D Type 24V 200mA providing 20x general alarm inputs

Relays:

- 9-way female D Type rated at 24V 200mA providing 4x light duty outputs.
- 37-way female D Type rated at 24V 200mA providing 18x light duty outputs.

Connection/Installation

Step 1 Connecting Video

The FireVu server supports up to 8 Video Inputs via 75Ω BNC connectors. Cameras should be connected to the video inputs, starting from input 1. Cameras are connected using 75Ω coax cable, this may be standard CCTV grade or fire retardant if the installation is being undertaken with the intent of fire standards in mind.

Two rows of connectors provide video input and loop-through support. It is possible to use either the top or bottom row of connectors. For consistency and quality of installation, it is recommended that one row is used for video inputs and the other for any required loop-through connections onto other pieces of equipment.

Note: Remember if using loop through that the last piece of equipment in line must be terminated. Any intermediate units must therefore be "de-terminated".

Double termination, (not removing termination from the unit), will result in the 1V peak to peak video signal being reduced. This can reduce the video quality of the video source and may cause the video signal not to be as the video signal is no longer 1V peak-to-peak. This will compromise the effectiveness of the algorithm to detect smoke and or flame.

Step 2 Connecting to a Monitor

Main monitor - BNC 'A' or HDMI connector
Spot monitor - BNC 'B'

Step 3 Connecting to the Network

The FireVu has two auto-detecting network ports –

- 10/100/1Gbps labelled NET 1
- 10/100Mbps labelled NET 2

The Network port labelled 'NET 1' should be used for 1Gb Network Connections.

As shipped the FireVu server will be configured with a fixed IP address of "192.168.16.2".

IMPORTANT: If utilising both Network ports different IP addresses must be assigned to each connection. These IP addresses must not be in the same subnet, i.e. NET 1 - 10.12.131.1, NET 2 – 192.168.1.13.

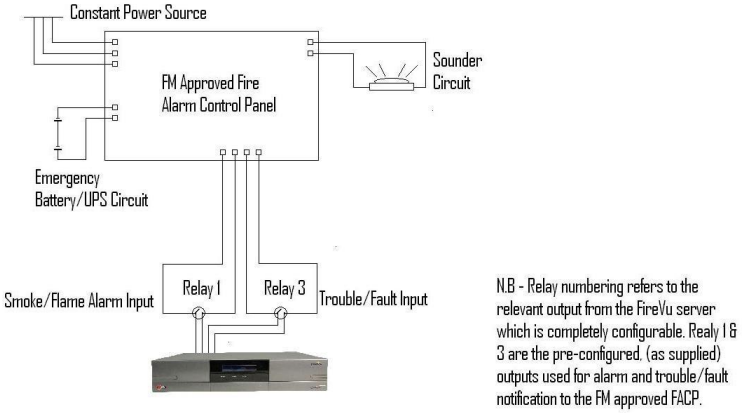
Note: The unit will not act as a router between the subnets on NET 1 and NET 2. A 3rd party router would need to be configured for this purpose.

Use a CAT5 or CAT6 cable to connect the unit to the network.

Relay/Dry Contact Outputs

N.B – The FireVu server is intended to provide outputs to a FM approved Fire Alarm Control Panel, (FACP) with latching relay contacts for trouble and alarm signals which will control and annunciate faults & alarms, it is not intended that the FireVu server be utilised to handle the alarm outputs and perform the final annunciation within a Fire Detection System, this functionality should be undertaken by the FACP. Any visual indications of alarm or trouble signals provided by the FireVu, (for example the LED's on the front of the system), are for indication only

Connecting to an FM Approved Fire Alarm Control Panel (FACP) with latching relay contacts for trouble and alarm signals.



Step 4 Global Relays

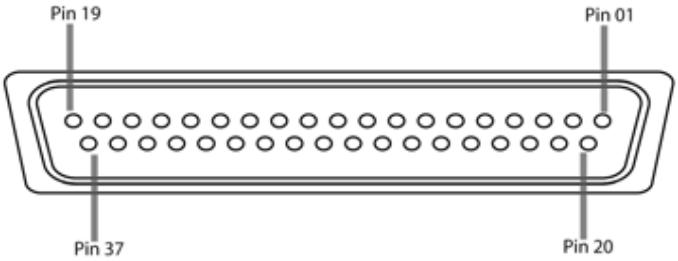
- Pin 1 - Relay 1 Signal
- Pin 2 - Relay 2 Signal
- Pin 3 - Relay 3 Signal
- Pin 4 - Relay 4 Signal
- Pin 6 – Relay 1 Signal
- Pin 7 – Relay 2 Signal
- Pin 8 – Relay 3 Signal
- Pin 9 – Relay 4 Signal

The above 4 relays are Global 24V 200mA relays. Connector on FireVu server is a 9 way female “D” type.

Step 5 Smoke Detection Relays

FireVu allows alarm notification to the FM approved FACP through the use of up to 18 dry contact relay outputs. These provide smoke/flame alarms as well as fault or trouble indications to be connected to the FACP's latching relay contacts.

N.B – below diagram depicts either the connector on the rear panel as viewed from behind the unit and/or the mating connector used if viewed from the side to which cable would be connected – the solder bucket or crimp side.



Relay Connector Pins	Connection
1 / 20	Relay 5 signal
2 / 21	Relay 6 signal
3 / 22	Relay 7 signal
4 / 23	Relay 8 signal
5 / 24	Relay 9 signal
6 / 25	Relay 10 signal
7 / 26	Relay 11 signal
8 / 27	Relay 12 signal
9 / 28	Relay 13 signal
10 / 29	Relay 14 signal
11 / 30	Relay 15 signal
12 / 31	Relay 16 signal
13 / 32	Relay 17 signal
14 / 33	Relay 18 signal
15 / 34	Relay 19 signal
16 / 35	Relay 20 signal
17 / 36	Relay 21 signal
18 / 37	Relay 22 signal

The above 18 relays are 24V 200mA relays intended for use on smoke/flame detection. Connector on FireVu server is a 37 way female "D" type.

Step 6 Alarms

Pin 1 – DTX
Pin 2 – DTX
Pin 3 – DTX
Pin 4 – DTX
Pin 5 – DTX
Pin 6 – DTX
Pin 7 – DTX
Pin 8 – DTX
Pin 9 – DTX
Pin 10 – DTX
Pin 11 – DTX
Pin 12 – DTX
Pin 13 – DTX
Pin 14 – DTX
Pin 15 – DTX
Pin 16 – DTX
Pin 17 – DTX
Pin 18 - DTX
Pin 19 - DTX
Pin 20 - DTX
Pin 21 - Earth
Pin 22 - Earth
Pin 23 - Earth
Pin 24 - Earth
Pin 25 - Earth

The above provides 20 alarm inputs.

Step 7 Connecting Serial Ports

The FireVu has 4 serial ports –

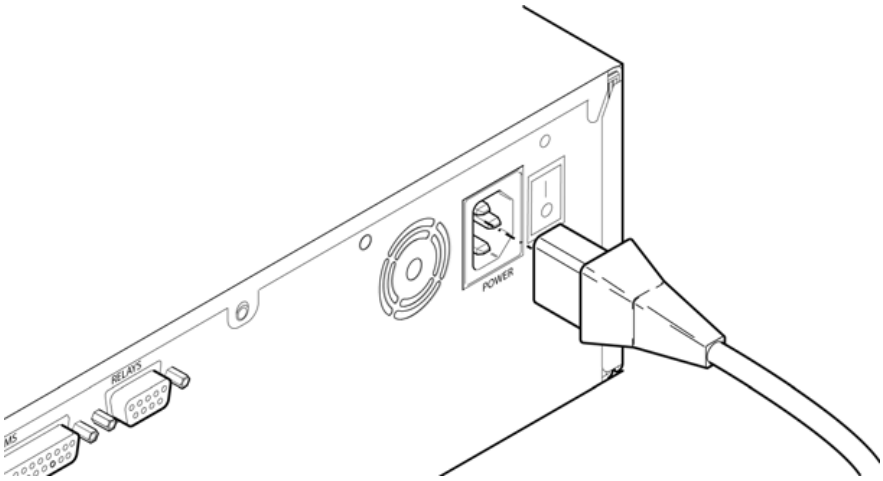
- RS232

RS-232	Serial 1 & 2 Pin Allocation	Serial 3 & 4 Pin Allocation
Data Carrier Detect (DCD)	1	-
Receive Data (RX)	2	2
Transmit Data (TX)	3	3
Data Terminal Ready (DTR)	4	-
Ground (GND)	5	5
Data Set Ready (DSR)	6	-
Ready To Send (RTS)	7	7
Clear To Send (CTS)	8	8
Ring Indicate (RI)	9	-

- RS485

RS-485	**Serial 3 & 4 Pin Allocation**
Transmit Data (TX+)	1
Transmit Data (TX-)	9

Step 8 Connecting Power



The FireVu has an internal power supply unit. Connect the mains lead to the unit and then to the wall socket, or to a fused spur connection. Check local regulations before installation. Some countries require an Alarm/Security device be connected to a fused spur and not a wall outlet socket. AD Group also recommends the use of a UPS.

In order to comply the power MUST be backed up by an FM approved UPS and this item MUST be supervised by the FM approved FACP with latching relay contacts for trouble and alarm signals.

A FireVu server detection system consists of up to 8 analogue CCTV cameras and the FireVu server itself, in order to detect smoke the camera fields of view MUST be permanently illuminated to a consistent level of not below 20lux, or fully floodlit with appropriate 850nm IR lighting. As a result of this the lighting being essential to smoke detection MUST be UPS backed/powered in addition to the FireVu server and individual camera power.

A suitable FM approved UPS must be used which will provide an alarm output to the FM approved FACP when the mains fails and the UPS batteries are providing the power. This FM approved UPS MUST be capable of supplying sufficient power to maintain the FireVu server all connected analogue CCTV cameras and the illumination in the monitored areas for no less than 24 hours supervisory and a further 5 minutes alarm.

Configuring the Unit

The unit can be configured either on the local monitor or over the network using a PC with Mozilla Firefox or similar browser. Both have near identical menu interfaces.

As shipped the FireVu server will have a fixed IP address of “192.168.16.2”. However should this need to be changed:

Accessing the menus on a local monitor:

The Configuration pages can be displayed on a local monitor connected to either the HDMI connector or the BNC Connector labelled “Mon A” on the rear of the unit.

Accessing the menus on a PC web browser:

- Locating the Unit IP address:
    - The IP address of the unit is required to access the webpages. This will be displayed on the LCD screen on the front of the FireVu. Alternatively it can be identified from the configuration menu pages as follows –
        - Using the local monitor navigate to:
        - Configuration > Network > Network. The current IP will be listed either as a manually set fixed IP, as its current DHCP acquired address or as 0.0.0.0 if set to DHCP but no DHCP server present.

Note:

- The unit can be installed in a DHCP network environment where an IP address, subnet mask and default gateway will automatically be allocated from the network DHCP Server.
- If a DNS (Domain Name Server) address is not to be used, it is strongly advised that a fixed IP address be assigned (a DHCP assigned address can change without notification i.e. following power failure).

Default DNS Address

It is recommended that a DNS (Domain Name Server) address be configured.
Assigning a recognisable name can help a remote user to locate the unit.
If no System name is allocated to the FireVu, the default DNS address will be:

"machine serial number".yourdomain.com

• <machine serial number> is displayed in the System menu page and also on the underside of the unit.
• <yourdomain> is the name assigned to your DNS network.

Note: To activate an assigned DNS address, it will be necessary to reboot the unit. The FireVu can be rebooted via System Settings>Maintain> Reset.

IMPORTANT: To set the time and date on the unit, navigate to:
System Settings>Time and Date.

Note: Within this page the relevant time zone should also be set, (for example GMT). It is also possible to configure the unit to "sync" its time to another server should one be available.

Accessing the Configuration Webpages

The unit can be configured using its webpages. To access these:

1. Launch Internet Explorer (or similar web browser package).
2. Type the URL for the unit (IP or DNS address).
3. The Opening menu page will be displayed.

Using the Webpages

Navigate the menus by clicking the tabs displayed on the left of the menu headings (on the menu tree). The first option is highlighted with a red tab. Select a main menu heading to open a drop down list of further sub-options.

Highlight an editable field by clicking on it directly.

Note: A selected item in the drop down list will appear highlighted.
Navigating away from a page, (clicking on a different option on the menu tree), will automatically save any changed settings. To undo changes made to any menu, select the Refresh (Purple) option.

Main Menu

When first accessing the unit, the main menu will be displayed. This menu allows access to the Configuration menus.

Design Guide

Principle of Operation

FireVu interfaced with suitably specified and installed standard Closed Circuit Television cameras is capable of recognising small amounts of smoke within a video image and alerting the system user both at the FireVu server itself and by a variety of remote outputs.

The system uses highly complex algorithms to process video information from up to eight cameras simultaneously. The system analyses all eight video feeds at 25Hz frame rate for each channel, (25 frames per second) PAL or 30Hz NTSC. The video hardware is designed to allow simultaneous real time digitising of all eight images, which means that the system does not multiplex images and therefore no information is lost. Alarm conditions are stored within the FireVu log.

The system detects smoke rapidly by looking for small areas of change within the image at the digitisation stage and only passing these pixel changes to the main processor for further filtering.

The video information is passed through a series of filters which seek particular characteristics which can be associated with smoke, further analysis is then carried out on the relationships between the filtered characteristics to determine whether all the conditions have been met for the system to confidently predict the presence of smoke.

To provide compensation for areas of the image which would otherwise prove troublesome such as windows or smoke/steam producing processes, part of the image can be eliminated from detection by use of masks, which can be fixed on a per pixel basis or dynamic on a colour detection basis.
The standard system has twenty two relay outputs, (4 global and 18 capable of being "per video input" assigned offering a range of alarm states.

Architecture

A FireVu system comprises of the FireVu server itself and the cameras used to monitor the "risk areas". Other equipment required is determined by the user's specific operational requirements in relation to alarm handling.

The FireVu server can be configured to provide a relay output on alarm which can be interfaced with a FM approved Fire Alarm Control Panel with latching relay contacts, (FACP), or other building management system.

Modbus integration is also available for alarm integration..

The FireVu server has both a Coaxial and HDMI monitor output upon which it will display a "virtual" alarm panel with site map, alarm status, event history and a "switch on alarm" video window. If utilised this requires an HDMI monitor, USB mouse and HDMI cable.

Alternatively the FireVu server will transmit any alarms over the network to any PC capable of "seeing" the FireVu server using AD Group's EDP alarm handling and NetVu Observer video management software.

Camera Selection

FireVu will operate with any standard CCTV camera (PAL or NTSC providing the FireVu itself is set to the appropriate video standard). The camera used MUST be capable of producing a sharp image in the lighting conditions present and a minimum of 20 lux of visible light is required for accurate operation, (IR lighting is a suitable alternative where 20 lux is not present but the IR lighting MUST evenly illuminate the entire video scene with no dark areas).
AD Group recommends no less than 540 TV line resolution cameras, and although FireVu will function with lower resolution cameras higher resolution ones will provide more precise smoke detection.

