iViewHD User's Manual

Manual V1.05
Firmware V2.0drn or later
Website V2.0aoa or later

November 11, 2009

NetMedia, Inc.
10940 N. Stallard Place
Tucson, Arizona 85737
TEL: (520) 544-4567
FAX: (520) 544-0800
http://NetMedia.com

PURCHASE TERMS AND CONDITIONS
The laws of the State of Arizona shall govern PURCHASE TERMS AND CONDITIONS. LIMITED WARRANTY:

NETMEDIA MAKES NO WARRANTIES OTHER THAN THOSE CONTAINED HEREIN AND NETMEDIA EXPRESSLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING ANY WARRANTY OF FITNESS FOR A PARTICU LAR PURPOSE OR OF MERCHANTABILITY.

The foregoing limited warranty shall not apply unless Buyer has paid for in full the NetMedia products. Elec tronic updates to the NetMedia iViewHD User's Manual and NetMedia iViewHD software are available free to Registered Buyer upon request for a one (1) year period from the invoice date.

NOTICE

NetMedia, Inc. reserves the right to make improvements in the software product described in this manual as well as the manual itself at any time and without notice.

DISCLAIMER OF ALL WARRANTIES AND LIABILITY

NETMEDIA, INC. MAKES NO WARRANTIES, EITHER EXPRESSED OR IMPLIED, WITH RESPECT TO THIS MANUAL OR WITH RESPECT TO THE SOFTWARE DESCRIBED IN THIS MANUAL, ITS QUALITY, PERFORMANCE, MER-CHANTABILITY, OR FITNESS FOR ANY PARTICULAR PURPOSE. NETMEDIA, INC. SOFTWARE IS SOLD OR LI-CENSED "AS IS". IN NO EVENT SHALL NETMEDIA, INC. BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAM-AGES RESULTING FROM ANY DEFECT IN THE SOFTWARE.

iViewHD Camera 2M / D1
Tested to comply with

For Home or Commercial Use

Conventions

- The term iViewHD is used throughout this manual to denote the family of iViewHD cameras such as the iViewHD-2M or iViewHD-D1.
- Web screen shots may not appear exactly the same between various web browsers and operating systems.

Table of Contents

Introduction

iViewHD is a family of high resolution small form factor internet protocol (IP) cameras. The cameras provide both still JPEG and Motion-JPEG (MJPEG) images which are either viewable with a standard web browser or usable with a Network Video Recorder (NVR).

iViewHD cameras are powered using Power Over Ethernet (POE) which means that data and power are supplied via a single Ethernet cable. Power is provided by standard POE network switches or power injectors. Because the cameras use standard Ethernet cabling infrastructure (CAT5), they are ideal in environments where networking cabling is already installed. New installations are also easier than traditional video cameras, due to the use of a single cable for both power and video.

The cameras are configured using a standard web browser. Various camera parameters can be set up and saved using a web page. A live camera view is also available via the web interface. iViewHD has several levels of security available to help protect the camera against unwanted use.

For security applications, iViewHD will generally be used in conjunction with a Network Video Recorder (NVR). Due to its use of JPEG and MJPEG, it will work with most NVR software and hardware.

Distinguishing Various iViewHD Models

Below you will find several iViewHD cameras illustrated so that you can distinguish between them.

iViewHD-2M

- 2 Megapixel maximum image output (1600x1200)
- Power Over Ethernet (POE) powered

iViewHD-D1

- 385K maximum pixel output (720x536)
- Power Over Ethernet (POE) powered

Specifications

Some of the iViewHD features include

- Compact size
- MJPEG streaming output. Can be preconfigured or selectable via HTTP or JSON commands for NVR integration
- JPEG output
- Various standard and user configurable resolutions from 1600x1200(UXGA) to 160x120 (QQVGA)
- Maximum resolution: 1600x1200 2M Camera; 720x536 D1 Camera
- Lens: F3.2, 59.9º diagonal
- Image Sensor Size: 1/4 inch
- Configurable via a web browser with username/password and IP and mask protection
- Conforms to various internet standards:
  - ARP
  - TCP/IP
  - UDP
  - DHCP
  - Link Local / Bonjour
  - ICMP Ping
  - HTTP
- Up to 4 IP addresses configurable:
  - DHCP
  - Link Local
  - 2 static IP Addresses
- OEM custom webpages available
- Controllable LED status indicator
- Audio power-on signal
- Power requirements: Class 1 (less than 3.8W) Power Over Ethernet POE (IEEE 802.3af) 2.5W actual
- FCC Class B certification
- CE certification
- RoHS
- Dimensions 2.75"x1.1"x2.75" (HxWxD)
- Camera Weight: 4 oz.
- Base Weight: 2 oz.
- Housing type: Aluminum

FCC Compliance Statement

This device compiles with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful inerference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CE-Mark Warning

In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

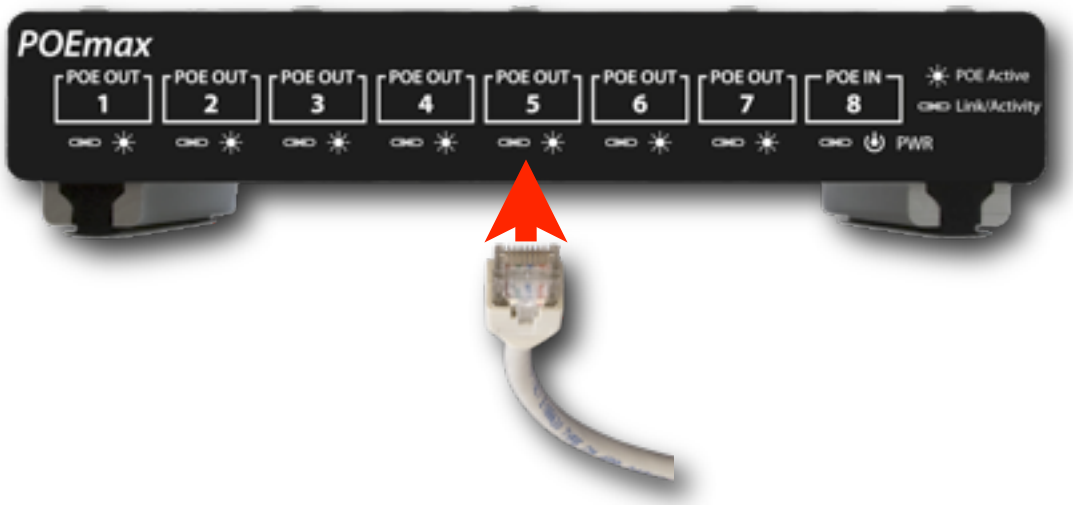
Quick Setup Procedure

This section presents a quick setup guide in configuring the iViewHD camera. For a more detailed explanation, please consult the following sections of the manual

The iViewHD camera connects to a Power Over Ethernet (POE) network switch, such as the Netmedia POEmax or other suitable POE switch. The POE switch provides the network connectivity and power for the camera.

To configure the iViewHD camera:

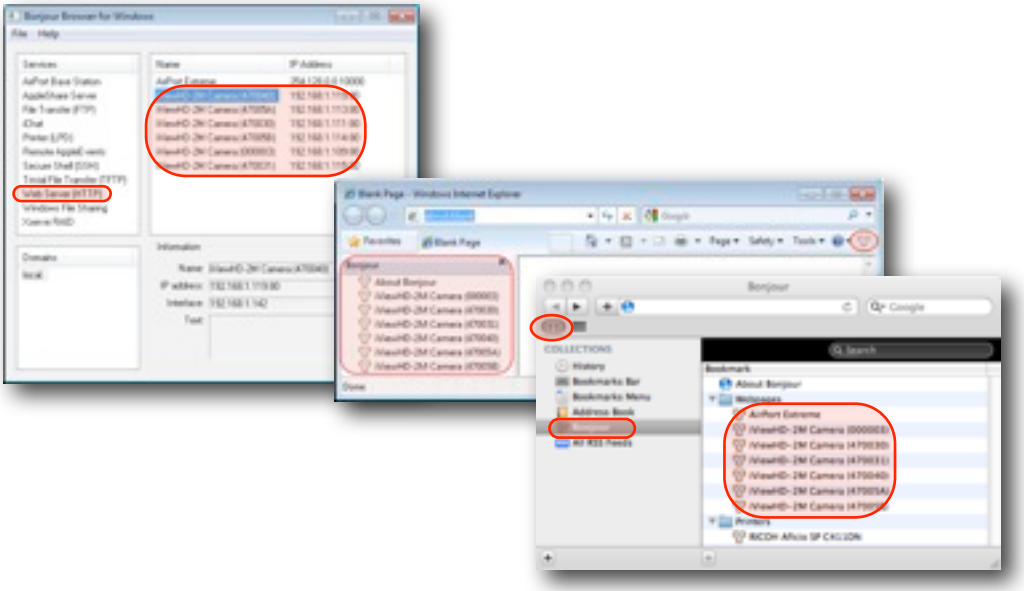
1. Plug in an Ethernet cable to the POE switch:



2. Plug the the other end of the Ethernet cable into the iViewHD Camera. The orange LED next to the RJ45 connector should illuminate. The red LED in front of the camera will light up and the camera should emit a series of beeps and you will probably see the green link activity light blinking:

3. Connect a computer to the same network as the camera.

4. Run a web browser on the computer which has Bonjour support enabled. Or for Windows download and install the Standalone Bonjour Browser for Windows
   http://netmedia.com/iviewhd/downloads.html
   On the the Mac run the Safari browser which has Bonjour already built in. See appendix A (**Alternate Ways to Locate an iViewHD Camera on the Network**) which provides several options for locating an iViewHD camera.
5. Locate the camera using Bonjour. And double click on the camera name:



