

# IP Surveillance 101

## Training Guide



**Getting started with IP Surveillance**

**D-Link®**  
FOR BUSINESS



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# IP Surveillance: The Opportunity

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The demand for IP Surveillance is growing fast, creating a lucrative market for IT resellers, system integrators and installers who take advantage of the opportunity.

For your end-user customers, investing in an IP video surveillance system is an equally smart move. Many of today's education campuses, warehouses and businesses have plenty of people and physical assets to protect, so they need high-quality security systems that are comprehensive, flexible and scalable enough to grow with their needs over time. They can't run the risk of having a security incident, only to discover that video footage has not been captured properly.

With security and surveillance moving into the digital world (through IP), the need for networking experts is more crucial than ever before. Whether your customers need to upgrade their old analog system to digital, create a complete end-to-end solution, or simply add new surveillance components, D-Link has the knowledge and experience to help you succeed.

If you want to take advantage of the IP Surveillance opportunity but are just getting started with IP Surveillance, please use this reference to guide your journey. It's intended to provide some basic IP Surveillance knowledge and tips on conducting an on-site assessment, selecting cameras and creating end-to-end IP Surveillance solutions for your customers.

## Why D-Link? We Get Security.

As a global leader in networking, D-Link has over 27 years of expertise developing the highest quality networking solutions to meet the ever-changing connectivity needs for businesses of all sizes. Our Switching, Business Wireless, IP Surveillance, Storage and Network Security solutions, along with our experienced engineering and professional services teams, enable organizations to stay competitive by providing leading-edge solutions with great value. Together, our standards-based technology and excellent quality create highly integrated solutions that are easy to implement. When it comes to innovative solutions that solve real challenges, businesses get more with D-Link.

# Analog Vs. IP

## What do IP and analog CCTV cameras have in common?

Sensor and lens considerations



Camera form factors



Lighting considerations



Physical installation



## How do IP and analog cameras differ?

	Power and cabling (PoE vs. traditional cables)	Scalability (closed vs. scalable)	Configuration (physical vs. web interface)	Resolution and function (basic vs. enhanced)
<b>IP</b>	PoE			
<b>Analog</b>				

## Close-up on Camera Architecture

### Analog CCTV: Closed Architecture

CCTV stands for closed circuit television. Because each CCTV camera requires a coax cable from the camera to the digital video recorder (DVR), this solution has several drawbacks.

#### Drawbacks:

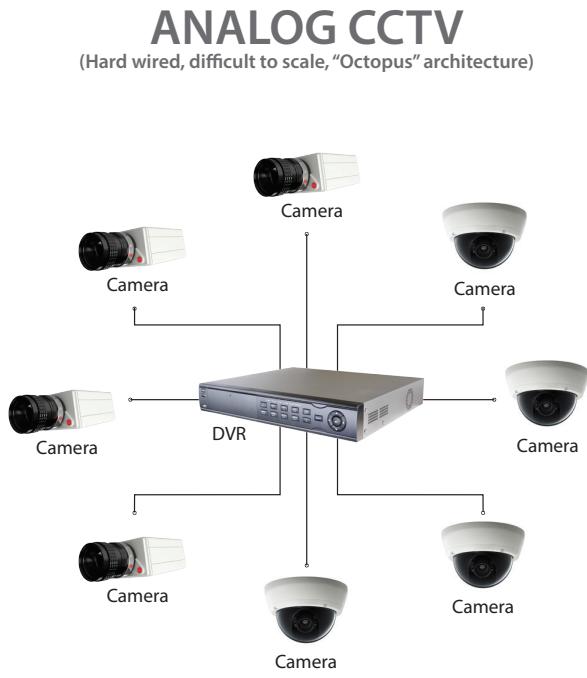
- **Scalability:** It's difficult and expensive to scale.
- **Cost:** Coaxial + Power cable costs more.
- **Management Limitations:** Video management from DVR only, not practical for multi-site operations.
- **Security:** It's less secure because coax cable can be physically breached.

### IP Surveillance: Networked Architecture

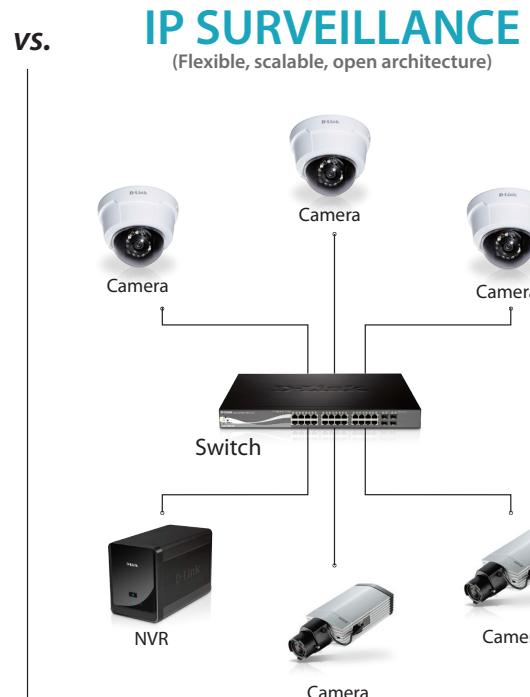
As the name implies, IP surveillance is a network solution, whereby each camera has its own IP address and password. Because this solution is built on a network, it offers several advantages.

#### Advantages:

- **Flexibility:** It's scalable and offers flexible installation and placement.
- **Affordability:** It uses lower-cost CAT 5/6 cabling, which carries power, video, audio, PTZ (Pan, Tilt, Zoom) and event data.
- **Convenience:** Remote viewing and management is natively integrated.



*Fixed number of cameras and storage.*



*Easily scale any installation as your needs and budget grow.*



## Close-up on Camera Resolution

### Analog CCTV: Limited Resolution

Regardless of an analog camera's cost, sensor quality and lens quality, the maximum video resolution is always limited to 704 x 480.

#### Drawbacks:

- **Lack of Scalability:** You can scale down, but you can't scale up.
- **Old Technology:** The NTSC video standard still in use today was designed over 50 years ago.

### IP Surveillance: Scalable Resolution

IP video is digital and not limited in resolution. Digital transmission also allows for audio, motion detection, analytics and PTZ controls.

#### Advantages:

- **More Choice:** D-Link offers 1, 2 and 3 Megapixel cameras, including wide screen HD (offering 720p and 1080p resolution)
- **Quality:** No signal loss.
- **Functionality:** Allows digital zooming
- **Clarity:** 3MP is nine times better resolution than CCTV offers.

# IP Camera Features

## Resolution

A camera's resolution is the number of pixels on the image sensor, measured horizontally by vertically. For example a Full HD 2-Megapixel camera has a resolution of 1920 pixels wide by 1080 pixels high. If you multiply 1920 x 1080, the result is the image resolution, in this case, 2,073,600 pixels or 2 megapixels.

