Arecont Vision

megapixel technology...

beyond imagination

Camera Web Page & Access Protocols

USER MANUAL

October 26, 2012

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Chapter I - Introduction

Product Contents

The Arecont Vision Megapixel Camera system packaging consists of the following:

- Arecont Vision camera(s)
- CD with AV100 software and manuals

Inspect the package and its contents for visible damage. If any components are damaged or missing, do not use the unit; contact the supplier immediately. If you need to return the unit, you must ship it in the original box.

Camera Reference

AV1300/1310/1305/1315/1355/1115, AV2100/2110/2105/2155, AV2805/AV2815/AV2115, AV3100/3110/3105/3155/3115, AV3130/AV3135, AV5100/5110/5105/5155/5115, AV8180/8185, AV8360/8365, AV8360DN/8365DN, AV20365DN/AV20185DN and AV10005/10115 are megapixel resolution IP cameras capable of delivering crisp, low-noise images at video frame rate.

AV1300/1310/1305/1315/1325/1355/1115/1125 is a 1.3-megapixel resolution camera with a maximum resolution of 1280 by 1024, achieving a maximum frame rate of 32 fps (AV1300/1310/1305/1315/1325/1355) and 42fps (AV1115/1125). AV1300 and AV1310 support MJPEG compression only. AV1305/1315/1325/1355/1115/1125 supports both MJPEG and H.264 (MPEG4 Part 10) compression. AV1310, AV1315 and AV1115 are compact box cameras. AV1355 is a dome camera. AV1325 and AV1125 are MegaView cameras. AV1315, AV1325, AV1115 and AV1125 are fully compatible with PSIA industry standard and pass PSIA conformance tests.

AV2100/2110/2105/2155 is a 2-megapixel resolution camera with a maximum resolution of 1600 by 1200, achieving a maximum frame rate of 24 fps. AV2100 and AV2110 support MJPEG compression only. AV2105/2155 supports both MJPEG and H.264 (MPEG4 Part 10) compression. AV2110 is compact box cameras. AV2155 is a dome camera.

AV2805/2815/AV2825/AV2115/AV2125 is a 1080p resolution camera with a maximum resolution of 1920 by 1080, achieving a maximum frame rate of 32 fps in AV2115 and AV2125, 30 fps in AV2805 and 24 fps in AV2815 and AV2825. AV2805/2815/AV2825/AV2115/AV2125 supports both MJPEG and H.264 (MPEG4 Part 10) compression. AV2815 and AV2115 are compact box cameras. AV2825 and AV2125

are MegaView cameras. AV2805/AV2815/AV2825/AV2115/AV2125 is fully compatible with PSIA industry standard and passes PSIA conformance tests.

AV3100/3110/3105/3155/AV3115/AV3125 is a 3-megapixel resolution camera with a maximum resolution is 2048 by 1536, achieving a maximum frame rate of 12 fps in AV3100/3110/3105/3155, 14 fps in AV3115/3125. AV3100 and AV3110 support MJPEG compression only. AV3105/3155/3115/3125 supports both MJPEG and H.264 (MPEG4 Part 10) compression.. AV3110 and AV3115 are compact box cameras. AV3155 is a dome camera. AV3115 and AV3125 are MegaView cameras. AV3115/AV3125 is fully compatible with PSIA industry standard and passes PSIA conformance tests.

AV3130/3135 is a dual-sensor, day-night camera featuring a 3-megapixel color sensor paired with a 1.3-megapixel monochrome sensor sensitive to near infrared illumination. When the scene is well illuminated the 3-megapixel sensor is selected to deliver color images of up to 2048x1536 pixels. In low-light conditions AV3130/3135 can automatically switch to the 1.3-megapixel (1280x1024) monochrome sensor, enabling the delivery of clear imagery at illumination levels as low as 0.00 lux (infrared only). AV3130/3135 typically delivers 20 fps in day mode at 1920x1200 and over 30 fps in night mode. AV3135 supports both MJPEG and H.264 (MPEG4 Part 10) compression.

AV5100/5110/5105/5155/5115/5125 is a 5-megapixel resolution camera. Its maximum resolution is 2592 by 1944, achieving a maximum frame rate of 9 fps in AV5100/5110/5105/5155, 12 fps in AV5115/5125. AV5100 and AV5110 support MJPEG compression only. AV5105/5155/5115/5125 supports both MJPEG and H.264 (MPEG4 Part 10) compression. AV5110 and AV5115 are compact box cameras. AV5155 is a dome camera. AV5115 and AV5125 are MegaView cameras. AV5115/AV5125 is fully compatible with PSIA industry standard and passes PSIA conformance tests.

AV8180/8185/AV8185DN is a quad-sensor 8-megapixel camera consisting of four 2-megapixel sensors operating at up to 22 fps at 1600 by 1200 resolution and 5.5 fps at 6400 by 1200 resolution. It is capable of providing 180 degree field of view. AV8185 and AV8185DN support both MJPEG and H.264 (MPEG4 Part 10) compression. AV8180 supports MJPEG only.

AV20185DN is a quad-sensor 20-megapixel camera consisting of four 5-megapixel sensors operating at up to 3.5 fps at 10240 by 1920 resolution and 11 fps @ 2560 by 1920. It is capable of providing 180 degree field of view. AV20185 supports both MJPEG and H.264 (MPEG4 Part 10) compression. AV20185 is fully compatible with PSIA industry standard and passes PSIA conformance tests.

AV8360/8365/AV8365DN is a quad-sensor 8-megapixel panoramic camera consisting of four 2-megapixel sensors and operating at up to 22 fps at 1600 by 1200 resolution and 5.5 fps at 6400 by 1200 resolution. It is capable of providing 360 degree field of view. AV8365 and AV8185DN support both MJPEG and H.264 (MPEG4 Part 10) compression. AV8360 supports MJPEG only.

AV20365DN is a quad-sensor 20-megapixel camera consisting of four 5-megapixel sensors operating at up to 3.5 fps at 10240 by 1920 resolution and 11 fps @ 2560 by 1920. It is capable of providing 360 degree field of view. AV20185 supports both MJPEG and H.264 (MPEG4 Part 10) compression. AV20365 is fully compatible with PSIA industry standard and passes PSIA conformance tests.

AV10005/10115 is the first 10Megapixel / 1080P dual mode camera in the world and supports both MJPEG and H.264 (MPEG4 Part 10) compression. AV10005/10115 in 10Megapixel mode is viewed at 3648x2752 with the frame rate up to 6fps (AV10015) and 7 fps (AV10115) ; AV10005/AV10115 in 1080p mode is viewed at 1920x1080 with frame rate up to 30fps (AV10005) and 32fps (AV10115) . AV10005/AV10115 has binning technique to improve low light performance, increase sensitivity and produce better SNR by combining and averaging pixels. AV10005 and AV10115 are compact box cameras. AV10005/10115 is fully compatible with PSIA industry standard and pass PSIA conformance tests.

All cameras are equipped with a LAN connector and can deliver image data at a maximum data rate of up to 55 Mbps and 70Mbps (AV10005/AV10015). Images are sent over the network using TFTP, HTTP and RTSP/RTP (available for H.264 camera models only) protocols.

All cameras feature:

- Privacy mask:
  - AV1315/1325/1115/1125/2805/AV2815/2825/2115/2125/3115/3125/5115/5125/10005/10015/8365DN/8185DN/20185DN/20365DN
- Flexible cropping:
  - AV1315/1325/1115/1125/2805/AV2815/2825/2115/2125/3115/3125/5115/5125/10005/10015
- Binned mode to increase low light performance:
  - AV3115/3125/5115/5125/10005/10115/20185DN/20365DN
- Automatic Exposure (AE) and Gain (AGC) control
- Automatic backlight compensation
- Automatic multi-matrix white balance
- 50/60Hz selectable flicker control
- Electronic Zoom, Pan and Tilt (PTZ)
- Programmable brightness, saturation, gamma, sharpness, windowing and decimation

- Simultaneous delivery of full-field view and zoomed images at video frame rate
- Multi-streaming: 8 non-identical streams
- Electronic image rotation by 180 degrees
- Regions of interest windowing down to 32x32 pixel window
- Regions of interest windowing down to 1x1 pixel window for jpeg and 2x2 pixels for H.264
    - AV1315/1325/1115/1125/2805/AV2815/2825/2115/2125/3115/3125/5115/5125/10005/10015
- Programmable motion blur control for low-light mode
- Moonlight mode – extended exposure and noise cancellation
- Up to four regions of interest simultaneously for panoramic and digital PTZ view
- On board motion detection with 64 detection zones
- On board motion detection with 1024 detection zones
    - AV1315/1325/1115/1125/2805/AV2815/2825/2115/2125/3115/3125/5115/5125/10005/10015/8365DN/8185DN/20185DN/20365DN
- Optional auto iris
- Optional day/night IR switching filter

Connectors

All Arecont Vision Megapixel cameras have the following connectors located on the rear panel of the camera housing:

- LAN connector, accepting a network UTP or STP cable carrying 100 Base-T. The LAN connector also accepts Power-over-Ethernet (PoE).
- Power terminals: please refer to enclosed documentation and product labeling for specific power options:
    - PoE : All Arecont Vision cameras
    - Auxiliary Power: 15V-48V DC supply: AVXX00M, AV3130, AV8180 and AV8360
    - Auxiliary Power: 12V-48V DC and 24V AC supply : AVXX05, AVXX55, AV3135, AV8180/5, AV8185DN, AV8360/5, AV8365DN and AV10005, AV1115, AV2115, AV3115, AV5115, AV10015, AV20185DN, AV20365DN
- Optionally, a DC auto-iris connector. AV3130, AV3135, AVXX55, AVXX10, AVXX15, AVXX25 and AV10005 do not support auto-iris and does not have this connector.
- Auxiliary input and output connector

Power

Power for all Arecont Vision cameras can be supplied as follows:

- Via LAN connector according to IEEE 802.3af (PoE). For a list of recommended PoE switches, see "Network PoE Switch or Router PoE" on page 7.
- Via an auxiliary power jack.

Power consumption will vary depending on the mode of operation. The maximum power consumption takes place when the camera is streaming video at a maximum frame rate and at full resolution.

The maximum power consumption is:

- AV1300, AV1310, AV2100, AV2110, AV3100, AV3110, AV3130, AV5100, AV5110 – 3 W
- AV1305, AV2105, AV3105, AV1115, AV2125, AV3115, AV5115 – 4.5 W
- AV1355, AV2155, AV3155, AV3135, AV5105, AV5155, AV10015 – 5 W
- AV1315, AV2815, AV1325DN, AV2825DN – 4.5 W
- AV8180, AV8360 – 7.8 W
- AV1325IR, AV2825IR, AV3125IR, AV5125IR – 7.5 W
- AV8185, AV8365, AV8185DN, AV8365DN, AV20365DN, AV20185DN – 9.0 W
- AV10005 in 1080p mode - 5.1 W
- AV2805, AV10005 in 10 Megapixel mode – 4.9 W

Network PoE Switch or PoE Router

Using a 100 Mbps Ethernet Switch with PoE ports or a Router with PoE ports is recommended. A gigabit Ethernet Switch with PoE ports for multiple camera connections is highly recommended, especially in the case of a multi-camera installation. Simple hubs do not provide collision management and are not suitable for a multi-camera Arecont Vision system.

Tested models:

- Netgear ProSafe 8PT 100Base-TX Switch with PoE #FS108PNA, 10/100Base-TX w/4 PoE 100Base-TX (www.netgear.com)
- Netgear ProSafe 24+2 Gigabit Switch with PoE, 1 Gigabit output w/12 PoE, 100Base-TX (www.netgear.com)
- D-Link Web Smart #DES-1316 (POE Switch/Hub)10/100Base-TX, 8 PoE ports and 8 non-PoE ports, True IEEE 802.3af (www.compuplus.com)
- TRENDnet #TPE-S88 (POE Switch/Hub, www.trendnet.com) 10/100Base-TX 8 PoE ports and 8 non-PoE ports, True IEEE 802.3af (www.provantage.com)
- PowerDsine #PD-6001/AC (PoE Single port hub, www.powerdsine.com) 10/100Base-TX, Single Midspan POE port, True IEEE 802.3af (www.provantage.com)

PoE network equipment must be CE marked for use in European Community. Note that the cameras are designed for use with indoor network cabling only.

Network Cabling

Category 5e cabling or better is recommended. All network cabling must be installed according to applicable codes and regulations.

Housing and Mounting

All Arecont Vision camera models feature a durable aluminum housing that minimizes fire hazards. The housing is not hermetically sealed. The ambient temperature should be maintained between 0ºC and 50ºC (32ºF to 122ºF). Cameras used outdoors require appropriate protective enclosures.

Cameras are mounted using a ¼" x 20 threaded hole on the bottom of the housing. When mounting the camera, make sure that the mounting screw is no longer than ¼". The cameras are to be installed according to the applicable code and regulations. The mounting hardware should be able to support 1 lb camera (except AV8360 that weights 4lbs).
Model AV3130 and AV3135 require a 3" enclosure window; all other cameras can use most any outdoor housing.

Manual and Auto-Iris lenses

All Arecont Vision cameras should be used with a 1/2" or lager megapixel-resolution lenses. AV3130 and AV3135 require two manual iris lenses and have a limitation on lens diameter (<38mm). AV8360 and AV8365 are supplied with 4 preinstalled 4mm high-quality megapixel-resolution lenses; AV8180 and AV8185 are supplied with 4 preinstalled 8mm high-quality megapixel-resolution lenses.

Manual Iris Lenses

A wide variety of C/CS mount lenses with megapixel resolution may be used with Arecont Vision cameras. Note that all C-mount lenses require a 5mm adaptor ring. Additionally, some lenses may also require 0.4mm-0.8mm adjustment spacers.

Arecont Vision lens suggestions include:

- Arecont LENS4-10 (4mm -10mm), MPL6.0 (6mm), MPL 4-10 (4.5mm-10mm), MPL8-16 (8mm-16mm), MPL4-12 (4mm-12mm), MPL33-12 (3.3mm-12mm), MPL12-40 (12mm -40mm).
- Computar H0514-MP (5mm), M0814-MP (8mm), M1214-MP (12mm), M1614-MP (16mm), M2514-MP (25mm), M3514-MP(35mm), M5018-MP (50mm), M7528-MP (75mm), HG2Z0414FC-MP (4mm - 8mm), M3Z1228C-MP (12mm - 36mm)

- SpaceCom JHF8M (8mm), JHF12M (12mm), JHF16M (16mm), JHF25M (25mm), JHF35M (35mm), Pyxis8/JHF8M (8mm), Pyxis12/JHF12M (12mm), Pyxis16/JHF16M (16mm), Pyxis25/JHF25M (25mm), Pyxis35/JHF35M (35mm)
- Fujinon HF9HA-1B (9mm), HF12.5HA-1B (12.5mm), HF16HA-1B (16mm), HF25HA-1B (25mm), HF35HA-1B (35mm), HF50HA-1B (50mm), HF75HA-1B (75mm), HF12.5SA-1 (12.5mm), HF16SA-1 (16mm), HF25SA-1(25mm), HF35SA-1(35mm), HF50SA-1(50mm), HF75SA-1 (75mm)
- Kowa: LM8JC10M (8mm), LM12JC10M (12mm), LM16JC10M (16mm), LM25JC10M (25mm), LM35JC10M (35mm), LM50JC10M (50mm)
- Tokina: KCM-0914MP5 (9mm), KCM-12514MP5 (12.5mm), KCM-1814MP5 (18mm)

Using Manual Iris Lenses

Choosing the lens correctly is very important for megapixel cameras. Poorly selected lenses may cause the image to appear blurry when the lens iris is fully open or closed too much.

To deliver sharp megapixel resolution images, it is recommended to:

- Use megapixel-resolution lenses
- Obtain best resolution and depth of focus by having the iris slightly closed

When setting up the camera, direct the camera at the scene, fully open the iris, and then try closing the iris slightly. At some point the image will look it's sharpest. However, do not close down the iris too much to the point where the image becomes too noisy due to insufficient light.

Auto-Iris Lenses

Standard DC auto-iris lenses can be used with AV1300-AI, AV2100-AI, AV3100-AI, AV5100-AI, AV1305-AI, AV2105-AI, AV3105-AI, AV5105-AI, AV2805-AI, AV1115AI, AV2115AI, AV3115AI, AV5115AI, 10115AI (cameras equipped with the auto-iris feature).

Arecont Vision recommends the following high-resolution optics:

- Arecont Vision LENS4-10AI 4mm-10mm
- Fujinon DV3.4X3.8SA-SA1 3.8mm-13mm, DV10X8SA-SA1 8mm-80mm
- Computar HG2Z0414FC-MP 4mm-8mm
- Tamron M12VG412 4mm-12mm

Using Auto-Iris Lenses

AV1300-AI, AV1305-AI, AV2100-AI, AV2105-AI, AV3100-AI, AV3105-AI, AV5100-AI, AV5105-AI, AV2805-AI, AV1115AI, AV2115AI, AV3115AI, AV5115AI, 10115AI are available with DC auto-iris option.

To use the DC auto-iris lens:

- Attach the lens to the Arecont Vision camera.

- Plug in the lens cable into the connector on the back of the camera. Make sure that the lens cable is long enough. Many DC lenses are available with short and long cable options.

The camera will automatically detect the presence of an auto-iris DC lens and start using it.

An auto-iris lens typically operates as follows:

- If illumination is sufficient, the camera will partially close the iris within half a minute.
- When the iris is partially closed, the image should become visibly sharper. As the iris is gradually closed the image brightness may fluctuate slightly.

You can monitor the state of the auto-iris in AV100 Video System "Settings" dialog (read "**AV100 Software User Manual**" for details).

Accessing Arecont Vision cameras

Arecont Vision cameras can be accessed and controlled by means of:

- AV100 Video System software
- Third-party software utilizing Arecont Vision SDK (Software Development Kit). A list of compatible third-party software is available at our website www.arecontvision.com.
- HTTP requests issued from Microsoft Internet Explorer, Mozilla Firefox, other web browsers and third party HTTP software
- RTSP/RTP-capable media players, such as Apple QuickTime, VLC or other third party RTSP/RTP software (for camera models supporting H.264 compression).