The following is AD Group's minimum recommended analogue camera specification for purpose of video smoke detection:

540 TV lines resolution
Auto white balance (AWB)
Auto gain control (AGC)
Auto iris lens with manual focus
Peak White Inversion – appropriate if area to be monitored contains bright spots
Suitable IP66 weatherproof housing

Cameras should be mounted on as firm a structure as possible. If large amounts of camera vibration is present, then the video image will have constant large differences within it and the detection algorithms will be less effective. FireVu analyses changes within the video images it receives on a pixel by pixel basis and consequently if all pixels and constantly changing as a result of "camera shake" its sensitivity to changes as a result of smoke presence will be reduced.

Camera Lens Selection

Good quality, auto iris lenses should always be used. The lens size should be calculated such that 10% of the screen height would be occupied by the minimum amount of smoke that is required to be detected. This calculation should be carried out for the furthest point in the field of view where the user is intending that the camera in question will monitor.

For practical purposes a human target occupying 10% screen height at the furthest point is assumed to be a suitable size to produce good results – meaning that a smoke cloud will need to be approximately 6 foot high and 2 foot wide at the furthest point within the monitored area before effective detection will take place, and consequently a smaller smoke cloud will result in an alarm if nearer to the camera.

The following formula can be used to determine the desired size of lens for any given situation:

$$F = v/V \text{ x } D$$

Where:

- F = Focal length of the lens in millimetres
- v = Vertical dimension of the CCD imager (See table below)
- V = Vertical dimension of the target object in metres
- D=Distance between target object and lens in metres

Camera	Vertical imager dimension (v)
$^1/_3$"	3.6mm
$^1/_2$"	4.8mm
$^2/_3$"	6.6mm

This formula will give the focal length required for the target object to fill the screen, therefore for VSD calculations divide the result by ten providing the 10% of screen height required.
So for a man of 1.8M height stood 100M from the camera to fill the screen using a ½" CCD camera the lens required is calculated as follows:

$$F = 4.8/1.8 \text{ x } 100$$

Which gives a value for F of 267mm.

As we only require the 'man' to fill 10% of the screen height the result should be divided by 10. So for this example the correct focal length required would be around 27mm.

The normal aspect ratio for video images is 4:3 (horizontal to vertical) and therefore the width of the coverage will be approximately 1.33 times the vertical cover.

Camera Positioning

Covering the "Risk Area"

Before deciding upon a position for Video Smoke Detection cameras the risk must first be defined. The client or consultant will need to identify the nature and area of risk within the camera field of view.

If the risk is a defined item or area within the total area being monitored then the camera view should be set to maximise the size of that defined area whilst ensuring that the required monitored items all fit within the field of view. This often conflicts with any CCTV requirements for a camera and as a result AD Group advise against cameras being used for a dual security/VSD purpose.

Consideration must be given to any potential obstructions to the "risk area" being monitored. These may be either permanent, (pipe-work for example), or temporary, (vehicles or plant parked in times of non-operation). Although smoke will rise above and around such obstacles it will reduce the FireVu ability to identify it and increase the detection time, and may remove all chances of seeing flame. Consequently wherever possible the camera should be given a clear direct line of sight to the "risk area".

If the risk is identified as anywhere within the area then a sufficient number of cameras need to be used so that the entire area falls within the "useable" field of view of at least one camera and at least two if a "double knock" requirement is established/ stated. As a minimum neighbouring camera views MUST overlap to ensure the entire area is monitored.

It is advisable to have each monitored area covered from more than one side, and ideally from opposite sides so that the area underneath a camera is covered by an opposing camera view.

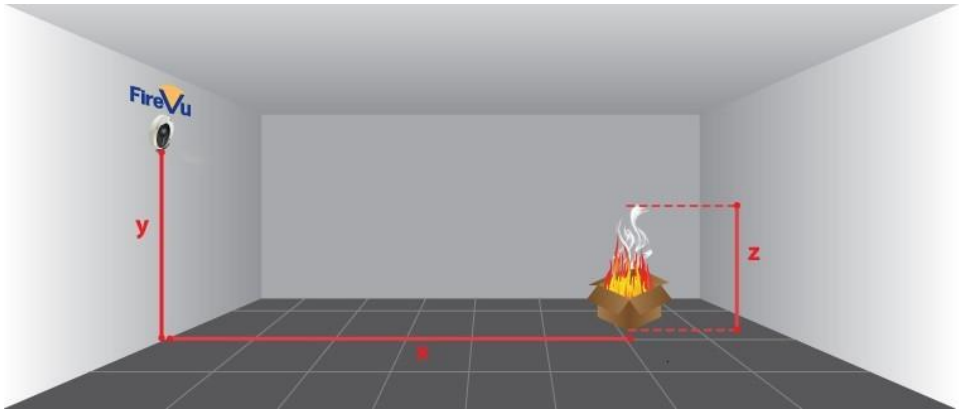
Note: AD Group recommend that wherever possible all parts of a risk area be covered by two cameras so "double knock" alarming can be utilised reducing the chances of a false alarm. This also ensures areas behind/below cameras are covered and that if a camera is obscured the area it is covering is still being monitored by another camera.

The "useable" field of view of the camera is that area within which a fire, or cloud of smoke considered large enough to result in an alarm will occupy 10% of the height of the camera view. A cloud of smoke smaller than 10% of the height of the field of view of the camera may not be detected by the system. As the further away an incident is the smaller it appears, even a large plume of smoke may not be detected if it is so far away that it occupies less than 10% of the camera view height.

As a rough guide a 3.6mm lens will give a wide angled field of view, (approx. 65 degrees horizontally), and so cover a large area left to right but only be capable of detecting to a distance of approximately 10 metres, beyond that a smoke cloud is likely to not occupy the required 10% view height to guarantee detection. Whilst a 9mm lens will give a narrower field of view, (approx. 28 degrees horizontally), requiring a larger number of cameras to cover the same area left to right but be able to

reliably detect to a distance of approximately 15 to 20 meters before an otherwise detectable smoke cloud will fall below the 10% required percentage of view height to be reliably detected.

Therefore in the below diagram if we assumed a 9mm lens, a fire could be 20 metres away (x) and still result in an alarm as long as “z” were 10% or greater of the cameras vertical field of view.



Height

The ideal scenario with VSD is to have the camera positioned such that if the view were split horizontally into two equal parts all “traffic” would pass through only the lower half and the upper half would be sterile. Traffic refers to anything which may move through the field of view and is not always present, e.g. people, vehicles or machinery.

In an office space where the only traffic will be people the camera would therefore be positioned between 2 and 3 metres from floor level, although this may be affected by the ceiling height. In larger, taller spaces the cameras can be positioned higher – the actual height will depend on the expected traffic height and that of the building itself.

Care must be taken not to mount the camera too high resulting in a need to point it downwards, avoiding all movement is not as important as not angling the camera down. The FireVu algorithms “see” smoke rising/moving through the image and will be less effective if looking down upon smoke rising towards the camera as the movement appears differently.

Angle of Camera

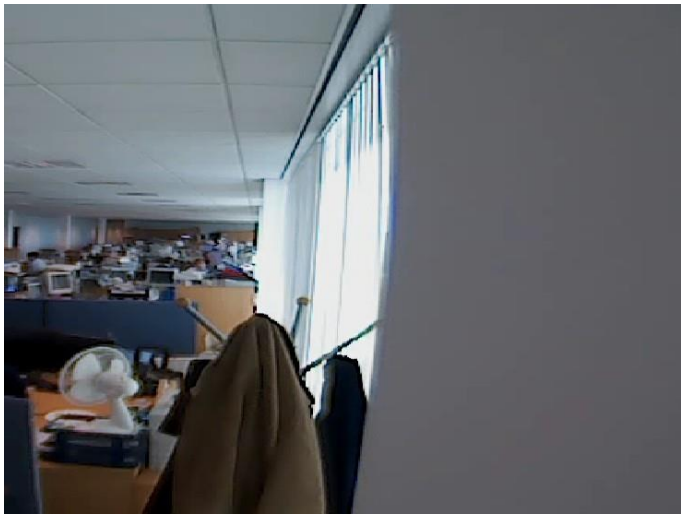
In order to achieve the criteria required to effectively split the camera view into a lower and upper half horizontally and any traffic moving through the scene be confined to the lower half the camera must be looking out horizontally, otherwise traffic at a distance from the camera will cross the split and enter the upper half of the view.

The VSD system works by “seeing” smoke rise through the view, it does not detect smoke if it is rising up towards the camera and or if the camera is looking down on the smoke. Consequently if the camera is positioned at an angle of greater than 20degress it cannot be guaranteed to “see” smoke.

Ensuring maximum “useable” view

When positioning cameras ensure that items or fixings mounted or positioned nearby do not un-necessarily come into the cameras view. For example if mounted beside an air conditioning unit the camera may need to be bought forward so as to not see the side of that unit “up close”.

E.g. – in the below view the camera has been positioned beside a pillar which effectively makes that area of the view useless.



Avoiding “problematic” areas where-ever possible

This can be done with careful placement of the “detection regions” as well as using the “Exclusion masking” feature in the FireVu dashboard configuration tool. However it is worth considering these issues at least in part when positioning the cameras.

In cases where these aspects cannot be avoided from being within the cameras field of view but do not need to be monitored then we can “ignore” them by either arranging the analysed regions so as not to cover those parts or in cases where the “problem” area is small or irregularly shaped we can exclude it using the manual fixed “exclusion mask” feature within the FireVu dashboard configuration tool, which allows us to not analyse as many sections of the view as needed in whatever shape appropriate.

Lighting

Areas of the view where there will be significant changes in light during the course of the day or year can be difficult to configure to see smoke in the differing conditions and not false alarm with the changes in those conditions, if those changes result in such a variety of lighting within a single camera view that in order to accommodate the darker areas the brightest areas saturate the camera sensor.

The easiest way to ensure a stable and reliable configuration which will work well all day long and year round is to avoid having certain areas within the “detection regions”.

Examples of these are:

- External cameras which point due east or west as the sun will come into view at either dusk or dawn. Camera choice is also important here, for example vertically placed dome externally may have problems with the sun refracting within the housings bubble/hemisphere. A box camera, or flat screened dome would be better but care should still be taken.

- External doors/windows which may be left open allowing light to stream in - both the opening itself and the area onto which light will shine should be considered.

- Roller shutter or hanger doors - where possible cameras should be positioned to be looking into the building rather than internally looking towards the doors which would result in looking out of the building in periods when those doors are opened.

- Artificial lighting including IR. If 24 hour operation of the VSD system is required then the cameras will need to be able to "see" at all times, consequently the monitored areas must be lit either by leaving sufficient lights on or fitting IR lighting specifically for the purpose. When fitting either the lighting or the cameras, (subject to which came first or other restrictions), care should be taken so as to avoid any camera looking directly into any of the lighting.

Note: AD Group recommend the use of 850nm IR flood lighting with 60degree spread of light to a length sufficient to cover the room being lit.

- Other lighting – flashing beacons should be avoided where possible if using flame detection.

Background of Image when using cameras externally

Particularly when looking for smoke rather than flame the camera should be positioned to give as sterile a view behind the "risk area" as possible. Continually movement in the background will result in greatly reduced sensitivity of the smoke detection parameters to avoid false alarms. Examples of phenomena to avoid are –

- Large areas of sky/cloud – distant clouds can be easily mistaken as smoke and so areas of sky should not be monitored.
- Machinery/natural phenomena which will emit steam
- Plant which emits smoke
- Visible air-borne particles

Cabling Requirements

Cameras should be cabled in the normal way using fireproof co-ax suitable for the lengths of run involved. The FireVu should be fed with the video signal before any other piece of equipment. Connection into the FireVu is by standard 75Ω BNC. The BNC loop-through connectors should be used to allow onward transmission of the video signal to other equipment if/as required.

Ground isolation transformers may be required if hum bars are visible on a monitor as a result of ground potential differences/poor grounding of the cameras.

Any connection between the FireVu and the items to which it is networked, or if appropriate the FM approved FACP should be run in fireproof cabling/twisted pair.

Appropriate Applications for FireVu

FireVu can be deployed as an effective detection system in nearly all environments, and any decision not to utilise FireVu is usually as a result of lower cost conventional technology being able to provide an appropriate solution and not because of any technical shortfall with FireVu.

Conversely there are applications where cheaper more conventional solutions simply cannot offer an effective detection solution and here FireVu is often the best or even the only viable solution.

Such environments/applications include but are not restricted to:

- Any area with very large air spaces where smoke will stratify before reaching ceiling mounted detectors or high up beam detectors.
- Any area with large amounts of complex machinery.
- Any area of machinery that produces an oil haze or that is too hot for point detection.
- External applications.
- Any area which cannot support other forms of early detection for aesthetic reasons.
- Any area where an intrusive form of detection cannot be used and detectors can only be installed where they would need to look through viewing glass, for example in hazardous or nuclear waste storage areas.
- Areas where chemical fires produce smoke which damages obscuration type detectors, (yellow phosphorous for instance produces an acid when mixed with moist air).
- Areas where health and safety requirements make the installation of conventional forms of fire detection difficult or expensive.

Situations to avoid when using FireVu

FireVu is a visual based Fire detection system and as a consequence any phenomena which shares the visual properties of smoke, or results in pixel by pixel changes within an image similarly to smoke will be identified as smoke by FireVu.

This does **not** create environments where FireVu should not be used but certain considerations need to be taken as to whether a FireVu camera should be configured to monitor its entire view or whether a form of masking should be employed to "ignore" certain areas.

Below is a list of the types of areas where care needs to be exercised in deciding where to monitor:

- Where background smoke levels are very high such as welding processes or excessive diesel smoke from forklift trucks etc. (reasonable levels of background smoke can be tolerated).
- Lighting conditions likely to cause camera flare/saturation of the camera sensor.
- Where the camera is required to view through things such as mesh fences, blinds, railings, frosted glass and other items likely to cause obscuration or deterioration of the image.
- Lighting levels which are lower than the camera is capable of dealing with.
- Highly polished shiny floors, especially if combined with large openings where shadows and bright sunlight will cause reflections and large contrast changes.
- Flashing beacons or lights on fast moving vehicles if using flame detection.

Setting the System Up

Default – "as shipped"

The FireVu server is shipped from manufacture pre-configured with a default configuration and set of parameters. This "default" configuration is specifically designed to offer effective detection in most environments, however some further configuration may provide a more robust solution in extreme cases.

Relay Output Default Configuration

The FireVu server is supplied with 22 internal relay outputs. The first 4 of these are "Global" relays and can be configured to open/close in response to a generic state – this covers trouble signals which effect the FireVu server as a whole or an alarm signal from ANY of the 8 camera inputs.

The following states can be configured to activate any one of the 4 Global relays:

- Zone – in response to a Zone alarm, this covers Smoke and Flame & Image Trouble signals – the latter being Images which cannot be monitored.
- Camera Fail – in response to a faulty camera or loss or connection to a camera.
- Camera Masked – in response to a camera being covered or the contrast dropping too low.
- Is Recording – to fire when the unit is recording the footage from the cameras
- Not Recording – to fire when the unit fails to record or is set not to record
- HDD Problem – in response to the FireVu server being unable to detect or to write to its hard disk drive

As shipped the FireVu server's global relay outputs are configured as follows:

Relay 1 – will open/signal an alarm state for a Fire alarm from any camera channel.
Relay 2 – is not assigned.
Relay 3 – will open/signal an alarm state for a camera fail alarm from any camera channel.
Relay 4 – will open/signal an alarm state when a camera is masked providing a trouble signal.