You can make adjustments to the default camera image on the main web page:

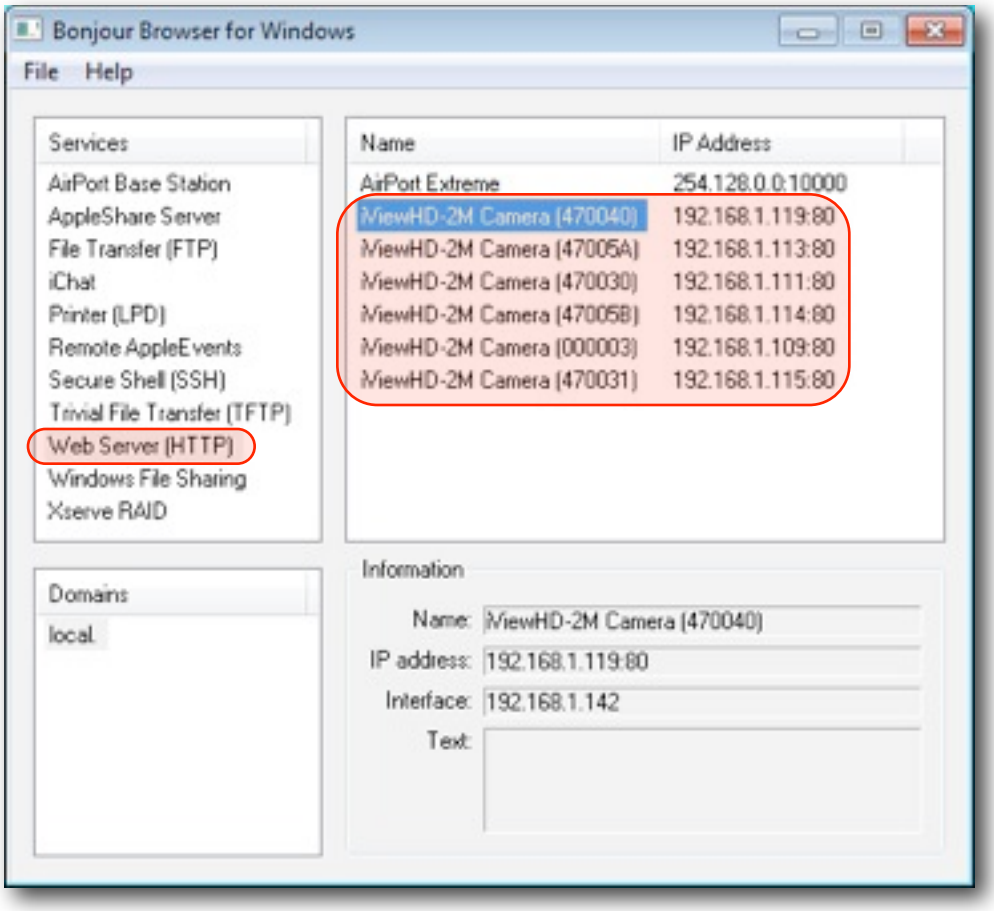
Configuration and Setup

iViewHD uses Link Local and multicast DNS (also known as Bonjour) to advertise its presence on the network. You can use a Bonjour enabled web browser to locate an iViewHD camera and configure it. Some web browsers, such as Apple's Safari, have a built in Bonjour browser. Other web browsers, such as Internet Explorer, can have a Bonjour plug-in installed for them.

For Windows users, the easiest thing to do is download the Standalone Bonjour Browser at

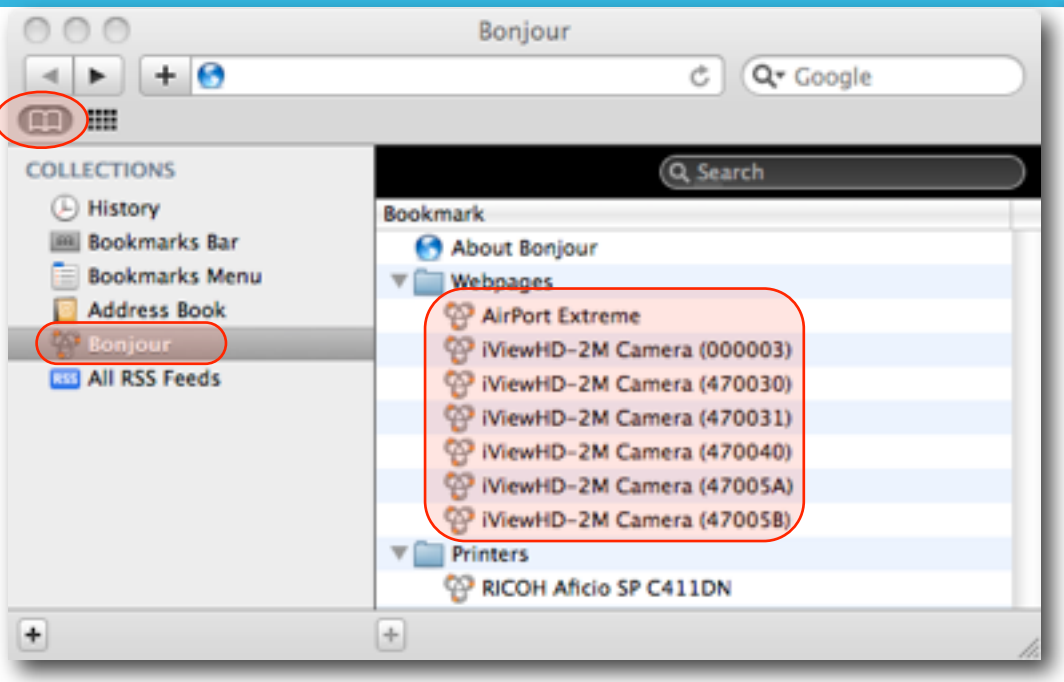
http://netmedia.com/iviewhd/downloads.html

Once you run the Bonjour Browser, you will see a window similar to the following



You will need to select *Web Server (HTTP)* under Services because iViewHD acts as a Web Server. The iViewHD cameras are then displayed in the right most window and you can double click the camera to launch your web browser.

In Safari the Bonjour browser can be selected by selecting the Collections icon on the Bookmarks bar:



There are other options also available for locating an iViewHD camera. See appendix A (**Alternate Ways to Locate an iViewHD Camera on the Network**) which provides several options for locating an iViewHD camera, such as

- Bonjour Browser for Windows (plugin)
- Safari Browser for Windows
- DHCP Server
- ARP table modification

In this section we will assume that you already have Bonjour installed and are running a Bonjour enabled browser or are running the standalone Bonjour Browser for Windows.

Each iViewHD has a unique name associated with it which you can change later on. The factory default name is in the form iViewHD-*TT* Camera (*XXXXXX*), where *TT* is either **2M** for a 2 megapixel camera or **D1** for a D1 camera. *XXXXXX* are the last 3 digits of the iViewHD's MAC address in hex. You can find the MAC address on a label on the back of the camera:

Double clicking on the name will attempt to connect to the iViewHD main image control web page.

When your browser connects to iViewHD, you may be greeted with an authentication window requesting your username and password. iViewHD ships with this feature disabled, but if you see the

following window, you should enter your username and password. If enabled, the factory default username is **user** and the factory default password is **password**. Usernames and passwords are case sensitive. You will have an opportunity later on to change these if you wish.

The following sections describe the main iViewHD image control web page and the other web pages which are used to configure your camera.

Once you know the address of your camera on the network, you can use a number of other browsers to connect to the camera:

Safari Internet Explorer Firefox Google Chrome Opera

iViewHD Image Control Page

This is the first page you will see when connecting to the iViewHD camera. The navigation bar at the top of the web page allows you to change various iViewHD non-image settings. You will find this navigation bar on all the iViewHD pages. The various pages available are

- **Image** - returns you to the iViewHD Image control page.
- **Services** - allows you to change the iViewHD device name and the network ports that various iViewHD services use.
- **IP** - allows you to enable / disable DHCP and specify additional static IP addresses.
- **Security** - allows you to change the web page username and password and limit access to iViewHD's network ports to certain IP addresses.
- **Admin** - allows you to perform administration functions on iViewHD such as Link LED control,restarting (rebooting) iViewHD or setting it back to factory defaults.
- **Update** - allows you to load new Firmware or Web pages into iViewHD.

Each iViewHD web page contains a footer which can be clicked to access the iViewHD home page where you will find out more information about iViewHD and also access support forums, documentation and firmware updates.