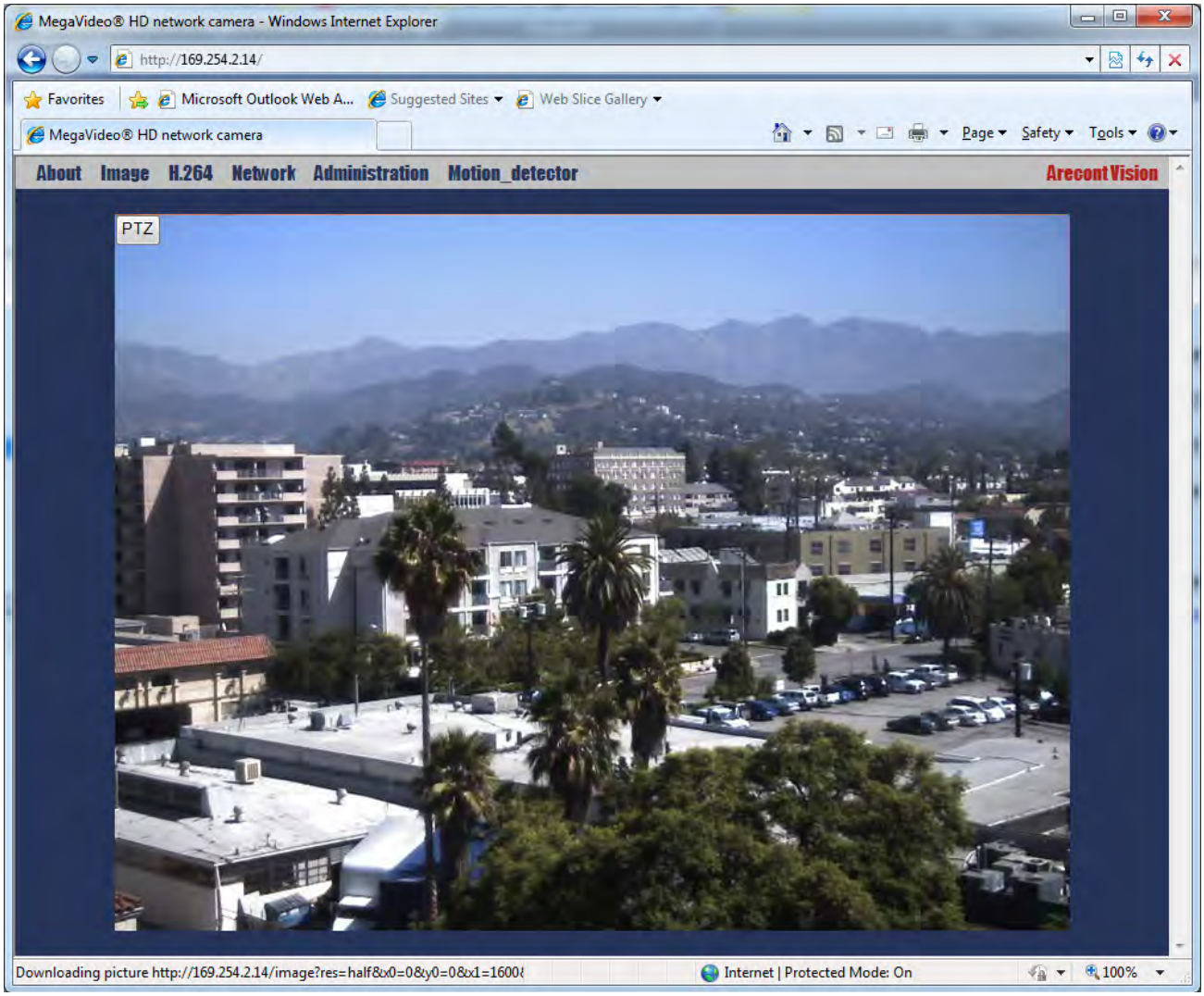
Chapter II - Camera Web Page

User Interface

Arecont Vision cameras can be accessed from a web browser via the on-camera web page. The web page allows changing camera settings and to view live video by means of Java script stored in camera's non-volatile memory. The web page is accessed by typing in any web browser:

http://ip_address or http://ip_address/index.html

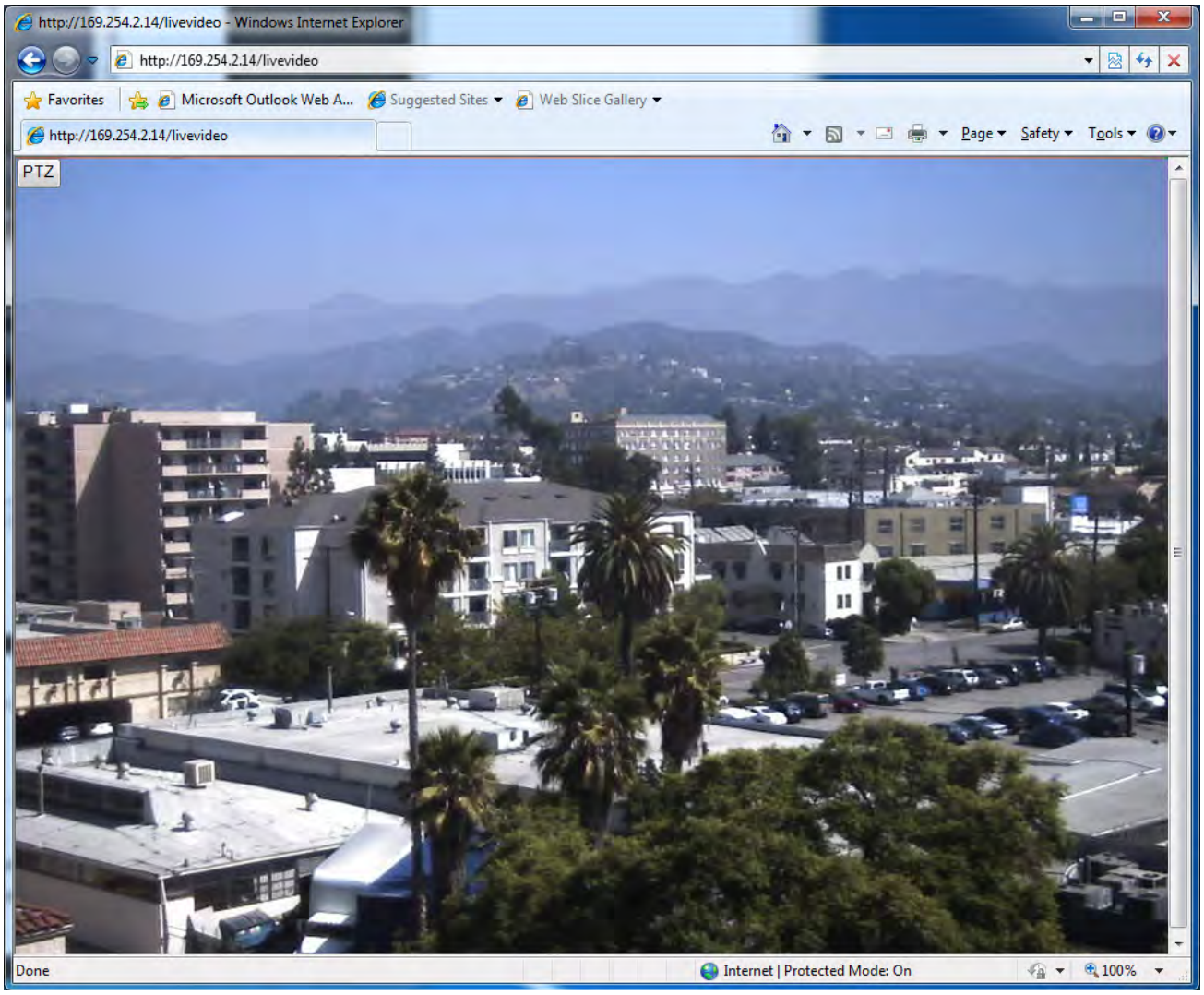
Figure 1. On-camera web page user interface



In addition to the web page Arecont Vision cameras also implement html video container that can be used for incorporation of the camera URL into user's own html page. This video container is accessed from:

http://ip_address/livevideo

Figure 2. On-camera web page live video only mode



To incorporate the video container in an html page, use the following line in the body of the page:

```
<iframe
src="http://200.168.1.10/"width="800"height="600"marginheight="0"marginwidth="0"scrolling="no">
</iframe>
```

where the width and height parameters specify the image size requested from the camera.

About Menu

About menu lists camera information like model, MAC address, firmware version, etc. In case you experience an issue with a camera and need technical support, you will be asked to provide all the numbers appeared on this menu together with a detailed description of the issue you are having. You are also encouraged to provide a screen shot of this page if it can show any image artifacts that you are experiencing.

Figure 3. About menu

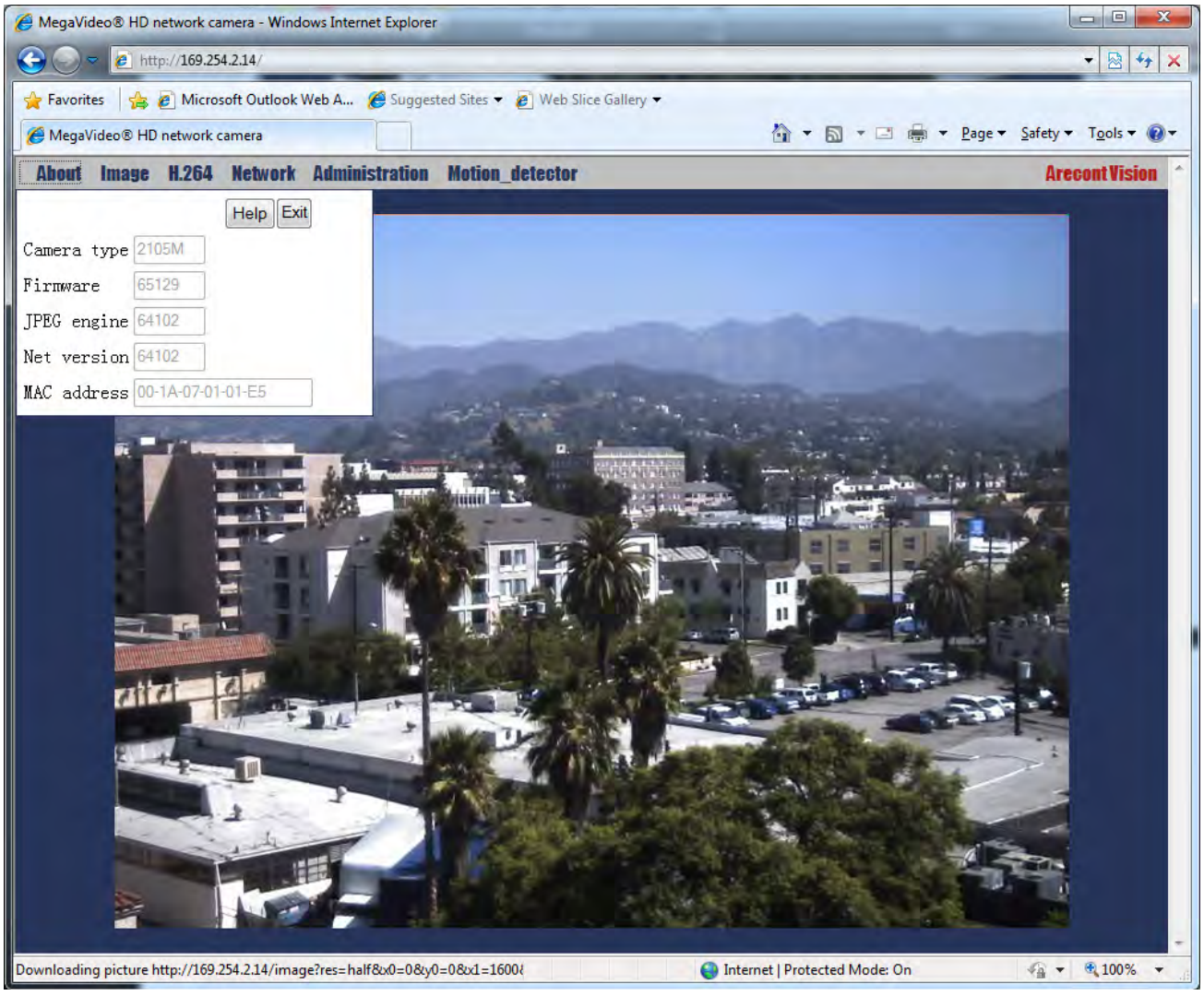
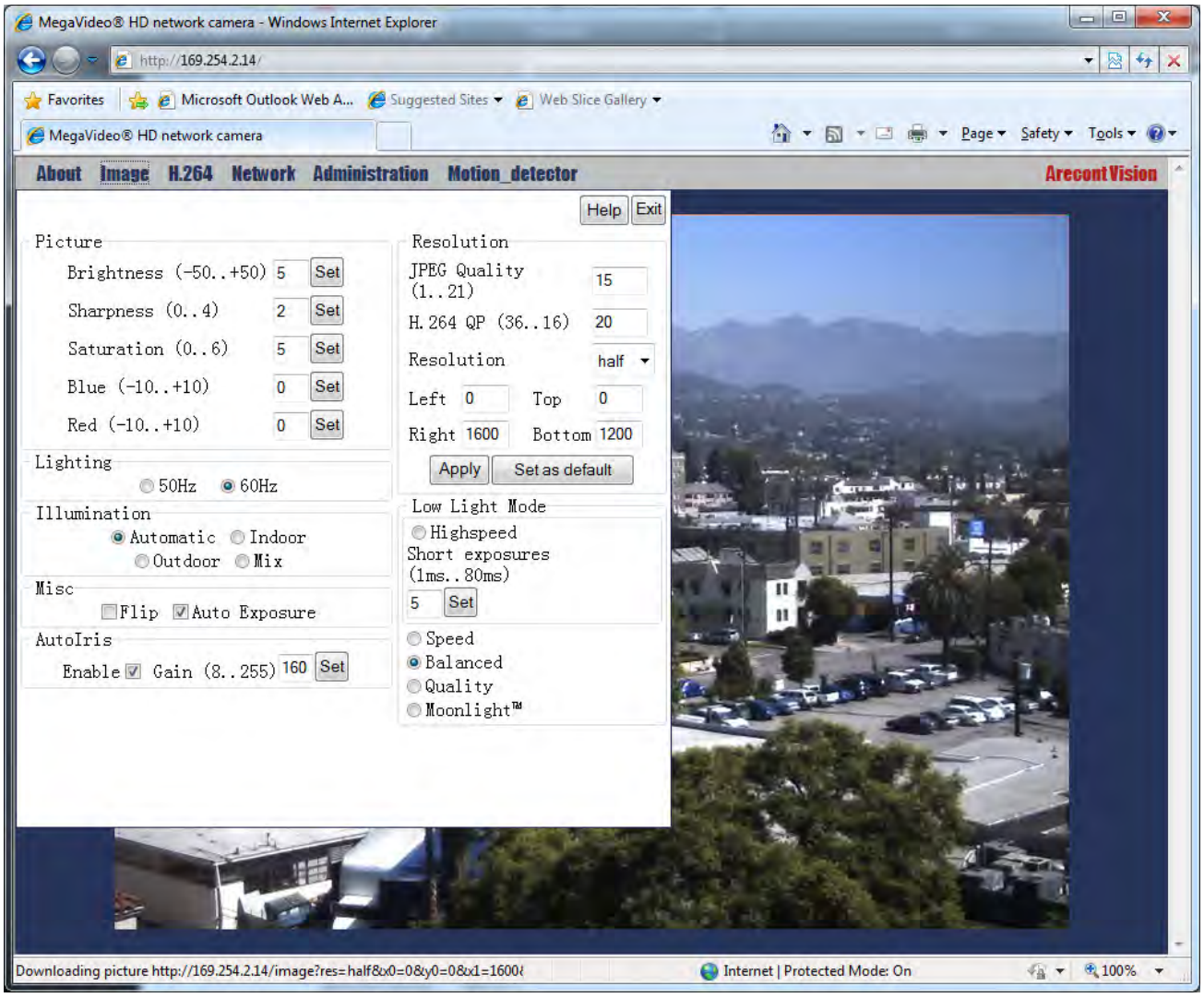


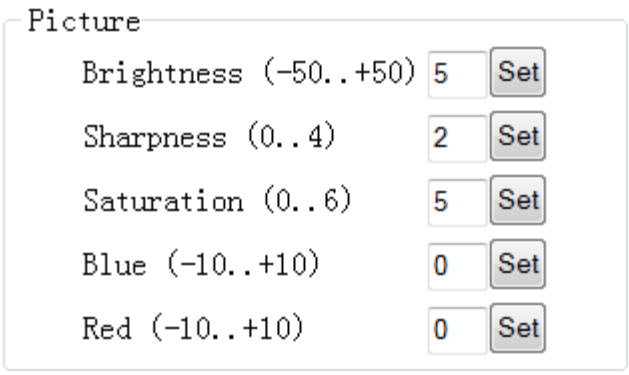
Image Menu

Image menu is the place to adjust imaging parameters like brightness, resolution, exposure mode, etc. Figure 4 shows the interface of an AV2105 camera. Other camera models may offer a slightly different menu with additional controls and functions specific to the model and firmware version.

Figure 4. Image menu



Picture Settings



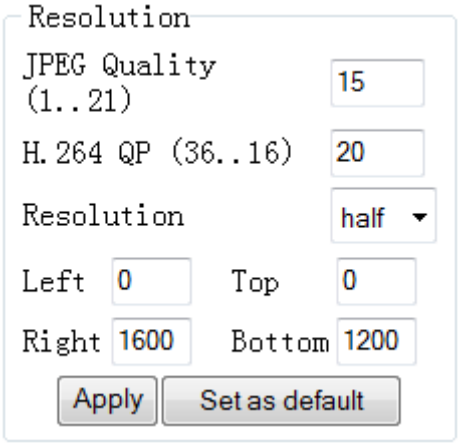
Brightness adjusts image brightness.

Sharpness adjusts image sharpness or the crispness of an image.

Saturation adjusts image color saturation or the amount of color in an image. Lower saturation gives a duller, faded image.

Red/Blue adjusts the red/blue tint. This setting changes the target for camera's automatic white balance computation. The effect is gradual and takes several seconds for the camera to fully adjust to the new setting.

Resolution Settings



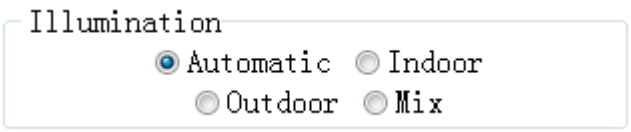
JPEG Quality adjusts the compression level for JPEG images

H.264 QP adjusts the compression level for H.264 images

Resolution selects from "half" or "full" resolution options that supported by the camera

Left/Top/Right/Bottom adjusts the image cropping relative to current sensor cropping

Illumination Settings

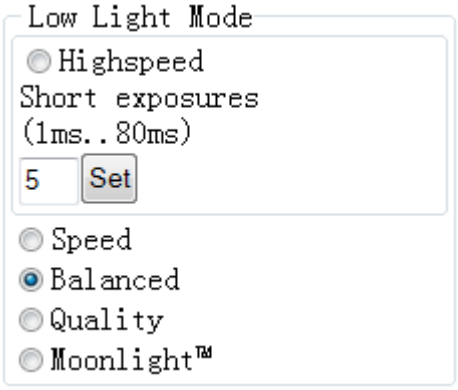


Illumination adjusts the camera's white balance computation based on the scene's illumination. "Automatic" enables the camera to adjust for illumination automatically while indoor/outdoor settings use presets assuming the camera is indoors or outdoors.

Lighting Settings

Lighting prevents flicker caused by the power line frequency of lighting. Choose 50Hz for European and China and 60Hz for US and Japan. This parameter would have no effect when the dominate light is sunlight. Also, this parameter will lose effect if camera exposure mode is set to "Highspeed" and the chosen "Short exposure" value does not match the power line frequency. A "Short exposure" value is said to match the power line frequency when it is close to a multiple of 8.3/10ms for 60/50Hz, respectively.

Low Light Mode Settings



Low Light Mode adjusts performance under low light conditions. Exposure time refers to the amount of time the sensor is exposed to light. Short exposures result in less light, giving darker images whereas longer exposures can flood an image with light, giving washed out images in the presence of a lot of light. Additionally, motion blur is reduced under short exposures and increased under long exposures.

High Speed enables a fixed exposure time, selectable from the "Short Exposure" menu with values between 1 and 80ms. Low values will reduce motion blur but may result in a noisier video. Ample illumination is required to improve quality under very short exposures due to the lack of captured light.

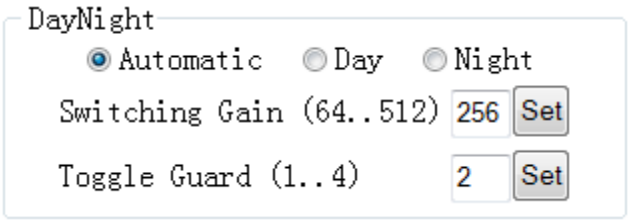
Speed enables short exposures ranging from 10-80ms. The exposure time will increase with low light conditions.

Balanced enables medium exposures ranging from 20-80ms with low light conditions resulting in a higher exposure time.

Quality enables longer exposures ranging from 40-200ms. Motion blur may increase, but video will contain less noise under low light conditions.

Moon Light enables exposures of up to 500 ms if necessary. This mode will result in more motion blur for fast moving objects.

DayNight Settings



Day/Night settings apply to dual-sensor cameras other camera models equipped with a switching IR filter.

Automatic enables the camera to automatically switch from daylight to nighttime conditions and vice versa based on the **Switching Gain** settings.

Day forces day mode and disables night mode.

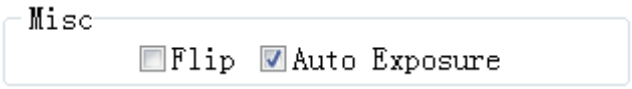
Night forces night mode and disables day mode.

Switching Gain adjusts the level of darkness to switch from day to night mode when switching is set to "Automatic" mode. Smaller values will cause the camera to switch to night mode when there is still much light in the scene. Larger values will cause the camera to stay in day mode much longer, requiring near darkness in order to switch.

Toggle Guard adjusts the level of brightness required to switch from nighttime to daylight mode. Setting this to 0% corresponds to "Switch At" set to 100%. Toggle Guard should be adjusted to prevent the mode from toggling during transitional lighting.

