IP Discovery and Connectivity

Purpose

This application note describes how a user can configure the camera for LAN connectivity.

Before installing the camera onto a network you should have:
1. Lumenera Ethernet Camera
2. Power supplied to the interface connector.
3. Ethernet connection to the LAN or directly to your computer.
4. Lumenera "Find Local Cameras" application (optional).

IP Addresses

The Lumenera Ethernet camera has two IP addresses. The first one is configurable to a static or dynamic interface. The second one is a link-local IP address that has been implemented for situations in which a network administrator or DHCP server is unavailable.

IP Address #1	Configuration	Static/Dynamic
	Default	Dynamic
	DHCP Fallback	192.168.1.222
IP Address #2	Configuration	Derived from MAC
	Default	Enabled

Table 1 – IP Address Properties

The link-local IP address of the camera is derived from the cameras MAC address. It is located within the 169.254.93.0 address block. The camera can be configured to disable the link-local IP address.

To determine the link-local address of your camera, use the following equation:

$$Link - local = 169.254.(93 + MAC_{decimal}^{BYTE\#5}).(0 + MAC_{decimal}^{BYTE\#6})$$

Figure 1 – Formula Used to Determine the Link-Local IP Address

An example of this would be a camera with MAC address 00:0B:E2:0B:01:6D. The cameras link-local IP address would then be 169.254.94.109.

Installation Checklist

1. After applying power to the camera, check that the green LED turns on. This verifies a valid Ethernet connection is working with the camera. Also check that the orange LED has turned off to indicate that the camera has finished its boot cycle.

2. If using DHCP, ensure that the Ethernet cable is connected before powering-on the camera.
3. Ensure that your computer and the camera IP address will be on the same subnet.

Discovery

Lumenera provides an application called "Find Local Cameras" that will send a multi-cast DNS message identifying the Ethernet cameras. The reply will contain the camera's IP address, description, and MAC address. This application will not find cameras outside of the host computer's subnet.

"Find Local Cameras" should be included on CD with the Ethernet camera. Please contact Lumenera Customer Support to request a copy.

Another method of discovering the camera on a LAN is to set the host computer's IP address to within the "link-local" address space. With this setting, the computer should be able to connect to the camera directly using the camera's "link-local" IP address.

Discovery using Apple Computers

Apple computers that are equipped with Rendezvous may access the camera by name. The name consists of the camera model name plus the last 6 digits of the camera MAC.

An example Rendezvous name for LE175 1.3Mpixel camera with a MAC address of 00:0B:E2:0A:12:CD would be LE175-0A12CD.

Lumenera Ethernet Camera's may also be discovered by using Rendezvous to search for local web servers. More information on Rendezvous can be found on the apple website (www.apple.com).

Connecting to the Ethernet Camera

The Ethernet camera contains an intuitive web-browser interface that allows the user to configure the image and network settings of the camera. The software API documentation is also located on the camera through the web-browser. The camera can also be accessed through a telnet client.

Troubleshooting

1. Find Local Cameras cannot find the Ethernet camera.

    The Find Local Cameras application sends a multi-cast message to identify the Ethernet cameras on your network. If there is a managed switch, router, gateway, or firewall configured to block multi-cast messages then the application will not find the Ethernet camera.

2. Find Local Cameras application identifies the Ethernet camera and its associated IP address however the computer cannot connect to the camera.

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Ensure that the computer IP address shown through "Find Local Cameras" is on the same subnet as the camera IP address. Try pinging the camera to check that your computer can communicate to the camera over the network.

3. There is no DHCP server running on the network. How do I initially connect to the Ethernet camera if the default settings use DHCP?

    The DHCP fallback IP address is available on the camera if there is no DHCP server present. Add an IP address to your network connection that is compatible to the DHCP fallback (192.168.1.222) or the link-local (169.254.X.X) IP address.

    If there is a router or gateway between the camera and your computer, the DHCP fallback route should be used instead of the link-local route. In this case, the network device should be configured to work with the DHCP fallback route.

    An example for both cases would be:
    - DHCP fallback route: 192.168.1.1/255.255.255.0
    - Link-local IP route: 169.254.0.1/255.255.0.0

4. How do I securely access the camera over the Internet?

    The camera, as shipped, does not have the security required to directly place it onto the Internet and therefore should be placed behind a firewall.

    Port 8080 is configured on the camera as a web-server that does not allow administrative privileges. Make this port available externally from the network to allow access to the camera over the Internet. An example of the HTTP connection would be http://ip_address:8080.

    Administrative access to the camera can be accomplished using secure shell. Make ssh port 22 externally accessible from the network. Then the network administrator should add/change their own password and/or the camera administrative password.

    To access the camera externally, a computer on the camera's network needs to run SSHD. SSHD will listen for incoming SSH requests and facilitate an SSH connection.

    An example camera connection command using SSH is ssh -L 8000:camera_ip:80 sshd_computer where camera_ip is the camera IP address and "sshd_computer" is the name of the computer running SSHD. Once an SSH connection is established, a web-browser can be pointed to http://localhost:8000/admin.html.

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