If only two FACP inputs are available it is recommended that Camera Masking be changed to Relay 3 so that all troubles result in Relay 3 activation, the other FACP input having been connected to Relay 1 of the FireVu for Fire alarm signals.

However if the Relay 1 is used as a single Alarm input it will be activated on Fire alarm & when the FireVu detects that one of the cameras is providing an image which it cannot analyse because of bright light or a contrast level that may indicate smoke has engulfed the whole view, this goes into alarm as a fail-safe. This will only apply if the "High Light Inhibit" has been enabled and configured to provide an output as defined from page 36 of this manual.

If the "High Light Inhibit" feature has been enabled and the user does NOT want a global dry contact output to include those trouble signals then this can be achieved

using the “Zone Input” and “Zone Actions” configurations described on page 29 of this manual but setting the same relay to be used for Zones 1 to 8 which are configured to provide an output in response to Fire detection from cameras 1 to 8 inclusive.

If multiple latching relay inputs are available on the FM approved FACP then the remaining 18 relay outputs can be configured to provide a closed/open contact in response to individual camera activations or trouble signals. This enables a per camera output to the FACP to which the FireVu is being connected. These 18 relays are pre-configured as follows on a FireVu as shipped:

Relay 5 – Smoke or Flame Alarm Camera 1
Relay 6 – Smoke or Flame Alarm Camera 2
Relay 7 – Smoke or Flame Alarm Camera 3
Relay 8 – Smoke or Flame Alarm Camera 4
Relay 9 – Smoke or Flame Alarm Camera 5
Relay 10 – Smoke or Flame Alarm Camera 6
Relay 11 – Smoke or Flame Alarm Camera 7
Relay 12 – Smoke or Flame Alarm Camera 8
Relay 13 – Fault/Trouble Indication Camera 1
Relay 14 – Fault/Trouble Indication Camera 2
Relay 15 – Fault/Trouble Indication Camera 3
Relay 16 – Fault/Trouble Indication Camera 4
Relay 17 – Fault/Trouble Indication Camera 5
Relay 18 – Fault/Trouble Indication Camera 6
Relay 19 – Fault/Trouble Indication Camera 7
Relay 20 – Fault/Trouble Indication Camera 8
Relay 21 – Spare
Relay 22 – Spare

N.B – the above is fully configurable within the FireVu web-pages, the above simply describes the default or as shipped settings. This can be altered so that a single alarm and trouble relay can be used when there are not sufficient FACP contacts available.

Alternatively the 18 expansion relays can be left unconnected and only the global relays utilised providing either an alarm state from any camera input, (Relay 1 for Fire), and a global trouble output to annunciate camera failure or masking.

Detailed Relay Contact Configuration

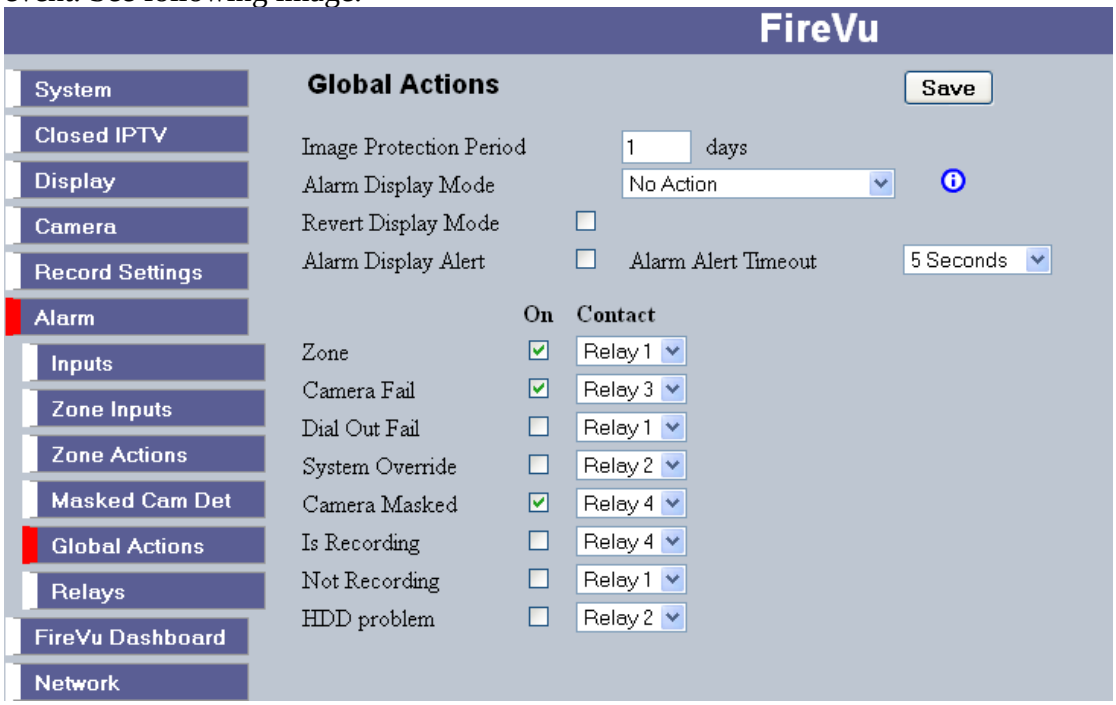
Global Relays

The FireVu can be configured to fire one of the 4 global relays in response to a set list of pre-determined events. Only one Relay can be selected per Global event but the same relay can be chosen to be driven for more than one type of event – it should however be noted that if this is done there is no way of the receiving equipment (FACP for example), determining what type of event provided the input as it will only see the given relay activation and not the reason – the reason would only be found be reviewing the FireVu inbuilt event log..

It is therefore highly recommended that Fire alarm, camera fail and image trouble signals be separated out so as to provide a meaningful input to the FACP.

The Global relay configuration can be found in the user configuration web-pages as a sub menu entitled “Global Actions” located below the “Alarm” tab within the list on the left hand side of the screen – all located under “Configuration” when connecting to the web-pages for the first time.

The below page will be displayed, with the Global events listed towards the bottom, simply select/enable the ones you wish to provide an output by choosing the relevant tick box, (some will already be selected as part of the default configuration), and by using the drop down menu you can assign a relay from 1 to 4 to each enabled Global event. See following image.



Individual Relays

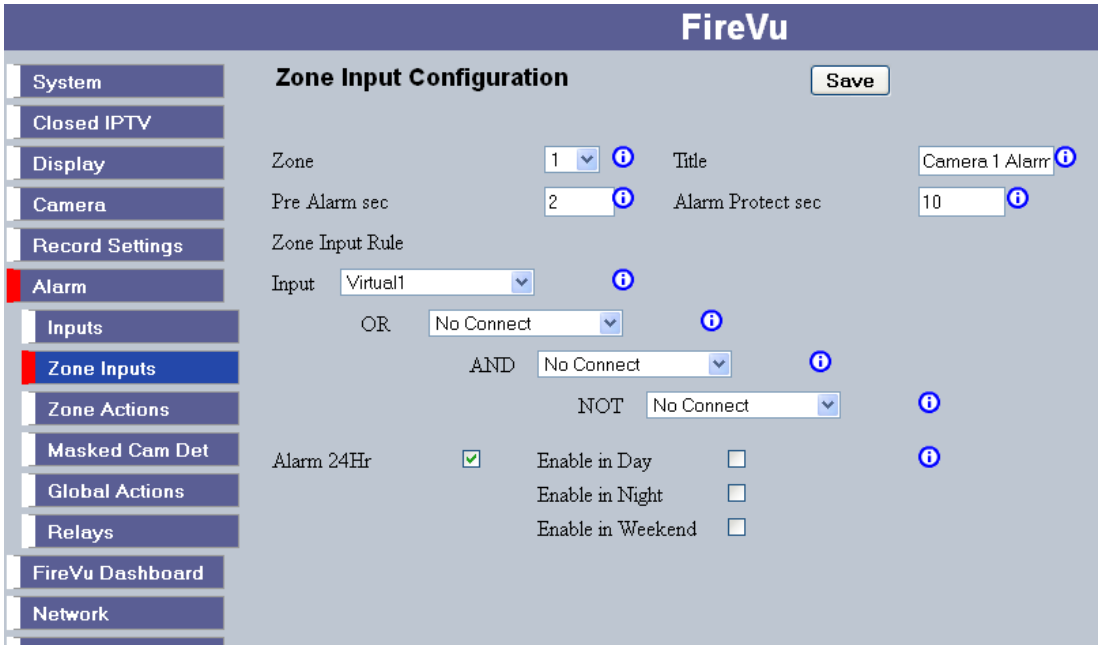
As referred to earlier in this document there are 18 relays which offer more specific functionality. This is achieved using the Zone Alarms configuration within the FireVu server web-pages.

The below documented web pages describe how to configure the FireVu servers alarm handling functionality to provide the desired outputs should you be able to accommodate multiple signals with the connected FACP – beyond simply an alarm and a trouble output.

It should be noted that the FireVu will be shipped with a default configuration for these outputs as described earlier in this manual. Consequently as shipped alarm and trouble events will activate both a Global and an individual relay output, but if the individual in not connected this will have no detrimental effect.

Zone Input Configuration:

The first point of user specific configuration is to assign each activity to be configured to provide an output with a “Zone”. The “Zone Input Configuration” page is located within the “Alarm” tab beneath the “Configuration” tab in the FireVu web-pages. See following image.



The following convention is the recommended configuration and the FireVu server is shipped with this as its default setup, if the configuration has been altered then below is what it should be set back to unless specifically required to be otherwise, (N.B each Zone as listed below can be viewed by selecting the drop down box next to “Zone” and choosing the relevant number):

Zone	Title	Input
1	Camera 1 Alarm	Virtual 1
2	Camera 2 Alarm	Virtual 2
3	Camera 3 Alarm	Virtual 3
4	Camera 4 Alarm	Virtual 4
5	Camera 5 Alarm	Virtual 5
6	Camera 6 Alarm	Virtual 6
7	Camera 7 Alarm	Virtual 7
8	Camera 8 Alarm	Virtual 8
9	Fault Camera 1	Virtual 9
10	Fault Camera 2	Virtual 10
11	Fault Camera 3	Virtual 11
12	Fault Camera 4	Virtual 12
13	Fault Camera 5	Virtual 13
14	Fault Camera 6	Virtual 14
15	Fault Camera 7	Virtual 15
16	Fault Camera 8	Virtual 16
17	Zone 17	Alarm 1
18	Zone 18	Alarm 18
19	Zone 19	Alarm 19

20	Camera Masking	Alarm 20
21	Zone 21	No Connect
22	Zone 22	No Connect
23	Zone 23	No Connect
24	Zone 24	No Connect
25	Zone 25	No Connect
26	Zone 26	No Connect
27	Zone 27	No Connect
28	Zone 28	No Connect
29	Zone 29	No Connect
30	Zone 30	No Connect
31	Zone 31	No Connect
32	Zone 32	No Connect

The Zone title can be set by simply typing the required title into the text box beside "Title" and this is the text/label that will be shown in the FireVu event database when reviewing footage and events with AD Groups viewer "NetVu Observer".

The "Input" is selected from the drop down box labelled "Input".

Other options on this page allow you to define a duration of time for which video footage from a camera which gives an alarm is protected, (although enabling the feature to protect video on alarm is itself located in the "Zone Actions" web-page described below). The "Pre Alarm Sec" allows you to define a period of time before the alarm event for which the footage will be protected and so not overwritten with future recordings, (as would happen otherwise once the FireVu has recorded footage to all of its internal hard drive and thus starts to record over the oldest footage – unless that is write protected). The "Alarm Protect Sec" allows you to define how much footage, (in time), should be protected after the alarm event.

Below the "Input" drop down menu you have the option to define further Inputs on a "OR", "AND" or "NOT" basis – this allows setup for double knock events or one event whilst another is not present or a combination or two events either being present to provide an activation. By default these are not in use.

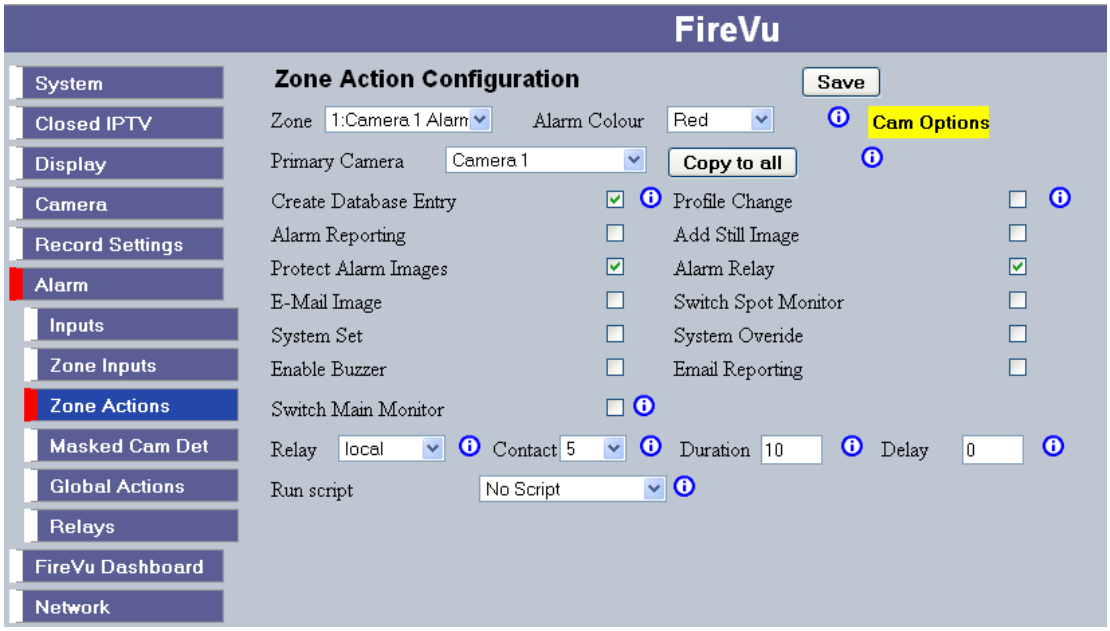
Finally you are able to define when the system is active by selecting one of 4 tick boxes –

- Alarm 24Hr – always active – selected by default
- Enable in Day
- Enable in Night
- Enable in Weekend

The latter three options work in conjunction with a set or unset signal that can be provided using the FireVu alarm inputs so that the system only runs out-of-hours if required. It is recommended that Alarm 24Hr always be the selected option, with the others utilised ONLY by an AD Group engineer on very specific circumstances.

Zone Action Configuration:

Having assigned the Zones as described above there are then several “Actions” which can be configured in response to any alarm or trouble signal activation, these are all assigned or enabled using the “Zone Action” web-page which appears beneath the “Alarm” tab within the “Configuration” option on the web-pages.



To configure a zone to perform certain actions you must select that zone from the drop down box at the top left labelled “Zone” – note the zones are named as set in the last section of this manual, and any changes made to those names in the “Zone Inputs” web-page will be passed through to this page.