Note: for dual-sensor camera models the values are displayed in F-Stops.

Miscellaneous Settings

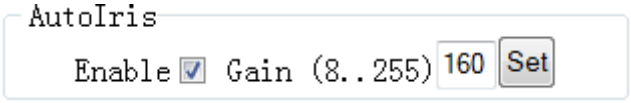


Flip is an option for flipping the image vertically and horizontally to rotate it 180 degrees.

Auto Exposure is an option to enable/disable the on-camera automatic exposure control. Auto exposure maintains the user-set image brightness under changing lighting conditions. This must be enabled to ensure the 'Low Light Mode' settings function.

Auto-Iris Settings

The on-camera Auto-Iris algorithm works in such a way that when the scene is too dark, the camera will open the iris fully. This allows more light onto the sensor and will substantially improve the low-light performance. When the scene is too dark, the camera will open the iris until there is enough illumination.



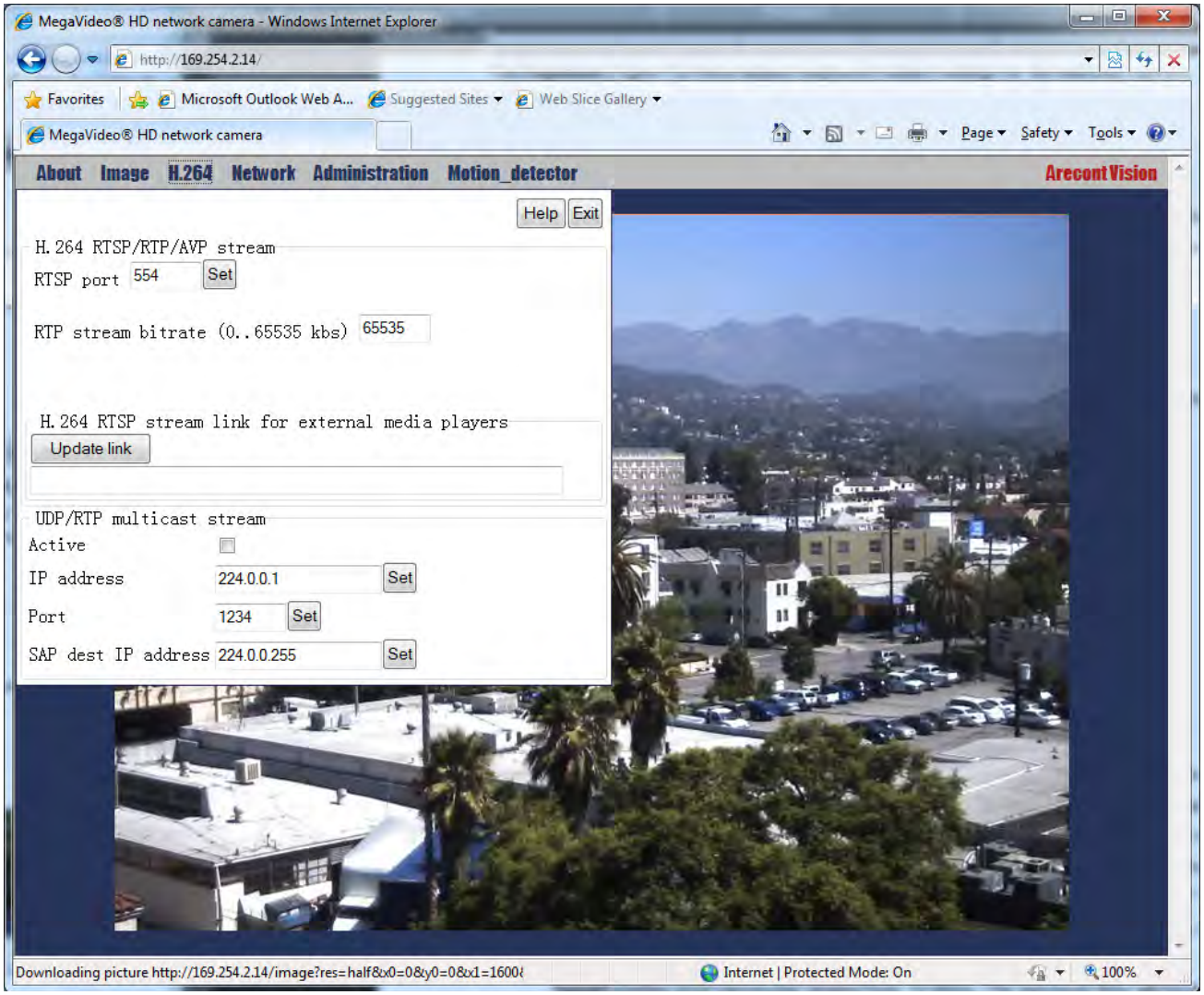
Enable enable or disable Auto-Iris functionality. When disabled, the camera will open the iris fully and have electronic auto-exposure working. This configuration is identical to using a manual lens.

Gain adjusts the point where the auto-iris will open fully: the higher the gain, the later the auto-iris will open as the illumination diminishes

H.264 Menu

H.264 menu is the place to configure H.264 streaming parameters targeting RTP protocol. Users can specify an RTSP port number, obtain a streaming URL to be opened by a third party media player, and enable RTP multicast function, etc.

Figure 5. H.264 menu



RTSP URL

Arecont Vision cameras' RTSP/RTP stream supports mainframe third party media players like the VLC player and Apple QuickTime player. Although users may create a customized RTSP request URL on their own, most users find it convenient to let camera generate a default URL then copy and paste into a media player.

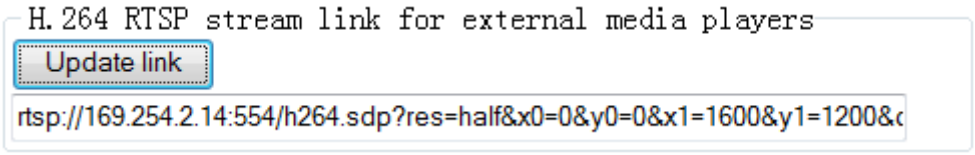
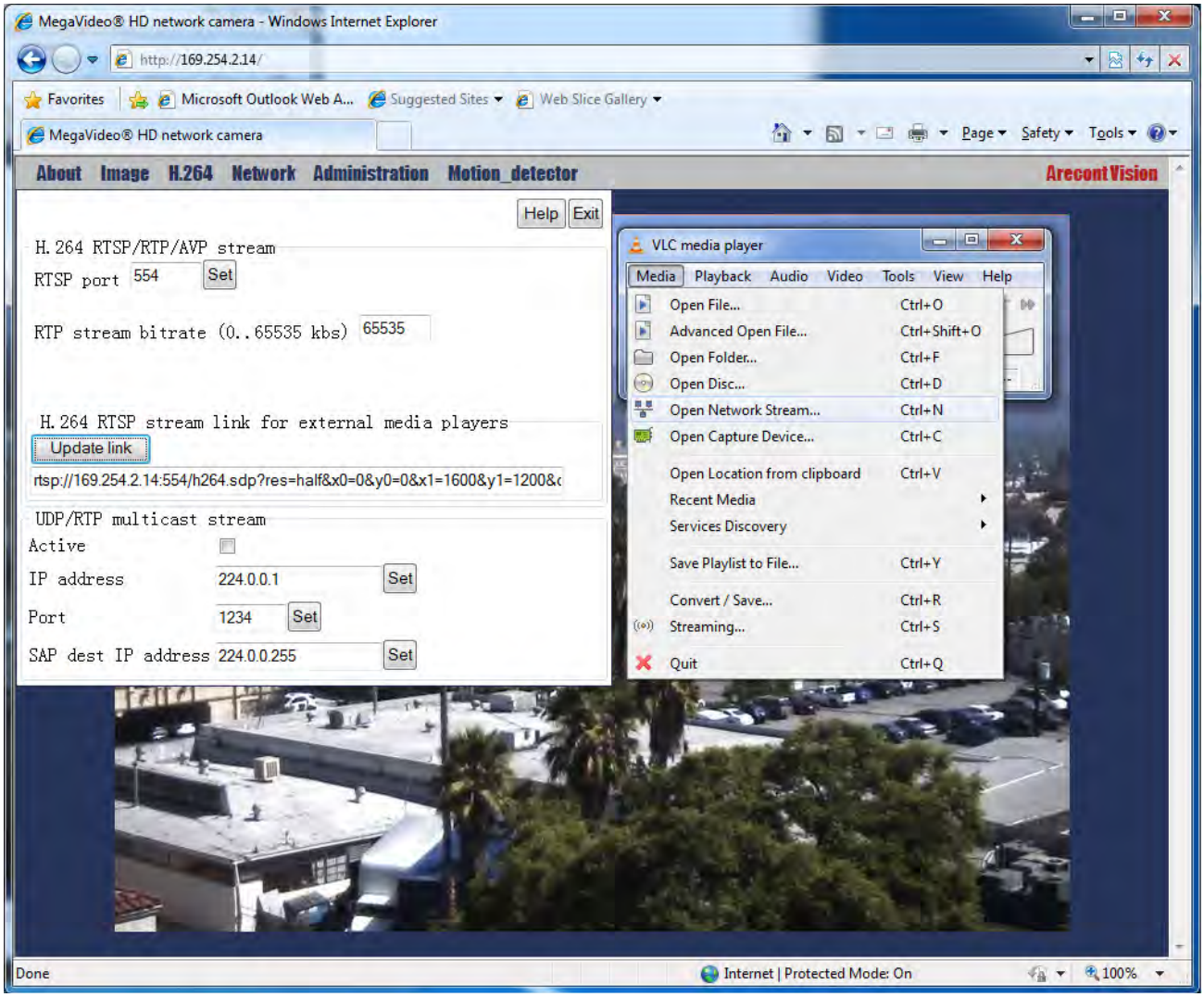


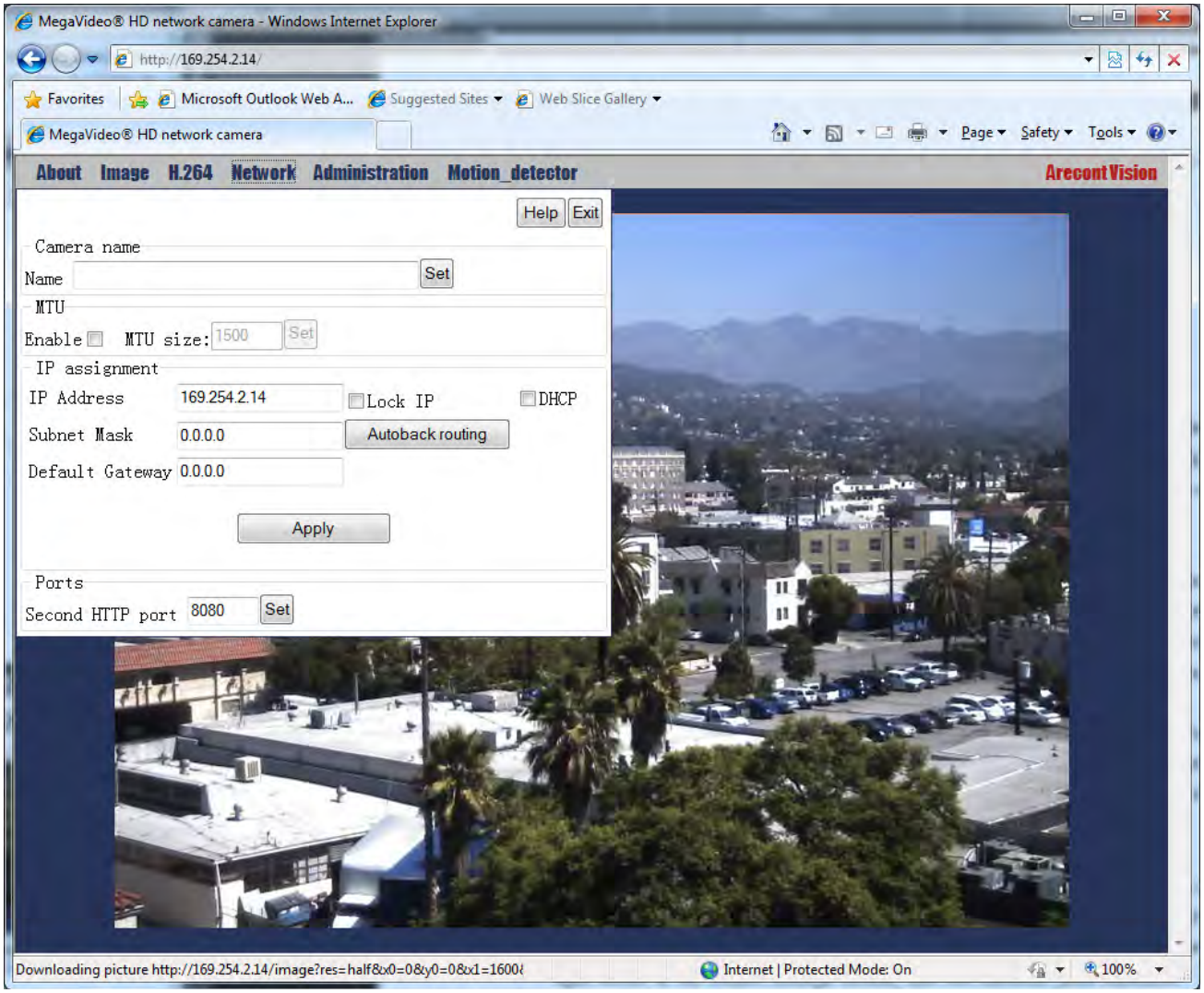
Figure 6. Open RTSP stream in VLC media player



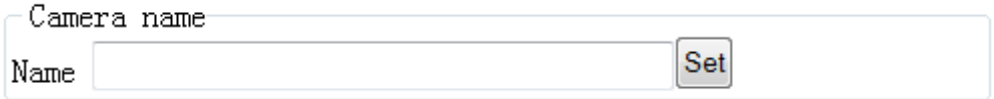
Network Menu

Network menu is where networking parameters such as IP address and port numbers are configured.

Figure 7. Network menu



Camera Name



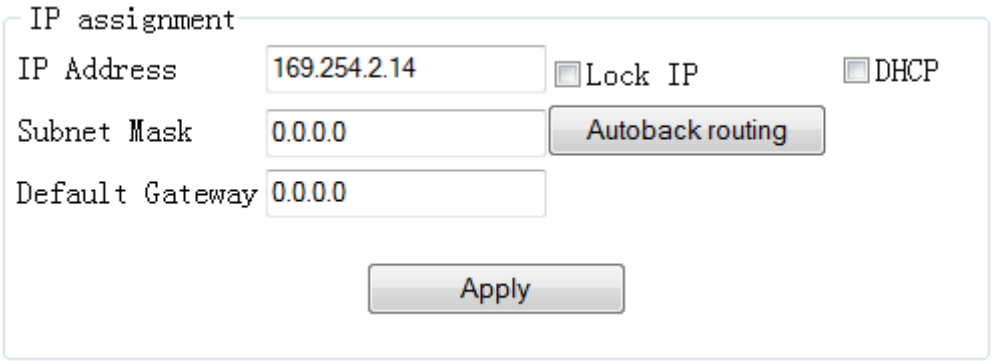
Camera name user can assign a text string of no more than 32 ASCII characters to the camera

MTU Settings

Enable enable or disable customized MTU size

MTU setting is for advanced users only. If your network has some type of restriction such that standard Ethernet MTU size (1500 bytes) is not appropriate for the network, you can enable this option and specify a different MTU size.

IP Settings



IP Address set the current IP address of the camera.

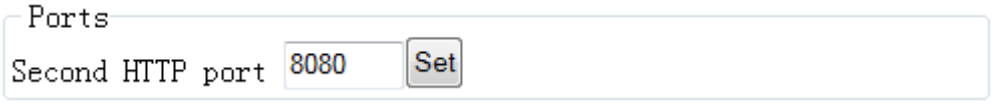
Lock IP if checked, camera will reject any attempt to change IP address until this box is unchecked

DHCP if checked, camera will attempt to obtain its IP address from the DHCP server available on the network

Subnet Mask once set, camera will use these mask bits to determine if a destination is from a different network

Default Gateway once set, camera will use send traffic to the specified gateway if the destination is on a different network

Port Settings

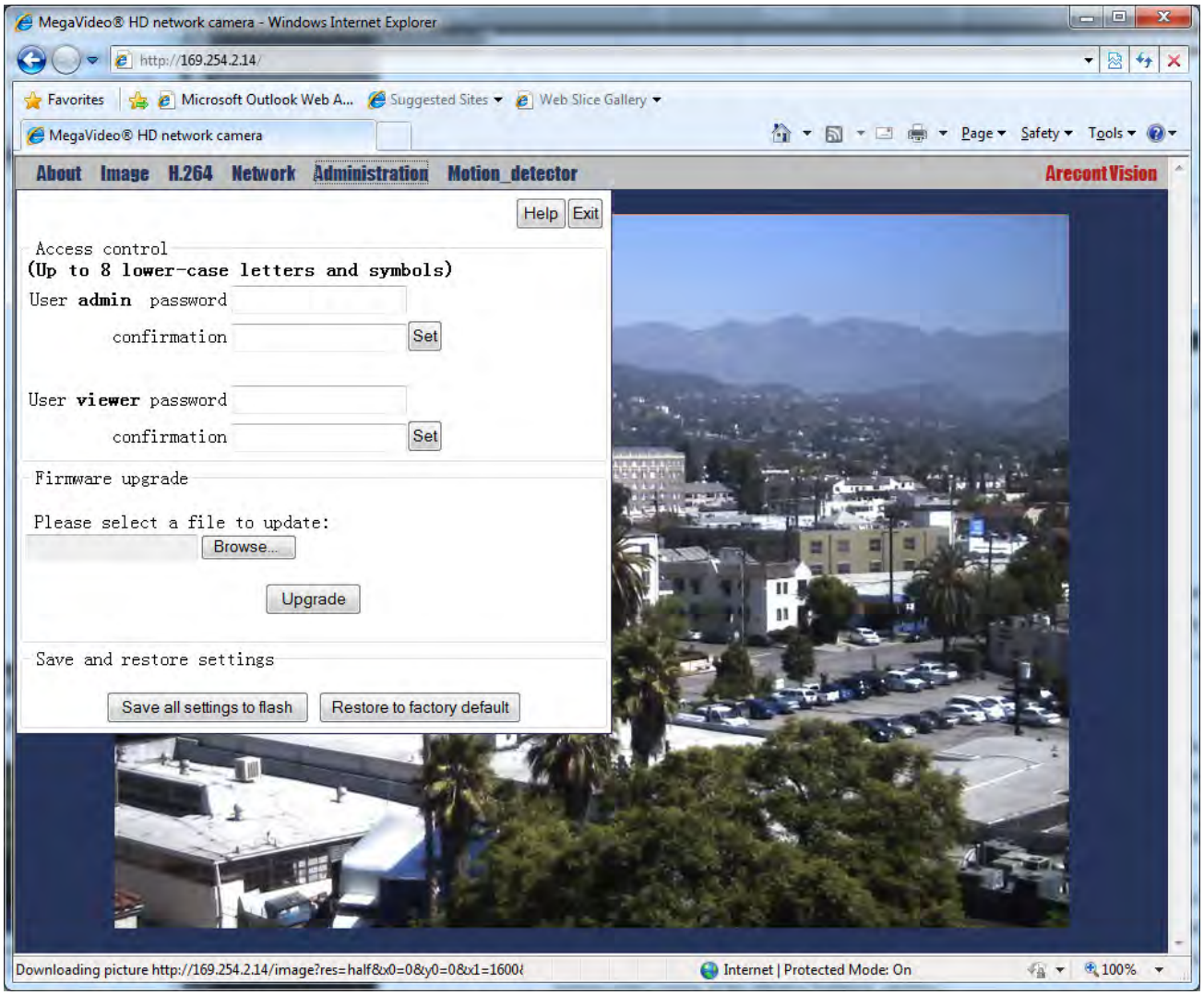


Second HTTP port set an alternative HTTP port. this port can be useful when the standard HTTP port (80) is not appropriate for this camera.