You can change various camera parameters and then save them in the camera's persistent storage. You can also retrieve your saved parameters. The parameters that you can modify are

- **Use Flash** - Enables use of an optional Flash plugin. This option is only visible in non-Internet Explorer browsers. For Internet Explorer this Flash plugin is used exclusively. In non-Internet Explorer browsers such as FireFox, Safari or Chrome, the browser is able to handle the MJPEG data stream directly. If you would rather have the camera image displayed by the Flash plugin, you can select this option. This is only a browser option, and is retained by your browser and not saved when parameters are saved.
- **Resolution** - Selects from a variety of fixed camera capture resolutions. The resolutions currently supported are
  - *UXGA 1600x1200*
  - *SXGA 1280x960*
  - *XGA 1024x768*
  - *SVGA 800x600*
  - *XD1 720x536*
  - *VGA 640x480*
  - *QVGA 320x240*
  - *QQVGA 160x120*
  - *CIF 400x296*
- **Frame Rate** - Selects from three frame rates which allow better displaying of lighting conditions. The camera may automatically adjust the frame rate based on the resolution selected:
  - *Best for Day* - This is the fastest frame rate and is better suited for brighter lighting conditions. Based on lighting conditions, resolution and compression, this frame rate can deliver more than 30fps, but in low light conditions, the frame rate will be much lower.
  - *Better for Night* - This frame rate is better suited for night. It's a medium frame rate that allows longer exposure for darker environments. Based on lighting conditions, resolution and compression, this frame rate can deliver more than 15fps, but in low light conditions, the frame rate will be much lower.
  - *Best for Night* - This frame rate is intended for night viewing, although it functions at a reduced frame rate in daylight. Based on lighting conditions, resolution and compression, this frame rate can deliver more than 10fps, but in low light conditions, the frame rate will be much lower.
- **Special Image Effects** - Selects from a variety of special effects which alter the appearance of the image:
  - *Normal* - The image is not altered.
  - *Negative* - The image is a color negative.
  - *Gray* - The image is grayish in appearance.
  - *Bluish* - The image has a blueish cast.
  - *Greenish* - The image has a greenish cast.
  - *Reddish* - The image has a reddish cast.
  - *Sepia* - The image appears as sepia
  - *BW* - The image appears a black and white

- *BW Negative* - The image appears as a black and white negative

- **JPEG Compression Level** - You can select a number from *0* to *45* which specifies the JPEG compression level. A lower number represents less compression and hence a better appearing image (at the expense of a larger image size). A higher number represents more compression and hence a lower quality image (but at a reduced file size). The compression may be automatically adjusted by the camera based on the resolution selection
- **White Balance** - Allows adjustment of the white balance:
  - *AWB Off* - Turns off any white balance compensation. This may be useful as a base comparison to the other white balance settings.
  - *AWB Auto* - Automatically adjusts white balance based on a gray average image. This works most of the time since average images are gray, but may be fooled when the image is skewed towards a particular color.
  - *Sunny* - This is suitable for lighting that is predominately from a sunny cloudless day.
  - *Cloudy* - This is suitable when the lighting is from a cloudy sky.
  - *Office* - This is suitable in environments with florescent lighting.
  - *Home* - This is suitable in environments with incandescent lighting.
- **Exposure Value** - Sets the exposure value. Values range from *-2.0EV* to *+2.0EV* in 0.3EV steps. The default value is 0, which means that no exposure compensation is used. Lower EV values set a lower exposure resulting in a darker image. Higher EV values increase the exposure resulting in a brighter image. You will generally adjust the EV to compensate for uneven brightness. The camera will attempt to automatically adjust its exposure based on average lighting. If there are very bright or dark areas in an image, one of them will not be as visible. You can use the EV setting to make these area more visible.

  For example, a bright sky may cause the foreground to appear too dark. You can set the EV value a bit higher and make the foreground less dark. This will have the effect of possibly washing out the sky.
- **Contrast Level** - Allows the adjustment of the image contrast level in a range of *-4* to *+4*. Lower contrast values allow more dynamic range, but the picture does not appear as sharp. Higher contrast values make the picture appear sharper at the loss of dynamic range.
- **Brightness Level** - Adjusts how bright the picture appears. This does not alter exposure, but rather the final image brightness. You can select a value from *-8* to *+8* which ranges from low to high brightness.
- **Color Saturation** - Adjust how saturated the colors appear. You can specify a number from *-4* (low) to *+4* (high). Low color saturation, results in very muted colors; high saturation results in very bright colors.
- **Color Hue** - Sets the color hue from *-60º* (greenish) to *+60º*(reddish). This allows fine adjustment of the output image color.
- **Sharpness** - Adjust the sharpness of an image. You can select *Auto* sharpness or a number from *0* (low) to *31* (high). Sharpness is adjusted based on edge detection of the image.
- **Vertical Flip** - Selects if the image is to be flipped vertically. If you are mounting the camera upside down, you will need to select both *Vertical Flip* and *Horizontal Mirror.*
- **Horizontal Mirror** - Selects if the image is to be mirrored horizontally. If you are mounting the camera upside down, you will need to select both *Vertical Flip* and *Horizontal Mirror.*

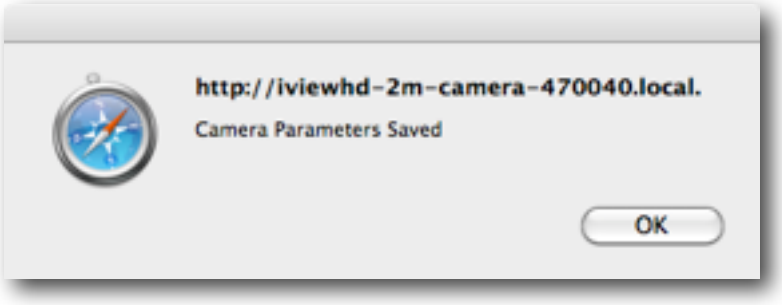
The following camera orientation illustrates Vertical Flip and Horizontal Mirror values:

Vertical Flip
Horizontal Mirror

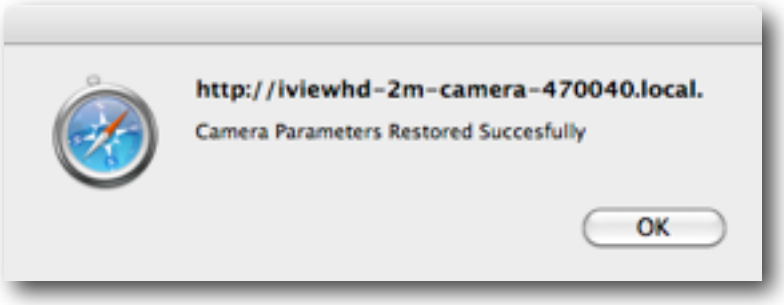
No Vertical Flip
No Horizontal Mirror

After the above parameters are selected, they can be saved in the camera's persistent storage. They can later be retrieved. This is useful if the parameters are altered and you wish to restore them to their saved state:

- **Save Parameters** - When you click this, the current parameters are saved in the camera's persistent storage. These parameters are retained if there is a power failure. You will get a confirmation dialog after the parameters are saved successfully:

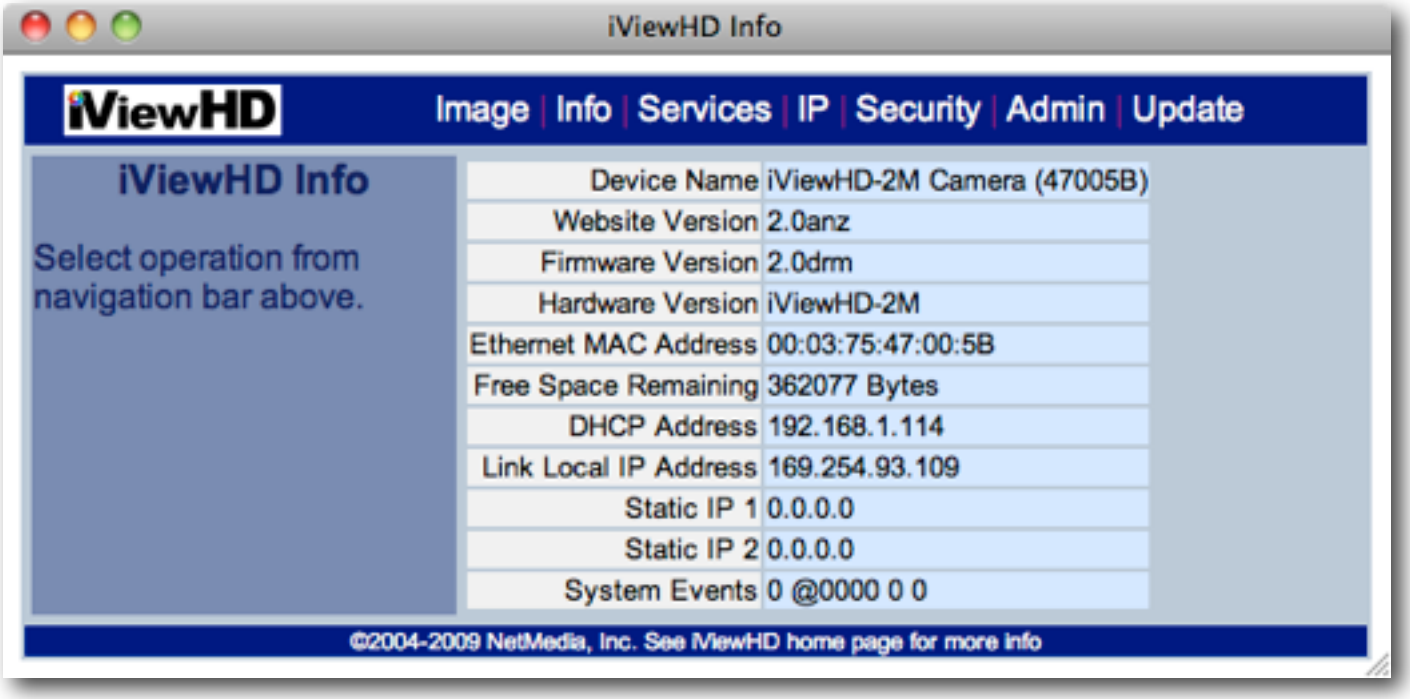


- **Restore Parameters** - When you click this, the current saved parameters are restored. You will get a confirmation dialog after the parameters are successfully restored:



Please see the **NVR Commands** section in **Appendix A** for a list of commands that may be issued by NVR software to control the camera outside of the web interface.