For each zone you can enable one or multiple actions by ticking the associated tick box beside each action:

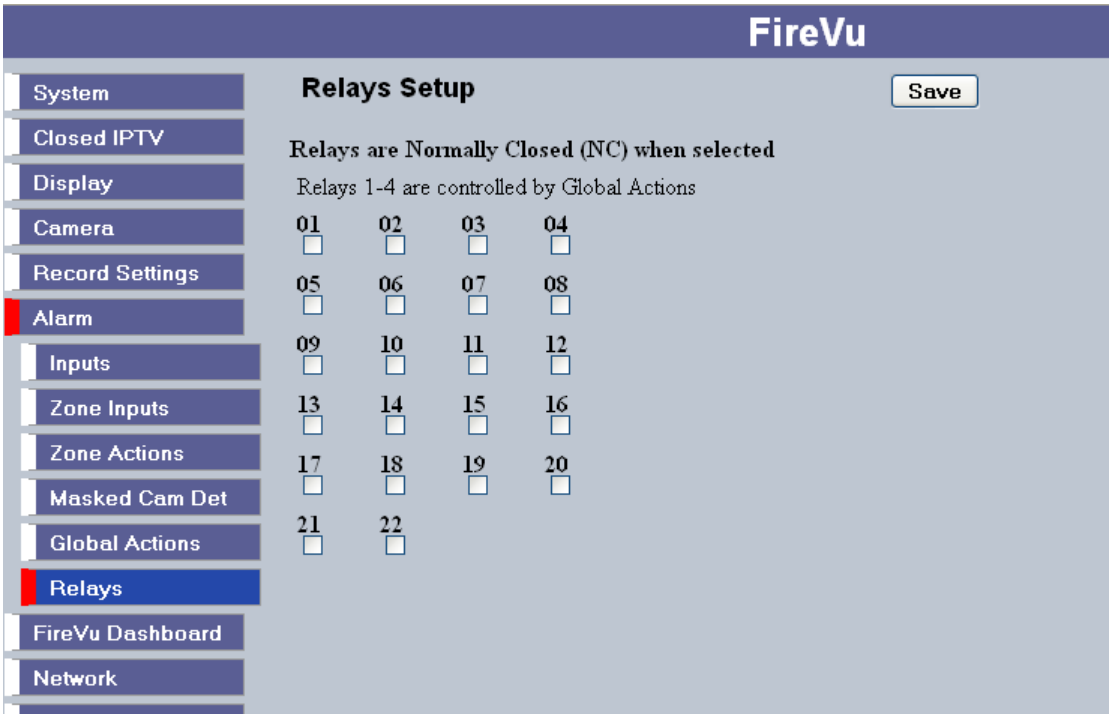
- Create Database Entry – this will list the alarm/trouble within the FireVu event log, which can be viewed from AD Groups NetVu Observer video viewing client, logged events can be selected to navigate straight to the camera and timed footage of the event for review.
- Alarm Reporting – if selected any event can be reported to a remote receiving centre. This feature is not enabled by default and should only be configured by a trained AD Group engineer.
- Protect Alarm Images – enabling this means any footage from a camera in alarm is protected so it is not later recorded over until specifically selected to be un-protected which is done in the “Record Settings” menu.
- E-Mail image – a JPEG image is captured of the footage at the point of alarm/ trouble and e-mailed to a selected address.
- System Set – The system can be put into “Set” mode on an alarm.
- Enable Buzzer – within the FireVu server is a audible buzzer, this can be configured to sound on alarm.
- Switch Main Monitor – the FireVu server has an HDMI and composite monitor output, which can display one of any of the cameras connected or a multi-way view of several cameras at once, selecting this option will

automatically switch that monitor out to the most recent camera to provide an alarm or trouble signal – the monitor will continue to show that camera as a live feed for a configurable length of time.

- Profile Change – the record settings, (pictures per second bit-rate and image resolution), can be altered on alarm, this may be used to provide better quality recorded video on alarm/trouble for post event review whilst maintaining a lower record quality when not in alarm/trouble and thus increasing the achievable record duration on the FireVu internal hard disk drive.
- Add Still Image
- Alarm Relay – This MUST be ticked if per camera signals are to be fed to a FM approved FACP with latching relay contacts for trouble and alarm signals as it tells the system to open/close the relevant relay contact.
- Switch Spot Monitor – as well as a main monitor the FireVu has a simple full screen spot monitor display output and as per the main monitor on alarm the spot monitor output will switch to the camera in alarm/trouble.
- System Override
- Email Reporting – will report alarm and trouble signals to a configured e-mail address.
- Relay – allows you to select a "local" relay – one on the FireVu or a "virtual" one which may be a ModBus device – only an AD Group trained engineer should use anything other than "local", all other users should leave this as "local".
- Contact - a drop down menu from which any of the 22 relays available can be selected – N.B relays 1 to 4 are the Global relays and so if a per channel configuration is required you should start from Relay 5 for camera 1 and work up from there, (the system is configured in this manner when shipped). If you wish to have a single relay output for all alarms and a second single output for all faults – for example using a FM approved FACP with only two latching relay inputs available then you MUST allocate the same relay contact for Zones 1 to 8, (smoke/flame alarms cameras 1 to 8), and AD Group recommend using contact 5 and DO NOT use contacts 1, 2, 3 or 4, and then zones 9 to 16, (Trouble/Fault cameras 1 to 8), must have contact 3 allocated so camera troubles and unit troubles are all annunciated using the same contact output – relay 3.
- Duration – allows you to determine how long the chosen relay is activated for on alarm.
- Delay – allows you to insert a delay between the Zone activation, (the alarm or trouble event) and the activation of the relevant relay contact.

Relay "States"

The Relays in a FireVu system can be set to be Normally Open or Normally Closed, this enables the user to set them so that they are held closed and will go open on a power failure providing a trouble signal and "fail safe" state if the FireVu unit were to experience a loss of power.



In order to alter the state from Normally Open to Normally Closed for any of the 22 relays tick the relevant box.

N.B – relays 1 to 4 are the Global relay contacts from the FireVu server and 5 to 22 are the 18off fully configurable “per camera channel” relays contacts.

Smoke/Flame Detection Parameters

These parameters cover all levels of the system configuration and smoke and flame detection algorithm and as a result the FireVu server is suitably configured for a relatively sterile environment where the entire view of each camera is to be monitored for smoke.

Although all parameters within the FireVu are fully configurable down to each of the 16 available regions on each of the 8 channels the FireVu does have 3 default settings, High, Medium and Low, where High is the most sensitive and Low the least. The unit is shipped with the High settings enabled.

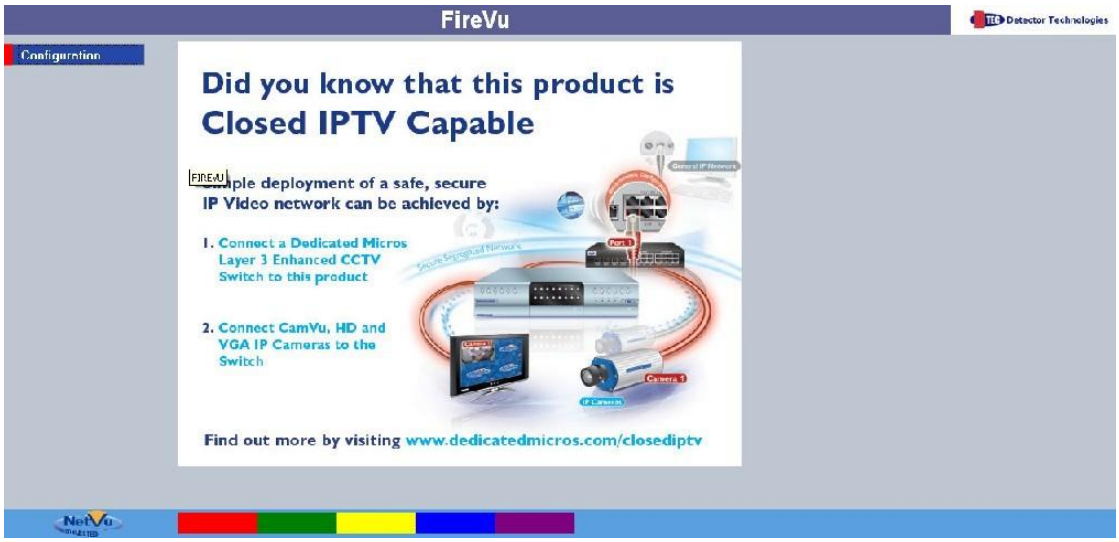
Consequently changes will only need to be applied at installation if there are areas of the camera views to be manually or dynamically masked out.

Configuration beyond selecting a sensitivity level and simple Region placement and masking MUST only be carried out by a trained AD Group Engineer or agent and as a result such configuration is not covered within this manual.

All configuration of the FireVu is performed using the FireVu web-pages.

FireVu Dashboard Web-Pages

Connecting to a FireVu server



- Open a web browser, (Mozilla FireFox recommended)
- Type the IP address of the FireVu server to which you wish to connect in address “bar” at the top.
- Hit “Enter”
- If connection is successful the above start page and splash screen will be displayed.

FireVu Parameter Options

There are two sets of parameters which can be configured for FireVu detection. The first set "SET 1" is always used, as shipped both SET 1 & SET 2 are configured with the same default settings.

By having a second SET of parameters a different level of detection can be employed as appropriate, for example a more sensitive set in unoccupied times, the switch between SET 1 and SET 2 can be initiated based on time or an external input.

Within the "Parameters" web-page the user can define whether Low, Medium or High sensitivity levels are applied to each channel/camera input of the FireVu using the "Camera" drop down menu to select the camera channel to be configured.

"VSD Setup" & Pre-Processor Web-pages

The "VSD Setup" and Pre-processor web-pages are engineering evaluation tools and changes to these pages can only be made by trained engineers, and only when the FireVu is in "Open configuration" mode.

Trouble/Fault Conditions

As defined earlier in this manual the FireVu offers detection and annunciation of several trouble states. There are two main categories of fault detected:

- Hardware Failure/Trouble
- Image Trouble – this is created when the unit identifies that it cannot monitor the scene and is seeing something which may hide a legitimate smoke detection – as a result this Trouble signal is tied in with Fire signals and also fires Global Relay 1. (See earlier in manual for how to configure FireVu to provide ONLY Fire signals on a global output and not include this type of trouble – this is only relevant when wanted and when interfacing with an FM approved FACP which has limited latching relay contacts for trouble and alarm signals).

Hardware failures include:

- Camera Failure
- Record Failure
- Power Failure

These failures are reported by means of a relay output from one of the 4 Global relays providing an indication of either the FireVu not recording or any one of the cameras not being seen. The relay outputs are held closed by the FireVu server and so if it loses power ALL the relays will go open – into trouble state. This can be set by choosing which relays to have normally closed or normally open as defined earlier in this manual.

In default or as shipped configuration as well as activating relay 1 an image Trouble signal will also activate one of the single purpose relays 13 to 20, providing a trouble

signal on a by camera basis with a separate relay output for each camera connected to the FireVu as defined below:

Relay 13 – Trouble Camera 1
Relay 14 – Trouble Camera 2
Relay 15 – Trouble Camera 3
Relay 16 – Trouble Camera 4
Relay 17 – Trouble Camera 5
Relay 18 – Trouble Camera 6
Relay 19 – Trouble Camera 7
Relay 20 – Trouble Camera 8

This can be re-configured so that only one relay output is given for a image trouble on any of the camera inputs by configuring the Zone Inputs and Zone Actions described earlier in this manual so that Zone 9 to 16 all activate the same relay – contact 3 should be used - this is only required if a single output other than relay 1 is wanted for trouble signals.

Image Trouble signals are generated under the following circumstances:

- Low Light – insufficient illumination in image
- High Light – bright or intense source of light in cameras field of view which may saturate the sensor and prevent effective fire detection.

"Fault Warning" Web-Page

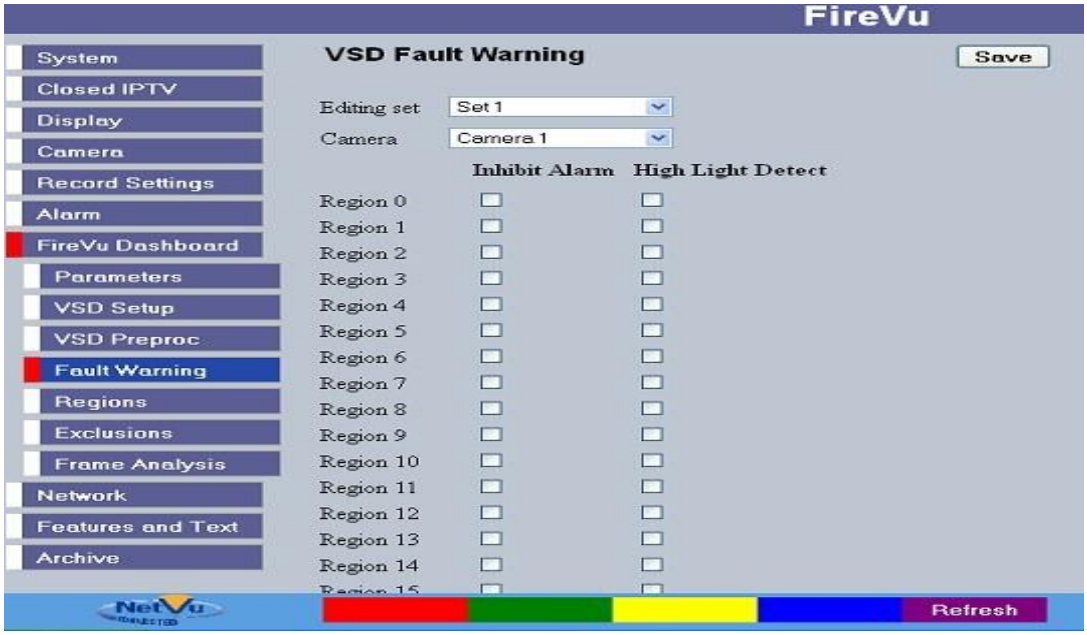
Bright light which is intense enough to saturate a camera sensor can result in a false alarm as the pixel changes within the image will look similar to the smoke detection algorithm to that of smoke. Additionally it can make the video from the camera subjected to the bright light un-useable for FireVu monitoring.

Consequently the FireVu has a feature whereby it can flag a trouble signal in any region where bright light is present at certain times and can be set to detect this bright light, this feature is called "high light detection", and can be enabled on a region by region basis on each camera using the "Fault warning" web-page.

At the top of the page are "Set" and "Camera" drop down menus which allow you to select the parameter set and camera channel to configure.

Having selected the relevant parameter set and camera channel you can then turn on the "High light detection" on a region by region basis.

Having enabled the FireVu to detect a "High light" condition you then have the option of setting that region to be "inhibited" if the "High light" detection results in a false alarm. This means that a region identified as suffering from high light detection can be selected to not count towards an alarm vote until it is no longer suffering from the high light situation. A screen shot of the "Fault Warning" page described here is shown below:



Low Contrast Trouble/Fault Indication

One of the methods by which FireVu intelligent algorithms determine the presence of smoke is through a reduction in contrast within the monitored view.