Resolution is one of many factors that affect image quality. The higher the resolution, the more details can be seen in the image. However, other factors can be affected by higher resolution, such as low light performance. Be sure to study the camera's datasheet to see if there is any tradeoff between resolution and low light performance or frame rate.

Resolution is also measured in pixels per foot, which can help define if there is enough resolution and/or the lens is zoomed enough to capture face or license plate details (typically 60 pixels per foot).



## Lux Rating

### What Is a Lux Rating?

Lux is a unit of luminance—a metric unit of measurement that represents the intensity of light. Lux meters (also called light meters) measure the Lux of light falling on specific objects in certain areas or at certain times (e.g., daylight, dark or dusk).

A Lux rating is used on jobs to determine luminance. How low can the light be and still see an image? Ideally, 1/30th or 1/60th of a second exposure time will provide a true Lux reading. You don't want a longer exposure in surveillance because this will result in motion blur.

### What you need to know:

- The lower a camera's Lux value, the more light sensitive the sensor.
- There's no standard for measuring Lux. Each manufacturer does its own testing and specifying (so buyer beware).

## Frames per Second (FPS)

Frames per second or frame rate is the number of images that occur in a second of time. For example, television broadcasts are usually 30 FPS, movies are 24 FPS and animation is 12 FPS. In surveillance, you have a choice of what frame rate to record, anywhere from 1 FPS to 30 FPS. Most cameras are capable of frame rates up to 30 FPS, but that doesn't necessarily mean you need to record at the full 30 FPS. Doing so creates redundant data and consumes excess bandwidth and storage. The average frame rate range falls between 5 and 15 FPS.

### **What you need to know:**

- Most D-Link IP cameras support 30 frames per second.
- Some multi-megapixel sensors have lower frame rates at full resolution and 30 FPS at lower resolutions.
- In most cases, 30 FPS produces redundant information and wastes bandwidth/storage, limiting the number of cameras the video management software (VMS) server can record.
- The average recording frame rate in the security industry is between 5 and 10 FPS.
- One example: Many grocery stores record at 7 FPS. This is sufficient for loss prevention, employee management and slip-and-fall litigation.
- Exceptions for standard FPS include casinos (e.g., gaming tables), which are heavily regulated and require higher FPS recording (30 FPS).

### **Wide Dynamic Range (WDR)**

WDR allows the camera to simultaneously capture detail in both light and dark areas of the scene.

### **What you need to know:**

- WDR is most often needed for interior shots with large windows in the background (e.g., a bank lobby, grocery store entryway).
- One side effect of WDR is less contrast in the image.



### **CMOS Vs. CCD Image Sensors**

Another reason IP cameras are often preferred over analog CCTV cameras is their use of CMOS image technology. The image sensor is essentially a camera's "eyeball." As the name implies, the image sensor converts the captured light of an optical image into an electronic signal. Most digital cameras use one of two types of sensors:

- A Charge-Coupled Device (CCD), used in analog CCTV cameras
- A Complementary Metal-Oxide Semiconductor (CMOS), used in most megapixel cameras

### **What are the differences?**

Image quality is more or less equivalent between the two, but there are some differences:

CCD	CMOS
CCD (charge-coupled device) sensors use a technology, where light striking the chip is contained as an electrical charge in the sensor. It offers:	CMOS (complementary metal-oxide semiconductor) is an active pixel sensor, which contains both a photo detector and an amplifier. It uses this other circuitry to convert the light to a voltage and then to stored data. It offers:
<ul style="list-style-type: none"><li>• Great light sensitivity (less "noise" for more uniform image quality)</li></ul>	<ul style="list-style-type: none"><li>• Improved light sensitivity</li></ul>
<ul style="list-style-type: none"><li>• Higher wattage, exotic voltages</li><li>• No onboard functionality</li></ul>	<ul style="list-style-type: none"><li>• Lower wattage, one voltage</li><li>• Onboard functionality</li></ul>
<ul style="list-style-type: none"><li>• Higher cost</li></ul>	<ul style="list-style-type: none"><li>• Lower cost</li></ul>

### **About D-Link Cameras:**

- D-Link CCD cameras include: DCS-5605, DCS-5635, DCS-6616 and DCS-6818 (all PTZ cameras).
- All D-Link cameras with MP (megapixel or higher) resolution use CMOS sensors.

## Sensor Size

Sensor size is the diagonal measurement of the imaging array of a sensor, meaning the area with the pixels on which the lens is focused. The bigger the image sensor size means the bigger the pixel size, which generally means the more light-sensitive the sensor is. However, the higher resolution the sensor (i.e. the more pixels), the smaller the sensor pixel size is. This means the pixel size is determined by both the image sensor size as well as the number of pixels.

The other important factor of sensor size is using a lens that is designed for that sensor. For example, a lens designed for a 1/4" sensor will not produce an optimal image if used on a 1/3" sensor because you would see black corners on the image because the lens isn't designed to focus on an area larger than 1/4".

### A visual guide to imaging sensor size:

Image Sizes	Formats (Type)	Uses
■	1/8"	Cell phones, web cams, etc...
■	1/7"	Cell phones, web cams, etc...
■	1/5"	Cell phones, web cams, etc...
■	<b>1/4"</b>	<b>IP cameras, web cams</b>
■	<b>1/3.2"</b>	<b>IP cameras</b>
■	<b>1/3"</b>	<b>IP cameras</b>
■	<b>1/2.7" &amp; 1/2.8"</b>	<b>IP cameras, digital cameras</b>
■■	1/2"	IP cameras, digital cameras
■■	1/1.8"	IP cameras, digital cameras
■■	2/3"	Digital cameras, DSLRs
■■	1"	DSLRs
■■■	4/3"	DSLRs

Note: D-Link cameras use 1/4", 1/3.2", 1/3" and 1/2.7" & 1/2.8"