Info Web Page



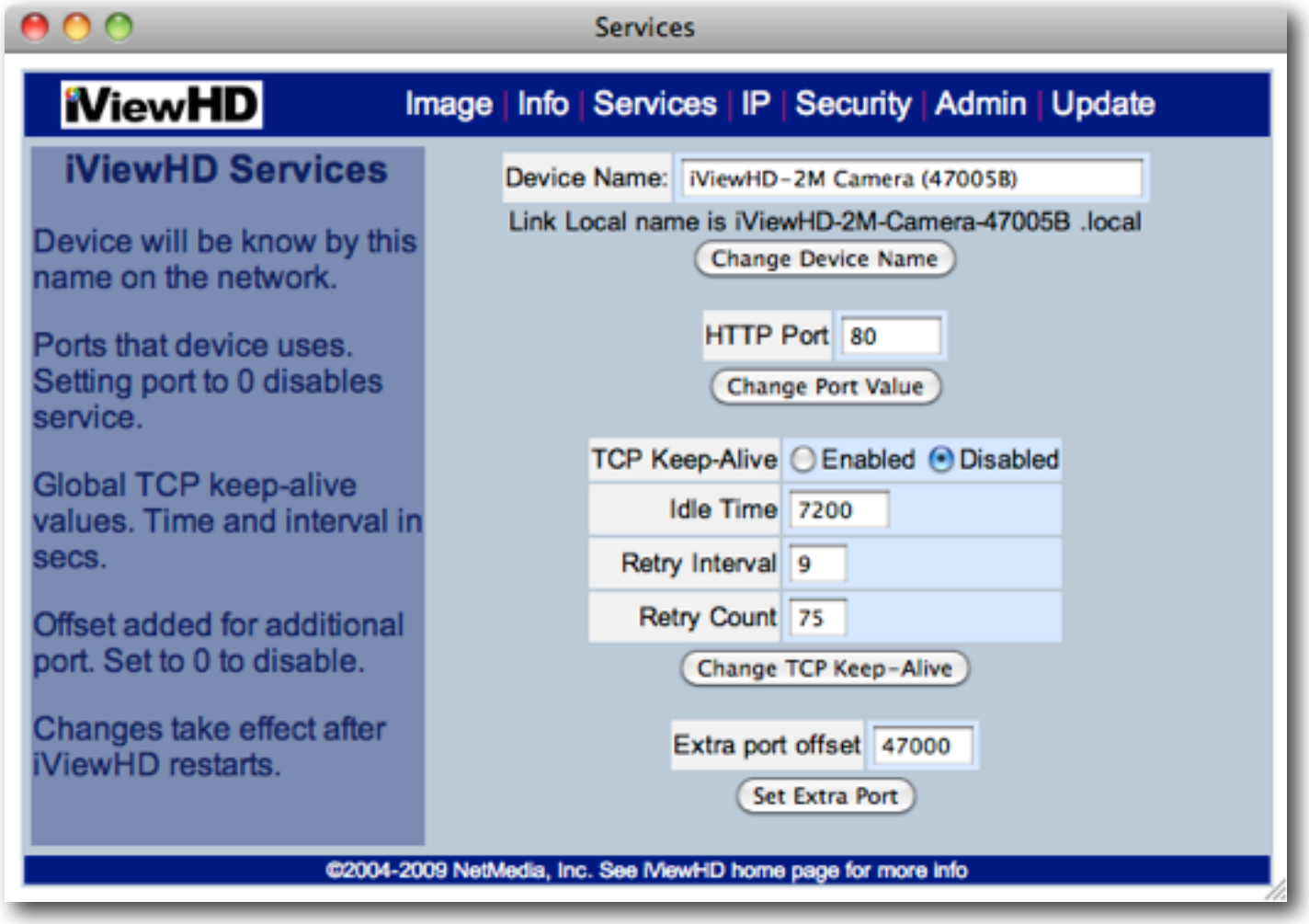
The Info web page gives a quick overview of some of iViewHD's settings:

- **Device Name** - shows the name of the iViewHD camera. This name is directly translatable to a Bonjour name which allows the camera to be located on the network.
- **Website Version** - shows the current version of the website that is loaded into the iViewHD camera. You can load new website firmware using the Update page.
- **Firmware Version** - shows the current Firmware version number. You can load new Firmware using the Update page.
- **Hardware Version** - shows the hardware version of the iViewHD camera. iViewHD-2M represents a 2 megapixel camera; iViewHD-D1 represents a D1 camera.
- **Ethernet MAC Address** - shows iViewHD's Ethernet MAC address. Each iViewHD has a unique MAC address.
- **Free Space Remaining** - shows how much free space is remaining in iViewHDs persistent (flash)storage. iViewHD stores configuration parameters in persistent storage. If persistent storage space is exhausted, you will need to reset iViewHD back to factory defaults to reclaim the space.
- **DHCP Address** - shows your current DHCP address. A value of 0.0.0.0 means that a DHCP address has not been obtained either because iViewHD was recently rebooted and has not requested a DHCP address yet, the DHCP server may not have allocated one or DHCP was disabled.
- **Link Local IP Address** - shows your current link local (LL) address. Each iViewHD automatically generates its own LL address which is unique on the local network. LL addresses are not routable and thus cannot be accessed outside of the local network. If you need a routable address, you should use a DHCP or Static IP address.

- **Static IP 1 & 2** - shows each static IP address that iViewHD will respond to. A value of 0.0.0.0 means that no Static IP address has been configured.
- **System Events** - These are internal events that iViewHD logs. If you are experiencing problems, technical support may ask you for these values to assist in isolating the problem.

Any changes that are made to iViewHD parameters are saved in persistent storage. Most changes to iViewHD parameters force iViewHD to restart, so you should be careful not to change these parameters while there are other network connections to iViewHD or else these connections will be lost. You should also be careful when changing things such as IP addresses and or the device name, because you may need to locate the camera on the network again using Bonjour.

Services Web Page



The Services web page allows you to change the iViewHD device name, the HTTP port that various iViewHD services use (such as the web page and the MJPEG streaming), various TCP keep-alive parameters and an extra port offset.

Change Device Name

The device name is the name that iViewHD uses to advertise its services and is seen by the Bonjour browser. The factory default name is in the form iViewHD-*TT* (*XXXXXX*), where *TT* is either **2M** for a 2 megapixel camera or **D1** for a D1 camera. *XXXXXX* are the last 3 digits of the iViewHD's MAC address in hex You can change the name to anything up to 32 characters. You should try to keep names unique on your network if you are using multiple iViewHDs to more easily distinguish among them.

This web page also displays the Link Local name. The link local name is a DNS safe name that is derived from the device name. Operating systems which support the mDNS (Bonjour) protocol allow you to address iViewHD using the Link Local name.

Change Port Values

You can also change the HTTP port number that iViewHD supports. Normally you will leave this port number at its default value. The HTTP protocol is used to communicate with iViewHD's web server and also provides access to the JPEG and MJPEG camera images

See **iViewHD Services and Protocols** section for more details about the protocols and how to use them.

Change TCP Keep-Alive

You can enable and change various parameters which control iViewHD's keep-alive mechanism. The keep-alive mechanism will terminate network connections if a computer is not reachable for a period of time. The parameters which can be changed here are global and effect all iViewHD TCP/IP protocols/services (i.e. HTTP).

Normally TCP/IP connections are maintained indefinitely. This means that intermediate computers and routers can go down and come back up and TCP/IP will not care. This can cause problems in certain cases when a computer connected to iViewHD goes down. iViewHD will maintain the connection to its service for the computer because it has no way of knowing the computer has been shut down. Because a connection is still maintained for a particular service, iViewHD will not allow other computers to connect to that service.

To remedy this problem you can enable TCP Keep-Alive. You can fine tune the keep-alive mechanism by altering various parameters:

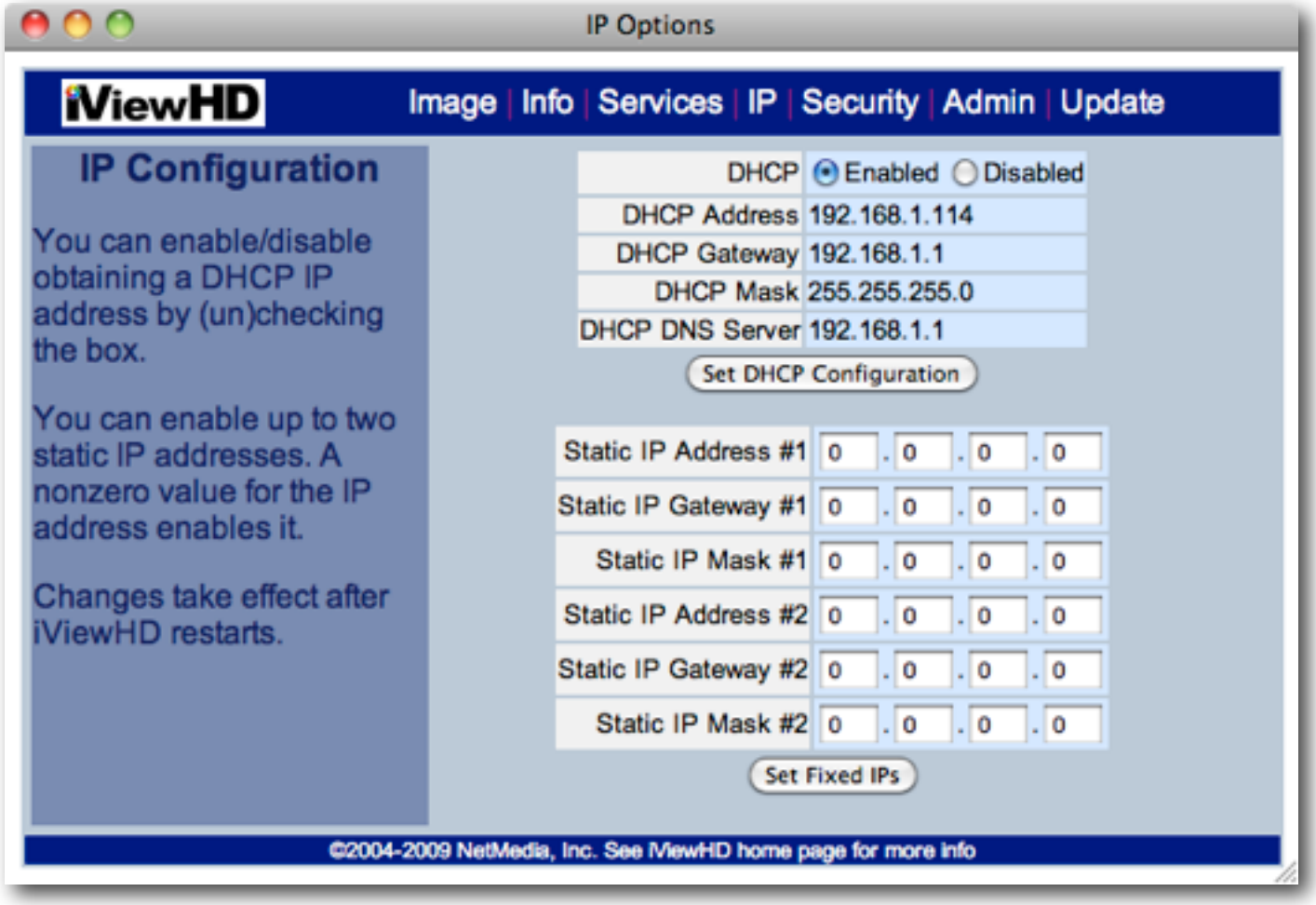
- **Idle Time** - specifies the amount of time in seconds to wait before sending a probe packet to determine if the other end is still active. The default value of 7200 is 2 hours.
- **Retry Interval** - specifies the amount of time in seconds between successive probe packets. The default is 9 seconds.
- **Retry Count** - specifies the number of times probe packets will be retried before the connection is terminated. The default value is 75 times.