As a result for this method to be effective there needs to be a detectable amount of contrast within the camera view that can therefore be measured, to assist in ensuring this is the case FireVu is capable of providing a trouble/fault indication when there is insufficient contrast.

This warning is turned on by default but by default will only provide a visual indication of areas of insufficient contrast when the camera signal is viewed in AD Groups NetVu Observer viewing software.

Any Region, (and therefore monitored area of the cameras view), which contains insufficient contrast will become highlighted grey as a trouble/fault indication.

This can be used in one of two ways:

- A visual indication that areas within the field of view have very little or no detectable contrast.
- By enabling the “Inhibit alarm” option for the required regions within the “Fault Warning” web page under the “FireVu Dashboard” section of web pages (see previous section in this manual), you can generate an output from the FireVu server if/when any region looses its contrast.

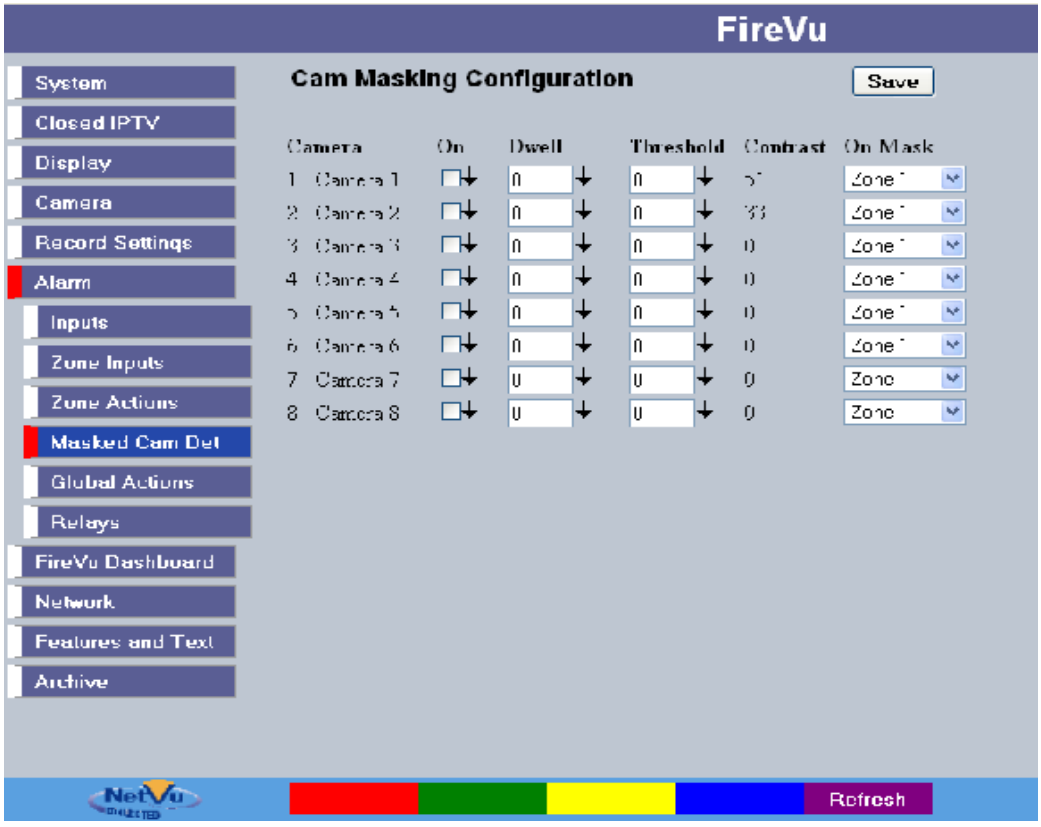
The second option listed above will therefore create a system alarm when an area of the monitored view which usually has sufficient contrast for effective detection reduces in contrast. This will draw the user’s attention to excessively dirty cameras or cameras which go out of focus, as either of these situations will erode the measurable contrast.

Focus Trouble/Camera Masking Indication

In addition to fault indications the FireVu server can be configured to provide an output if the image provided by a camera becomes un-useable as a result of being masked, this could be as a result of the camera's view going out of focus, an excessive dirt build up on the camera housing or if a camera is deliberately covered over or closely blocked following some form of site activity.

By default the camera masking detection is turned on and the below instructions can be followed, however if the feature is ever turned off then to turn it back on there is a tick box labelled "Camera Masking" in the web-page menu structure, ("Configuration" then "System" then "Features"). Once turned on the unit will asked to be reset – this needs to be done to enable the camera masking feature and make its configuration menu visible.

Following a reset a "Masked Cam Detect" page will become visible within the units web-pages, this will appear under: "Configuration", "Alarm" then "Masked Cam Det", see image below:



From this menu you are able to turn the feature on for each camera 1 to 8. The "Dwell" defines a period of time for which the system needs to have detected a "masking" of the camera before it will alarm. It is strongly recommended that this is not left as zero as this may result in camera masked alarms every time a large object passes within the camera vicinity, a level of 5 being 5 seconds is advised.

The "Contrast" column indicates a numeric representation of the current contrast within the camera image, if the camera is masked either fully or partially this level

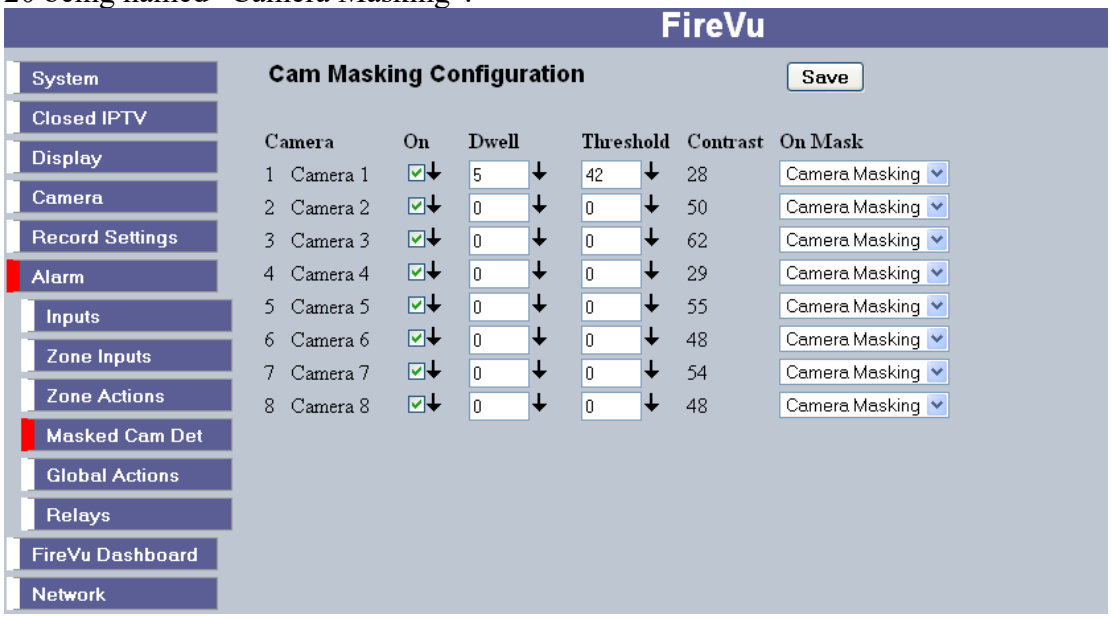
will drop. This remains at the level detected when the page is first loaded, and so any changes in the contrast measurement whilst the page is displayed will not be seen, however selecting the “Refresh” button at the bottom of the page will show if/how the contrast level is changing/fluctuating.

The “Threshold” is a user defined level which if the detected contrast drops below will result in a fault alarm.

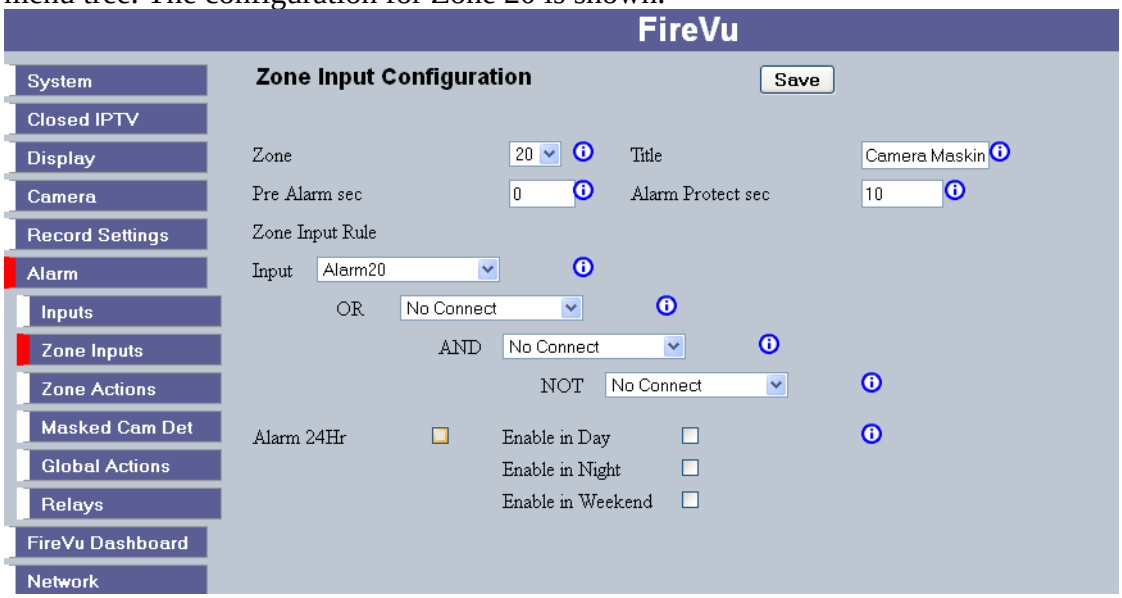
When setting the threshold level consideration must be taken for how much the contrast level will vary for each scene throughout the day, as contrast may be effected by lighting levels and may differ between a colour image under natural light and the same scene but as a mono image under IR lighting. As a start point it is recommended that the Threshold be set 3 or 4 points below the current measured level.

What happens when there is masked camera detection is defined by a zone, the “On Mask” column allows the user to define which zone is activated and the results of that zones activation are then determined by what it is configured to do.
The “On Mask” column provides a drop down menu option for each camera enabling you to select a zone to be activated following masking of any camera or a per camera zone enabling the user to have an output which will determine which camera has gone into “mask” alarm. By default this should be set to Zone 20 which is titled “Camera Masking” as detailed on page 29 of this manual.

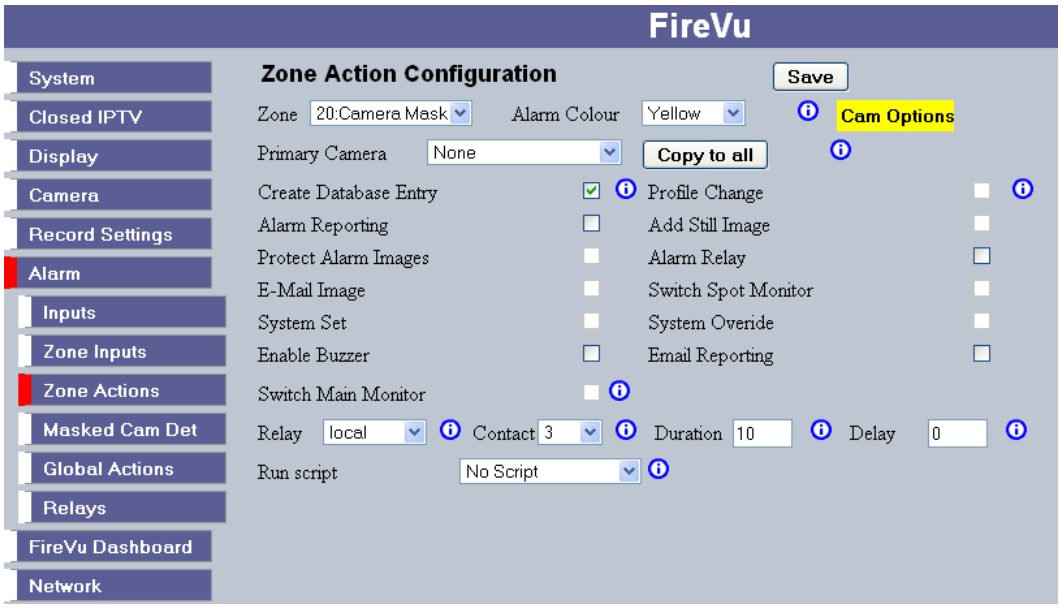
In the example below, (from selecting “Alarm” “Masked Cam Det” in the web-page menu), only camera 1 has been fully set up for “mask” detection, Zone 20 was selected as a Global Zone for a masked detection from any one of the 8 cameras Zone 20 being named “Camera Masking”.



The below web page is viewed by selecting “Alarms” then “Zone Inputs” in the main menu tree. The configuration for Zone 20 is shown.



Configuring what happens when a zone is activated is done within the “Zone Actions” web-page which is located under the “Alarm” option just above the “Masked Cam Det” option described above. In this page you are able to define what happens on the activation of the zone by selecting various options listed, see below:

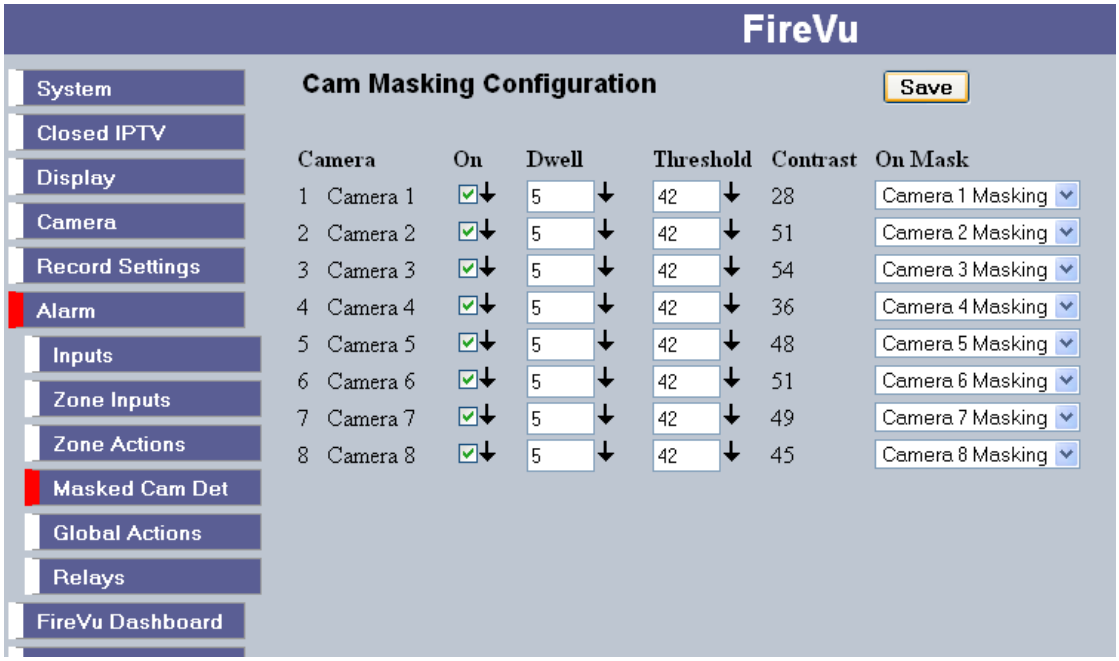


In the above image the set-up for Zone 20 Camera masking is shown, here it has been configured to create a database entry when the system detects that a camera has been masked.