### Sensor size affects two areas:

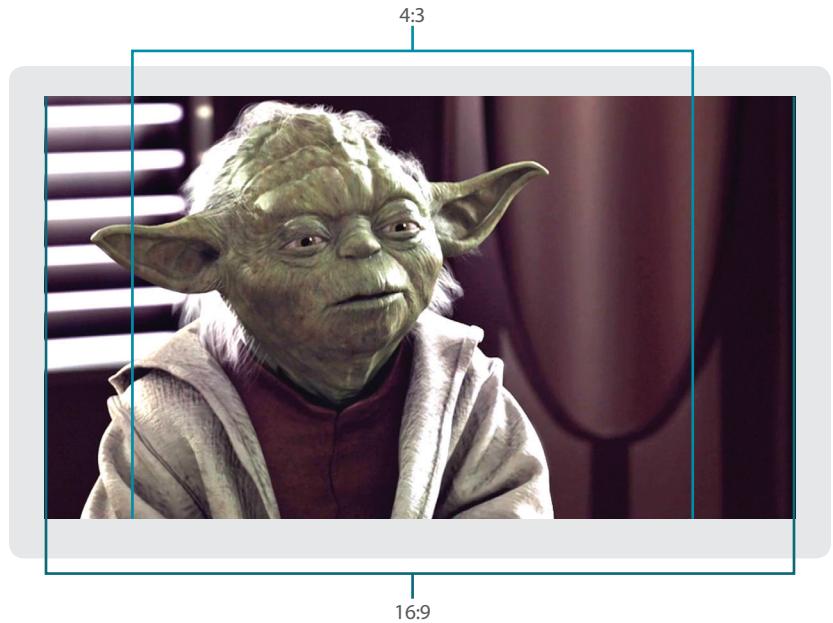
- Pixel size, which affects light sensitivity
- Field of view

### What you need to know:

- D-Link professional camera sensor sizes range from 1/4" to 1/2.7."
- Low-end cameras use 1/5" (e.g., DCS-932L). This size makes the pixel size smaller so it's less light sensitive.
- The larger the sensor, the larger the pixel size.
- Bigger pixel size = more light sensitivity.

## Aspect Ratio

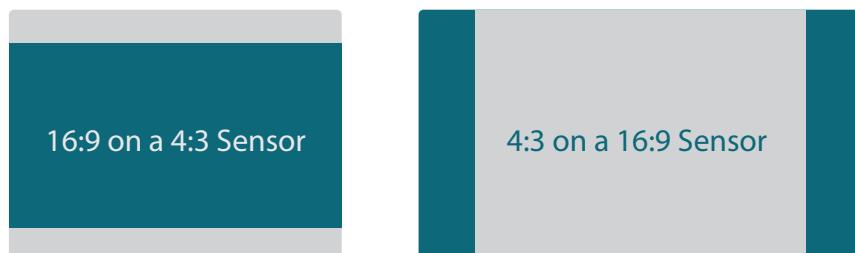
16x9 is the aspect ratio of the widescreen format adopted for HD. 4:3 or 4x3 is the aspect ratio of older CRT-style TVs and computer monitors.



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### What is HD?

- HD = 720p = 1280x720 = 1 Megapixel
- Full HD = 1080p = 1920x1080 = 2 Megapixel



### What you need to know:

- D-Link offers VGA, HD, Full HD and multi-megapixel resolution cameras.
- Most D-Link cameras support both 4:3 and 16:9 aspect ratios.  
The camera simply crops the image to achieve the desired aspect ratio.

# Imaging / Lenses

## Lens Types

Lenses are like “eyeglasses” for our sensor “eyeballs”—and they come in a variety of shapes and sizes. Here’s an overview:

- **Fixed Focal** – WYSIWYG (“What you see is what you get.”)
- **Manual Varifocal** – Consider these lenses the “poor-man’s” zoom. Adjusting the field of view (i.e. zoom ring) means you must manually refocus the lens.
- **Motorized Varifocal** – These lenses are designed for remote lens adjustment via a web browser. They are not designed for duty cycle (continuous zoom-in and zoom-out) These lenses are found on D-Link’s DCS-6511, DCS-6513, DCS-7513 cameras, which provide the convenience of remote lens adjustment without having to physically be at the camera.
- **Motorized Zoom** – These lenses are built into Pan/Tilt Zoom / Speed Dome cameras (e.g., D-Link’s DCS-5605, DCS-5635, DCS-6616, DCS-6618 and DCS-6915).



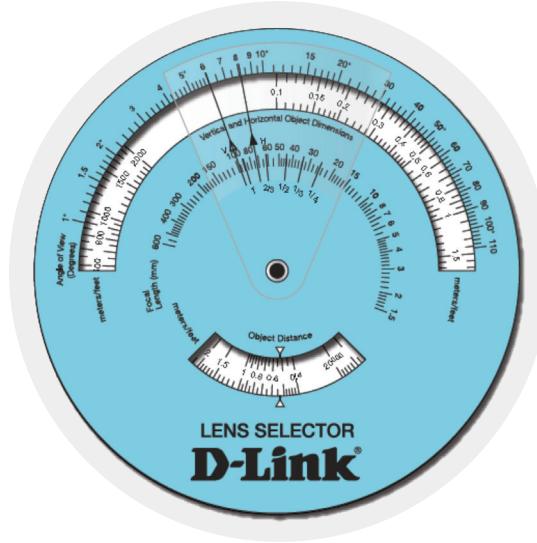
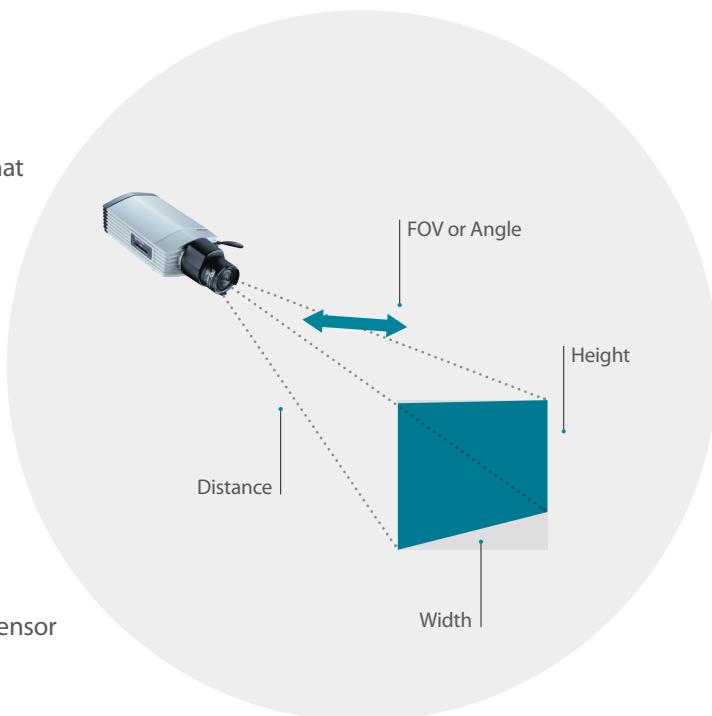
## Field of View

Field of View (FOV), also called Angle of View, is what the camera can see (measured in degrees). The most common FOV measurement is horizontal FOV (HFOV).

### An Example:

Your customer needs to capture license plates from all visitors—and there's only one way in and out. The entrance and exit is 20 feet away from the camera mounting point. The horizontal view width needs to be about 22 feet. What is the focal length they need (mm)?