Set Extra Port

All iViewHD services can be accessed at their default port numbers. The extra port value is a number which is added to the default port number which allows iViewHD to also be accessed at a different port number. For example, by default iViewHD's web pages can be accessed at port 80. The default extra port value of 47000 allows iViewHD to also be accessed at port 47080. If you need to disable this feature, just set the extra port value to 0.

The extra port value can be used, for example, in a NAT router to forward TCP/IP data in a certain port range to a iViewHD. You could set port 47080 to be forwarded to a iViewHD on the local network while the NAT router's web page was externally accessible as port 80. This is also useful in cases where some ISPs block port 80. In this case, iViewHD would be externally accessed on port 47080 while still being internally accessed on port 80.

IP Options Web Page



The IP Web page allows you to specify how iViewHD acquires an IP address. You can enable or disable DHCP address acquisition or you can assign fixed IP addresses to iViewHD.

DHCP Configuration

The current DHCP status is displayed along with the DHCP address, gateway, mask and DNS server that has been acquired. The only option you have is to enable or disable DHCP address acquisition.

Fixed IP Addresses

You can specify up to 2 static IP addresses. Static IP addresses can be used to give iViewHD a known unchanging IP address. You will need to specify the IP address, gateway, and mask to properly set the static IP address. The gateway and mask values are used to initiate communications from iViewHD to other computers. Some example values are

Static IP Address #1	192.168.1.50
Static IP Gateway #1	192.168.1.254
Static IP Mask #1	255.255.255.0

If you disable DHCP address acquisition and you don't specify any static IP addresses, the only IP address that iViewHD will have is the automatically generated Link Local address. This may make iViewHD more difficult to locate on a network if your computer does not support link local addressing/ Bonjour. See **Appendix A - Adding Route to Windows so Link Local Devices Can be Accessed** if you have Windows and need to only use a link local address.

In order to have changes to the DHCP configuration or static IP addresses made, iViewHD will automatically restart.

Security Web Page

The Security Web page allows you to specify the level of protection you need for iViewHD.

Change Username and Password

You can enable or disable username and password protection for iViewHD's web pages. If you disable username/password security anyone can access iViewHD's web setup pages. With security enabled all of iViewHD's web pages will be protected with a username and password, although you will only need to enter this information once when you access the first web page.

You can change the username and password for web access. Both the username and password are case sensitive. Only the username is displayed. The default username and password are

Default Username	*user*
Default Password	*password*

Authorized Port, IP address and Mask

You can specify up to 4 TCP ports that need protection. Ports may be protected so that only computers with certain IP addresses can have access to iViewHD. For each protected port you can set three parameters:

- **Port Number** - the number of the port you wish to have protected. These port numbers should correspond to the port numbers in the Services web page. For example, the factory default port of 80 is used for HTTP. Access is only restricted for port numbers which are listed here. If a port number is not listed then it has no access restriction.
- **IP Address** - the complete or partial IP address that will have access to the port. •
- **IP Mask** - a mask value which allows you to specify a range of IP addresses. The mask is ANDed with the IP address which is accessing iViewHD and compared to the **IP Address** above. Here is an example,

Port Number	80
IP Address	192.168.2.0
IP Mask	255.255.255.0

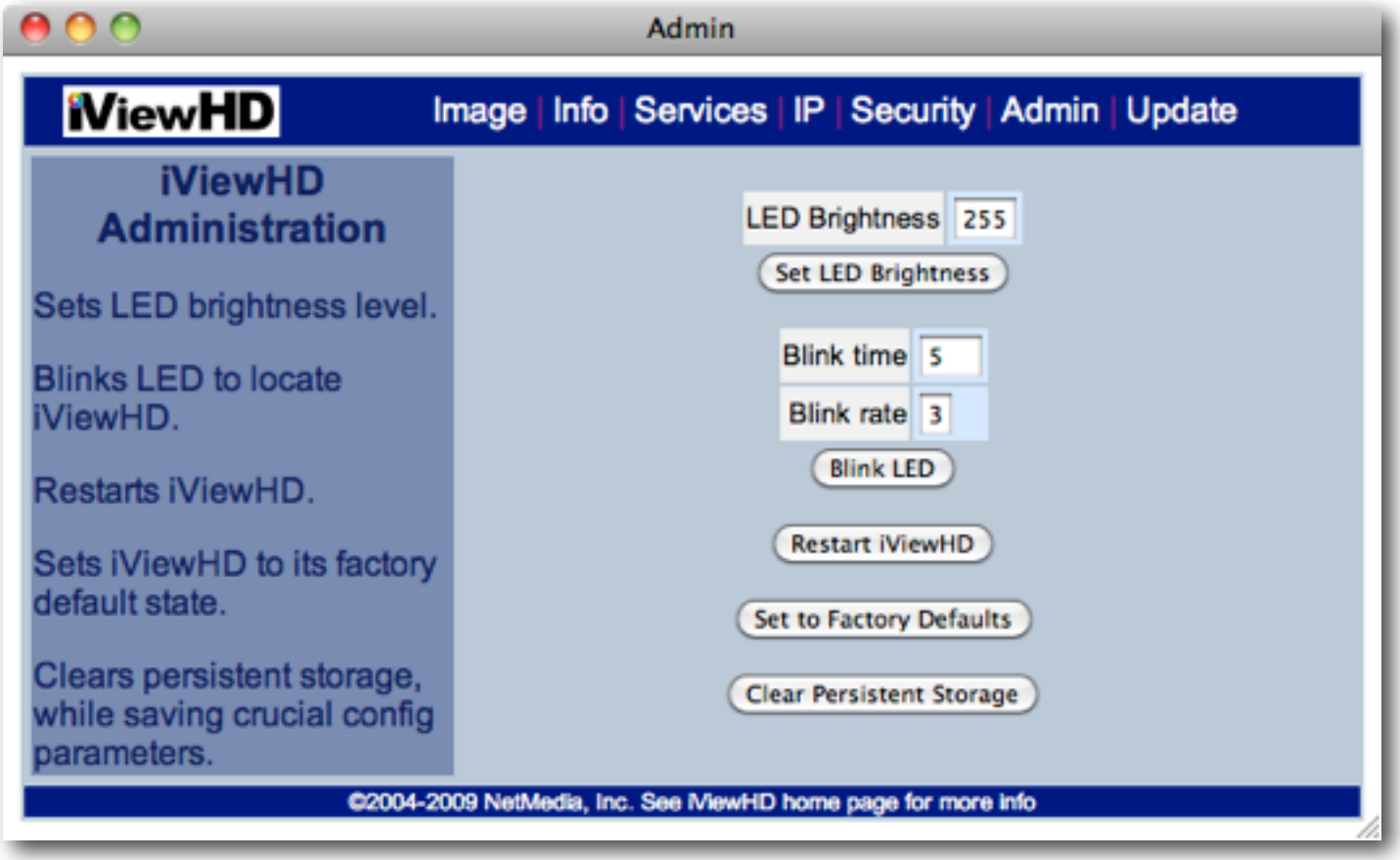
This will grant access to port 80 (the HTTP port) for anyone from the 192.168.2.0 subnet. That is IP ad dresses 192.168.2.0 to 192.168.2.255.

Port Number	47080
IP Address	192.168.2.153
IP Mask	255.255.255.255

This will grant access to port 47080 (the extra HTTP port) for anyone from IP address 192.168.2.153. Notice by setting the mask to 255.255.255.255 and specifying a full IP address, you can restrict access to just a single IP address.

If you forget the username/password you will need to perform a hardware reset to set iViewHD to its default username and password.

Admin Web Page



The Admin Web page provides several options which help you manage iViewHD. You can control the Link LED and force iViewHD to restart (reboot) or to have iViewHD set itself into a factory default configuration.

Set LED Brightness

You can control the brightness level of the Link LED.

- **LED Brightness** - specifies the LED brightness level. You can set a level from 0 to 255. A level of 0 turns off the LED and a level of 255 sets the LED brightness to its maximum. The default value is 255.