Administration Menu

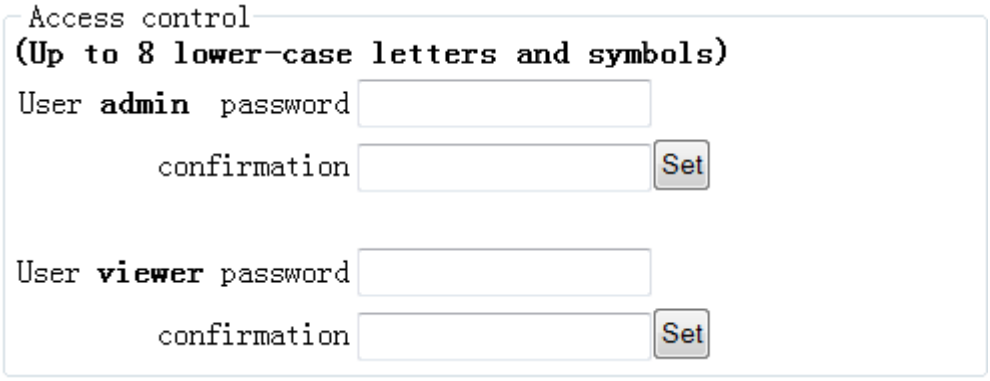
Administration menu is the place to set a password, upgrade camera firmware and save/restore camera configurations.

Figure 8. Administration menu



Access Control

Arecont Vision cameras support two levels of password-protected access control. Camera authentication is compatible with RFC-2068 HTTP 1.1 and is supported by all standard browsers and video surveillance software.



There are two types of users with the following reserved names:

admin – full access to all camera settings and live video.

viewer –viewing access only to all current camera settings and live video.

Setting and removing the passwords is the privilege of the **admin** user, while the **viewer** can only use the existing password, but not change it. Factory defaults erase all current passwords for both the **admin** and the **viewer.** A newly shipped camera has no password protection and allows full anonymous access from the network. In case the **admin** password has not been set, the camera has full anonymous access from the network, even if the **viewer** password has been set.

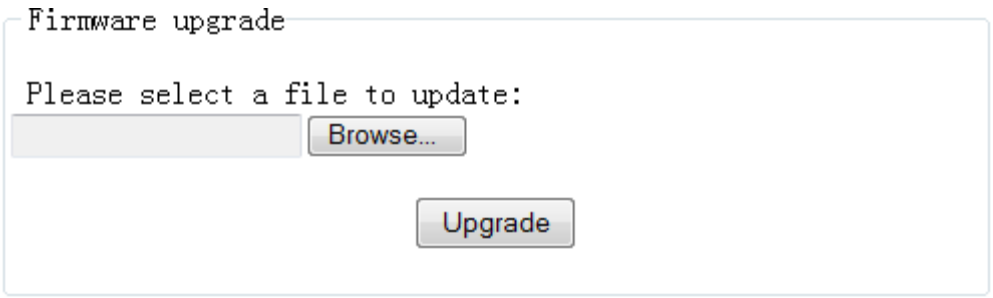
Access control setup consists of three steps:

1. Set **admin** password (using http commands or using the camera's web page, see below).
2. Log-in using the **admin** password and set the **viewer** password.
3. Communicate the **viewer** password to the users.

In order to delete **viewer** password, log-in as **admin** and change the viewer password to a reserved password **empty** – this would restore the full anonymous access to the camera. The **admin** user can change the **viewer** password at any time, even without knowing the current **viewer** password.

NOTE: *If the admin password has been set and forgotten, it can only be erased through reprogramming the camera's firmware, or by accessing the camera registers via developers' register access from AV100 software.*

Firmware Upgrade

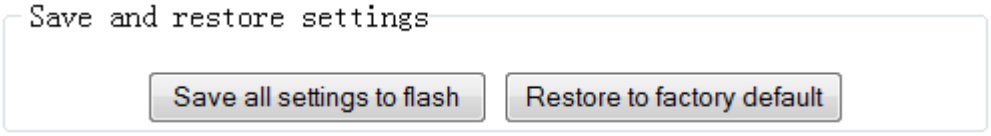


Users can also upgrade firmware by Internet Explorer and Firefox web browser.

To upgrade the firmware:

- Choose the firmware upgrade file and click "**Upgrade** ". The firmware upgrade will start automatically. Do not disconnect the Arecont Vision camera at any point during the upgrade process.

Save Settings



Save and restore settings

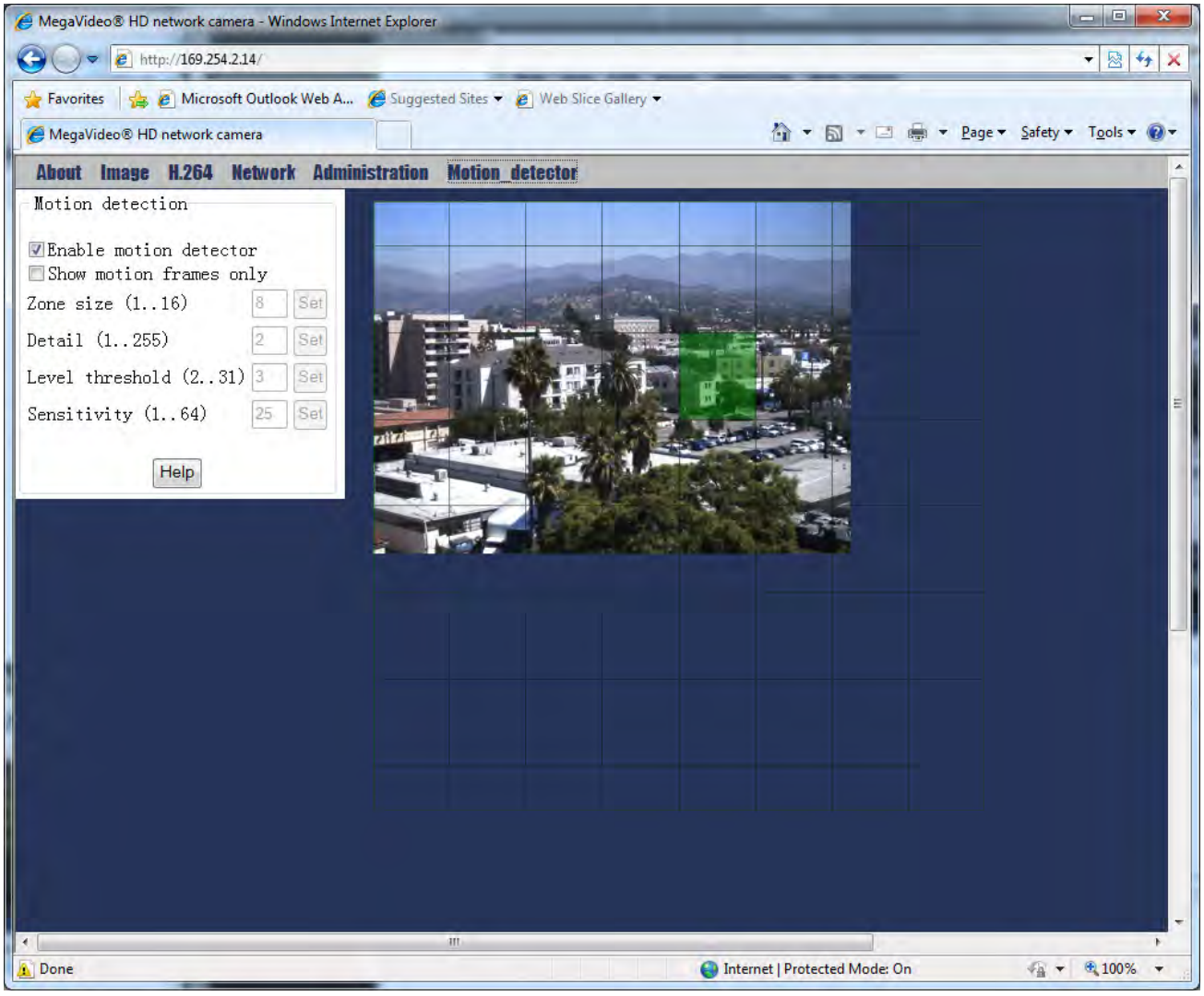
Save all settings to flash Click this button to save all settings to on-camera flash memory when camera has been properly configured and you want to save the changes.

Restore to factory default Click this button to reset camera to factory default state if you find some changes of configuration causes unsatisfactory results and you want a quick way to cancel all the changes.

Motion Detector Menu

Arecont Vision cameras support highly sensitive motion detection based on pixel brightness analysis. There are total 64 motion detection zones arranged as an 8x8 array. Each zone is comprised of certain number of cells, where each cell is a block of 32x32 pixels. By choosing a proper "Zone size" parameter, the total area covered by 64 zones can be large enough to cover the interested image area (normally the entire picture).

Figure 9. Motion Detector menu



Enable motion detector turns on and off on-camera motion detection. On-camera motion detection is done by hardware thus it does not affect frame rate.

Show motion frames only cause the camera to stop video streaming if motion detection is active and result is negative. This is implemented in the camera web page using javascript function which polls motion detection results before sending any image requests to the camera. If no motion is detected, image request is skipped.

Zone size adjusts the size of motion detection zones. The total area covered by motion detection zones is (N*32*8)x(N*32*8) pixels, where N is the chosen zone size, 32 is hard-coded cell size and 8 is hard-coded number of zones in each direction. For example, N=8 results in a detection area of 2048x2048 pixels which is good for 2MP and 3MP resolution. For 5MP resolution, N>=11 is appropriate.

Detail adjusts the size of the detectable objects within each motion detection zone. For example, when Zone size=8, there are total 64 cells in each zone. If Detail=2, motion detection will be triggered when 2 out of 64 cells are found positive. Lower settings may cause false motion detection due to noise. Higher settings will require larger objects for motion detection. This is useful when motion detection should only detect something of the size of a car and ignore smaller objects like an animal.

Level threshold adjusts the inter-frame brightness change threshold that triggers motion detection. Lower settings results in more sensitive detection but may cause more false triggers due to noise. Higher settings will require a larger brightness change on the moving object to trigger motion detection.

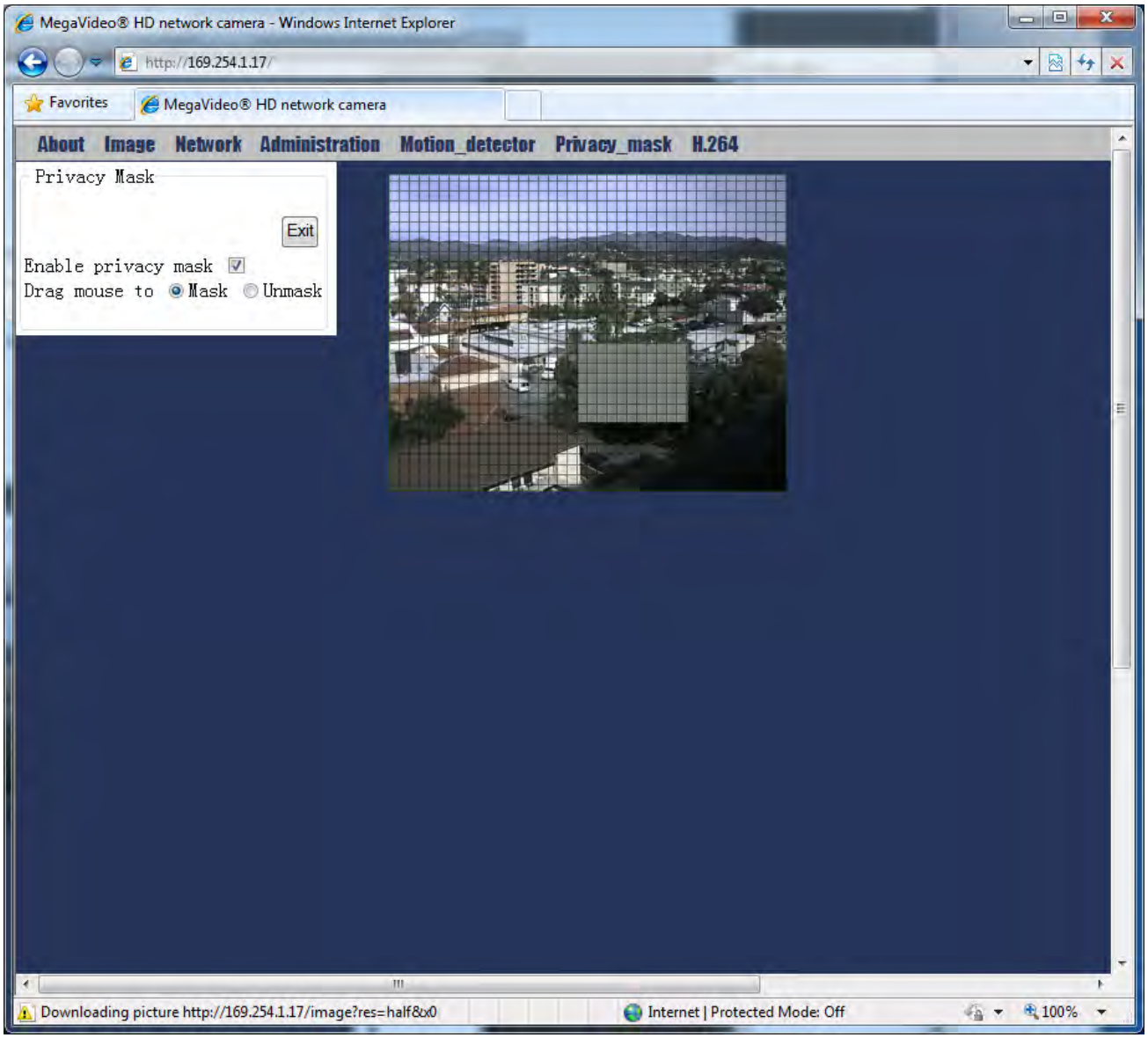
Sensitivity serves as a guard against false triggering due to a sudden overall change in lighting that would trigger motion detection in a large number of zones simultaneously. For example, a bright flash in the scene would not trigger motion detection when Sensitivity value is significantly lower than the maximum. Note that the maximum number depends on image resolution and is usually less than the total zone size (64). For example, when Zone size=8 and image resolution is 1600x1200, there are only 7x5=35 active zones since 7*8*32=1792 covers the width and 5*8*32=1280 covers the height. Other zones will always read zero.

Motion Privacy Mask Starting from firmware version 65165, a motion privacy mask feature begin available on certain camera models. When enabled, a privacy mask can be set up to block motion detection in some of the zones by drawing a rectangle with the mouse (by left-clicking and holding down the mouse button). The privacy mask is marked in red. A more complex shape can be created by drawing multiple rectangles. Erasing the mask (or part of the mask) is done by drawing a rectangle in "erase" mode.

Privacy Mask Menu

Starting from firmware version 65154, a video privacy mask feature begins available on certain camera models. When enabled, a blocked out region in the video can be set up using the mouse. The masked area is shown in gray as illustrated in Figure 10.

Figure 10. Privacy Mask menu



Chapter III - HTTP Access

Arecont Vision cameras support three protocols: TFTP, HTTP, and RTSP/RTP. TFTP protocol is the first protocol available on Arecont cameras and it is very efficient in delivering high quality video at full frame rate in a LAN environment. The drawback is that TFTP port is often disabled by default on complex corporate networks thus it could be difficult for TFTP traffic to penetrate subnets. Secondly, the implementation of TFTP protocols requires custom software application development based on Arecont Vision's SDK. And it could take up to weeks to go through the administrative processing before SDK can be released.

HTTP protocol is now supported by all Arecont cameras and it is also supported by almost all third party software systems or plug-ins that support standard IP video over HTTP. Developers would find it easy and quick to locate technical resources to help integrate Arecont cameras using HTTP protocol. Camera performance in terms of frame rate is somewhat slower via HTTP than via TFTP but is comparable to other multi-megapixel products available on the market.

RTSP/RTP protocol is supported only in camera models that are equipped with h.264 encoder, as described at the end of this chapter.

Notational conventions:

- **camera_ip** or **ip_address** : IP address of the camera;
- **|** : means one or another, but not both i.e. logical OR;
- **( )** : allowable values;
- **..** : a range of values which can be incremented by 1;
- **+/-** : positive values do not need the "+" sign, while the negative values do need the "- " sign in front of the value;
- **[ ]** : non-mandatory value which can be omitted.

HTTP Request Format for Receiving Individual JPEG Frames

NOTE: *A complete set of http requests described in this document is supported for firmware versions 61430 and above. If you have an Arecont Vision camera with a lower firmware version contact your distributor for a firmware upgrade.*

An individual image can be requested from Arecont Vision cameras by using the following HTTP request format:

http://ip_address/image?res=resolution_value&x0=X0&y0=Y0&x1=X1&y1=Y1&quality=quality_value&doublescan=doublescan_value&id=id_value

where

- **Res** can have value of either "half" or "full" and specifies whether camera should decimate the image by a factor of 2 in each direction or display the full resolution.
- **X0, Y0, X1, Y1** are the left, top, right and bottom coordinates of the requested image window, respectively. These values cannot exceed the size of the image sensor array for the specific camera and should be divisible by 16 if "**Res=full**" and 32 if "**Res=half**". These parameters allow for a particular image to be cropped to a selected size.
- **Quality** is the compressed JPEG image quality with a range from 1 to 20.
- **Doublescan** allows the user to specify whether the camera should delay the image output until a new image is available (**doublescan** = 0) or the image request should be serviced by outputting the content of the image buffer that was already once output (useful for picture-in-picture display).
- **ID** is an optional field that is ignored by the camera but may be set by the user to a random value to force some browsers to display a new image. Some browsers may display a cached image if a previous URL is reused without modifying the **ID** field.
-

The following example illustrates the request to camera with IP address 192.168.0.36 for a new full resolution 1600x1200 image with compression quality 12:

http://192.168.0.36/image?res=full&x0=0&y0=0&x1=1600&y1=1200&quality=12&doublescan=0

The user also has the option of specifying default image parameters via parameter "set" requests and then obtaining the image by using a simple request without additional parameters: http://ip_address/img.jpg

HTTP Request Format for Continuous MJPEG Video Streaming

Continuous sequence of JPEG images (MJPEG) separated by the boundary separator can be requested from Arecont Vision cameras by using the following GET method request format:

GET /mjpeg?res=resolution_value&x0=X0&y0=Y0&x1=X1&y1=Y1&quality=quality_value&doublescan=doublescan_value&fps=fps_value&id=id_value HTTP/1.1\r\n
Host: ip_address\r\n

\r\n

where

- **Res** can have value of either full or half and specifies whether camera should decimate the image by a factor of 2 in each direction or display the full resolution.
- **X0, Y0, X1, Y1** are the left, top, right and bottom coordinates of the requested image window, respectively. These values cannot exceed the size of the image sensor array for the specific camera and should be divisible by 16 if "**Res=full**" and 32 if "**Res=half**". These parameters allow for the video to be cropped to a specific size.
- **Quality** is the compression quality of the jpeg image with the range from 1 to 20;
- **Doublescan** allows the user to specify whether the camera should delay the image output until a new image is available (**doublescan** = 0) or if the image request should be serviced by outputting the content of the image buffer that was already once output (useful for picture-in-picture display).
- **FPS** specifies the requested frame rate; values 1 to 15 result in the specified frame rate, while omitting fps parameter as well as fps values of 0 and all values above 16 will result in maximum frame rate that is model dependent.