**Answer:** about a 4mm focal length with a 1/3" sensor (for 62 degrees HFOV).



The D-Link Lens Selector Tool is a great way to quickly determine the proper lens for nearly any situation.

### Need further help with calculations?

Take advantage of any of these resources:<sup>\*</sup>

1. Video Insight FOV and Lens calculators ([www.video-insight.com/Support/Tools/Field-View-Calculator.aspx](http://www.video-insight.com/Support/Tools/Field-View-Calculator.aspx))
2. Online calculator: [www.cctvlenscalculator.com](http://www.cctvlenscalculator.com)
3. IP Video System Design Tool ([www.jvsg.com](http://www.jvsg.com))

If:	Then:
• 1/3" Sensor	• HFOV = 62°
• Lens Focal Length = 4mm	• Width = 110 feet
• Distance = 100 feet	• Height = 82 feet

### Lens Selector Tool Instructions

(also on back of actual tool)

Select either 1/2", 1/3" or 1/4" format size depending on your camera.

1. Align object distance scale according to distance from camera to object.
2. Align focal length of your lens with format indicators (lenses and cameras to be used should be the same format).
3. The object dimension and angle of view of your image can be found under the (H) and (V) bars of your cursor (H=horizontal, V=vertical).
4. Any unit of measure can be used. If you use feet, your answer will be in feet. If you use meters, your answer will be in meters.

\* Disclaimer: D-Link Systems does not endorse or partner with the websites mentioned above. These sites are for example and information purposes only.

## Iris Settings / F-Stops / Depth of Field

An Iris (or aperture) is an opening through which light travels.

An F-Stop is a measure of an iris setting.

- The larger the F-Stop, the smaller the iris (and less light hits the sensor).
- The smaller the F-Stop, the larger the iris (and more light hits the sensor).

Depth of Field is the distance between the nearest and farthest objects in a scene that's in focus.

### What you need to know:

- A large iris produces a small or shallow depth of field.
- A small iris produces a large depth of field.

In addition to a large iris producing a shallow depth of field, a zoomed-in lens (large focal length) further enhances this undesirable effect.



Shallow depth of field is a great effect for photographers, but it's lousy for surveillance.

### What you need to know:

- Most D-Link cameras have either an auto-iris or a fixed-iris lens and are designed to maximize depth of field, which is ideal for security applications.
- Some newer D-Link cameras feature P-Iris, which allows remote precise control of the iris. This is convenient if you want to precisely adjust the depth of field (which is not possible with an auto iris lens).

## Lens Mounts

C and CS-Mounts are industry lens mounts in the security industry. A mount means the threading on the camera that the lens is screwed into. All D-Link box cameras include an installed CS-Mount lens, but you also have the flexibility to remove it and install any other CS- or C-Mount compatible lens.

### What you need to know:

- D-Link box cameras employ an industry-standard CS-Lens Mount, enabling you to pair the camera with any C- or CS-Mount lens.
- It's a great option for extreme imaging requirements, such as telephoto or very wide angle surveillance.
- To install a C-Mount lens on a D-Link box camera, you'll need a C-to-CS Mount adapter ring. All D-Link cameras include this adapter ring.

# Imaging / Day & Night

## Mechanical Infrared (IR) Filter

All Day/Night IP cameras with color sensors need to block IR light in order to properly render color.

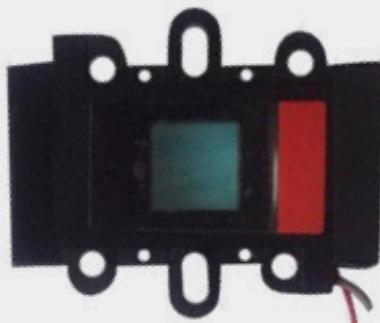
### What you need to know:

- If a camera captures both visible and IR light, the camera is more light sensitive and can be further illuminated with IR LEDs.
- A camera that captures IR light goes into black-and-white mode to avoid issues with improper coloring.

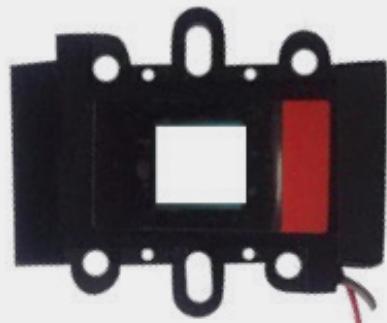
### About Mechanical IR Filters:

- A mechanical IR filter (or ICR) is a device that can move an IR filter in and out of the optical path.
- An IR cut filter is a thin piece of blue or clear glass that's used to filter IR light (letting only visible light through).
- At night, the IR cut filter is moved out of the way and the sensor "sees" both IR and visible light. The camera automatically goes into black-and-white mode to avoid any color imperfections.

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Visible light passes through while IR light is blocked.



Visible light passes through as well as IR light.



## IR Illumination

Infrared or IR Illuminators can be external to the camera or integrated into the camera itself. They are usually IR LEDs.



Integrated IR Illuminator



External IR Illuminator

## Exposure / License Plate Capture

Exposure (or shutter speed) is the amount of time an image (single frame of video) is exposed to light.

### What you need to know:

- It's easy to capture license plate information in the daytime.
- However, using the same camera to also capture readable plates at night requires a little extra camera configuration. You must limit the camera's maximum exposure time (through image settings).

**IMAGE SETTINGS**

Anti Flicker	<input type="radio"/> On <input checked="" type="radio"/> Off
Mirror	<input type="radio"/> On <input checked="" type="radio"/> Off
Flip	<input type="radio"/> On <input checked="" type="radio"/> Off
Power Line	<input checked="" type="radio"/> 60 Hz <input type="radio"/> 50 Hz
White Balance	<b>Auto</b>
Exposure Mode	<b>Customize1</b>
Shutter	<b>Min: 1/10000</b> <b>Max: 1/250</b>
Denoise	<b>20</b>
Brightness	<b>4</b>
Contrast	<b>4</b>
Saturation	<b>128</b>
Sharpness	<b>4</b>

**Reset Default**



Motion Blur due to long exposure (shutter speed)


Overexposed plate due to long exposure (shutter speed)

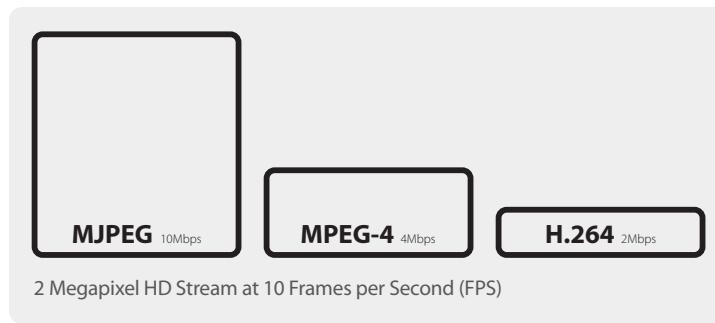
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# Image & Video Processing