Press "Set LED Brightness" to change the brightness level. The brightness level will change immediately without iViewHD restarting.

Blink LED

You can force the Link LED to blink for a period of time and at a certain rate. This is useful if you have several iViewHDs and you wish to know which iViewHD you are controlling via the web interface. Once the LED finishes blinking it will revert to its original functionality.

- **Blink time** - specifies the amount of time the LED will blink in seconds. You can specify a value of 0 to 255.
- **Blink rate** - specifies how fast the LED will blink. You can enter a value of 0 to 7. 0 is the slowest blink rate and 7 is the fastest.

Press "Blink LED" to start the LED blinking immediately without iViewHD restarting.

Restart iViewHD

Press the "Restart iViewHD" button to force iViewHD to restart itself. Any active network connections will be lost when iViewHD restarts.

Set to Factory Defaults

Press "Set to Factory Defaults" to cause iViewHD to erase its persistent storage. iViewHD will revert to a factory default configuration. The current Website will be erased, but the current Firmware will not be altered. This operation will take less than 1 minute. During this time, iViewHD's LED will be blinking to indicate that the persistent storage is being erased. Do not remove power while this is happening. After the persistent storage is erased, iViewHD will restart and revert to a minimal web page:

You should reload the Website ROM file so that you can reconfigure iViewHD. See the **Update Web Page** section on how to reload the Website ROM file. When setting the iViewHD to its factory defaults, you should be aware that any network configuration (IP address or DHCP) that you may have set, will revert back to the factory defaults. You may not be able to access the camera at those network settings.

Clear Persistent Storage

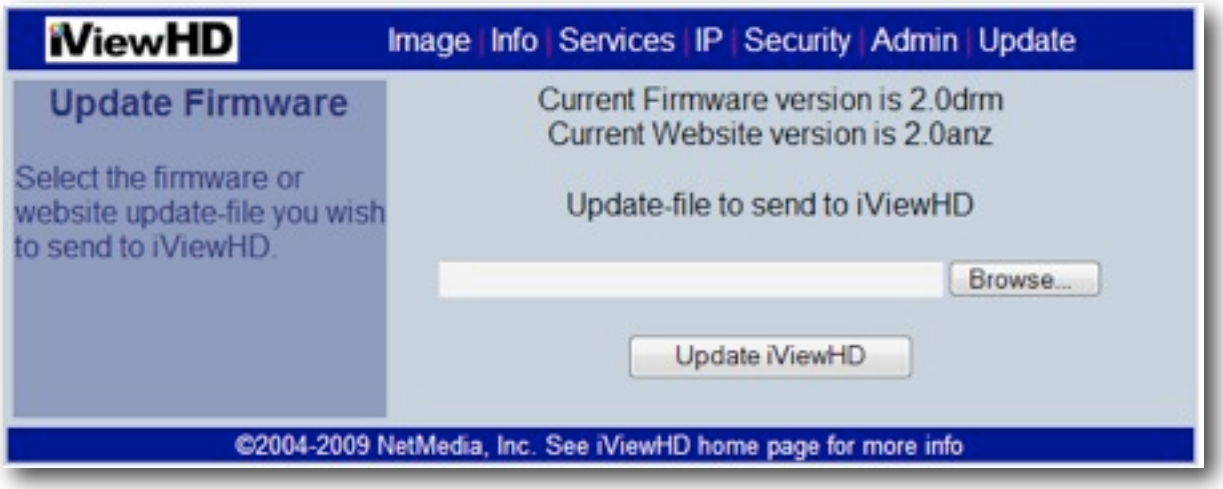
Press the "Clear Persistent Storage" button to have iViewHD erase its Persistent Storage. The current Website will be erased, but the current Firmware will not be altered. Before erasing the persistent storage iViewHD will attempt to save the current configuration parameters so they may be restored

after persistent storage is erased. This is useful when persistent storage is getting full and you want to reinitialize it, but don't want to lose your configuration parameters. If power is lost during this operation, then it is likely that the current configuration parameters were not saved and restored.

Update Web Page

The Update web page allows you to load new Firmware or Website ROM software. You will do this when new software becomes available. You can also do this to reload the current software. iViewHD determines from the contents of the file you select which kind of software is being loaded. The currently loaded Firmware or Website version is displayed for reference purposes.

The Update web page will appear slightly different depending on which browser you use. For example, if you are using Internet Explorer, the web page will look like this



In either case you will need to press the "Browse..." or "Choose File" button to select the appropriate file. ROM files are named as follows

iViewHD_Firmware_V**n_naaa**.rom

iViewHD_Website_V**n_naaa**.rom

where **n_naaa** is the version number which corresponds to version **n.naaa** of the ROM file. iViewHD will attempt to save and restore the current configuration parameters after an update.

Informational and Error Messages

You will encounter several informational and error messages as you use iViewHD's setup web pages. These messages will appear after you have clicked on a form button on a web page. The message are

Factory defaults are being set. Please wait...

You have requested that the iViewHD is set back to its factory default state. Persistent storage is being cleared. This operation will take about a minute.

Parameters set OK

You have requested changing some parameters that did not require restarting iViewHD. For example, changing serial port parameters or controlling the Link LED will give this message.

Restarting. Please wait...

You have requested to change some iViewHD parameters that have resulted in iViewHD restarting. Most parameters that are changed in iViewHD require a restart. You will also get this message if you clicked on "Restart iViewHD" in the Admin web page.

Bad flash file.

The flash file you attempted to update iViewHD with was either corrupt or some kind of network error caused the file to be received incorrectly. Make sure you are sending a valid flash file to iViewHD. If you have verified that the flash file sent to iViewHD is valid, then try updating iViewHD again with the same file. You may also get this message if your web browser does not correctly upload files. You could try switching to a different browser.

Bad request from browser or file not found.

You have requested a page on the iViewHD that does not exist or your browser has sent a command that iViewHD does not recognize.

Error setting parameters

There was an error in setting the parameters. Try the command again. You may also get this error if iViewHD's persistent storage is full.

Firmware received OK. Reflashing, please wait...

iViewHD has determined that you are attempting to upload a firmware file and that it was received with no errors. iViewHD will now re-flash its persistent storage with a copy of the newly received firmware. This operation will take several minutes.

Website feature/version mismatch

The website you uploaded to iViewHD is not compatible with the firmware currently running in iViewHD. This error is usually caused by attempting to load a website version into iViewHD that is either too old or too new. iViewHD's firmware is feature locked with certain website versions. If you attempt to load a website which does not have a compatible feature set, then you will get this error message.

Website received OK. Restarting...

iViewHD has determined that you are attempting to upload a website file and that it was received with no errors. iViewHD will now reflash its persistent storage with a copy of the newly received firmware. This operation will take several minutes.

Appendix A
Alternate Ways to Locate an iViewHD Camera on the Network

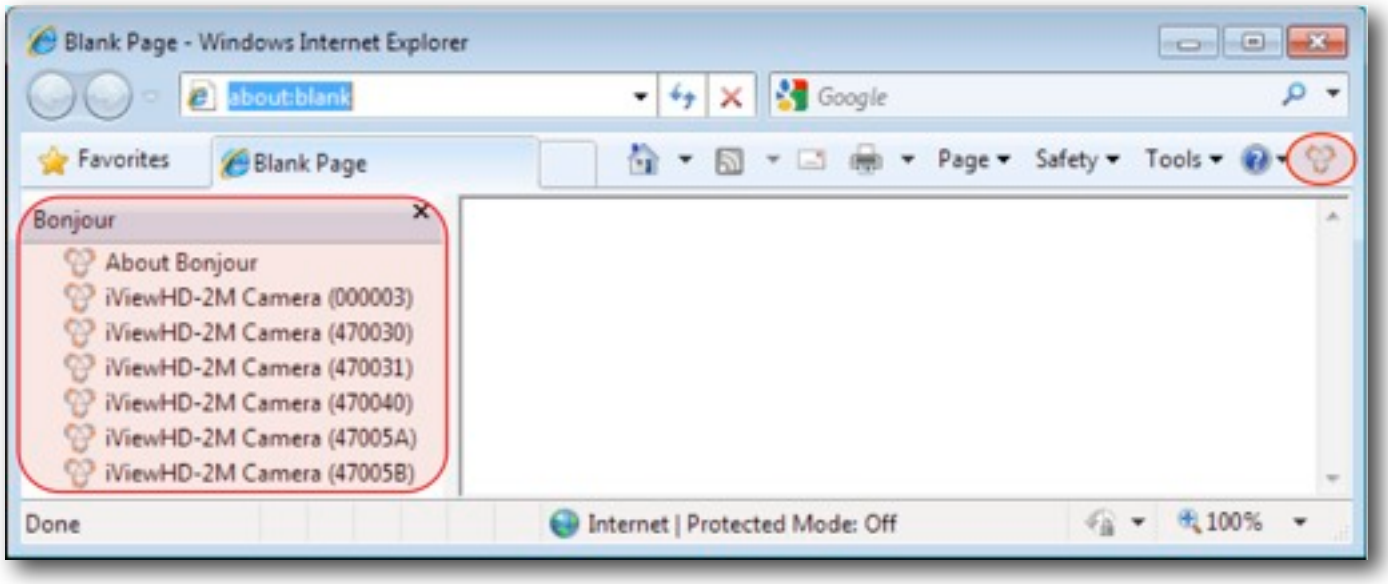
The iViewHD camera supports Bonjour which allows it to be easily located on a network.

Bonjour Browser for Windows (plugin)

For Windows, you can install Bonjour support for Windows which can be downloaded at

http://support.apple.com/downloads/Bonjour_for_Windows

This will enable Bonjour for your computer and also place a Bonjour item into Internet Explorer's task bar. Once you start Internet Explorer, you should see a window similar to the following after selecting the Bonjour logo on the Tools Bar. You can then click on the camera that you want to manage.