The following example illustrates the request to camera with IP address 192.168.0.36 for the new full resolution 1600x1200 video stream with compression quality 12 at a maximum frame rate:

```
GET /mjpeg?res=half&x0=0&y0=0&x1=1600&y1=1200&quality=12&doublescan=0 HTTP/1.1\r\n
Host: 192.168.1.11\r\n\r\n
```

In response to the above request the camera sends a continuous stream of images separated by the boundary separator "fbdr" in accordance with MIME multipart/x-mixed-replace format. Please note that MIME multipart/x-mixed-replace format is not directly supported by Internet Explorer. For video viewing based on IE only the users should use on-camera script that can be accessed via **http://ip_address/index.html** request.

```
HTTP/1.0 200 Ok\r\n
Content-Type: multipart/x-mixed-replace;boundary=fbdr\r\n
\r\n
--fbdr\r\n
Content-Type: image/jpeg\r\n
\r\n
<JPEG image 1 data>
\r\n
```

```
--fbdr\r\n
Content-Type: image/jpeg\r\n
\r\n
<JPEG image 2 data>
\r\n
--fbdr\r\n
…
Content-Type: image/jpeg\r\n
\r\n
<JPEG image n data>
\r\n
--fbdr\r\n
```

HTTP Request Format for Receiving Individual H.264 Frames

NOTE: *The h.264 http requests described below are supported only by camera models AVxxx5.*

To maintain a continuous H.264 stream, the requests for individual video frames should be sent one after another. If the delay between requests exceeds 5 sec, the camera will initiate a new stream by sending an Intra coded frame first in response to the next frame request. Individual H.264 video frames are requested from Arecont Vision cameras by using the following HTTP request format:

```
http://camera_ip/h264f?res=(half|full)&x0=(0..2596)&y0=(0..1944)&x1=(32..2596)&y1=(32..1944)&qp
=(4..36)&doublescan=(0|1)&ssn=(1..65535)[&iframe=(0|1)][&bitrate=(1..51200)][&
intra_period=(0..255)]
```

Where

- **Res** can have a value of either “half” or “full” to specify whether the camera should decimate the image by a factor of 2 in each dimension or produce the full resolution image.
- **X0, Y0, X1, Y1** are the left, top, right and bottom coordinates of the requested image window, respectively. These values cannot exceed the size of the image sensor array for the specific camera model and should be divisible by 32 if **Res = full** and 64 if **Res = half**.
- **QP** is the quantization parameter for H.264 encoder. To achieve a higher quality image, a lower **QP** is needed. Recommended values are in the range (16..37);
- **Doublescan** is the parameter that allows the user to specify whether the camera should delay the frame output until a new frame is available from the sensor (**doublescan** = 0) or the request should be

serviced by outputting the content of the memory buffer that has been already once output (**doublescan=**1, useful for picture-in-picture display).

- **SSN** specifies stream identifier. MPEG codecs including H.264 codecs are context dependent (decoding of the current frame depends on the previous frame(s)). The stream is a sequence of frames of the same resolution which can be decoded sequentially by one instance of an MPEG decoder. Accordingly, **SSN** is a means to distinguish different streams from one another. Use a unique **SSN** for each stream with a unique image size, quality and/or frame rate. Each camera supports up to eight simultaneous non-identical streams. Each client must have a unique (ip:ssn)
- **Iframe** set to 1 will force the camera to return an Intra frame with a corresponding SPS and PPS as an IDR slice, so that the stream is decodable from this point. When opening a new stream (for example when changing the image size and/or frame rate) the Intra frame will be sent automatically regardless of the input value of **iframe**. To reduce the stream size, reduce the frequency of **iframe** = 1 in the requests. The default number of P-frames for any of the streams sent by the camera is set using HTTP command:

  http://camera/setreg?page=3&reg=21&val=(number of P-frames)

  The camera will return an Intra frame even if **iframe** in the request is set to 0 when the on-camera counter of P-frames fills up. To find out whether an Intra frame was received, check the HTTP Content Type.
- **Bitrate** is used to set up a constant **bitrate** of the H.264 stream in kilobits per second. If this parameter is present in the request string and is larger than zero then the QP parameter is ignored, and the camera adjusts quantization parameters automatically to maintain the specified **bitrate**.
- **Intra_period** is valid only in bitrate control when a non-zero bitrate is present in the request string and iframe=1 is periodically requested by the user. In this case, the user must specify the intra-frame period at which the user is sending requests with iframe=1. If the user does not specify **intra_period** in this case, then bitrate control will not function correctly unless the actual period of sending iframe=1 requests is the same as the default number of P-frames specified in register 3:21 of the camera via

  http://camera/setreg?page=3&reg=21&val=(number of P-frames)

  If there are no **iframe**=1 requests, then **intra_period** parameter is not required and the bitrate control will rely on the default number of P-frames set in register 3:21.

The following example illustrates a request to a camera with IP address 192.168.0.36 for a full resolution 1600x1200 image as a part of the stream with a constant bitrate set to 2 Mbits/sec:

http://192.168.0.36/h264f?res=full&x0=0&y0=0&x1=1600&y1=1200&quality=12&doublescan=0&bitrate=2048&ssn=1

Each frame sent by the camera may contain multiple zero bytes at the end – there is no Unit Delimiter (UD). Although this does not contradict ITU-T H.264 standard (ISO/IEC 14496-10), some decoders may delay decoded frames by one due to the absence of the UD. If this presents a problem, replace all zero bytes at the end with the UD, a sequence of the following five bytes: 0x00 0x00 0x01 0x09 0x10. In addition, the number of zero bytes at the end of a frame may be significant, up to a few hundred bytes. Replacing them with the UD will also reduce the stream size.

HTTP Request Format for Continuous H.264 Video Streaming

NOTE: *The h.264 http requests described below are supported only by camera models AVxxx5.*

A continuous h.264 video stream with frames separated by the boundary separator can be requested from Arecont Vision cameras by using the following GET method request format:

GET /h264stream?res=(half|full)&x0=(0..2596)&y0=(0..1944)&x1=(32..2596)&y1=(32..1944)&qp=(4..36)&doublescan=(0|1)&ssn=(1..65535)[&fps=value][&bitrate=(1..51200)] HTTP/1.1\r\n
Host: ip_address\r\n
\r\n

Where:

- **Res** can have value of either “half” or “full” and specifies whether the camera should decimate the image by a factor of 2 in each dimension or produce the full resolution image.
- **X0, Y0, X1, Y1** are the left, top, right and bottom coordinates of the requested image window, respectively. These values cannot exceed the size of the image sensor array for the specific camera model and should be divisible by 32 if **Res = full** and 64 if **Res = half**.
- **QP** is the quantization parameter for H.264 encoder. To achieve a higher quality video, a low *qp* is needed. Recommended values are in the range (16..37);
- **Doublescan** allows the user to specify whether the camera should delay the image output until a new image is available from the sensor (doublescan = 0) or the image request should be serviced by outputting the content of the image buffer that has been already once output (useful for picture-in-picture display).

- **SSN** specifies the stream identifier. MPEG codecs including H.264 codecs are context dependent (decoding of the current frame depends on the previous frame(s)). The stream is a sequence of frames of the same resolution which can be decoded sequentially by one instance of an MPEG decoder. Accordingly, **SSN** is a means to distinguish different streams from one another. Use a unique **SSN** for each stream with a unique image size, quality, and/or frame rate. Each camera supports up to eight simultaneous non-identical streams. Each individual client must have a unique (ip:*ssn)*
- **Bitrate** is used to set up a constant bitrate of the H.264 stream in kilobits per second. If this parameter is present in the request string and is larger than zero then the **QP** parameter is ignored and the camera adjusts quantization parameters automatically to maintain the specified bitrate.
- **FPS** specifies the requested frame rate. Values 1 to 15 result in the specified frame rate. Omitting the fps parameter or using fps values of 0 or any values above 16 will result in maximum frame rate which is model dependent.

The first frame or the stream is always an IDR (Intra) frame followed by multiple P (Inter) frames. The default number of P-frames is 50, and can be modified via register 3:21 using the following HTTP command:

http://camera/setreg?page=3&reg=21&val=(number of P-frames)

For the 8185/8365 cameras, P-frame interval can be modified using the following HTTP command:

http://camera_IP/setreg?page=3&reg=100&val=(number of P-frames)

The current P-frames setting can be checked using the following HTTP command:

http://camera/getreg?page=3&reg=21

Each frame sent by the camera may contain multiple zero bytes at the end. There is no Unit Delimiter (UD) used. Although this does not contradict the ITU-T H.264 standard (ISO/IEC 14496-10), some decoders may delay decoded frames by one due to the absence of the UD. If this presents a problem, replace all zero bytes at the end with the UD, a sequence of the following five bytes: 0x00 0x00 0x01 0x09 0x10. In addition, the number of zero bytes at the end of a frame may be significant, up to a few hundred bytes. Replacing them with the UD will also reduce the stream size.

The following example illustrates a request to a camera with IP address 192.168.1.11 for full resolution 1600x1200 images as a part of the stream with a constant bitrate set to 2 Mbits/sec with maximum frame rate:

GET /h264stream?res=full&x0=0&y0=0&x1=1600&y1=1200&qp=26&ssn=1&doublescan=0
&bitrate=2048 HTTP/1.1\r\n

```
Host: 192.168.1.11\r\n
\r\n
```

In response to the above request the camera sends a continuous stream of images separated by the boundary separator “fbdr” in accordance with MIME multipart/x-mixed-replace format.

Basic Camera Control Parameters

The camera parameters can be accessed via the HTTP requests of the following format:

http://ip_address/set?parameter=value

http://ip_address/get?parameter

Examples:

http://192.168.0.36/set?brightness=15

http://192.168.0.36/get?brightness

The following parameter requests are supported via HTTP protocol by Arecont Vision cameras:

- **brightness** – image brightness (valid values are from -50 to 50)
- **sharpness** – image sharpening(valid values are from 0 to 4)
- **saturation** – color saturation (valid values from 0 to 6)
- **blue** - blue tint adjustment (valid values from -10 to +10)
- **red** - red tint adjustment (valid values from -10 to +10)
- **illum** – illumination setting for auto white balance (valid values are auto, indoor, outdoor, mix)
- **freq** – frequency of AC powered light sources (valid values are 50 and 60)
- **lowlight** – low light mode of the camera, allows tradeoff between frame rate and image quality (valid values are balance, speed, quality, highspeed, moonlight). If highspeed is used, an additional parameter **shortexposures** can be set with valid values from 1 to 10.
- **rotate** – image rotation (valid values are 0 and 180)
- **autoexp** – allows to turn on and off auto exposure (valid values are on and off)
- **expwndleft** - left coordinate of user-defined auto-exposure measurement window (valid values should fall within sensor window)
- **expwndtop** - top coordinate of user-defined auto-exposure measurement window (valid values should fall within sensor window)
- **expwndwidth** - width of user-defined auto-exposure measurement window (valid values should fall within sensor window)
- **expwndheight** – height of user-defined auto-exposure measurement window (valid values should fall within sensor window)
- **sensorleft** - left coordinate of sensor window (valid values defined by sensor size)
- **sensortop** - top coordinate of sensor window (valid values defined by sensor size)
- **sensorwidth** - width of sensor window (valid values defined by sensor size; this value affects sensor frame rate)

- **sensorheight** - height of sensor window (valid values defined by sensor size; this value affects sensor frame rate)
- **imgleft** - left coordinate of the default image returned in response to the simple request http://ip_address/img.jpg (valid values should fall within the camera's sensor window)
  imgtop - top coordinate of the default image returned in response to the simple request http://ip_address/img.jpg (valid values should fall within the camera's sensor window)
- **imgwidth** – width of the default image returned in response to the simple request http://ip_address/img.jpg (valid values should fall within the camera's sensor window)
- **imgheight** - height of the default image returned in response to the simple request http://ip_address/img.jpg (valid values should fall within sensor window)
- **imgquality** – quality setting of the image returned in response to the simple request http://ip_address/img.jpg (valid values 1 to 21)
- **imgres** – resolution of the default image returned in response to the simple request http://ip_address/img.jpg (valid values are full and half, where half is used to request images decimated by a factor of 2 in both directions)
- **auto-iris** – allows to enable and disable auto-iris (valid values are on and off)
- **irisgain** – allows to specify threshold for closing the auto-iris (valid values are from 8 to 255)
- **save** – saves current camera configuration (all parameter values) in the non-volatile memory http://ip_address/set?params=save
- **mac** – retrieves the MAC address of the camera (read-only)
- **make** – retrieves the manufacturer abbreviation (requires firmware version 64116)
- **model** – retrieves a four-digit camera model number (read-only, e.g. AV2100M camera will return "model=2100")
- **fwversion** – retrieves firmware version of the camera
- **procversion** – retrieves version of the image processor
- **netversion** – retrieves version of the network processor
- **revision** – retrieves the revision code of the PCB
- **factory** – restores camera parameters to factory defaults http://ip_address/set?params=factory

The camera registers can be accessed via the HTTP requests of the following format:

http://camera_ip/getreg?page=(0..6)&reg=(0..255)

http://camera_ip/setreg?page=(0..6)&reg=(0..255)&val=(0..65535)

Parameters Specific to AV3130/35 and DAY/NIGHT Cameras

The AV3130 and AV3135 camera utilizes two distinct sensors for its day and night modes. Specifically, a 3-Megapixel color sensor with IR-cut filter is used in the day mode, and a 1.3-Megapixel monochrome sensor without IR-cut filter is used in the night mode.
Single sensor Day/Night cameras use a mechanical IR switcher to switch between day mode (color, with IR-cut filter) and night mode (monochrome, without IR-cut filter).

By default, the camera automatically switches between day and night channels as illumination changes. However, it is also possible to force the camera to operate in either day or night channel by using the **daynight** request. The switching point between day and night modes is determined based on overall AE/AGC gain and can be adjusted via the parameter **nightgain**. To avoid oscillations between day and night modes, the night-to-day transition is specified via parameter **daygain** in terms of "hysteresis" relative to day-to-night transition threshold.

- **daynight** – if set to "auto" the camera will select between color and monochrome channels automatically based on **daygain** and **nightgain thresholds** (valid values are "auto", "day" and "night")
- **nightgain** – specifies the automatic switching point for day-to-night transition in proportion to overall exposure*gain value. The user may need to adjust this value if the lenses on day and night channels have different f-stops. Higher values will cause the transition to night mode at lower illumination levels (valid values for the AV3130 and AV3135 are 0..18, for -DN models the valid range is 64..512)
- **daygain** – allows to specify the automatic switching point for night-to-day transition as "hysteresis" relative to night-to-day transition; Higher values will cause the transition to day mode at higher illumination level (valid values for AV3130 are 0..6, for –DN models are 1..4)

As AV3130 camera has two sensors with different resolutions it is most convenient to specify the required image size in terms of percentages of the full image size as shown in the following example:

http://200.168.1.10/image?res=full&x0=0%&y0=0%&x1=100%&y1=100%&quality=12&doublescan=0

Motion Detection Control Parameters

The unique design of Arecont Vision cameras allows for highly accurate 64-zone motion detection (also see Motion Detection). Motion detection is achieved by analyzing inter-frame brightness changes on a pixel-by-pixel basis. To provide accurate motion detection in low contrast and low light environments, EACH pixel of EACH frame is analyzed. The user can set the size of motion detection zones (via **mdzonesize**), select the sensitivity to motion (via **mdlevelthreshold**), select the zones where the motion detection has to be blocked (via **mdprivasymask**) and specify the size of the moving objects of interest (via **mddetail**). Motion detection information can be obtained from the camera in terms of "amount" of motion in each zone (via **mdresult**) In

addition to retrieving motion detection information, the camera can also be configured to output images only if motion is detected (via **mdmode**).

The On-camera motion detection unit utilizes up to 64 and 1024 distinct zones. Only AV1315, AV1325, AV2815, AV2825 and AV10005 support 1024 grid size. All zones are square, have equal size and are arranged in 8 rows with 8 zones per row. The zones are numbered from 0 to 63 or 0 to 1023 upper leftmost zone having number 0 and lower rightmost zone having number 63. The zones are broken into sub-zones of size 32x32 pixels. The size of zones is specified in terms of the square root of the number of sub-zones via parameter **mdzonesize.** With 64 grid size, the zones can be defined to be as small as 7x7 sub-zones to as large as 15x15 sub-zones. With 1024 grid size, the zones can be defined as small as 2x2 sub-zones. By setting the limit on how many sub-zones should contain the motion for the entire zone to be considered to contain motion the user can effectively decide on the size of the moving objects that should be detected. This is done via the parameter **mddetail**.

- **motiondetect** – enables on-camera motion detection (valid values are “on” and “off”)
- **mdmode** – motion detection mode for mjpeg streams (valid values are “on” and “off”); if set to “on” the camera will only output an image in the presence of motion; If the motion is not detected, the field following the frame boundary separator --fbdr will be followed by Content-Type: text/plain (instead of usual -Type: image/jpeg) and the image data will be substituted with the text message “no motion”
- **mdtotalzones** - number of independent motion detection zones; Currently must be 64 or 1024 if supported. There are 8 rows of zones, 8 zones per row. Note that depending on zone size and the camera model (image resolution in terms of the number of pixels)some zones may not correspond to the active image area (valid value 64)
- **mdzonesize** – size of motion detection zones measured in number of 32x32 pixel blocks in each zone; All zones are squares of the same size from 7x7 to 15x15 (valid values are 7 to 15 for AV1300 and AV2100 and 8 to 15 for AV3100 and AV3130). For 1024 grid, the minimal zone size is 2x2. However, AV10005 minimal zone size is 4x4.
- **mdlevelthreshold** – motion detection threshold that determines the sensitivity to local inter-frame brightness changes (valid values are 2…31). Lower settings may cause false motion detection due to noise. This parameter corresponds to “Level” under the “Motion Settings” in the AV100 Video System GUI.
- **mdsensitivity** – sensitivity of the motion detection to sudden overall lighting changes. This prevents false triggering due to a sudden overall brightness change that triggers motion detection in a large number of zones simultaneously. If more than this number of zones have motion it is assumed that the change is due to lighting change and the detected motion is ignored. Recommended values are 40 for AV3100/AV3130, 30 for AV2100 and 20 for AV1300. This parameter corresponds to “Limit” under the “Motion Settings” in the AV Video System GUI.

- **mddetail** – allows controlling the size of detectable moving objects. The value is the number of 32x32 sub-zones within each zone that should contain motion for the entire zone to be considered to contain motion. (valid values are 1 through square of **mdzonesize**). This parameter corresponds to "Detail" under "Motion Settings" in AV Video System GUI.
- **mdprivasymask** – Privacy matrix. An 8-byte array, where each byte corresponds to one row of motion detection zones. Each bit in a byte enables motion detection in a corresponding zone, if set to '1'. Leftmost zone is controlled by MSB, rightmost zone by LSB.

  Example*:* set?mdprivasymask=2a8f3d135b71ee04 results in the following enabled zones relative to camera image:

  01010100
  11110001
  10111100
  11001000
  11011010
  10001110
  01110111
  00100000

- **mdresult** – Motion detection information returned by the camera; The return value is "no motion" if motion has not been detected, otherwise the motion detection information is returned in the following format:

  mdresult=<SP><hexadecimal byte0><SP><hexadecimal byte1>...<SP><hexadecimal byte63>

  where <SP> is the SPACE symbol, and the byte value, byteN, indicates the number of sub-zones (blocks of 32x32 pixels) with motion within zone N. Note: the sub-zone size is fixed to 32x32 and cannot be changed. Important: the user should keep in mind that the total number of zones is always 64 (8 vertically and 8 horizontally). Therefore, if the zone size is large, some zones may not correspond to the active pixel array. In that case their motion detection value is not meaningful and should be ignored. For example, for AV1300 camera: if the image size is 1280x1024, then for zone size 8x8 there are 5 by 4 active zones (3 zones after every 5 zones must be ignored as well as all zones after zone 32).

  Example:

  mdresult= 00 1A 01... means that in zone 0 motion was not detected, in zone 1 there are 26 (32x32) sub-zones with motion, in zone 2 there is one sub-zone 1 with motion ….

Access Control

HTTP commands for password setting:

1. For **admin** passwords:
   http://camera_IP/get?admin
   http://camera_IP/set?admin=(a string of 1..8 ASCII symbols or "empty") The reserved password **empty** is used to erase the existing password.

2. For **viewer** passwords (Figure 30):
   http://camera_IP/get?viewer
   http://camera_IP/set?viewer=(a string of 1..8 ASCII symbols or "empty") The reserved password **empty** is used to erase the existing password.

Access Control for Panoramic Cameras

Arecont Vision cameras support dual-level password-protected access control. Camera authentication is compatible with RFC-2068 HTTP 1.1 and is supported by all standard browsers and video surveillance software.

There are two types of users with the following reserved names:

admin – has full access to all camera settings and the video.
viewer – has viewing access to all current camera settings and the video.

Setting and removing the passwords is the privilege of the **admin** user. The **viewer** user can only use a password set by the admin and has no rights to modify their own password. Resetting to factory default will erase all current passwords for both **admin** and **viewer.** A newly shipped camera will have no password protection and will allow full anonymous access. Setting the **viewer** password without an admin password will still allow full anonymous access to the camera's live feed.

Access control setup consists of three steps:

1. Set an **admin** password, using http commands or using the camera's web page.
2. Log-in using the **admin** password and set the **viewer** password.
3. Convey the **viewer** password to the users.