## Video Compression

Video compression is a series of mathematical algorithms used to compress video and image data. Uncompressed video data uses an extraordinary amount of bandwidth. Compression is required in order to deploy cameras on a network. Nearly all D-Link cameras support the three most popular forms of video compression:

- **MJPEG** is a series of JPEG images, the same format a digital still cameras uses to compress a photo. The M in MJPEG stands for motion and it's literally a sequence of JPEG images. Although each image or frame is compressed, there is no "video compression" happening, meaning each frame is a standalone compressed still image.
- **MPEG-4** is video compression, meaning the camera generates a reference or "I" frame followed by a set number of changed or "P" frames. The "P" frames represent changes between it and the "P" frame. Only something moving in the scene consumes data. Still parts of the scene don't change and are not duplicated, which can result in significant savings.
- **H.264** is the next generation of the MPEG-4. Like MPEG-4, it is a true video compression and uses I and P frames to reduce bandwidth. It deploys more sophisticated algorithms and is able to produce higher video quality than MPEG-4 at about 50% the bandwidth usage.



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## Image Processing Options

In most scenes, the default imaging settings in a D-Link IP camera are suitable and no customization is required. However, in certain scenes or applications (such as nighttime license plate capture), it may be necessary to have control over imaging features.

A variety of image processing features exist on D-Link cameras, including:

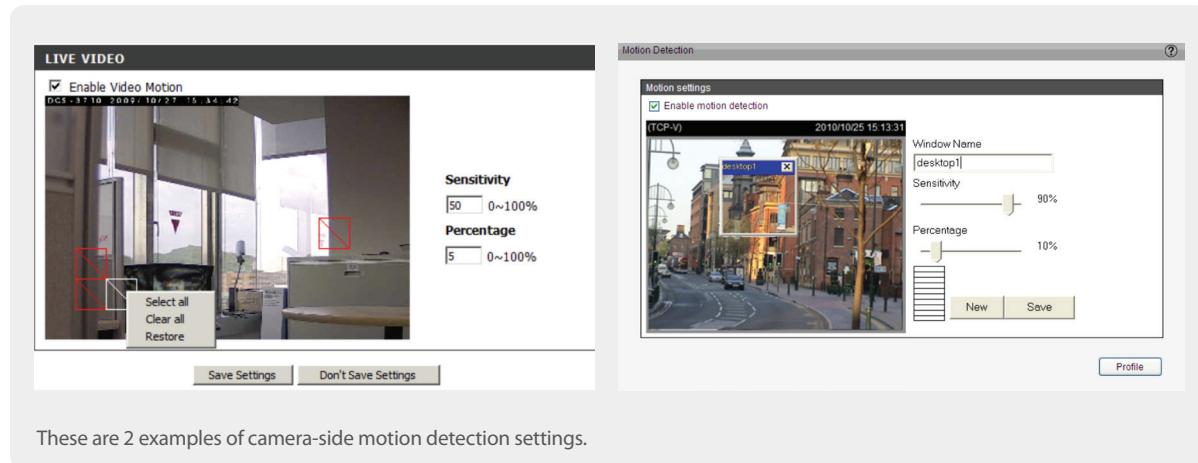
- Shutter speed (exposure)
- Saturation (amount of color)
- Brightness / Contrast (post-processing)
- Color balance (auto or scene-based)
- Time/Text overlay (OSD, on-screen display)
- Privacy mask

## Motion Detection

Motion detection is the measurement of change in pixels between frames.

### What you need to know:

- Sensitivity and percentage of scene are adjustable.
- Areas of interest are selectable.
- Camera side motion detection frees CPU cycles on the VMS, allowing more cameras per VMS server.



These are 2 examples of camera-side motion detection settings.

## Audio

Most surveillance applications are video-only and audio is not required or necessary. However, there is a growing trend in surveillance to include audio, primarily for use in conflict management. Be aware that recording audio has stricter legal limitations compared to video. Always check with local ordinances regarding the recording of audio.

### What you should know:

- Most D-Link cameras support one- or two-way audio.
- Cameras offering one-way audio have a built-in microphone or a microphone input
- Cameras offering two-way audio add a speaker or audio output.
- Some cameras (like dome cameras) require a third-party speaker and microphone.  
(For example, the D-Link DCS-6112 camera has a mini din connection for an external microphone.)
- All audio is half duplex, meaning one direction at a time.
- Audio codec's include G.726, G.711, GSM and AAC.
- Most D-Link cameras use G.726.
- Audio can be disabled on any D-Link camera. This is an important feature since audio recording is regulated more heavily than video recording.

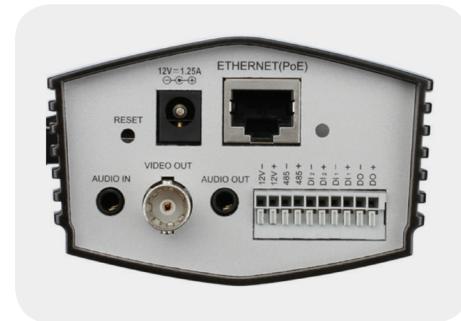
# External Connections

## Digital Input/Output (DI/DO)

Most D-Link cameras support digital input/output.

### What you need to know:

- A digital Input can be used to connect to an alarm system, door sensor, external motion PIR sensor, etc.
- An input can trigger recording of video, emailing of an image, and/or FTP transfer of an image or video.
- Output can be used to connect to a door relay, light switch, etc.

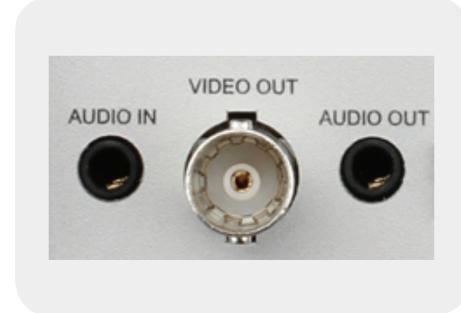


## Audio/Video Out

Most D-Link cameras also support audio.

### What you need to know:

- Input can be used to connect to a microphone source.
- Output can be connected to an amplifier/speaker.
- Some D-Link cameras support analog video output, which is useful when installing/aiming/focusing the camera.
- Video out is also useful for existing public view monitors.



## Power and Reset

All cameras include a reset button. Holding the reset button down for 10 seconds will reset the camera to factory defaults.

### What you need to know:

- Most D-Link cameras support 802.3af PoE (Power over Ethernet). D-Link wireless cameras do not support PoE.
- Most D-Link cameras can also be powered by 12VDC (power supply included). Some also support 24VAC input.