Here it has not been configured to activate a relay and so relay 4 by default, (or relay 3 if limiting all trouble signals to one output), would be activated on “Camera Masking” by way of the Global Relays configuration as defined earlier in this manual.

As with all outputs the FireVu can be configured to provide per camera trouble signals for camera masking, to do this you would need to configure Zones 20, 21, 22, 23, 24, 25, 26, & 27 as follows:

- Within the “Zone Inputs” web-page label them as:
    - Zone 20 – Camera 1 Masking
    - Zone 21 – Camera 2 Masking
    - Zone 22 – Camera 3 Masking
    - Zone 23 – Camera 4 Masking
    - Zone 24 – Camera 5 Masking
    - Zone 25 – Camera 6 Masking
    - Zone 26 – Camera 7 Masking
    - Zone 27 – Camera 8 Masking
    - Tick Alarm 24Hr for these zones
- Within the “Zone Actions” web-page for all zones 20 to 27 inclusive tick the “Alarm Relay” box and select the relay you want to fire from the “Contact” drop down menu – N.B care needs to be taken as to what relays are selected for other use, as this is a trouble signal its is recommended that the following relays be chosen so that all per channel trouble signals are result in the same relay per camera:
    - Zone 20 – Relay 13
    - Zone 21 – Relay 14
    - Zone 22 – Relay 15
    - Zone 23 – Relay 16
    - Zone 24 – Relay 17
    - Zone 25 – Relay 18
    - Zone 26 – Relay 19
    - Zone 27 – Relay 20
    - Ensure a Duration is set for each zone/relay
- Within the “Masked Cam Det” page you assign the ON Mask drop down boxes as shown:



Connecting to an FM approved FACP or BMS Requiring one single trouble/fault indication

It is recognised that in some applications the user may not wish or may not be able to accept numerous inputs due to the number available to them on their Fire Alarm Control Panel FACP, or building management system BMS.

In such cases the FireVu output configuration is completely flexible and can be altered so that a trouble/fault state from any of the 8 cameras will fire the same relay contact.

Earlier pages explain how and where to alter specific options within the FireVu web-pages so as to enable the desired contact output configuration for the FM approved FACP with latching relay contacts for trouble and alarm signals, or the BMS being interfaced to.

A FireVu server(s) should be connected to an FM approved fire alarm control panel FACP with latching relay contacts for trouble and alarm signals, and all events including faults and alarms will be annunciated and controlled at the FM approved FACP or primary control unit.

Adjusting Detection Zones

FireVu is capable of providing up to 16 detection regions per camera, and as shipped/ standard each view is split into the maximum 16 as a 4 x 4 grid.

However should the specific camera view to be monitored require it these regions can be altered, and are in fact fully configurable as to the number used, (1 to 16), the placement of them, the size of them and how much of the camera view they actually cover.

The act of breaking the camera view down into multiple regions provides a high degree of flexibility and the ability to customise each and every camera view to provide a highly robust detection with minimal false alarm risk. There are three main benefits achieved with this method:

1. Areas within the camera view which may cause false alarms, have steam or smoke present as part of a manufacturing or other process, or are simply not of interest can be excluded from the active analysis of FireVu algorithms simply by not covering those areas with a region.

2. Regions can be sized and positioned so as to cover similar areas within each field of view, this may prove useful if needing to filter out non-smoke phenomena using the colour filtering tool.

3. Providing cameras are installed in accordance with AD Group's recommended best practice the upper half of the view will be capable of being more sensitive than the lower half of the view. This is achieved by using different parameters in the regions located above the half way mark and those regions located below the half way mark.

Note: Any area of the camera view which does not fall within a region is NOT being monitored and smoke/flame present in such areas will not be detected until it spreads to areas which are within the detection zones.

The only rules relating to detection regions are:

- There must be at least one region
- They must not overlap
- They must be of a pixel size divisible by 8 – if not the configuration tool will highlight the region in red in the "region list" so that attention is drawn to it.

Adding/Removing or Adjusting Regions

To add, remove or alter a region navigate to the relevant web-page once connected to the unit in a web browser – described above.

The initial web-page/splash screen will have a button labelled “Configuration” at the top left of the page, selecting this will open the full web-page options tree.

The forth item from the bottom of the list is called “FireVu Dashboard”, selecting this button will open the FireVu Dashboard configuration options list.

Select the “Regions” button and from here the regions can be altered as required, the below web-page will be displayed:

At the top of the regions page is a camera drop down box, here you select the camera you wish to configure. On selecting a camera the image from that channel will appear in the page and be over layed with any existing regions, no overlay means no regions are set.

If no regions are present they can be added/created in a number of ways:

1. A grid or regions of equal size can be created by putting the number of horizontal and vertical regions required into the “X” and “Y” boxes beside the “Grid” text. Note – maximum region count is 16 so the grid numbers must result in a grid which would exceed 16 regions. The “Default” button will populate a 4 x 4 grid. Once the “X” and “Y” grid numbers are populated select the “Go” button to create the grid overlay in the web-page, then select “Save” to save it to the FireVu server.

2. Individual regions can be created by selecting the region in the “Regions” drop down box and then selecting “Enable” in the other drop down box, the region will then appear in a default grid position and can be amended from there if required.

3. Once created regions can be altered manually using the mouse by positioning the cursor over either the top left or bottom right corner of the region and then clicking the left hand mouse button and dragging the cursor in the direction required to alter the region as wanted.

Note: if you attempt to set a configuration which would exceed 16 regions then only the first 16 will be created, starting from the top left and working across to the right and then down, if left this will result in an area starting from the bottom right of the view not being covered.

Once created regions can be moved and re-sized in two ways:

1. Select the region with the mouse from the drop down “Region” menu and then adjust it as required by dragging the mouse cursor.

2. Select the region with the mouse from the drop down “Region” menu and then adjust it as required by typing the new upper and lower X and Y co-ordinates for each corner of the region in the boxes labelled “Top Left X”, “Top Left Y”, “Bottom Right X” & “Bottom Right Y”. The X axis runs from 0 to 351 and the Y axis from 0 to 255.

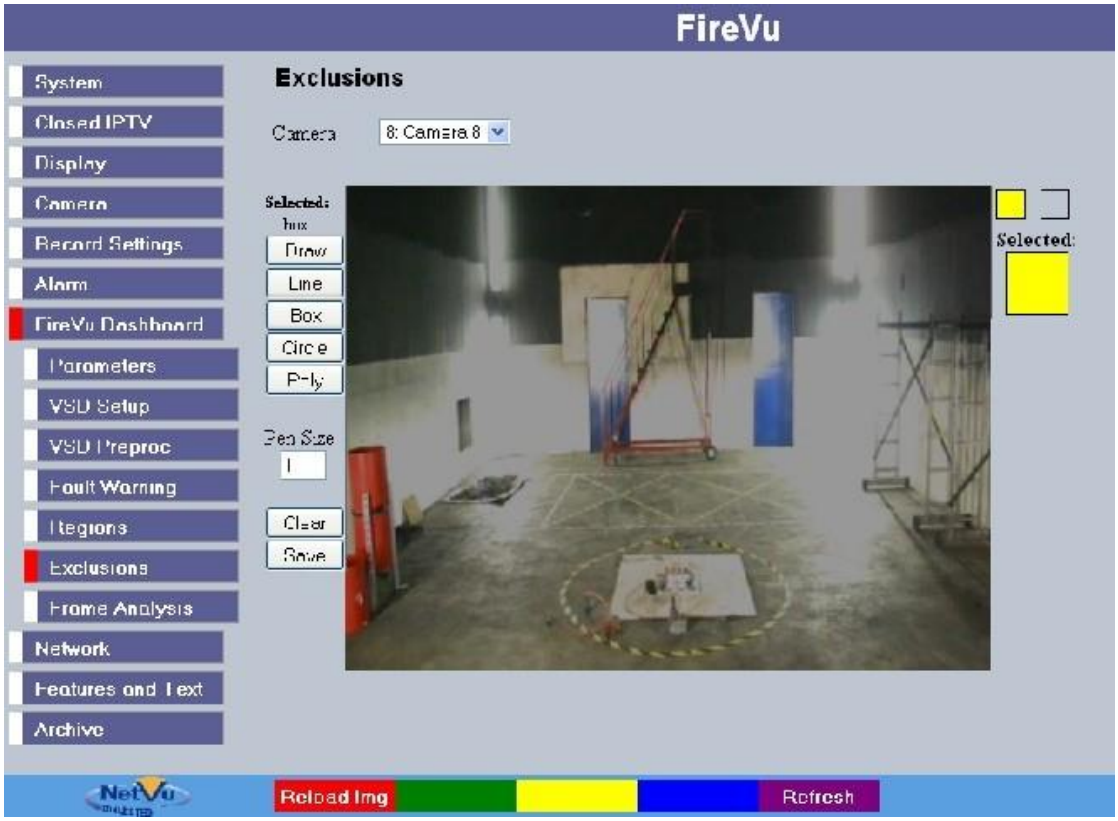
Unwanted regions can be deleted by selecting the region from the drop down “Region” list and then setting it as “Disabled” in the other region drop down box.

Masking non-essential or potentially problematic areas

As detailed earlier in this manual there are some scenarios which should be avoided within the analysed field of view of FireVu. In some cases avoiding these using region placement can be difficult to achieve and as a result of the rectangular nature of the regions to remove areas from the analysed view in this manner can result in larger than required or “at risk” areas also not being analysed.

In such cases the regions should be positioned to cover the entire area and the section of the view not to be monitored should be “masked” using the manual masking feature.

This feature is enabled and configured using the “Exclusions” web page within the FireVu servers web-pages. This is located as a sub button within the “FireVu Dashboard” button below the above detailed “Regions” page. Below is a screen shot of the Exclusion web-page:



By default, (as shipped) there will be no area of the view excluded and the exclusion tab will appear as displayed above.

In order to set up a manual exclusion mask the steps to configure masking are as follows:

1. At the top of the page is a “Camera” drop down menu, this selects the camera to be modified/have a mask implemented.

2. Areas to be excluded are yellow, whilst clear areas/areas displayed as the camera view are included.

3. You can now exclude any part of the camera view down to a pixel by pixel basis if required.

4. Using the upper five buttons in the web-page you can exclude areas as filled in shapes, rectangles, circles or polygons, alternatively you can exclude areas with lines of whatever length required or have full control using the “Free Draw” option.

5. The “Pen Size” button enables you to set a variety of sizes of cursor for exclusion using the “Line” or “Free Draw” options.

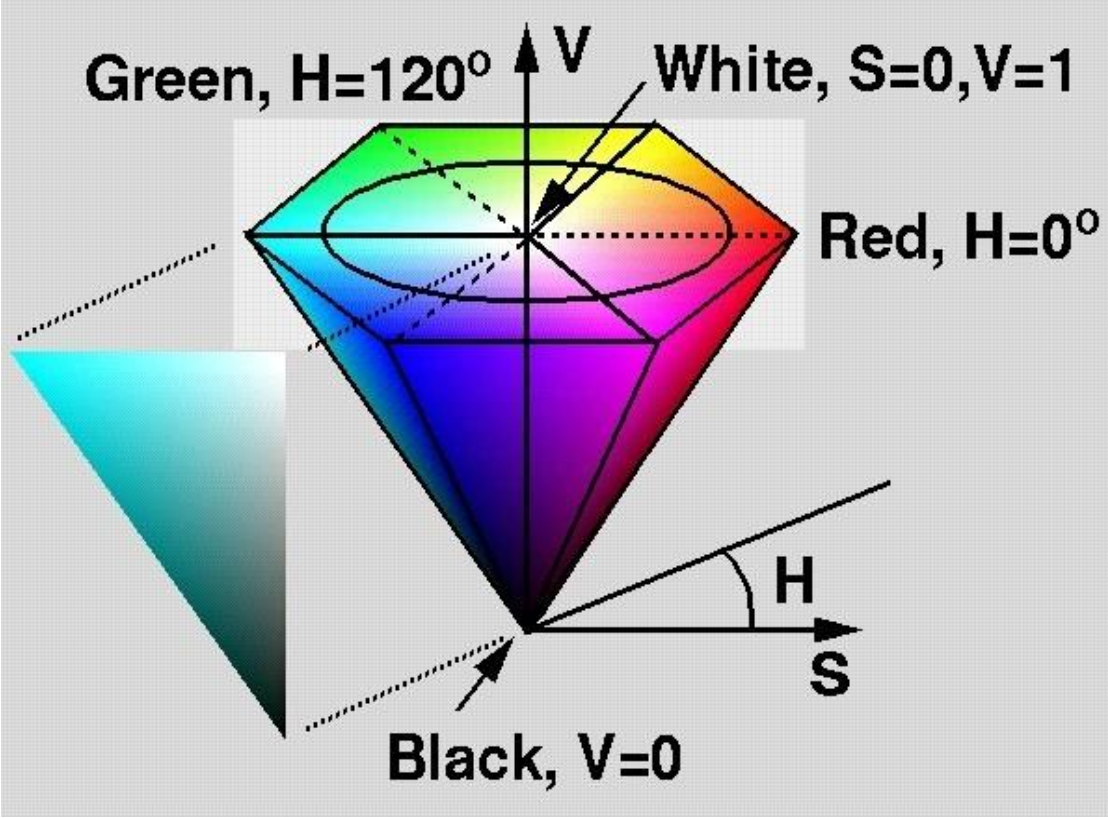
6. The “Clear” button clears an existing exclusion mask allowing you to start again, the “Save” button save the mask in the web-pages but does not apply it to the server, this allows further configuration before applying it, then when finished the “Apply” button will save it to the FireVu server and apply it to the camera required.

7. Below is a screen shot of the “Exclusions” web-page showing several different exclusion types:

Colour Filtering

In addition to being able to set a fixed mask up as detailed above FireVu also has the feature of allowing you to dynamically exclude pixels within the field of view of the camera based on the **H**ue, **S**aturation & **V**alue of a pixel, (HSV).

This allows for the exclusion of phenomena which may present similar movement patterns to smoke but which are brightly coloured and so can be distinguished from smoke on that basis. It also allows the exclusion of areas where bright lighting can periodically saturate the camera sensor.



Hue – angle around cone – for example red is 0degress.

Saturation – how far from centre of circle – what position alone radius you are – 0 at centre 255 on circumference of circle.

Value – How far up the "cone" – i.e. how bright the colour is 0 to 255.