In order to delete **viewer** password, log-in as **admin** and change the viewer password to a reserved password **empty** – this would restore the full anonymous access to the camera. The **admin** user can change the **viewer** password at any time, without knowing the current **viewer** password.

NOTE: *If the admin password has been set and forgotten, it can only be erased through reprogramming the camera's firmware or by accessing the camera registers via developers' register access from AV100 software.*

HTTP/1.1 vs. HTTP/1.0

Arecont Vision cameras support both HTTP/1.0 and HTTP/1.1 protocols as defined by RFC-1945 and RFC-2068, respectively. While HTTP/1.0 is simple, it limits the speed of image transmission for cases when the user requests individual images rather than an mjpeg stream. This is due to the fact that connection is closed after the transmission of each image, forcing the client to incur round trip delay repeatedly. However, HTTP/1.0 is supported by all HTTP implementations and can be used reliably, albeit with limited speed. By default, Arecont Vision cameras are configured to respond using HTTP/1.0 protocol regardless of the HTTP version used by the client.

Users who desire faster full duplex communication and image delivery may request responses using the HTTP/1.1 protocol. To do so, the user should append the parameter ver=HTTP/1.1 to the request string as shown in the following example:

http://192.168.0.36/image?res=full&x0=0&y0=0&x1=1600&y1=1200&quality=12&doublescan=0&ver=HTTP/1.1

It is important to note that Arecont Vision cameras implement "chunked" transfer encoding as defined by paragraph 14.40 of RFC-2068. While RFC-2068 requires that all HTTP/1.1 implementations support "chunked" encoding, in reality many older implementations (Indy 9, WinHTTP 5.0, etc) are not fully compliant with the requirements of the standard. As a result, if the HTTP/1.1 protocol is requested from a non-compliant implementation, the chunks separators will remain in the data stream and the jpeg image will be corrupted. If the user receives corrupted images over HTTP/1.1 the user should either remove HTTP/1.1 specification from the request or upgrade the HTTP implementation to fully compliant (e.g. WinHTTP 5.1)

HTTP Access of Panoramic Cameras

Notational conventions:

camera_ip	: IP address of the camera;
get	: get a parameter from camera via http;
set	: set a parameter on camera via http;
<channel>	: panoramic camera channel number from 1 to 4;
""	: a symbol string in ASCII;
|	: means one or another, but not both;

( )	: allowable values;
..	: a range of values incrementable by 1;
+/-	: positive values do not need the "+" sign, while the negative values do need the "- " sign in front of the value;
[ ]	: non-mandatory value which could be dropped.

In order to access the built-in camera's web page type either of the two following http commands into the web browsers' address field:

http://camera_ip/

http://camera_ip/index.html

Requesting Images from Panoramic Cameras AV8180/AV8185/AV8185DN & AV8360/AV8365/AV8365DN

The AV8360/AV8180/AV8365/AV8185 camera models support two types of image requests: individual JPEG image requests (image or img.jpg) and continuous MJPEG stream requests (mjpeg). In addition, models AV8365/AV8185 support h.264 streaming using RTSP/RTP protocol. The maximum number of supported simultaneous requests of single images or mjpeg streams is eight for AV8180 and AV8360, and up to twelve in AV8185 and AV8365.

***NOTE**: Even though the camera supports multi-user access, the maximum frame rate is achieved only when there is a single request arriving to each channel at any given time.*

1. Requesting individual JPEG images

   1.1 Requesting images using explicit parameter list within the HTTP string:

http://camera_ip/image[<channel>]?res=(half|full)&x0=(0..1600)&y0=(0..1200)&x1=(32..1600)&y1=(32..1200)&quality=(1..21)&doublescan=(0|1)&[id=(0..99999999999999)]&[ssn=(0..65535)]

Where:

Res can have value of either "half" or "full" and specifies whether the camera should decimate the image by a factor of 2 in each dimension or display the full resolution.

x0,y0,x1,y1 are the left, top, right and bottom coordinates of the requested image window, respectively. These values cannot exceed the size of the image sensor array.

Quality – image quality, the inverse of image compression level;

Doublescan allows the user to specify whether the camera should delay the image output until a new image is available (doublescan = 0) or the image request should be serviced by outputting the content of the image buffer that was already once output (useful for picture-in-picture display).
Id is an arbitrary number used to control the web browser's cache;
SSN a unique HTTP session number which cancels out any earlier sent HTTP request with the same number which got "hung".

NOTE: *Image requests without the <channel> parameter specified will cause the camera to transmit the next available image from any of the currently enabled channels. The channel number of the transmitted image could then be identified from the HTTP header Etag (see RFC-2068 HTTP 1.1):* ***ETag: Channel<channel> .***

1.2 Requesting images using an implicit parameter list (parameters are loaded on camera in advance using separate http commands (see section B 16 below):

http://camera_ip/img.jpg?[id=(0..99999999999999)]&[ssn=(0..65535)]

Where:

id – an arbitrary number used to control the web browser's cache;
ssn – a unique HTTP session number which cancels out any earlier sent HTTP request with the same number which got "hung".

2. Requesting a continuous Motion JPEG image stream

http://camera_ip/mjpeg[<channel>]?res=(half|full)&x0=(0..1600)&y0=(0..1200)&x1=(32..1600)&y1=(32..1200)&quality=(1..21)&doublescan=(0|1)&[fps=(0..15)]&[id=(0..99999999999999)]&[ssn=(0..65535)]

Where:

Res can have value of either "half" or "full" and specifies whether the camera should decimate the image by a factor of 2 in each dimension or display the full resolution.
x0,y0,x1,y1 are the left, top, right and bottom coordinates of the requested image window, respectively. These values cannot exceed the size of the image sensor array.
Quality – image quality, the inverse of image compression level;

Doublescan allows the user to specify whether the camera should delay the image output until a new image is available (doublescan = 0) or the image request should be serviced by outputting the content of the image buffer that was already once output (useful for picture-in-picture display).

FPS specifies the desired frame rate.

Id is an arbitrary number used to control the web browser's cache;

SSN a unique HTTP session number which cancels out any earlier sent HTTP request with the same number which got "hung".

NOTE: *MJPEG requests without <channel> parameter specified will cause the camera to transmit next available image from any of the currently enabled channels. The channel number of the transmited image could then be identified from the HTTP header Etag (see RFC-2068 HTTP 1.1):* ***ETag: Channel<channel>.***

3. In addition to JPEG streaming, panoramic camera models AV8185 and AV8365 support h.264 streaming using RTSP/RTP protocol. Any RTSP request sent to camera via UDP will be ignored. The actual video stream is transmitted by the camera using RTP protocol. Arecont Vision cameras support two options for RTP transmission: RTP over UDP, and RTP over TCP (RTP/AVP). The maximum number of simultaneously serviced unicast requests or video streams is up to twelve per panoramic camera allocated among its enabled channels. For example three video streams per channel for each of the four channels are supported.

Accessing video stream via RTSP commands in AV8185 and AV8365:

An H.264 video stream is requested via RTSP using the following URL. Please note that this URL will not work in a typical web browser. A media player such as VLC or Apple Quicktime is required for this to function properly.

rtsp://camera_ip/h264.sdp<channel>?res=(half|full)&x0=(0..1600)&y0=(0..1200)&x1=(32..1600)&y1=(32..1200)&qp=(4..51)&ssn=(1..65535)&[bitrate=(0..65536)]&[fps=1..100]

NOTE: *RTSP requests without <channel> parameter specified will cause the camera to transmit next available image from any of the currently enabled channels. The channel number of the transmitted image could then be identified from the RTP Payload Type: 96~99 corresponding to channel 1~4. For details, please refer to chapter IV regarding Panaramic RTSP generic request.*

Where:

- **Res** can have value of either “half” or “full” and specifies whether the camera should decimate the image by a factor of 2 in each dimension or produce the full resolution image.
- **X0, Y0, X1, Y1** are the left, top, right and bottom coordinates of the requested image window, respectively. These values cannot exceed the size of the image sensor array for the specific camera model and should be divisible by 32 if **Res = full** and 64 if **Res = half**.
- **QP** is the quantization parameter for H.264 encoder. To achieve a higher quality video, a low *qp* is needed. Recommended values are in the range (16..37);
- **SSN** specifies the stream identifier. MPEG codecs including H.264 codecs are context dependent (decoding of the current frame depends on the previous frame(s)). The stream is a sequence of frames of the same resolution which can be decoded sequentially by one instance of an MPEG decoder. Accordingly, **SSN** is a means to distinguish different streams from one another. Use a unique **SSN** for each stream with a unique channel, image size, quality, and/or frame rate. Each camera supports up to eight simultaneous non-identical streams. Each client must have a unique (ip:*ssn)*
- **Bitrate** is used to set up a constant bitrate of the H.264 stream in kilobits per second. If this parameter is present in the request string and is larger than zero then the **QP** parameter is ignored and the camera adjusts quantization parameters automatically to maintain the specified bitrate.
- **FPS** specifies the requested frame rate. Values 1 to 15 result in the specified frame rate. Omitting the fps parameter or using fps values of 0 or any values above 16 will result in maximum frame rate which is model dependent.

AV20365/AV20185DN vs. AV8365/AV8365DN

AV20365/AV20185DN camera models have binning technique to improve low light performance by combining adjacent pixels, comparing to AV8365/AV8185DN models. The binning mode can be set separately as day_binning and night_binning mode using the following HTTP commands:

http://camera_ip/get?day_binning
http://camera_ip/set?day_binning=(on|off)
http://camera_ip/get?night_binning
http://camera_ip/set?night_binning=(on|off)

Getting and Setting Camera Parameters

NOTE: *All commands listed below that allow parameter setting without explicitly specifying the channel number apply to all four channels.*

NOTE*: The parameter setting is allowed only for the users with the* ***admin*** *access level (see below under Camera Access Control).*

1. Enabling camera channels:

   http://camera_ip/get?channelenable

   http://camera_ip/set?channelenable=(1..15 as a 4-bit mask where each bit corresponds to one camera channel, LSB is channel 1)

2. Image rotation:

   http://camera_ip/get<channel>?rotate

   http://camera_ip/set[<channel>]?rotate=(0|180)

3. Brightness:

   http://camera_ip/get<channel>?brightness

   http://camera_ip/set<channel>?brightness=(-50..+50)

4. Sharpness:

   http://camera_ip/get<channel>?sharpness

   http://camera_ip/set<channel>?sharpness=(0..4)

5. Saturation:

   http://camera_ip/get<channel>?saturation

   http://camera_ip/set<channel>?saturation=(0..6)

6. Blue balance:

   http://camera_ip/get<channel>?blue

   http://camera_ip/set<channel>?blue=(-10..+10)

7. Red balance:

   http://camera_ip/get<channel>?red

   http://camera_ip/set<channel>?red=(-10..+10)

8. Illumination:

http://camera_ip/get<channel>?illum

http://camera_ip/set<channel>?illum=("auto"|"indoor"|"outdoor"|"mix")

9. Mains frequency, Hz (for indoor lighting compensation):

http://camera_ip/get<channel>?freq

http://camera_ip/set<channel>?freq=(50|60)

10. Exposure mode (low light mode):

http://camera_ip/get<channel>?lowlight

http://camera_ip/set<channel>?lowlight=("highspeed"|"speed"|"balance"|"quality"|"moonlight")

11. Shutter time in high-speed exposure mode (in milliseconds):

http://camera_ip/get<channel>?shortexposures

http://camera_ip/set<channel>?shortexposures=(1..80)

12. Auto exposure control:

http://camera_ip/get<channel>?autoexp

http://camera_ip/set<channel>?autoexp=("on"|"off")

13. Auto exposure mode:

http://camera_ip/get<channel>?exposure

http://camera_ip/set<channel>?exposure=("auto"|"on"|"off")

14. Exposure window:

http://camera_ip/get?expwndleft

http://camera_ip/set?expwndleft=(0..max of the corresponding sensor size)

http://camera_ip/get?expwndtop

http://camera_ip/set?expwndtop=(0..max of the corresponding sensor size)

http://camera_ip/get?expwndwidth

http://camera_ip/set?expwndwidth=(0..max of the corresponding sensor size)

http://camera_ip/get?expwndheight

http://camera_ip/set?expwndheight=(0..max of the corresponding sensor size)

15. Sensor cropping:

http://camera_ip/get?sensorleft

http://camera_ip/set?sensorleft=(0..max of the corresponding sensor size)

http://camera_ip/get?sensortop

http://camera_ip/set?sensortop=(0..max of the corresponding sensor size)

http://camera_ip/get?sensorwidth

http://camera_ip/set?sensorwidth=(0..max of the corresponding sensor size)

http://camera_ip/get??sensorheight

http://camera_ip/set?sensorheight=(0..max of the corresponding sensor size)

16. Image settings used as the implicit parameter list in **img.jpg** image requests:

http://camera_ip/get?imgleft

http://camera_ip/set?imgleft=(0..max of the corresponding sensor size)

http://camera_ip/get?imgtop

http://camera_ip/set?imgtop=(0..max of the corresponding sensor size)

http://camera_ip/get?imgwidth

http://camera_ip/set?imgwidth=(0..max of the corresponding sensor size)

http://camera_ip/get?imgheight

http://camera_ip/set?imgheight=(0..max of the corresponding sensor size)

http://camera_ip/get?imgquality

http://camera_ip/set?imgquality=(0..21)

http://camera_ip/get?imgres

http://camera_ip/set?imgres=("full"|"half')

17. Obtaining MAC address:

http://camera_ip/get?mac

18. Getting camera model:

To get camera's base model number:

http://camera_ip/get?model

With parameter "fullname", the camera returns the base model number plus feature letter.
With parameter "releasename", the camera returns the manufacture model number plus feature letter, or the real model number.

http://camera_ip/get?model=[fullname|releasename]

For example, for the model AV2115DN, the base model number is 2805, the fullname is 2805DN and the releasename is 2115DN. All the models with the same base model have the same format and functionality except specified features. This benefits NVRs with new model integration. If the NVR has already integrated AV2805 model earlier, AV2115DN can be easily integrated and treated as an AV2805 model.

19. Getting firmware version:

http://camera_ip/get?fwversion

20. Getting image processor engine version:

http://camera_ip/get?procversion

21. Getting network processor version:

http://camera_ip/get?netversion

22. Getting PCB revision

http://camera_ip/get?revision

23. Store current settings into the flash memory:

http://camera_ip/set?params=save

24. Restore factory default setting:

http://camera_ip/set?params=factory

25. Custom mode settings:

http://camera_ip/get<channel>?kneepoint

http://camera_ip/set<channel>?kneepoint=(1..100)

http://camera_ip/get<channel>?analoggain

http://camera_ip/set<channel>?analoggain=(1..10)

http://camera_ip/get<channel>?maxkneegain

http://camera_ip/set<channel>?maxkneegain=(2..??)

http://camera_ip/get<channel>?maxexptime

http://camera_ip/set<channel>?maxexptime=(0..100)

http://camera_ip/get<channel>?maxdigitalgain

http://camera_ip/set<channel>?maxdigitalgain=(32..127)

26. Alternative receiving port of the camera's web server:

http://camera_ip/get?webserverport

http://camera_ip/set?webserverport=(0..65535)

27. User password with **admin** level of access:

http://camera_ip/get?admin

http://camera_ip/set?admin=(text string of 1..8 ASCII symbols | "empty")

NOTE: to erase the password use the reserved word "empty".

28. User password with **viewer** level of access:

http://camera_ip/get?viewer

http://camera_ip/set?viewer=(text string of 1..8 ASCII symbols | "empty")

NOTE: to erase the password use the reserved word "empty".

29. Camera's register access:

http://camera_ip/getreg?page=(0..6)&reg=(0..255)

http://camera_ip/setreg?page=(0..6)&reg=(0..255)&value=(0..65535)

30. Maximum sensor size:

http://camera_ip/get?maxsensorwidth

http://camera_ip/get?maxsensorheight

31. Motion detection settings:

To set regular or extended motion detection mode:

http://camera_ip/get?mdtotalzones

http://camera_ip/set?motiondetect=(64|1024)

To enable/disable motion alarm mode:

http://camera_ip/get<channel>?mdmode

http://camera_ip/set<channel>?mdmode=("on"|"off")

To enable/disable motion detection mode:

http://camera_ip/get<channel>?motiondetect

http://camera_ip/set<channel>?motiondetect=("on"|"off")

To set regular or extended motion detection mode:

http://camera_ip/get?mdtotalzones

http://camera_ip/set?motiondetect=(64|1024)

To set motion detection zone size (32 pixels per zone):

http://camera_ip/get<channel>?mdzonesize

http://camera_ip/set<channel>? mdzonesize=(1..16)

http://camera_ip/get<channel>?mdlevelthreshold

http://camera_ip/set<channel>?mdlevelthreshold=(2..31)

http://camera_ip/get<channel>?mddetail

http://camera_ip/set<channel>?mddetail=(1..255)

http://camera_ip/get<channel>?mdprivacymask

http://camera_ip/set<channel>?mdprivacymask=(...)

To query motion detection result:

http://camera_ip/get<channel>?mdresult

32. Auxiliary I/O setting:

http://camera_ip/get?auxin

http://camera_ip/get?auxout

http://camera_ip/set?auxout=("on"|"off")

33. Enabling flexible cropping:

To get flexible cropping status:

http://camera_ip/get?cropping

To enable/disable flexible cropping:

http://camera_ip/set?cropping =("on"|"off")

Note:

1. With flexible cropping off, the requested image dimension has to be divisible by 32x16 for JPEG format or by 64x32 for H.264 format.
2. With flexible cropping on, the requested image dimension can be arbitrary (some restriction might apply). The additional cropping information needs to be dealt by the decoder or the client software.
3. Default setting for flexible cropping is off.

34. Binning mode setting:

http://camera_ip/get?day_binning

http://camera_ip/get?night_binning

http://camera_ip/set?day_binning=("on"|"off")

http://camera_ip/set?night_binning=("on"|"off")

35. 1080p mode setting (10xx5 models only):

http://camera_ip/get?1080p_mode

http://camera_ip/set?1080p_mode=(“on”|”off”)

36. Privacy mask setting:

To enable/disable privacy mask:

http://camera_ip/get?pmask

http://camera_ip/set?pmask=(“on”|”off”)

To set/erase privacy mask block (32x32 pixels/block):

http://camera_ip/set<channel>?pmaskleft=(0..1023)

http://camera_ip/set<channel>?pmasktop=(0..1023)

http://camera_ip/set<channel>?pmaskright=(0..1023)

http://camera_ip/set<channel>?pmaskbottom=(0..1023)

http://camera_ip/set<channel>?pmaskblock=("on"|"off")

Note 1: for panoramic models, channel number is required.