Safari Browser for Windows

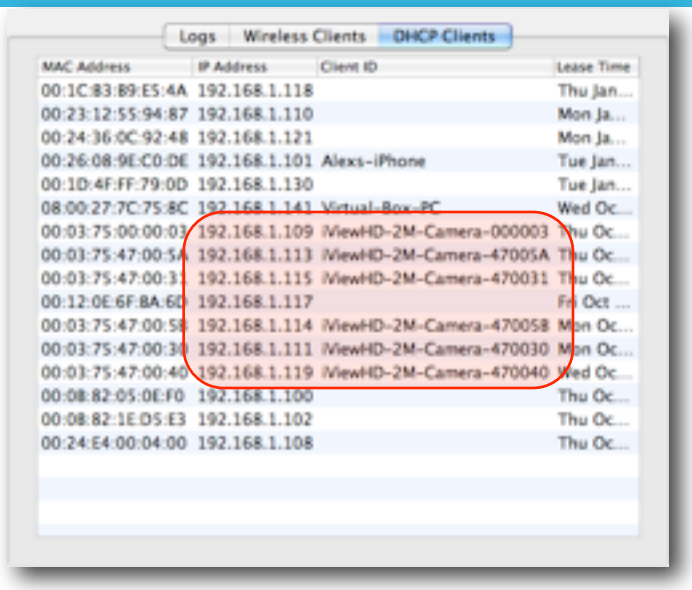
You can also install the Safari web browser which will enable Bonjour on your computer and also give you a Bonjour browser. It's available at

http://www.apple.com/safari/download/

For cases where Bonjour is not appropriate there are several other ways to locate an iViewHD camera.

DHCP Server

iViewHD has DHCP enabled by default. If you have a DHCP server, then you can query your DHCP server about its DHCP leases. The iViewHD camera will be listed there:



You will then be able to associate the camera with an IP address that you can use in a browser.

ARP Table Modification

The Address Resolution Protocol (ARP) table in your computer translates an IP address to an Ethernet MAC address. This allows your computer to use an IP address to access devices on the network. The ARP table is normally filled in automatically by the operating system, but you can also modify it and assign your iViewHD camera an IP address. You need to be careful in doing so as not to use an IP address that is already in use. Once you assign an IP address to a camera, you can use the IP address in a web browser to setup the camera.

You will need to issue commands on a terminal or command shell. In Linux or Mac OS X, you can use the terminal. In Windows you will use CMD.EXE. The command to modify the ARP table is similar in all operating systems.

You will need to obtain the MAC address of the camera which you want to locate. The MAC address is on a sticker on the back of the camera:

The MAC address for the above image is 00:03:75:00:00:07. The command for mapping an IP address to a MAC address is

arp -s *IP-Address MAC-Address*

In Windows the MAC address is specified as ***00-03-75-00-00-07***. In Linux or Mac OS X the MAC address is specified as ***00:03:75:00:00:07***.

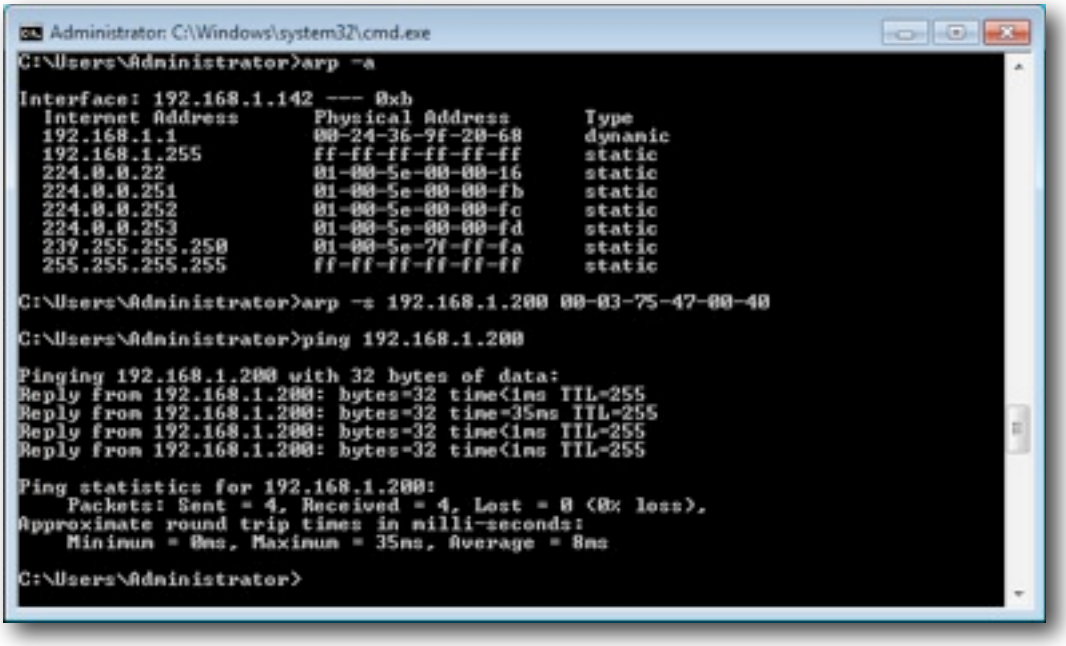
Let's say we wanted to address the iViewHD camera at IP address 192.1681.200. The command in Windows would be

```
arp -s 192.168.1.200  00-03-75-00-00-07
```

In Linux or Mac OS X the command would be

```
arp -s 192.168.1.200  00:03:75:00:00:07
```

Here is an example CMD.EXE session for windows mapping the IP address **192.168.1.200** to the MAC address of **00-03-75-47-00-07**:



The **arp -a** command lists all the entries in the ARP table. After the new IP to MAC association is made, we do a **ping** to make sure that the iViewHD camera is accessible.

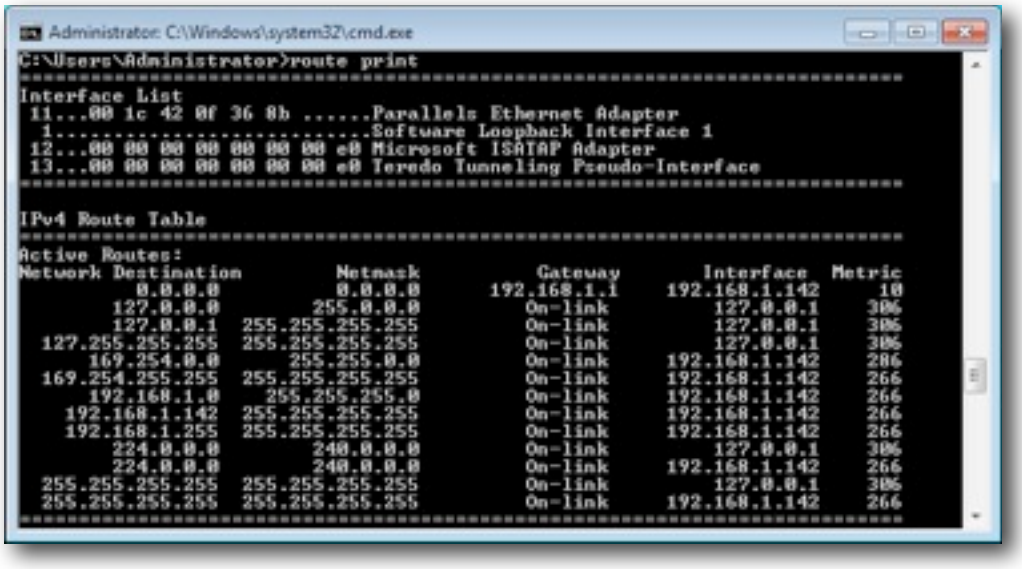
Adding Route to Windows so Link Local Devices Can be Accessed

You only need to be concerned about this if you have not installed Bonjour for Windows.

Windows supports Link Local (LL) addressing. If you are connected to a network and an IP address cannot be obtained manually or automatically (via DHCP), Windows will choose a LL address. These addresses are in the form 169.254.x.y, where x.y are randomly chosen numbers such that they are unique on the network. While Windows is using the LL address it maintains a route to the LL address subnet. This means that it can communicate with LL devices such as iViewHD.

In most cases once Windows obtains an IP address via DHCP, iViewHD will also obtain a DHCP address and accessing the device is not an issue. There may be cases, however, where the DHCP server does not assign an IP address to iViewHD. This can occur when DHCP has been disabled in iViewHD or the DHCP server's IP address allocation rules prevent an address from being assigned. In these cases, iViewHD can only be accessed via its LL address.

Unfortunately, once Windows obtains a non LL address (either manually or through DHCP), it removes its route to the LL address subnet. This has the effect of not being able to communicate with devices which are addressed only through 169.254.x.y. The easiest way around this is to add a route to the LL subnet so that Windows knows where to send packets that are addressed to LL devices. This may be accomplished by running CMD.EXE and typing ROUTE PRINT



You will need the interface IP address under the "Interface" column - the one with a "Destination" of 0.0.0.0. In this example it is ***192.168.1.142***.