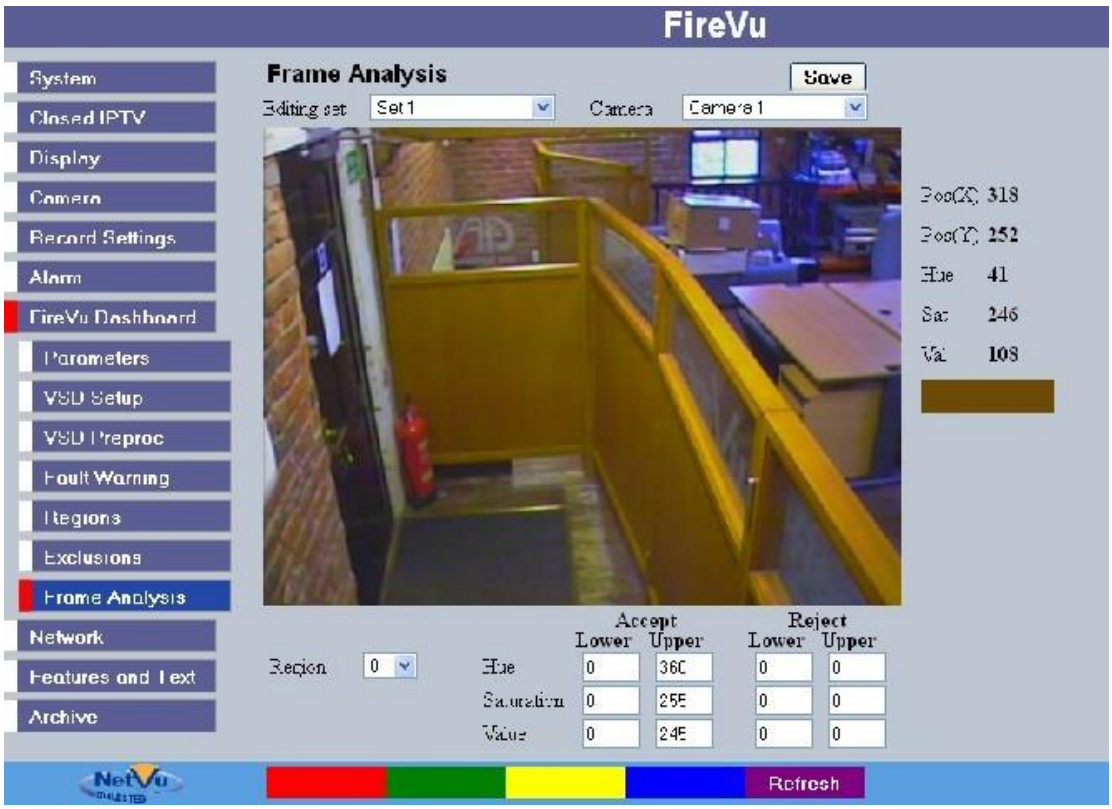
Colour Filtering/Dynamic Masking

The FireVu Dashboard button within the FireVu web-pages has a sub menu called "Frame Analysis" this allows you to either reject pixels based on a range of H, S, or V or a combination of any of the three, or to only allow pixels based on a range of H, S or V or a combination of any of the three.

From within this web-page you can limit the number of pixels analysed by either rejecting a range of pixels based on their Hue, Saturation or Value by setting a lower limit to reject from and an upper limit to reject to, this will exclude pixels within that H, S or V range leaving all pixels outside that range being analysed by the FireVu algorithm.

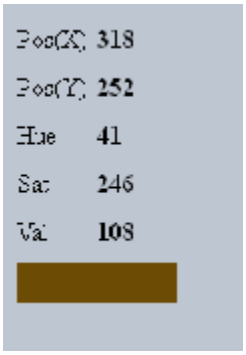
Alternatively you can only accept a range of pixels based on their Hue, Saturation or Value by setting a lower range to accept from and an upper range to select to, pixels with an H, S of V outside that range will be excluded from the FireVu algorithms analysis.

A screen shot of the "Frame Analysis" web-page is shown below:



Establishing the relevant Hue Saturation or Value levels to either accept or reject can be achieved using the “Frame Analysis” part of this web-page:

At the top of the “Frame Analysis” web-page is a “Camera” selection drop down box, this allows you to select the camera you wish to configure, and once selected a still image from the video connected to that camera input will be shown within this web-page. If you hover over the camera image with the mouse cursor then the data shown to the left of the image will show the X and Y co-ordinates of the pixel the mouse cursor is pointing to and the Hue, Saturation & Value for the pixel to which the cursor is pointing.



Using the “Frame Analysis” web-page you can run the cursor over similarly coloured areas and then either accept only those areas or reject those areas using the range of Hue, Saturation or Value seen in the data beside the image, whether you pick H, S or V will depend on the pixel’s of interest as you need to pick the characteristic which gives a close continuous range of values to either accept or reject.

Notes:

- Colour Filtering is per region and so you will need to apply it to each region required, selecting the region(s) to which you wish to apply the colour filtering is done using the “Region” drop down menu below the camera screen shot and to the left of the H, S, V acceptance/rejection settings.

Performance & Limitations

The FireVu server will detect visible smoke and flame within the field of view of a connected camera.

The system will respond to the following fires:

Smoke Detection

- Paper Fire
- Wood Fire
- Flammable Liquid Fire

The FireVu system is not suitable for detecting fine smoke from:

- Smoldering Smoke Fire

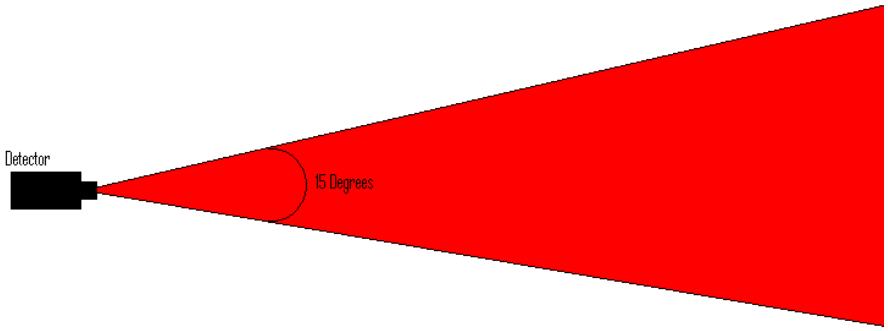
Flame performance

Response at a distance of 15feet at Medium sensitivity configuration to:

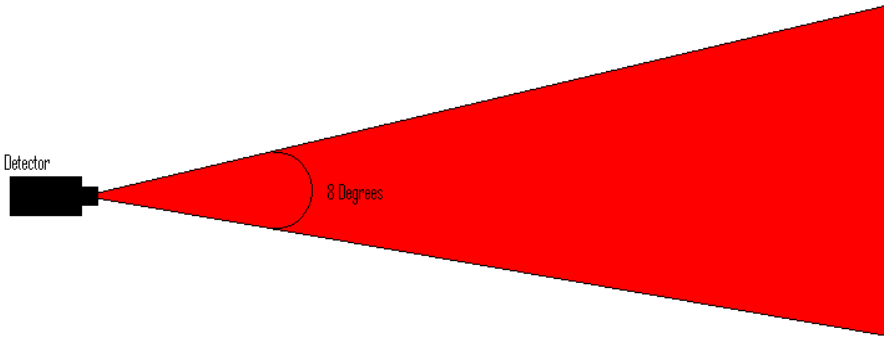
- 12 x 12in (0.3 x 0.3m) N Heptane pan fire
- 12 x 12in (0.3 x 0.3m) alcohol pan fire
- 39in (1m) methane flame from a 0.375inch (9.5mm)

The above detailed flame performance is verified with the below detailed camera field of view:

Horizontal Field of View



Vertical Field of View



Limitations

The FireVu system is susceptible to arc welding and reflected sunlight, either of which if present in the field of view of a camera may induce a false alarm.

Commissioning a FireVu System

In order to confirm the operation of a FireVu system it is necessary to perform a smoke test of some description in front of each camera. This section details how this should be done and describes how the resultant footage of the test should be kept so as to avoid future potentially disruptive tests.

Equipment Needed

- Laptop loaded with current release of Observer viewing software, (or access to PC on same network as the FireVu equipment with Observer viewing software loaded) NetVu Observer to be of version 1.18.27 or newer.
- USB storage, DVD or other device upon which downloaded files can be saved – **essential if using site PC.**
- Means of generating smoke for test, plumbers pellets or smoke machine or both. Choice of which will depend on the size, airflow within and/or availability of 240vac power supply at the area viewed by the camera.
- Accurate portable time-piece, e.g. wrist watch
- Portable chart/form and pen for noting test start and end times whilst out on site performing the tests

Process

(i) FireVu Equipment Preparation

1. Ensure the FireVu equipment is powered up, running the appropriate validated release of software, and that the camera(s) are also powered, properly and appropriately positioned in accordance with any existing screen shots and site assessment information, which must have been completed assessed and approved prior to any commissioning visit.
2. Ensure that the time and date information as displayed in the web-pages are correct.
3. Ensure your portable time piece and the FireVu equipment are synchronised.

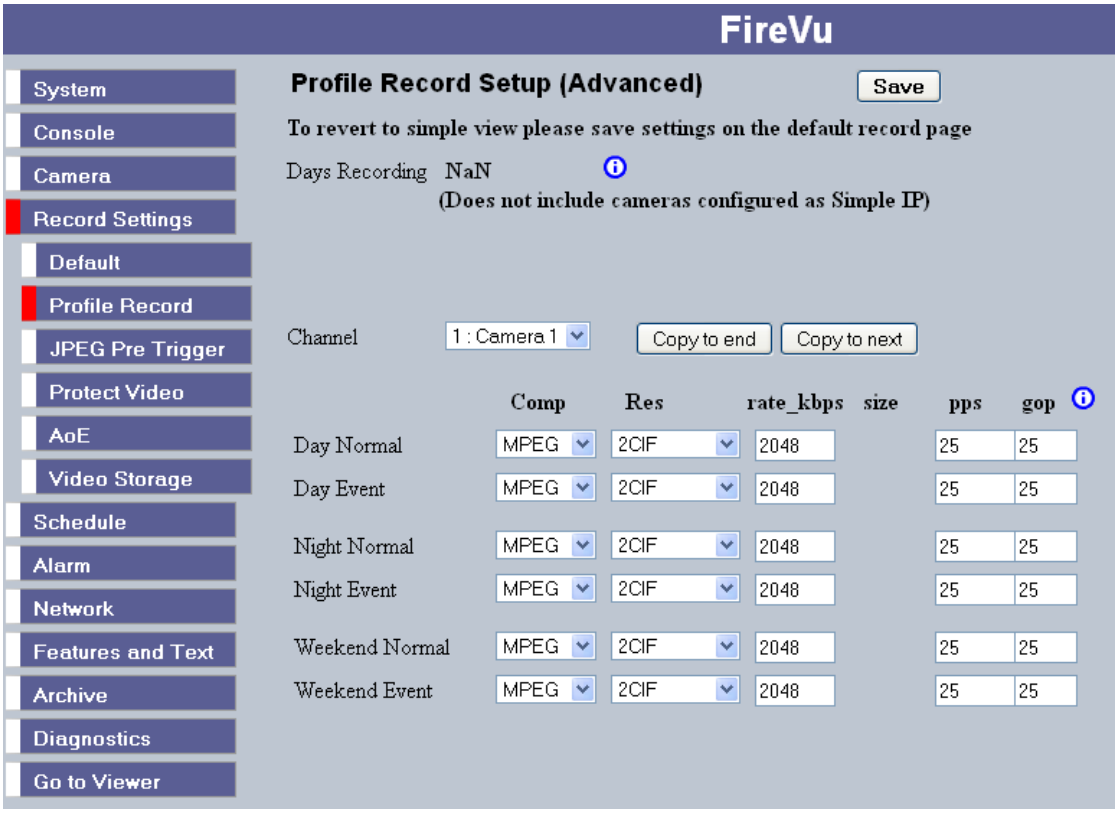
(ii) Configuring FireVu Equipment For Test

Overview – The smoke tests MUST be kept so that they are performed only once and can then be re-used for ongoing evaluation and configuring of the FireVu settings. Due to the disruption caused by and resource required in performing the tests this is essential.

1. The FireVu equipment's record settings must be set to a suitable level for the smoke test footage to be of optimum use. These settings may differ from those required on an on-going basis by the client and so MUST be set as detailed below before performing the smoke test and can subsequently be set as needed once the test is complete and the footage is protected.

This is done by following these steps -

- Open a suitable web-browser, (e.g. Mozilla Firefox)
- Enter IP address of server, unless otherwise requested FireVu servers are shipped with an IP address in the region of 192.168.16.X
- From the menu structure select “Configuration” then “Record Settings” then “Profile Record”
- At the top of the page the type of menu structure displayed will be shown - you require the “Advanced” menu structure as shown below.
- If the “Simple” page structure is being shown then using the “Menu view” drop down list select the “Advanced” option.
- For **SMOKE** testing Set up as follows, (also shown in the below screen-shot) -
    - MPEG
    - 2CIF
    - 2048 kbps
    - 25pps



2. Select the “Copy to end” key shown in the above screen-shot to ensure all cameras are set as required.
3. Select the “Save” button.

(iii) Preparation For The Smoke Test

1. Before going out to perform the actual smoke tests review each camera view area and decide what method of smoke testing best fits – based on how much smoke is required and whether power is available for the smoke machine. A large area with no access to power will require several smoke pellets so care should be taken on deciding where to place them to give "pluming" smoke over all the camera view where regions will need to be set and smoke parameters configured. What ever method used the "risk areas" which have already been defined must be smoke tested in a manner that a situation of "pluming" smoke is achieved in front of all of them.
2. Identify the best "route" around the cameras to be smoke tested, we recommend doing no more than 8 channels in one go, (equivalent to the most any one server could cover). Ideally you want to be able to travel from one channel to the next with the minimum amount of time between tests.
3. Ensure you have the necessary number of smoke pellets along with at least a 10% overhead for repeat tests and a sufficient amount of the appropriate smoke fluid if using a smoke machine.