37. Focus and Zoom setting:

To set focus/zoom moving steps:

http://camera_ip/set?focus=(fullrange | shortrange | -20..20)

http://camera_ip/set?zoom=(-20..20 | reset)

http://camera_ip/get?focus

NOTE 1: All above requests return focus value; the bigger value indicates the better focusing

NOTE 2: After set zoom/focus steps, the focus value becomes valid after the next frame

NOTE 3: This feature is only enabled in MegaDome2 models, such as AV1255, AV2255, AV5255 and AV10255

To query if the focusing scan is finished after setting "focus=fullrange/shortrange". It returns "on" or "off".

http://camera_ip/get?focus=status

To set focus window:

http://camera_ip/get?focusleft=(0..max of the corresponding sensor size)

http://camera_ip/get?focustop=(0..max of the corresponding sensor size)

http://camera_ip/get?focusright=(0..max of the corresponding sensor size)

http://camera_ip/get?focusbottom=(0..max of the corresponding sensor size)

38. Casino mode setting:

http://camera_ip/get?casino_mode

http://camera_ip/set?casino_mode=("on"|"off")

39. DHCP, RTP multicast, MTU setting:

http://camera_ip/get?netopt

http://camera_ip/set?netopt=(decimal value of corresponding bits on/off)

NOTE 1: bit 0: DHCP IP assignment; bit 6: RTP multicast server; bit 7: MTU enable/disable

40. Multicast related setting:

Multicast IP address:

http://camera_ip/get?streamip

http://camera_ip/set?streamip=xx.xx.xx.xx

Multicast Port:

http://camera_ip/get?rtpport

http://camera_ip/set?rtpport=(0..65535)

Multicast SAP destination IP:

http://camera_ip/get?sapip

http://camera_ip/set?sapip=xx.xx.xx.xx

41. Multicast frame rate setting:

http://camera_ip/get?fps

http://camera_ip/set?fps=(0..30)

42. H.264 bitrate control:

Variable bitrate is controlled by “qp” and “ratelimit” prarameters. “qp” is used to set the target quantization parameter while the maximum bitrate is limited by “ratelimit”. The quality will be reduced to cap the bitrate at the maximum value.

http://camera_ip/get?qp=(36..16)

http://camera_ip/get?ratelimit_mode=(“on”|”off”)

http://camera_ip/get?ratelimit=(0..65535)

Constant bitrate is controlled by “bitrate” parameter by automatically adjusting image quality to maintain the desired bitrate.

http://camera_ip/get?bitrate=(0..65535)

41. H.264 key frame and key frame interval:

http://camera_ip/set?keyframe=”on”

http://camera_ip/get?keyframeinterval

http://camera_ip/set?keyframeinterval=(0..65535)

42. RTSP port:

http://camera_ip/get?rtspport

http://camera_ip/set?rtspport=(0..65535)

43. Low light noise filter:

Set special noise filter strength from 0..100%. The default is set to 0% or turned off.

http://camera_ip/get?spacialfilter

http://camera_ip/set?spacialfilter=(0..100)

44. Camera name

http://camera_ip/get?name

http://camera_ip/set?namer=(up to 32 characters)

45. MTU size

http://camera_ip/get?mtu

http://camera_ip/set?mtu=(512..1500)

46. IP address

http://camera_ip/get?ip

http://camera_ip/set?ip=xxx.xxx.xxx.xxx

47. Subnet mask

http://camera_ip/get?subnet

http://camera_ip/set?subnet=xxx.xxx.xxx.xxx

48. Default gateway

http://camera_ip/get?gateway

http://camera_ip/set?gateway=xxx.xxx.xxx.xxx

49. Default gateway

http://camera_ip/get?webserverport

http://camera_ip/set?webserverport=(0..65535)

Panoramic specific setting:

50. Brightness/Color equalization setting:

http://camera_ip/get?equalbirght

http://camera_ip/get?equalcolor

http://camera_ip/set?equalbirght=("on"|"off")

http://camera_ip/set?equalcolor=("on"|"off")

51. Vertical Alignment setting:

http://camera_ip/get?vertical_alignment

http://camera_ip/set? vertical_alignment =("on"|"off")

http://camera_ip/get<channel>?vertical_shift

http://camera_ip/set<channel>? vertical_shift =(-maximum_shift..maximum_shift)

HTTP Request Format for Transmit Data to Camera Speaker

Continuous sequence of G.711 (u-law) data can be transmitted to Arecont Vision cameras by using the following POST method request format:

POST /g711?

Chapter IV - Alternative Access Protocols

RTSP Request Format for Continuous H.264 Video Streaming

Reference documents for the RTSP/RTCP+SDP+RTP protocol implementation are:

- RFC 3550 for RTCP
- RFC 1889 for RTP
- RFC 2327 for SDP
- RFC 2326 for RTSP
- RFC 3984 for the data format of H.264 streaming over RTP

Unicast camera access:

The AVxxx5 series cameras support the RTSP protocol via TCP connections. Any RTSP request sent to camera via UDP will be ignored. The actual video stream is transmitted by the camera using RTP protocol. Arecont Vision cameras support two options for RTP transmission: RTP over UDP, and RTP over TCP (RTP/AVP). The maximum number of simultaneously serviced unicast requests or video streams is eight.

Multicast Camera access:

The AVxxx5 series cameras support multicast h.264 video streaming. Valid multicast destination IP address range is: 224.0.0.0 – 239.255.255.255, default is 224.0.0.1. Destination multicast IP address range for SAP is: 224.0.0.0 – 239.255.255.255, default is 224.0.0.255.

Accessing video stream via RTSP commands:

An H.264 video stream is requested via RTSP using the following URL. Please note that this URL will not work in a typical web browser. A media player such as VLC or Apple Quicktime is required for this to function properly.

rtsp://camera_ip/h264.sdp?res=(half | full)&x0=(0..max_sensor_width)&y0=(0..max_sensor_height)&x1=(32..max_sensor_width)&y1=(32..max_sensor_height)&qp=(4..51)&ssn=(1..65535)&[doublescan=(0|1)]&[bitrate=(0..65536)]&[fps=1..100]&[mic=on|off]

Where:

- **Res** can have value of either "half" or "full" and specifies whether the camera should decimate the image by a factor of 2 in each dimension or produce the full resolution image.
- **X0, Y0, X1, Y1** are the left, top, right and bottom coordinates of the requested image window, respectively. These values cannot exceed the size of the image sensor array for the specific camera model and should be divisible by 32 if **Res = full** and 64 if **Res = half**.
- **QP** is the quantization parameter for H.264 encoder. To achieve a higher quality video, a low *qp* is needed. Recommended values are in the range (16..37);
- **Doublescan** allows the user to specify whether the camera should delay the image output until a new image is available from the sensor (doublescan = 0) or the image request should be serviced by outputting the content of the image buffer that was already once output (useful for picture-in-picture display).
- **SSN** specifies the stream identifier. MPEG codecs including H.264 codecs are context dependent (decoding of the current frame depends on the previous frame(s)). The stream is a sequence of frames of the same resolution which can be decoded sequentially by one instance of an MPEG decoder. Accordingly, **SSN** is a means to distinguish different streams from one another. Use a unique **SSN** for each stream with a unique image size, quality, and/or frame rate. Each camera supports up to eight simultaneous non-identical streams. Each client must have a unique (ip:*ssn)*
- **Bitrate** is used to set up a constant bitrate of the H.264 stream in kilobits per second. If this parameter is present in the request string and is larger than zero then the **QP** parameter is ignored and the camera adjusts quantization parameters automatically to maintain the specified bitrate.
- **FPS** specifies the requested frame rate. Values 1 to 15 result in the specified frame rate. Omitting the fps parameter or using fps values of 0 or any values above 16 will result in maximum frame rate which is model dependent.

The camera recognizes the following RTSP methods:

OPTIONS – requesting supported RTSP methods;
DESCRIBE – requesting available resources and their format;
SETUP – resolving the camera's and the client's ports;
PLAY – starting RTP video stream;

The camera also recognizes PAUSE and TEARDOWN but terminates the RTSP session when it receives these commands. To resume the stream it is necessary to repeat stream initialization.

The following is a sequence of resolving camera's parameters and starting an RTP stream:

1) Open a TCP connection on port 554 (RTSP) of the camera.

2) Request the camera's data format via DESCRIBE. The camera will respond with SDP parameter set of the H.264 stream (SPS/PPS) with trackID=1, and the method of forming RTP data packets and synchronization (90 KHz timer).

If the microphone is enabled, the camera will also respond with additional SDP parameter set of the G.711 (u-law) audio stream with trackID=2, and the method of forming RTP data packets and synchronization (8 KHz timer).

3) Specify via SETUP the client ports for receiving the video stream.

If the microphone is enabled, specify via the second SETUP the client ports for receiving the G.711 audio stream.

4) Request PLAY to start the RTP video stream.

5) Receive and decode H.264 video frames packed into fragmented RTP packets that are transmitted via UDP, or optionally over TCP, by the camera.

If the microphone is enabled, the G.711 RTP packets are also transmitted via UDP. The G.711 RTP over TCP is not supported.

6) At least every 5 seconds of the RTP streaming send RTCP feedback packets. If the camera does not receive any RTCP packets over a 10 second period, the session will be terminated.

The camera sends IDR frames followed by multiple P-frames. All frames are transmitted in the form of FU-A fragmented RTP packets as described in RFC 3984. The default number of P-frames is 50, and can be modified using the following HTTP command:

http://camera_IP/setreg?page=3&reg=21&val=(number of P-frames)

The current P-frame setting can be checked using the following HTTP command:

http://camera_IP/getreg?page=3&reg=21

Following is a sequence of resolving camera's parameters for the AV3135, AV51x5 and AV100x5 cameras:
After initiating RTSP sequence as above, in-band SPS/PPS RTP packets are inserted in the video stream to help switching between day/night sensors or non-binning and binning mode.

Before sending out every RTP I-frame data packets, the in-band RTP SPS and PPS packets will be sent. The in-band SPS/PPS packets will help changing image parameter sets on the fly without re-initialize the RTSP sequence. Especially when the camera switches between day sensor and night sensor, or between binning mode and non-binning mode, the SPS and PPS packets will be issued immediately and then an I-frame will follow. Therefore, the client decoder will recognize the new parameter set and decode accordingly.

Following is a sequence of resolving camera's parameters and starting four RTP streams with one generic RTSP request for AV8365/AV8185DN and AV20365/AV20185DN cameras:

1) Open a TCP connection on port 554 (RTSP) of the camera.

2) Request the camera's data format via DESCRIBE. The camera will respond with four SDP parameter sets of the H.264 stream (SPS/PPS) with different Payload types (96, 97, 98, 99), and the method of forming RTP data packets and synchronization (90 KHz timer).

3) Specify via SETUP the client ports for receiving the video stream. The client needs to send four SETUP's corresponding to four parameter sets. For example, for RTP/UDP, ports 1500-1501 for the first parameter set with trackID=1; port 1502-1503 for the second parameter set with trackID=2, ports 1504-1505 for the first parameter set with trackID=3; port 1506-1507 for the second parameter set with trackID=4. For RTP/TCP, interleaved channels 0-1, 2-3, 4-5 and 6-7 will be assigned to them.

4) Request PLAY to start the RTP video streams.

5) Receive and decode H.264 video frames packed into fragmented RTP packets that are transmitted via UDP, or optionally over TCP, by the camera. RTP packets sent between four sensors can be identified by RTP Payload types (96, 97, 98, 99).

6) At least every 5 seconds of the RTP streaming send RTCP feedback packets. If the camera does not receive any RTCP packets over a 10 second period, the session will be terminated.

Additionally, before sending out every RTP I-frame data packets, the in-band RTP SPS and PPS packets will be sent. The in-band SPS/PPS packets will help changing image parameter sets on the fly without re-initialize the RTSP sequence. Especially for AV20365/AV20185DN models, when the camera switches to binning mode or switches back to non-binning mode, the SPS and PPS packets will be issued immediately and then an I-frame will sent. Therefore, the client decoder will recognize the new parameter set and decode accordingly.

PSIA Protocol

PSIA (Physical Security Interoperability Alliance) is one of the new security industry standardized protocols that promotes plug-and-play interoperability. Starting from firmware version 65165, PSIA protocol becomes available on selected camera models, initially AV2805, AV2815, AV1315 and more in the future. These cameras will be able to operate on any PSIA compliant NVR software without the need for a special device driver or plug-in, thus greatly facilitate camera installation and maintenance.

To check if a camera supports PSIA protocol or which PSIA feature set it supports, the user can open a web browser and send the following HTTP command to the camera:

http://camera_IP/PSIA/index

Upon success, the camera will return a human-friendly XML file which lists the supported PSIA root services. It is also possible to get an expanded list of PSIA services by sending the following command which instruct the camera to enumerate all services recursively:

http://camera_IP/PSIA/indexr

PSIA is an open standard and its documentation is available to the public at http://www.psialliance.org/. Interested users can visit the PSIA website and get latest documentation.

Chapter V - Troubleshooting and Useful Tips

Connecting Directly to a Laptop or PC

In a typical scenario cameras are connected using network cables to a network switch. A camera can also be connected to a PC or laptop directly by using a cross-over network cable between the camera and PC.

When a camera is connected directly, you may need to change the TCP/IP configuration on your PC. For example, the PC may need to be configured to use a static IP address.

When a PoE injector is used and connected directly to a PC, there are two networking cables. One cable connects the PC to the PoE injector, while the other connects the injector to the camera. Only one of these cables should be cross-over. The other cable must be a regular, straight through cable.

NOTE: *AV8360 cameras require a higher PoE power class (Class 3: from 6.49 to 12.95 Watt) than other Arecont Vision camera models.*

Switches and Routers

Note that some Gigabit switches and network adapters incompletely emulate 100BaseT signaling levels and may not work correctly with high bandwidth 100BaseT equipment.

Low Sharpness

If the image sharpness appears to be low:

- Check if the lens is in focus.
- Check if the lens is appropriate for a megapixel camera.
- Under the Image Quality menu decrease compression and increase sharpness.
- Check if the lens iris is fully open or closed down too much. For best resolution and depth of field the iris (depending on lens make and model) should be closed by 2-3 F-stop.

Frequently Asked Questions

1. **How do I get online technical support for Arecont Vision products?**

   Create an account on our support portal located at http://support.arecontvision.com/. Once an account has been created, a new ticket can be posted and one of our technical support team will follow up with you promptly. To ensure timely responses, please make sure to login to the support portal to post any replies to your open ticket.

2. **What information can I provide to AV customer support for a faster response to my issues?**

   - Arecont Vision camera MAC address and firmware release as shown in the **About** menu on camera web page or AV100 software.

   If the issue is related to networking and/or AV100 software

   - Switch or POE model number.
   - Type of network cable eg Cat 5e (min and max distance of run)
   - Type of power used (VDC, milliamps, Watts) or POE
   - Computer Information:
     - 100base-T or Gigabit card
     - CPU speed, RAM, Video Card specs
     - Hard disk size, and available free space.

   -Please provide the Imlog.dat file and localmachine.ini file. This file can be found in XP under "C:\Documents and Settings\All Users\Application Data\Video" and in Vista/Win7 under "C:\Users\(YourUserName)\ApplicationData\Video Application" Or "C:\Users\(YourUserName)\AppData\Local\VirtualStore\ProgramData\Video Application"

3. **How can I obtain an RMA for a camera?**

   Initial RMA requests should be directed to the vendor from whom you purchased your camera. Your vendor may be capable of processing your request directly, resulting in a quick turnaround time for a replacement camera. If this is not possible, please fill out a support request on http://support.arecontvision.com/ and a support representative will follow up to verify your claim prior to issuing an RMA number. Please do not ship a camera back to Arecont Vision without an approved RMA number or your return will be severely delayed in processing.

4. **What type of video compression is used in Arecont Vision cameras?**

   Arecont Vision cameras use MJPEG in the case of model numbers AVxxx0 and H.264 for models AVxxx5.

5. **Which DVRs/NVRs support your cameras?**

   Several DVRs/NVRs support Arecont Vision cameras such as Bosch, March networks and Sanyo DVRs. For a full list of verified NVRs, please see http://www.arecontvision.com/nvrintegrationmatrix.html.

6. **How much storage space is required when using Arecont Vision cameras?**

   The storage space requirements will vary depending on the compressibility of your imagery. Shown below (Figure 33) is an example of a system running at 22 FPS. However, the user can specify the archival frequency to be lower than the full frame rate. Most Arecont Vision cameras also provide highly sophisticated on-board motion detection. To further reduce the required storage the user has an option to archive only those images that contain motion. Furthermore, Arecont Vision cameras support real-time resolution changes and image windowing on a frame-by-frame basis. The user may wish to archive windows of interest or reduced resolution images at the high frame rate while archiving full resolution images at the lower frame rate. A bandwidth calculator is provided at http://www.arecontvision.com/sales-tools.html to help with determining storage/bandwidth requirements.

Figure 10. Example of a system running at 22 FPS

Busy scene, lot of motion (e.g. busy parking lot)									
FPS = 22									
	Quality = 2	Storage		Quality = 13	Storage		Quality = 21	Storage	
Resolution	Kbtyes/frame	Mbytes/Hr	Mbytes/24 Hr	Kbtyes/frame	Mbytes/Hr	Mbytes/24 Hr	Kbtyes/frame	Mbytes/Hr	Mbytes/24 Hr
2040x1530	202	15,998	383,962	278	22,018	528,422	463	36,670	880,070
1920x1200	154	12,197	292,723	216	17,107	410,573	352	27,878	669,082
1920x1080	148	11,722	281,318	202	15,998	383,962	329	26,057	625,363
1600x1200	128	10,138	243,302	176	13,939	334,541	293	23,206	556,934
1280x1024	100	7,920	190,080	139	11,009	264,211	227	17,978	431,482
640x480	29	2,297	55,123	40	3,168	76,032	60	4,752	114,048
Quiet scene, not a lot of motion (e.g. hallway)									
	Quality = 2	Storage		Quality = 13	Storage		Quality = 21	Storage	
Resolution	Kbtyes/frame	Mbytes/Hr	Mbytes/24 Hr	Kbtyes/frame	Mbytes/Hr	Mbytes/24 Hr	Kbtyes/frame	Mbytes/Hr	Mbytes/24 Hr
2040x1530	148	11,722	281,318	205	16,236	389,664	369	29,225	701,395
1920x1200	111	8,791	210,989	151	11,959	287,021	267	21,146	507,514
1920x1080	103	8,158	195,782	142	11,246	269,914	247	19,562	469,498
1600x1200	97	7,682	184,378	134	10,613	254,707	233	18,454	442,886
1280x1024	69	5,465	131,155	97	7,682	184,378	165	13,068	313,632
640x480	20	1,584	38,016	26	2,059	49,421	43	3,406	81,734
Notes: Quality refers to JPEG compression. Therefore Quality = 21 refers to high quality image									

7. **Can I update all my cameras with the same version of firmware?**

   No, you will need to make sure you use the appropriate firmware file for your camera. There are several variations of firmware update files, with the camera model being listed in the update file name. Please ensure that the firmware file you are using contains the model number of your camera in its file name.

8. **How do I find out the IP and MAC addresses of my cameras?**

   You can find camera IP and MAC address using the AV100 Camera Installer utility. The same information as well as the AV100 software version is displayed in the **About** dialog (Figure 34). To open the **About** dialog, right click anywhere in the live video application and select **About**.

Figure 11. About dialog

9. **What ports are used by Arecont Vision cameras?**

   Arecont Vision cameras operate using TFTP on port 69, HTTP on port 80 or an alternative HTTP port of 8080 (default) and RTSP on port 554. The alternate HTTP port can be modified through the 'Network' portion of the camera's web interface.

10. **What is the cost of an Arecont Vision camera?**

    The cost varies from camera to camera but for unparallel clarity our prices are unbeatable. Almost all cameras have MSRP well below $1000. Visit us online at http://www.arecontvision.com/buy.html. Fill out the form and our sales staff will contact you.

11. When should I use an auto-iris camera?

The following cameras support the auto-iris function: AV1300-AI, AV2100-AI, AV3100-AI and AV5100-AI. The auto-iris option allows for the camera to keep the lens optimally closed when there is sufficient scene illumination, providing good depth of focus. When the illumination diminishes the camera automatically opens the iris, allowing more light to reach the sensor, thus extending the sensitivity range of the camera. This option should only be used for outdoor applications, where there is a large variation in illumination. In many applications the auto-iris is unnecessary. It is important to keep in mind that the best image quality will still be achieved with megapixel lenses. The auto-iris lenses available on the market today are not megapixel and will yield the images that are less crisp than those that can be obtained with manual megapixel lens.

12. What adjustments can be made to reduce motion blur?

The shutter speed is automatically controlled by the camera. Motion blur may occur when the camera operates at slow shutter speeds (long exposure times, such as the scene being relatively dark. Arecont Vision cameras provide a number of options that allow the user to control auto-exposure behavior when illumination is low.

The user can set the preferred exposure time that the camera will attempt to maintain as long as illumination level allows. This setting essentially allows the user to choose the tradeoff between gains and exposure time at reduced light levels. There are 3 basic settings: Speed, Balance, and Quality These settings can be selected from "Low Light Mode" menu Mode list. The Speed setting will result in higher image noise but will attempt to maintain 10ms exposure time for as long as possible, reducing motion artifacts. The Quality setting will maintain 40 ms exposure time, resulting in low-noise image with some motion blur in low light. The Balanced setting falls between Quality and Speed.

There are also two special modes, High Speed and MoonLight™, which can be used for very fast moving targets and very low illumination, respectively. High Speed mode allows the user to specify a fixed exposure time in terms of milliseconds (from 1 to 80). While this will allow crisp video of fast moving vehicles, the side effect of this setting is that low-light performance of the camera will be significantly worse (up to 800 times) than in default mode. Therefore, High Speed should only be used for well lit scenes.

The other special mode, MoonLight™ implements long exposure times of up to 0.5 seconds in combination with proprietary noise cancellation technology. This mode allows viewing under

extremely low illumination conditions. It is important to note, that MoonLight™ is NOT digital frame integration and will offer significantly better image quality than cameras that employ digital frame integration. However, the motion blur will still be significant.