# IP Camera Features

## Temperature Range

A camera's operating temperature determines which environment the camera can be operated in.

### What you need to know:

- Outdoor cameras range from as low as -40°F to as high as 122°F.
- Indoor box cameras can be used outdoors with the addition of an outdoor enclosure.

## Weatherproof Rating

Outdoor cameras are weatherproof rated for water and dust ingress.

Higher rating values demonstrate better protection.

### What you need to know:

- Most D-Link outdoor cameras have at least as high as an IP66 rating.
- The first number stands for dust ingress. (Six is the highest value and means "No ingress of dust; complete protection against contact.")
- The second number stands for water ingress. (Eight is the highest value, meaning "submersible." A six rating means "Water projected in powerful jets [12.5mm nozzle] against the enclosure from any direction shall have no harmful effects.")

### Understanding Weather Rating Codes

#### 1st Digit – Protection Against Solid Objects

- |          |                                               |
|----------|-----------------------------------------------|
| <b>0</b> | Not protected                                 |
| <b>1</b> | protected against objects greater than 50mm   |
| <b>2</b> | Protected against objects greater than 12.5mm |
| <b>3</b> | Protected against objects greater than 2.5mm  |
| <b>4</b> | Protected against objects greater than 1mm    |
| <b>5</b> | Dust protected                                |
| <b>6</b> | Dust-tight                                    |

#### 2nd Digit – Protection Against Water

- |          |                                                            |
|----------|------------------------------------------------------------|
| <b>0</b> | Not protected                                              |
| <b>1</b> | Protected against vertically dripping water                |
| <b>2</b> | Protected against direct sprays up to 15 deg from vertical |
| <b>3</b> | Protected against direct sprays up to 60 deg from vertical |
| <b>4</b> | Protected against direct sprays from all angles            |
| <b>5</b> | Protected against low-pressure water jets                  |
| <b>6</b> | Protected against high-pressure water jets                 |
| <b>7</b> | Immersible in water up to 1m                               |
| <b>8</b> | Immersible in water beyond 1m                              |

## Vandal proof Rating

Outdoor cameras also carry a vandal proof rating—an international numeric classification for the degrees of protection provided by enclosures for electrical equipment against mechanical impacts. Again, higher numbers convey better protection.

### What you need to know:

- IK10 is the highest possible rating.
- Nearly all D-Link outdoor cameras have an IK10 rating.

## Form Factors

D-Link cameras come in a variety of physical form factors, each one designed for specific applications and locations.

Cube Cameras				Bullet Cameras				
								
DCS-2210	DCS-2230	DCS-2310L	DCS-7010L	DCS-7110	DCS-7413	DCS-7513		
Dome Cameras (outdoor)		Dome Cameras (indoor)						
								
DCS-6210	DCS-6510	DCS-6511	DCS-6010L	DCS-6111	DCS-6112	DCS-6113		
Box Cameras				PTZ & Speed Dome Cameras				
								
DCS-3010	DCS-3112	DCS-3710	DCS-3716	DCS-5605	DCS-5635	DCS-6616	DCS-6818	DCS-6915

## Cable Management

Most D-Link outdoor cameras offer a form of cable management, which protects the cable from the elements and vandalism.



## Accessories

D-Link includes a variety of accessories for its camera line, including wall mounts, ceiling mounts and outdoor enclosures.

Box Camera Enclosure	PTZ Enclosures	Outdoor Power Supply						
								
DCS-55	DCS-71P	DCS-71W						
Mounts								
								
DCS-32-2	DCS-32-4	DCS-33-1	DCS-33-2	DCS-33-3	DCS-33-4	DCS-34-2	DCS-34-3	DCS-35-1

# Network Video Recorders / Storage

For effective storage of IP surveillance video, D-Link offers network video recorders (NVRs).

## DNR-322L Network Video Recorder

- It's cloud-enabled: You can remotely view cameras with a Smartphone, tablet or web browser
- It offers apps for iOS and Android devices
- Supports up to nine D-Link cameras
- Features two drive bays (up to 8TB of storage)



## DNR-326 Network Video Recorder

- This professional NVR is ideal for multi-site retail deployments
- Supports up to nine D-Link cameras
- Offers third-party camera support
- Supports multi-site client software
- Features two drive bays (up to 8TB of storage)



## DNR-312L Standalone Network Video Recorder

- Records up to 4 D-Link IP Cameras
- Supports up to 4TB
- Auto Camera Detection
- HDMI Out
- Remote Access via mydlink.com Portal and Mobile Apps



## D-Link NVRs At-a-Glance

	NVRs		
	DNR-312L	DNR-322L	DNR-326
Description	1-Bay Standalone mydlink NVR	2-Bay mydlink NVR	2-Bay Professional NVR
Supported IP Cameras	D-Link	D-Link	D-Link, Axis, Panasonic, Sony, Mobotix, Arecont Vision, IQinVision, Cisco and ACTi
Channels	4	9	9
Recording Performance	Up to 120 FPS @ HD 720p	Up to 270 FPS @ HD 720p	Up to 270 FPS @ HD 720p
Record on Camera Motion Detection	Yes	Yes	Yes
HDD Bays	1 x 3.5" SATA	2 x 3.5" SATA	2 x 3.5" SATA
Max Capacity	4TB	8TB	8TB
Network	1x GigE LAN Port	1x GigE LAN Port	1x GigE LAN Port
Raid Levels	N/A	Single, RAID 0, RAID 1, JBOD	Single, RAID 0, RAID 1, JBOD
mydlink Cloud Enabled	Yes	Yes	No
Supported Compression	H.264, MPEG4, MJPEG	H.264, MPEG4, MJPEG	H.264, MPEG4, MJPEG
Auto Camera Detection	Yes	Yes	Yes
Digital Input/Output	No	No	1/1
Monitor Out	HDMI	No	No
Smart Search	No	No	Yes
Multiple NVR Management/Viewing Client Software	No	No	Yes