Type the following command substituting your interface IP address for ***192.168.1.142***:

```
ROUTE ADD 169.254.0.0 MASK 255.255.0.0 192.168.1.142
```

This will add a route so that link local devices can be accessed. You will need to do this every time the computer is rebooted, unless you make the route permanent by typing

```
ROUTE -p ADD 169.254.0.0 MASK 255.255.0.0 192.168.1.142
```

HTTP Commands

iViewHD accepts HTTP commands that may be used with NVR software to control the operation of the camera. These commands are case sensitive and must be issued in the proper case or else they will not be understood. The general form of the HTTP commands is

http://*IP-Address*/image.cgi?CAPTURE=*YES/NO*&STREAM=0/1&COMMAND=*commands*

Where

- **IP-Address** is the IP-Address of the camera. If you have Bonjour installed on your NVR or the computer issuing the commands, you can use the camera's Bonjour name here.
- **YES/NO** is either the word YES or NO and is used to indicate if an image is to be **CAPTURED** after the **commands** that follow are processed. Usually you set this to YES to begin capturing video or still pictures. You would set this to NO if you just want to change some camera parameter without receiving an image. This is useful if you are changing parameters while another computer is capturing images.
- **0/1** is either the number 0 or 1 and indicates if images are to be streamed or not. A 0 means that only a single JPEG image is to be returned, while a 1 means that multiple JPEG (MJPEG) images are to be returned/streamed.
- **commands** is a list of commands separated by commas described below. The **COMMAND=** parameter should always be present even if there are no commands included afterwards.

Some example HTTP commands are

```
http://iViewHD-Camera-2M-470040/image.cgi?CAPTURE=YES&STREAM=1&COMMAND=
```

Returns a stream of MJPEG images using the camera parameters that are currently set in the camera at IP address iViewHD-Camera-2M-470040.

```
http://192.168.1.140/image.cgi?CAPTURE=YES&STREAM=1&COMMAND=
```

Same as previous example, but camera images come from IP address 192.168.1.140.

```
http://192.168.1.140/image.cgi?CAPTURE=YES&STREAM=0&COMMAND=
```

A single JPEG image is returned from IP address 192.168.1.140 using the cameras current parameters.

As a convention we will be omitting the **http://*IP-Address*/** portion in some of the examples below

Commands that can follow the **COMMAND=** option are also case sensitive and are separated by commas. The commands are

- **COMP:** 0..45 Compression level (Default 11)
  - 0 is lowest compression (best image quality) - large file size
  - 45 is highest compression (worst image quality) - small file size
- **EFFECT:** 0..8 Special effect (Default 0)
  - 0 - Normal
  - 1 - Negative
  - 2 - Gray
  - 3 - Bluish
  - 4 - Greenish
  - 5 - Reddish
  - 6 - Sepia

  - 7 - Black & White
  - 8 - Black & White Negative
- **MODE:** UXGA, SXGA, XGA, SVGA, VGA, QVGA, QQVGA or CIF - or numeric corresponding value 0..8 (Default XD1)
  - UXGA 0 - 1600x1200
  - SXGA 1 - 1280x960
  - XGA 2 - 1024x768
  - SVGA 3 - 800x600
  - XD1 4 - 720x536
  - VGA 5 - 640x480
  - QVGA 6 - 320x240
  - QQVGA 7 - 160x120
  - CIF 8 - 400x298
- **RATE:** 0..2 (default varies based on resolution and compression)
  - 0 - Best for Night
  - 1 - Better for Night
  - 2 - Best for Day
- **BRIGHT:** 0..16 Brightness (default 8)
  - 0 - Low
  - 8 - Normal
  - 16 - High
- **EXPO:** 0..12 Exposure (default 6)
  - 0 - -2.0EV
  - 1 - -1.7EV
  - 2 - -1.3EV
  - 3 - -1.0EV
  - 4 - -0.7EV
  - 5 - -0.3EV
  - 6 - 0.0EV
  - 7 - +0.3EV
  - 8 - +0.7EV
  - 9 - +1.0EV
  - 10 - +1.3EV
  - 11 - +1.7EV
  - 12 - +2.0EV
- **SAT:** 0..8 Saturation (default 4)
  - 0 - Low
  - 4 - Normal
  - 8 - High
- **HUE:** 0..4 Hue (default 2)
  - 0 - -60º
  - 1 - -30º
  - 2 - 0º
  - 3 - +30º
  - 4 - +60º
- **CONTRAST:** 0..8 Contrast (default 4)

  - 0 - Low
  - 4 - Normal
  - 8 - High
- **SHARP:** 0..7 Sharpness (default 0)
  - 0 is Automatic sharpness
  - 1..7 Progressively sharper images. Sharpness is based on edge detection and enhancement
- **WB:** 0..5 White balance (default 1)
  - 0 - AWB Off
  - 1 - AWB Automatic
  - 2 - Sunny
  - 3 - Cloudy
  - 4 - Office
  - 5 - Home
- **DCW:** Digital Crop Window. Defaults to size of current base resolution. This specifies an area of the current image that is cropped before being displayed. You should begin by setting a *base resolution* mode of either UXGA (1600x1200) or SVGA (800x600). The DCW operates on one of these base resolutions and is relative to the Pan offset (see below).
  - HxV - The horizontal and vertical size in pixels (separated by 'x') of the window within the base resolution. This value should be in increments of 4 pixels - if not, it will be rounded down to the nearest 4 pixels.
- **PAN:** Pan. Defaults to 0x0. This specifies a location to begin the DCW within the current base resolution image.
  - HxV - The horizontal and vertical location in pixels (separated by 'x'). The coordinates are relative to the upper left corner of the base resolution image. This value can be in increments of 1 pixel.
- **SIZE:** Output image size. Defaults to size of current output resolution. This value should be no larger than the DCW and the same image aspect ratio - if not, it will be adjusted automatically.
  - HxV - The horizontal and vertical size in pixels (separated by 'x'). This value should be in increments of 4 pixels - if not, it will be rounded down to the nearest 4 pixels.
- **VFLIP:** Vertical flip (default 1)†
  - 0 - Do not flip image vertically
  - 1 - Flip image vertically
- **HMIRROR:** Horizontal mirror (default 1)†
  - 0 - Do not mirror image horizontally
  - 1 - Mirror image horizontally

Some examples of HTTP commands using the **COMMAND=** option are

```
/image.cgi?CAPTURE=YES&STREAM=1&COMMAND=MODE:UXGA,COMP:25
```

Starts receive MJPEG images at UXGA resolution with compression level 25

```
/image.cgi?CAPTURE=YES&STREAM=1&COMMAND=MODE:UXGA,COMP:25,VFLIP:0,HMIRROR:0
```

Receives UXGA MJPEG images at compression level 25 and images are inverted. This is useful if the camera is mounted upside down.

---

† The sensor is mounted upside down in the camera and thus the image is normally vertically flipped and horizontally mirrored to appear correct

A special form of the HTTP command is available to retrieve a single JPEG image using the current camera parameters. It's equivalent to the

```
/image.cgi?CAPTURE=YES&STREAM=0&COMMAND=
```

The command is simply

```
/Image.jpg
```

For example,

```
http://192.168.1.140/Image.jpg
```

JSON Object Support

The iViewHD camera supports a variety of JSON (JavaScript Object Notation) objects to manipulate camera parameters. JSON is of primary interest to those that want to make custom web applications that communicate to the iViewHD camera without having to issue HTTP commands. For a general outline on what JSON is and various JSON links, please see

http://www.json.org/

iViewHD supports both reading and writing JSON objects. JSON objects are read/written using GET or PUT JavaScript *XMLHttpRequest* calls. Because JSON objects may contain special characters, it is always best to URL encode the JSON request using something like JavaScript's *escape* function.

Reading JSON Objects

To read a JSON object issue a GET or PUT request in the form

```
/JSON.cgi?GETSET=0&COMMAND=<JSON-Partial-Objects>
```

where `<JSON-Partial-Objects>` denotes JSON objects to be retrieved formatted as JSON objects without their corresponding values. For example,

```
{"JSONVersion":}
{"CameraParameters":}
{"CameraStats":}
{"":}
```

The object name may also be an empty string, in which case all JSON objects will be retrieved.

Writing JSON Objects

To write a JSON object issue a GET or PUT request in the form

```
/JSON.cgi?GETSET=1&COMMAND=<JSON-Object>
```

where `<JSON-Objects>` denotes a single JSON object and its corresponding values. For example,

```
{"CameraParameters":{"OutputSize":[1600,1200]}}
```

Some JSON parameters are Read-Only and attempting to change them has no effect. Other JSON parameters are used internally and are not documented here.

JSONP Support

iViewHD also supports JSONP (JSON with Padding). This allows the JSON object to be returned surrounded by parenthesis and an object name such as a function. If you're not familiar with JSONP, here are some links

http://bob.pythonmac.org/archives/2005/12/05/remote-json-jsonp/
http://ajaxian.com/archives/jsonp-json-with-padding

To use JSONP use the following syntax:

```
/JSON.cgi?GETSET=0&JSONP=<JSONP-Name>&COMMAND=<JSON-Partial-Objects>
```

where `<JSONP-Name>` is the JSONP prefix that will be returned with the response. The `JSONP=` designator needs to come before the `COMMAND=` designator. For example,

```
/JSON.cgi?GETSET=0&JSONP=showVersion&COMMAND={"JSONVersion":}
```

would return something like

```
showVersion({"JSONVersion":4096})
```

iViewHD JSON Objects

Below is a list of iViewHD's supported JSON objects.

```
{
    "JSONVersion": number,
    "CameraParameters": {
        "Resolution": number,
        "Crop": [number, number],
        "PanOrigin": [number, number],
        "OutputSize": [number, number],
        "Effect": number,
        "Compression": number,
        "Brightness": number,
        "Contrast": number,
        "Hue": number,
        "Saturation": number,
        "Sharpness": number,
        "Exposure": number,
        "WB": number,
        "VFlip": boolean,
        "HMirror": boolean,
        "FrameRate": number,
        "Save": boolean,
        "Restore": boolean
    },
    "CameraStats": {
        "FramesPerSecond": number,
        "TotalFrames": number,
        "BadFrames": number,
        "BadJPEG": number
    }
}
```