Setting the Low Light Mode to Speed is the first thing to try to eliminate motion blur. If that doesn't produce enough improvement, the user may want to open the lens aperture more to allow more light in. The user may also want to consider going with the camera equipped with auto-iris lens - the lens will open automatically as illumination diminishes. If that is not sufficient, the user may want to consider using a lower resolution camera. For example, the 2-megapixel AV2100 has larger pixels and has better low-light sensitivity than the 3-mega pixel product, AV3100. If that still does not yield sufficient low-light performance then, the user should consider the AV3130 day-night camera that uses a monochrome sensor in low light conditions and is sensitive to 0.00 lux .

13. Is there a link to view live video from your camera systems?

Publicly accessible cameras are currently unavailable.

14. What is the maximum physical distance between computer and Arecont Vision camera?

Typical Ethernet 100Base-T has a maximum distance of 100 meters (330 feet). The range can be increased by using a standard powered mid-span switch. Alternatively, 3Com IntelliJack Switch that accepts the power over Ethernet can be used to avoid the need to provide mid-span power supply.

15. Are Arecont Vision cameras RoHS compliant?

Arecont Vision products confirm to the Europeans Union Restrictions on Use of Hazardous Substances in Electrical and Electronic equipment (RoHS) Directive 2002/95/EC for six regulated substances. The certification is applicable to all Arecont Vision products shipped after April 15, 2006.

16. Can we mount a motorized zoom lens from another supplier?

Motorized zoom is not supported by the camera but you can mount an external PTZ unit with independent controls.

17. How do I access the Arecont Vision MegaPixel® WEB camera home page to view my cameras remotely?

Type http://200.168.100.10/index.html in your web browser, replacing **200.168.100.10** with the camera's IP address.

If the camera is behind a router, you cannot access the camera directly, instead the router has to be configured to forward incoming TCP traffic with specific destination port to the camera. For example, you can configure the router so that incoming TCP traffic with destination port 8080 is forwarded to

camera 200.168.100.10 port 80, and TCP traffic with destination port 8081 is forwarded to camera 200.168.100.11 port 80, and so forth. In this way you can access all the cameras on the internal network using only one public IP address. Different cameras are distinguished by different port numbers.

18. Is the MegaPixel® WEB camera home page compatible with Mozilla Firefox?

You can take snapshots, view live video and adjust camera settings via Mozilla Firefox.

19. How can I access the SDK download?

Access to the SDK requires an NDA (Non-Disclosure Agreement) to be signed and approved prior to obtaining access. More information can be provided through websales@arecontvision.com or by accessing the support section of http://www.arecontvision.com/

20. How do the Arecont Vision cameras utilize PTZ (Pan, Tilt, Zoom)?

There is no mechanical PTZ. However, Arecont Vision cameras allow instantaneous electronic pan, tilt and zoom by specifying PTZ window coordinates. Multiple users can each select their own windows allowing for independent PTZ control. Users of AV100 software can create a zoom window and use keyboard to move the zoom window around to achieve PTZ effect.

21. What is the night performance (Lux) of the AV3130 camera?

In low-light conditions AV3130 switches to 1.3 megapixel monochrome sensor resulting in good image quality down to 0.01 Lux. AV3130 is also sensitive to near-infrared illumination, allowing the use of standard infrared illuminators as a light source.

22. When I attempt to update the firmware on the Arecont Vision camera with the firmware update option I receive the "Ack Timeout" message. Why do I get this error?

If you get the timeout message take the following steps:

- Make sure that no application, aside from FirmwareLoader.exe, is accessing the camera during the update
- Make sure that the camera is connected via switch and not with a cross-over cable
- Re-run AV Installer prior to the upgrade to make sure the camera is accessible and there is no IP conflict

23. Do Arecont Vision cameras support multicast?

All single sensor H.264 cameras support multicasting.

24. Are there any moving mechanical parts in the AV3130?

The AV3130 does not have any mechanical moving parts inside.

25. What is Ethereal or Wireshark and where can I get it?

Ethereal and Wireshark are network protocol analyzers. When camera exhibit network related issues, for example connection issues, loss of frames, etc., our technical support team may need a network traffic log captured by Ethereal or Wireshark to help trace the issues. Ethereal can be downloaded for free at http://www.ethereal.com/. Wireshark is available at http://www.wireshark.org/.

26. How do I reset the camera settings to the original factory configuration?

Resetting the Arecont Vision camera to its original configuration can be achieved through the built-in web interface. To reset the Arecont Vision camera open your web browser and type

http://ip_address/set?params=factory

Replace "ip_address" with the camera's current IP address.

27. How do I assign a subnet mask and gateway to my camera?

a) On the camera's web interface, click 'Network' and enter the desire information, then click 'Apply'.

b) Save the changes to the camera's flash memory by going to Administration and clicking 'Save all settings to flash.

28. How do I save camera settings via the web interface?

Changes to settings in the web interface are saved by going to 'Administration' and clicking 'Save all settings to flash.'

29. How do I set up multicasting on H.264 cameras?

You can configure multicasting via the camera's web interface. Under 'H.264', check the box next to 'Active' under the UDP/RTP multicast stream options. You should now be able to access the multicast stream using the URL http://camera_IP/stream.sdp.

30. How do I automatically upload images from the camera to a website/ftp server?

Arecont Vision's cameras do not support any automatic image uploads to an FTP or web site. NVR software is required for the camera to stream and record.

31. What is the RTSP command for accessing an Arecont camera using a media player such as VLC?

The general command for RTSP (see page 55 for more details) is:
rtsp://camera_ip/h264.sdp?res=(half|full)&x0=(0..max_sensor_width)&y0=(0..max_sensor_height)&x1

=(32..max_sensor_width)&y1=(32..max_sensor_height)&qp=(4..51)&ssn=(1..65535)&[doublescan=(0|1)]&[bitrate=(0..65536)]&[fps=1..100]

32. What PoE class are MegaVideo® and SurroundVideo® cameras?

MegaVideo® cameras are PoE class 2 and SurroundVideo® cameras are class 3.

33. What is the default IP address of Arecont Vision cameras?

Arecont Vision cameras do not have a specific default IP address. The AV100 Camera Installer will allow for camera detection, giving the current IP of the camera. The IP address can also be modified through the Camera Installer. This software comes standard on the CD included with every camera and is also downloadable here: http://www.arecontvision.com/index.php?section=downloads&subsection=list_files&s_fk_category_id=5

34. What is the default password of Arecont Vision cameras?

Arecont Vision cameras do not ship with a password set on the web interface. If a password is required to secure the camera or because 3rd party software requires one, log in to the camera's web interface by typing the camera's IP address into your web browser. Under 'Administration', enter the desired password for admin access. The user name will be admin.

35. What is the voltage requirement for using an external power supply?

12-48VDC is required as marked on the back panel of the camera. Currently shipping H.264 cameras will also accept AC power input. If you are unsure as to whether your camera will accept AC, check the back panel to see if it notes 24VAC below the 12-48VDC requirement.

36. What lenses and housings work with Arecont Vision cameras?

Arecont Vision offers an assortment of lenses and housing that fulfill almost every security need. These lenses and housings can be found under the Products section of http://www.arecontvision.com/. By selecting a specific camera from the products section, a list of recommended lenses and housings/domes are listed. If a specific application requires lenses or housings other than those listed on Arecont Vision's web site, please contact your local sales representative for further assistance with finding a compatible housing.

37. Where do I find H.264 demo movies on the web site?

H.264 demo videos are available upon request. Please access http://support.arecontvision.com/ to request a video.

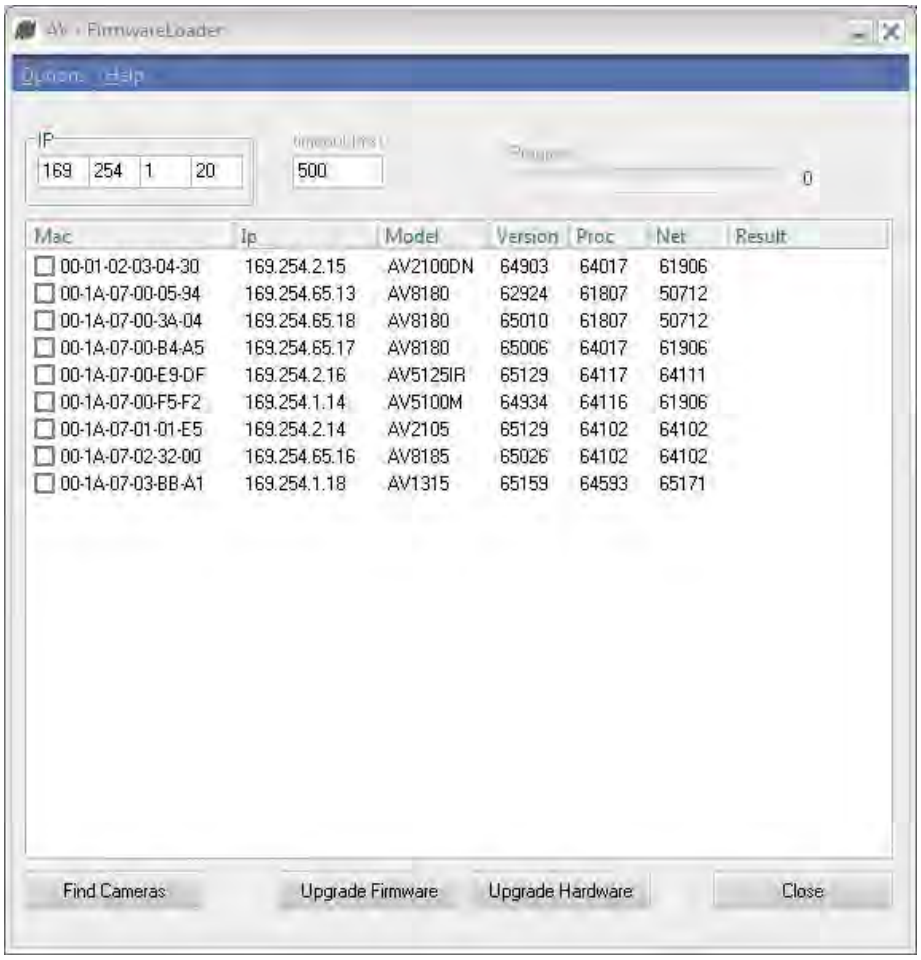
48. Why is multicasting not working in my web browser?

A media player such as VLC or QuickTime will support multicasting via RTSP.

Firmware Upgrade Using FirmwareLoader Utility

All models of Arecont Vision cameras are field-upgradeable since firmware version 51821. Recent H.264 models support firmware upgrade directly through the on-camera webpage, as shown in the "Administration Menu" section of Chapter III . However the webpage approach is not available on non-H.264 models, and it can only upgrade one camera per time. The AV FirmwareLoader is a special utility for upgrading camera's firmware and hardware. It supports all camera models and can update multiple cameras by one click. In case there is a camera that needs to be upgraded, you can contact your distributor to obtain the latest firmware upgrade file and utility.

Figure 12. FirmwareLoader Uitility



Please don't forget to disable any recording software/NVR applications prior to updating the firmware. Also it is strongly recommended to temporarily turn off Windows firewall and anti-virus software during the upgrade since it is frequently seen that firewall and anti-virus software could compromise the FirmwareLoader's ability to discover cameras without warning.

To upgrade a camera:

1. Start the Application Manager, run the Camera Installer to make sure the cameras to be upgraded are properly installed.
2. Start the AV Firmware Loader by clicking the corresponding **Run** button in the AV Application Manager. Alternatively, run FirmwareLoader.exe.
3. Click "**Find Cameras**". It may take up to a minute to find any cameras. Once the cameras have been found select the appropriate cameras to upgrade.
4. To upgrade the firmware:
   - Click "**Upgrade Firmware**" and choose the firmware upgrade file. The file name starts with "fwupdate", and the file extension is .txt or .mb, depending on the model. MAKE SURE THAT THE CAMERA MODEL YOU ARE UPGRADING IS INCLUDED IN THE FWUPDATE FILE NAME.
   - The firmware upgrade will start automatically. Do not disconnect the camera at any point during the upgrade process. When the upgrade is complete, a "Success!" message will be displayed at the "Result" column.
5. To upgrade the hardware:
   - Click "**Upgrade Hardware**" and choose the hardware upgrade file. The file name starts with "hwupdate", and the file extension is .bin. MAKE SURE THAT THE CAMERA MODEL YOU ARE UPGRADING IS INCLUDED IN THE HWUPDATE FILE NAME.
   - The hardware upgrade will start automatically. Do not disconnect camera at any point during the upgrade process. When the upgrade is complete, a "Success!" message will be displayed at the "Result" column.

IMPORTANT: DISCONNECTING THE POWER TO THE CAMERA DURING THE UPGRADE WILL RESULT IN PERMANENT DAMAGE TO THE CAMERA.

Chapter VI - Regulatory Compliance

FCC Compliance Statement

All Arecont Vision cameras have been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

Modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment under FCC rules.

1. It is suggested that the user use shielded CAT6 cables to comply with FCC rules.
2. It is suggested that the user use power-over-Ethernet supply
3. To comply with FCC rules when using auto-iris with AV1300, AV2100 and AV3100 it is also suggested using a ferrite common mode choke Fair-Rite # 0444164281 with 1 ½ turns place on the auto-iris lens cable three centimeters from the lens.

Terms and Conditions of Sale

1. **Terms and Conditions.** This sale is subject to the terms and conditions set forth below, which supersede any and all terms and conditions set forth in any documents issued by Purchaser, including Purchaser's purchase order. ANY ADDITIONAL, DIFFERENT OR CONFLICTING TERMS AND CONDITIONS HEREBY ARE OBJECTED TO BY ARECONT VISION, LLC ("AV"), AND SHALL BE OF NO FORCE AND EFFECT. No waiver or amendment of these terms and conditions shall be binding on AV unless made in writing expressly stating that it is such a waiver or amendment and signed by AV.

2. **Limited Warranty.** AV warrants to Purchaser (and only Purchaser) (the "Limited Warranty"), that: (a) each Product shall be free from material defects in material and workmanship for a period of twelve (12) months from the date of shipment (the "Warranty Period"); (b) during the Warranty Period, the

Products will materially conform with the specification in the applicable documentation; (c) all licensed programs accompanying the Product (the "Licensed Programs") will materially conform with applicable specifications. Notwithstanding the preceding provisions, AV shall have no obligation or responsibility with respect to any Product that (i) has been modified or altered without AV's written authorization; (ii) has not been used in accordance with applicable documentation; (iii) has been subjected to unusual stress, neglect, misuse, abuse, improper storage, testing or connection; or unauthorized repair; or (iv) is no longer covered under the Warranty Period. AV MAKE NO WARRANTIES OR CONDITIONS, EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, OTHER THAN THE EXPRESS LIMITED WARRANTIES MADE BY AV ABOVE, AND AV HEREBY SPECIFICALLY DISCLAIMS ALL OTHER EXPRESS, STATUTORY AND IMPLIED WARRANTIES AND CONDITIONS, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NON-INFRINGEMENT AND THE IMPLIED CONDITION OF SATISFACTORY QUALITY. ALL LICENSED PROGRAMS ARE LICENSED ON AN "AS IS" BASIS WITHOUT WARRANTY. AV DOES NOT WARRANT THAT (I) THE OPERATION OF THE PRODUCTS OR PARTS WILL BE UNINTERRUPTED OR ERROR FREE; (II) THE PRODUCTS OR PARTS AND DOCUMENTATION WILL MEET THE END USERS' REQUIREMENTS; (III) THE PRODUCTS OR PARTS WILL OPERATE IN COMBINATIONS AND CONFIGURATIONS SELECTED BY THE END USER; OTHER THAN COMBINATIONS AND CONFIGURATIONS WITH PARTS OR OTHER PRODUCTS AUTHORIZED BY AV OR (IV) THAT ALL LICENSED PROGRAM ERRORS WILL BE CORRECTED.

3. **Exclusive Remedy; Limitation of Liability.** Purchaser's exclusive remedy for a breach of the Limited Warranty shall be limited to repair or replacement of, or refund for, the non-conforming Product (at AV's sole option). Product returned to AV for non-compliance with this Limited Warranty shall be returned in accordance with the "Rejection/Return" provisions below. Any refund shall be equal to the actual purchase price for the applicable Product. IN NO EVENT SHALL AV BE LIABLE TO PURCHASER FOR ANY INDIRECT, INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES RESULTING FROM AV'S PERFORMANCE OF FAILURE TO PERFORM, WHETHER DUE TO BREACH OF CONTRACT OR WARRANTY, NEGLIGENCE OR OTHERWISE.

4. **Repaired or Replaced Product.** The warranty for repaired or replaced Product shall be limited in scope to the warranty set forth above, and shall have a duration of the greater of (i) the remaining Warranty Period in the original warranty that was applicable to the original Product, extended by the time elapsed between AV receiving notice of the non-conformity and Purchaser's receipt of the repaired or replaced Product; or (ii) ninety (90) days following delivery to Purchaser's of the repaired or replaced Product.

5. **Shipment and Risk of Loss.** All Products shipped by AV shall be packaged in AV's shipping cartons so as to prevent damage and shall be delivered to a common carrier FOB AV's facility in Altadena, CA, USA, at which time risk of loss shall pass to Purchaser. All freight, insurance, and other shipping expenses, as well as expenses for any special packing requested by Purchaser and provided by AV, shall be paid by Purchaser.

6. **Licensed Programs.** Upon the sale of any Product to Purchaser, AV grants to such Purchaser a non-exclusive, non-transferable, royalty-free license to (i) install copies of the Licensed Programs in appropriate hardware; and (ii) use the Licensed Programs for their intended purpose. Purchaser may make copies of any Licensed Programs only as necessary to exercise its rights authorized hereunder and as necessary to backup the Licensed Programs.

7. **Payment.** Payment shall be in U.S. Dollars, and shall be due and payable in accordance with the terms set forth on the applicable AV Quotation. Payment shall be in an amount equal to the purchase price for the applicable Product plus all applicable taxes, shipping charges, and other charges to be borne by Purchaser.

8. **Rejection/Return.** All Products shall be deemed accepted by Purchaser twenty (20) business days after receipt unless Purchaser rejects such Product within such twenty (20) business day period for failure to comply with the Limited Warranty set forth in above. Upon such rejection, Purchaser shall immediately notify AV of the rejection and shall, at AV's option, return the Product or allow AV to inspect the rejected Product and shall follow AV's instructions regarding disposition of the rejected Product. Prior to the return of any Product to AV as provided for hereunder, Purchaser shall obtain from AV's Technical Support Department a Return Material Authorization ("RMA") number. Within ten (10) business days after receiving an RMA number for the Product, Purchaser shall package the Product in its original packing material or an equivalent and return such Product to AV or such other location as AV may designate in writing. AV shall bear the cost of freight and insurance for the return to AV. Purchaser shall enclose with the returned Product the applicable RMA form, and any other documentation or information requested by AV. AV may refuse to accept returns of any Product not packed and shipped as provided in this paragraph. Upon verification that the Product does not comply with the Limited Warranty, AV shall repair, replace, or provide a refund for such Product, at AV's option, no later than thirty (30) days after the time AV receives from Purchaser written notice of such return or rejection. AV shall be responsible for returning, at AV's cost, repaired or replaced Products to Purchaser.

9. **General Provisions.** Notwithstanding any other provision hereof, performance by AV shall be excused to the extent that performance is rendered commercially unreasonable by acts of God, war, fire, flood, riot, power failure, embargo, material shortages, strikes, governmental acts, man-made or natural disasters, earthquakes, failure or limitation of supply, or any other reason where failure to perform is beyond the reasonable control and not caused by the negligence of AV. The time for performance shall be extended for the time period lost due to the delay. This Agreement shall be governed by and construed under the laws of the State of California, USA, without reference to conflict of laws. These terms and conditions, including those on the face page hereof (if any), set forth the entire agreement and understanding of AV and Purchaser with respect to the sale and distribution of Products, the Licensed Products and Parts and supersede all prior or contemporaneous agreements relating thereto, written or oral, between the parties. Purchaser may not assign its rights or delegate its obligations hereunder without the express written consent of AV. Any assignment by Purchaser without such consent shall constitute a breach hereof by Purchaser.