# Video Management Software (VMS)

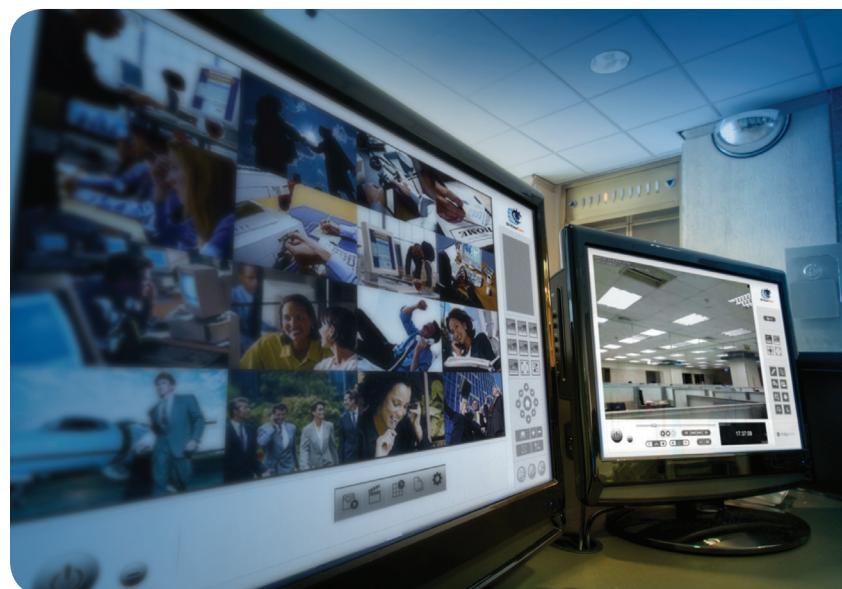
Video Management Software, or VMS, is the heart of any IP surveillance system. It's what is used to view the cameras and playback their live video, as well as manage user account, change camera settings and more. The VMS is the primary visual interface your customer will use with their surveillance system.

## What you need to know:

- D-Link's unique VMS is called D-View Cam, and it's included free with each D-Link IP camera.
- It supports up to 32 D-Link cameras.
- There's no licensing fee.
- It's designed for basic VMS applications and offers core VMS functionality.

In addition, D-Link IP cameras also support a variety of third-party VMS partners, including:

- Video Insight
- Milestone
- NUUO
- e-Watch
- OnSSI



VIDEOINSIGHT

OnVIF

OnSSI  
Intelligent IP Video Surveillance



# Before the Site Survey: Questions to Ask End-Users (And What You're Hoping to Learn)

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Note: A master worksheet containing these questions has been included with this resource guide. This worksheet can be copied and used during interviews with prospective customers to gather information before you conduct a physical site survey.

## **What is the goal of the surveillance system?**

(Here you want to learn the intended purpose and use of the customer's new system. Is it to prevent vandalism, theft, employee theft or litigation? Finding out the system's purpose will help you not only with camera placement, but also camera selection. Also, for certain applications, specific frame rates and recording lengths might be required.)

## **Will someone be monitoring the cameras live?**

(This will apply to larger businesses or organizations that have particular needs, such as big-box retail stores with dedicated loss prevention teams, a college campus with campus safety officers, or a manufacturer aiming to monitoring quality control and employee theft. This question will help you determine what this organization might need in terms of a workstation and also if PTZ cameras are needed.)

## **Do you currently have a surveillance system in place? If yes, is it analog or IP?**

(It's important to find out what (if any) surveillance system the customer already has in place. If they already have an IP system in place, are they looking to expand it or replace it? If you're tying into an existing system with different cameras, the NVR/VMS will need to be compatible with the other cameras. Also, you'll need to determine the power requirements of the cameras as well as cabling.)

## **What physical areas in your facility / facilities are you most concerned about?**

(This question will help you identify "hot spots" of activity. Once these areas are identified, you might suggest placing additional cameras to make sure you capture every angle of the room or area. If the concern is litigation, you might suggest a camera with a higher frame rate. You will also want to ask about lighting conditions during the day and at night to help determine what type and placement of cameras is needed.)

## **How many rooms/areas do you need to cover with surveillance?**

(This will help you determine the total number of cameras, switches and storage solutions.)

## **How many entry/exit choke points are in each room?**

(Entry and exit points are crucial in establishing a crime. You want to be able to see if a suspect forced entry and caused any damage. Also, you will be able to capture video footage of the suspect(s) removing items from the location. Smaller businesses may only have budget for a few cameras and, if so, the entry/exit areas will always be a priority.)

## **How many entry/exit choke points in the parking lot?**

(If the suspect(s) are arriving at the location via a vehicle, your cameras want to capture vehicle license plates, vehicle descriptions, and possible identification of additional suspects. Having cameras pointed at the entry/exit points will enable you to capture that crucial information.)

**What time of day is the most problematic? (Day or night?)**

(If all of your customers' problems arise during the day, the customer may not need more advanced night capabilities, thus reducing their overall costs.)

**Where is your current network setup?**

(This question will help you determine where to place switches, as well as the amount of cabling required to connect each camera.)

**Who is the main contact that manages your network?**

(If you are not the one who installed your customer's existing network, it's important for you to have that person's contact information so you can coordinate your installation and configuration with the existing setup.)

**Are your rooms pre-wired with Ethernet?**

(If your customers' rooms are pre-wired, you may not have to run new Ethernet cables to the rooms. This will also depend on whether or not the rooms are being used and the specific placement of the cameras.)

**How many days do you require for recording, if any?**

(This question will help determine whether there are any required or mandated recording times. If your customer doesn't have any recording mandates, you'll need to recommend a recording time based on their needs. Recording times are typically one to two weeks. This question will also help you determine how much storage is needed.)

**Do you have access to blueprints or a building layout, preferably electronic?**

(Every location is unique. The more information you can gather, the better prepared you will be. With this information, you may be able to shorten your installation time and lower your costs. Always try to obtain as much information as you can about the job, the building and the surrounding area before the site survey.)

# Conducting a Site Survey

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Once you've gathered some preliminary information (using the end-user questions), you can begin to create a preliminary design that addresses your customer's top challenges. This rough plan will be helpful when you visit your customer's facility for the on-site assessment because you'll have a general idea of the layout and design.

On larger IP Surveillance projects, a site survey is almost always required. On smaller projects, you may be able to achieve your goal with simply a facility blueprint and some phone/email communication, but quite often, the end user or integrator will prefer a site survey, even for smaller projects.

## **What to bring to your site survey:**

- Questionnaire (confirm information acquired)
- Notepad
- Measuring tape
- Pedometer or rolling measuring device (to measure linear distance)
- Digital camera
- Site survey form (provided)

## **A Few Tips:**

### **Bring a digital camera to take sample images from proposed locations.**

Although a cell phone camera is acceptable, you'll get more information from a camera with an optical zoom lens. This will help mimic the field of view the customer requires. The focal length information is stored with the JPEG and can be useful in calculating the proper lens focal length for a surveillance camera.

### **Pay attention to choke points.**

Any area where people or vehicles enter or exit an area is considered a choke point. Examples include doorways, parking lot entrances/exits, and tops/bottoms of escalators. Choke points are critical to identify for two reasons:

1. People or vehicles have to pass through this area.
2. A properly positioned camera on the choke point can capture far more detail than an overview camera.