(iv) Performing The Smoke Test

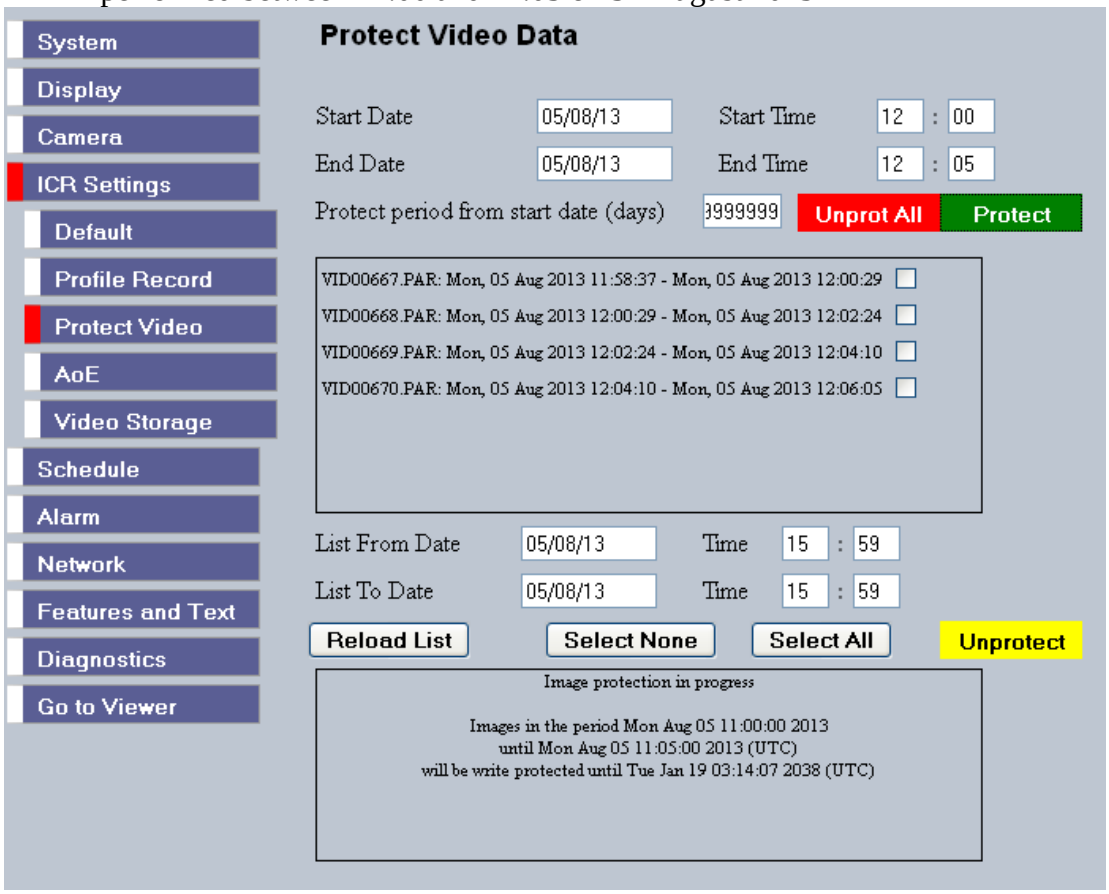
1. Proceed to the first camera's viewable area and set up the smoke test as required. Before lighting pellets or commencing smoke machine dis-charge note the time from your time-piece, (which has been synchronised to that of the FireVu equipment), on your chart/form.
2. Wait for 30 seconds to allow all pixel changes resulting from your presence to "settle". Commence smoke test. If using a machine discharge for at least 30 seconds, or as long as needed to achieve a persistent plume which remains present for a minimum of 5 seconds across a good portion of the field of view of the camera being tested.
3. On completion of the smoke discharge allow sufficient time, (which will vary depending on the environment), for the smoke to rise and disperse.
4. Once sufficient smoke has been deployed to constitute "pluming" smoke over the whole risk area and has cleared at least in part, note the time on your chart/ form as Smoke test end time for the relevant camera.
5. Proceed to the next camera view. If near to any others already smoke tested ensure there is no lingering smoke from previous tests, at the start of the test there should be no smoke present. Perform the test as with the previous camera view noting start and end times.
6. Repeat for all cameras connected to the current "on test" server – 8off maximum.
7. Follow the below steps to protect the footage on that server and then repeat the process above for the next server and so on.

(v) Protecting The Smoke Test Footage

This is an essential stage and MUST be performed as soon as the smoke tests on the cameras connected to that server, (or for no more than 8 separate dome cameras), are complete.

This is done from the FireVu Equipment's web-pages as follows -

- Open a suitable web-browser, (e.g. Mozilla Firefox)
- Enter IP address of server, unless otherwise requested FireVu servers are shipped with an IP address in the region of 192.168.16.X
- From the menu structure select “Configuration”, “Record Settings” and “Protect Video”
- For each smoke tested camera in turn enter the time periods as noted on your chart/form giving the date, start and end time, always add 60 seconds to the start and end time to get a “run-in/out” of footage before the smoke test begins and at its end. If working on a server and the smoke tests are consecutive with no gaps you can protect the entire time as one block.
- In the entry box labelled “Protect period from start date (days)” enter 999999.
- Select the “Protect” button.
- Check the boxes to ensure the required times are listed as protected, and that the lower box shows them as being protected until “2038”.
- Example below shows a single entry for a smoke test for one channel performed between 12.00 and 12.05 on 5th August 2013 -



(vi) Downloading The Smoke Test Footage

Although the smoke test footage is now safe from being over-written it should also be downloaded and archived in case of hard drive failure or accidental deletion from the FireVu Equipment. This MUST include the 60 second “run-in” time in the same manner as the footage was protected.

This is done by extracting the relevant PAR files from the FireVu server. There are several methods of extracting these files not all of which are appropriate, (or possible), for ALL variants of the FireVu product range. Consequently the method covered here is chosen because it applies equally to the entire FireVu product range, both current and legacy products.

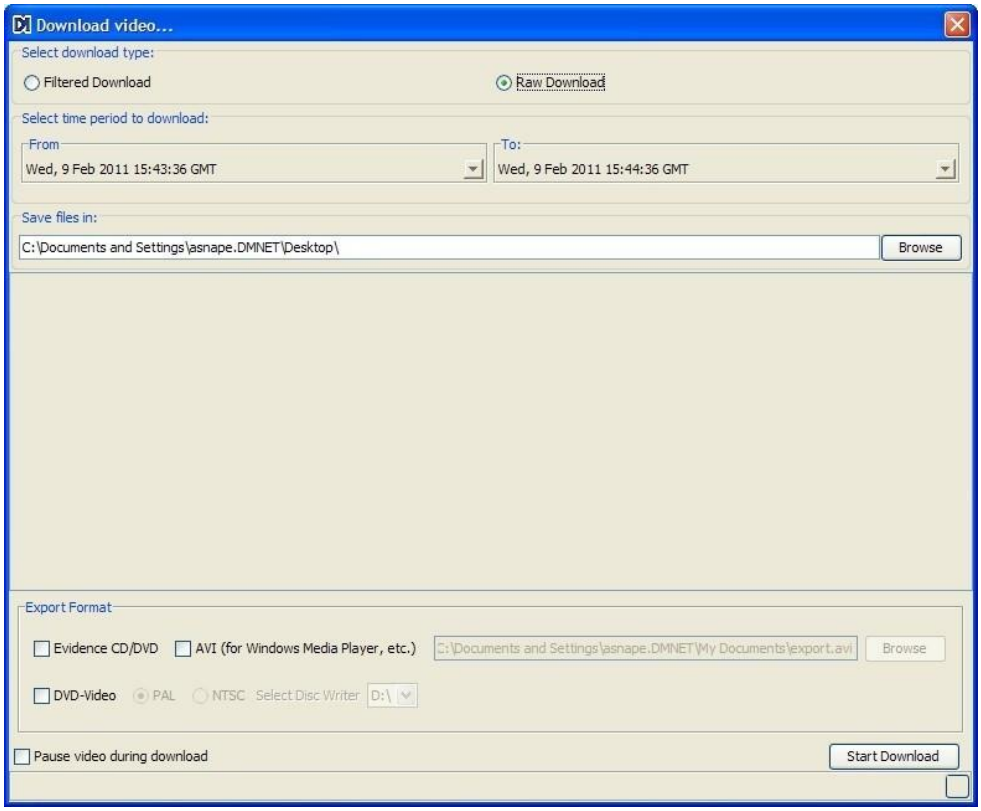
To download the required footage follow the below process -

1. Using either a PC on site or your laptop with Observer viewing software loaded open that software.
2. In the window labelled “Enter IP address or domain name:” enter the IP address of the FireVu Equipment.
3. Select the “Add” button
4. Within Observer it is possible to download all associated recorded images from the hard drive of the image server to the local PC (or a networked PC) from a specified time and date and burn it to DVD.
5. Ensure there is a blank DVD in the local PC drive and that it is writeable.
6. If there are multiple Video Servers configured in Observer, ensure the correct video server is selected in the Image Server Tree panel.
7. Click on the Download icon to open the download dialogue box.

8. Select Raw download. This will download all the data from all cameras between the selected times (next step).

N.B – do not select “Filtered” download as this may not include some of the embedded FireVu parameter information.

9. Set the period to be downloaded to disk by setting start and end date and time.
10. Select the Evidence CD/DVD tick box within the “Export format” section.
11. If the bandwidth is limited, use ‘pause video during download’ to speed up the download.
12. Click on Start Download. The files will be downloaded to the connected computer. The computer will be scanned for a suitable CD/DVD burning device to use and the CD or DVD will be created.
13. Downloading the images may take some time depending on the size of the video segment selected and the network connection to the unit.



14. In the absence of a DVD burner on the site PC or your laptop you can download the required footage in the same way as listed above but do not select any of the tick boxes in the “export format” section. The PAR files will then be saved where pointed to in the “Save files in:” section. Set this as somewhere sensible and easily found and then once completed copy it to a USB stick or other portable storage media to take away.

Your smoke tests are now complete, protected on the server and you have a copy of them which should be safely archived for all future use. If a suitable PC is located with the FireVu system then a copy of the smoke tests should also be saved on the desktop there to enable future maintenance and service validation of settings/configuration.

Maintenance

AD Group recommend that any FireVu based system be regularly maintained. The number of maintenance visits will vary from annual to quarterly subject to the nature of the site.

Details of the recommended actions to be carried out during a maintenance visit can be obtained on request, but a typical maintenance visit will comprise the following stages:

Example Maintenance Scope

There are two types of visit to be conducted each year, 1 Main annual visit and up to 3 interim visits. Both types of visit are to include the below actions, with the exception that smoke tests will only be performed on the main annual visit.

- Backup of master.sfm file from each piece of FireVu equipment to be taken
- Software versions to be logged
- Check units log files for signs of any faults
- All camera views to be checked for –
    - Good quality picture – colour if appropriate, focus & overall image quality. Any faults to be reported.
    - Camera position to match reference screen shots. Any deviation to be reported as needing correction or if camera has been intentionally and correctly re-located a new reference screen shot to be taken.
    - Check recorded footage for a few minutes from several times to check camera has been running correctly – no intermittent fault. Also confirms FireVu is recording.
- Last reset code of FireVu to be checked, if other than a reset "100" log files to be copied and analysed.
- Servers to be cleaned inside and out, (carefully use airgun on inside to remove dust).
- Confirm LCD screen and internal fan are operational.
- Ensure FireVu time and date is correct.
- If "AD Group supplied configuration PC" is present then this along with any ancilliaries is to be checked, to include Monitor, mouse and Keyboard.
- FireVu alarm logs to be analysed and if any alarms are present associated footage reviewed
- On-site record of smoke tests to be checked, if AD Group engineer does not have a copy already then a copy must be taken.
- FireVu software to be updated to current release version.

N.B – the following parts of the maintenance process will require that the FireVu is NOT connected to a fire alarm control panel or any other "live" fire notification or suppression equipment. In the case of smoke tests it is recommended that all such equipment be disabled to avoid false activation.

- If false alarms are present FireVu parameters to be "tweaked" to avoid response to such cases whilst still ensuring an alarm to smoke test footage – utilising Forensics feature.
- Means of on site alarm notification to be checked and appropriate action taken
    - If FireVu alarm results in a local live image on monitor this is to be verified as working. If monitor/PC responsible was AD Group supplied then any faults to be rectified. If not then any faults to be reported.
    - If FireVu alarm results in an activation to a fire panel using relay out from the FireVu then all FireVu relay outputs to be checked as working using test equipment.

MAIN VISIT ONLY –

- ***Perform a smoke test in front of each camera in accordance with AD Group's smoke test procedure, and ensure the FireVu gives a satisfactory response to each test performed.***

Note: In addition to maintenance on the FireVu server itself cameras MUST be kept clean and screen shots regularly checked to ensure the camera has not been moved or its image altered in any way.

Other Related Documents

This Manual is intended to support the initial installation and configuration of a FireVu server being used in a default configuration.

FireVu is fully configurable when being set-up by a trained AD Group FireVu agent and for such personnel further instructive documentation is available, which includes but is not limited to:

- Dashboard Configuration Tool Manual
- FireVu Annunciation Panel Instruction
- Mod-Bus Integration Instruction
- Watchdog Integration Instruction

Appendix A – FireVu Server Models

Models

FireVu Server Model Numbers

PIN Structure	PIN Structure Explained
DT/FVU2/XXX/YY(A)	XXX – Hard Disk Drive Size YY – Number of Channels/Video Inputs addition of A at end denotes US power cable and NTSC Video Standard

Model	Description
DT/FVU2/XXX/08	FireVu Server 8 Channel **XXX to allow for new hard drives as they are released** Hard Disk Drive PAL Video Standard
DT/FVU2/500/08	FireVu Server 8 Channel 500Gb Hard Disk Drive PAL Video Standard
DT/FVU2/1T0/08	FireVu Server 8 Channel 1000Gb Hard Disk Drive PAL Video Standard
DT/FVU2/2T0/08	FireVu Server 8 Channel 2000Gb Hard Disk Drive PAL Video Standard
DT/FVU2/3T0/08	FireVu Server 8 Channel 3000Gb Hard Disk Drive PAL Video Standard
DT/FVU2/6T0/08	FireVu Server 8 Channel 6000Gb Hard Disk Drive PAL Video Standard
DT/FVU2/XXX/08A	FireVu Server 8 Channel **XXX to allow for new hard drives as they are released** Hard Disk Drive NTSC Video Standard
DT/FVU2/500/08A	FireVu Server 8 Channel 500Gb Hard Disk Drive NTSC Video Standard
DT/FVU2/1T0/08A	FireVu Server 8 Channel 1000Gb Hard Disk Drive NTSC Video Standard
DT/FVU2/2T0/08A	FireVu Server 8 Channel 2000Gb Hard Disk Drive NTSC Video Standard
DT/FVU2/3T0/08A	FireVu Server 8 Channel 3000Gb Hard Disk Drive NTSC Video Standard
DT/FVU2/6T0/08A	FireVu Server 8 Channel 6000Gb Hard Disk Drive NTSC Video Standard
DT/FVU2/XXX/04	FireVu Server 4 Channel **XXX to allow for new hard drives as they are released** Hard Disk Drive PAL Video Standard
DT/FVU2/500/04	FireVu Server 4 Channel 500Gb Hard Disk Drive PAL Video Standard
DT/FVU2/1T0/04	FireVu Server 4 Channel 1000Gb Hard Disk Drive PAL Video Standard
DT/FVU2/2T0/04	FireVu Server 4 Channel 2000Gb Hard Disk Drive PAL Video Standard
DT/FVU2/3T0/04	FireVu Server 4 Channel 3000Gb Hard Disk Drive PAL Video Standard
DT/FVU2/6T0/04	FireVu Server 4 Channel 6000Gb Hard Disk Drive PAL Video Standard
DT/FVU2/XXX/04A	FireVu Server 4 Channel **XXX to allow for new hard drives as they are released** Hard Disk Drive NTSC Video Standard
DT/FVU2/500/04A	FireVu Server 4 Channel 500Gb Hard Disk Drive NTSC Video Standard
DT/FVU2/1T0/04A	FireVu Server 4 Channel 1000Gb Hard Disk Drive NTSC Video Standard
DT/FVU2/2T0/04A	FireVu Server 4 Channel 2000Gb Hard Disk Drive NTSC Video Standard
DT/FVU2/3T0/04A	FireVu Server 8 Channel 3000Gb Hard Disk Drive NTSC Video Standard
DT/FVU2/6T0/04A	FireVu Server 8 Channel 6000Gb Hard Disk Drive NTSC Video Standard