### **Note areas of interest.**

Areas of interest can include warehouses, office areas, parking lots and dining rooms, etc. Depending on the assets that need to be covered and the amount of detail required, the cameras can either be overview cameras or cameras meant to target smaller, more specific areas.

Remember situational awareness. In the context of IP Surveillance, this means an entire area can be viewed or reviewed with a single camera—usually a 360°/180° camera. A situational awareness camera is usually augmented with cameras zoomed in on choke points and specific areas of interest, in order to capture enough detail for identification.

# Sample Site Survey Assessment Forms

**D-Link IP Surveillance Site Survey Assessment Checklist**

Take and Use this checklist during the physical site survey at your customer's facility. Please make copies of this form and use as needed if you conduct your walk-throughs of each property. This form is meant to help you collect the information you need to configure your IP Surveillance system layout. It is not a definitive list of all the questions you may have in designing your job layout.

**Customer Information**

Customer name	Address	City	State
Phone			
Fax			

**Project Background**

Is there an IT person on site to consult with?  Yes  No

What is the customer's primary objective? \_\_\_\_\_

Is this project part of a larger project?  Yes  No

Is there an existing data network infrastructure that can be utilized?  Yes  No

Are there other building buildings?  Yes  No

Is it free?  Yes  No

Are there equipment closets available for your installation?  Yes  No

**Cameras Required (Quantity)**

Indoor: Fixed Dome  Box  PTZ  Bullet  
 Pst:  Yes  No

Outdoor: Fixed Dome  Box  PTZ  Bullet  
 Pst:  Yes  No

Lens: 2.8-12mm  3.5-8mm  5-50mm  
 Will the cameras need to be recessed?  Yes  No  
 Provide server?  On NVR

If recording is required:  
 How many days needed? \_\_\_\_\_ How many total FPS? \_\_\_\_\_  
 Compression format:  H.264  MP4  H.265

**Resolutions:**  
 1280x720  1280x480  1080P (1920x1080)  
 1080P (1920x1080)  720P (1280x720)  4MP (2560x1440)

**Customer Information**

Customer name \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**Cameras**

Will there be any wireless cameras? (If yes, insert quantity.)  Yes  No  
 Will any cameras need additional lighting?  Yes  No  
 Does the calling need to be plenum?  Yes  No  
 Will the network need to use fiber optic cable?  Yes  No  
 If so, what type of fiber optic cable?  Singlemode  Multimode

**Registration**

Is this project a design build?  Yes  No  
 Is this project a "meet competition"?  Yes  No  
 Does the project have specific requirements?  Yes  No  
 Are you a D-Link partner?  Yes  No  
 Are you certified on any recording software?  Yes  No  
 If so, which?

**Accessories (Insert quantity needed)**

Trunks  Patch panels  Patch cables   
 Wall jacks  Splitters

**Customer Information**

Customer name \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

**Before the Site Survey: Questions to Ask Prospective End-User Customers**

Use these questions to guide your early conversations with prospective end-user customers. Answers to these questions will help you better prepare for your on-site Site Survey Assessment and help you formulate a rough IP Surveillance layout design. Copy this worksheet as needed for multiple conversations.

What is the goal of your surveillance system?

Will someone be monitoring the cameras live?

Do you currently have a surveillance system in place? If yes, is it analog or IP?

What areas are you most concerned about?

How many rooms/areas do you need to cover with surveillance?

How many entry/exit points are in each room?

How many entry/exit points in the parking lot?

What time of day is the most problematic? (Day or night?)

Where is your current network setup?

Who is the main contact that manages your network?

Do you have an existing wireless network in place? If so, do you currently have any wireless cameras?

Are your rooms pre-wired with Ethernet?

How many days do you require for recording, if any?

Do you have access to blueprints or a building layout, preferably electronic?

**D-Link**  
FOR BUSINESS

**Master Site Survey Assessment Forms** have been provided with this resource guide. Please make copies of these forms and use as needed as you conduct your physical Site Survey.

## Installation Tips

Unlike other network products, IP cameras include some additional installation changes.

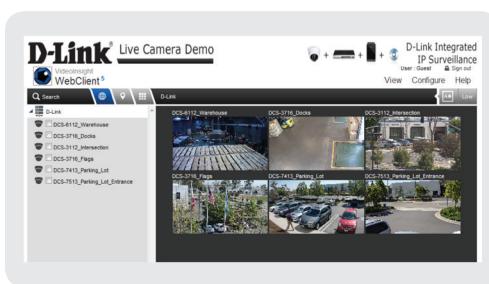
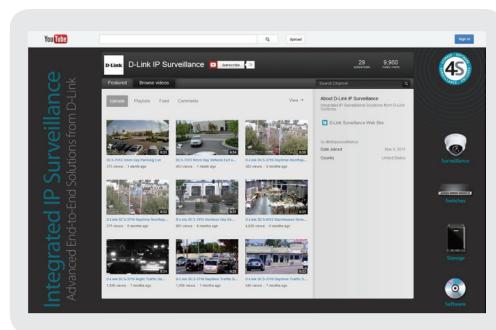
### What you need to know:

- Indoor camera locations are usually located on the ceiling or on a wall near the ceiling. For a standard office building, the installation will most likely only require a ladder. For larger buildings like a warehouse, gymnasium or cafeteria, a scissor lift may be required. For high ceilings, suspending the camera at the opposite end of ceiling-mounted conduit is required in order to achieve proper camera placement.
- Outdoor camera locations are usually located on an exterior wall, rooftop or light pole. Depending on the height and location, a scissor lift or bucket truck may be required.
- Depending on the camera model, certain lens adjustments (e.g., focal length, focus) will need to be made at the camera, which means a laptop or tablet will need to be used for visual feedback. Another option is to use a phone or radio and communicate with someone else viewing the live video. However, this is not the preferred method because it can be time-consuming. A camera with a remotely controllable motorized lens can be a real time saver here.

# Additional Resources

## D-Link's IP Surveillance YouTube Channel

To see real-world surveillance recordings from various D-Link IP cameras, be sure to check out our YouTube channels at <http://youtube.com/dlinkipsurveillance>. Also included are tutorials and informational videos relating to IP Surveillance.



## D-Link's Live Camera Demo

To see D-Link IP cameras live in action, we offer a publicly accessible demo web page at <http://vi.dlink.com>. This demo includes the ability to digitally zoom as well as play back video.

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## State Licensing Requirements

Be aware that some states have licensing requirements. To see information for your state visit [www.nlvca.org/licensing](http://www.nlvca.org/licensing)



## D-Link Technical Support

Call or visit us online for more information on the complete line of D-Link IP Surveillance solutions.

[ipsurveillance.dlink.com](http://ipsurveillance.dlink.com)

888.331.8686 | Email: [getmore@dlink.com](mailto:getmore@dlink.com)



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