

## Best Practices for Surveillance Installation

This overview gives those new to surveillance a better understanding of how to design, sell, and install a system.

### Before You Begin

First, interview your customers to understand their expectations. These questions help you understand what goals you need to accomplish.

- What do they want to see?
- What level of detail do they want?
- What are they willing to compromise on?

Next, analyze the scene. With this information, you can figure out how best to meet the customer's needs.

- Account for the environment, including field of view.
- Check the likely lighting level for both day and night.
- Can you eliminate certain areas from surveillance?

Taken together, this information tells you how many cameras you need, what types are best suited, how to position them accounting for angle, height, and zoom, and how to configure them to meet your client's expectations.

### Camera Styles

Cameras come in three forms: bullets, domes, and turrets. Dome cameras are the only ones that are vandal-proof—they can't be re-aimed without taking the camera apart—while bullets and turrets are easier to install and maintain.

Aside from that, there are only minor performance differences inherent to the various forms (slight variation in field of view, etc.). Really, for your customer, the choice is primarily about aesthetics.

Also, understand the purpose of each camera model within a product line. Choose the proper camera for each purpose. Within the Luma IP camera line:

- 110-series camera are budget friendly, offering 2MP resolution, without Starlight
- 310-series cameras are best for close shots (installed by a door). They are 2MP cameras and have Starlight.
- 410-series cameras are budget friendly and offer 8MP resolution, without Starlight.
- 510-series are 4MP cameras, with Starlight and a motorized varifocal lens.
- 710-series are 8MP cameras, with Starlight, a motorized varifocal lens, and a heater.

### Understand the Lenses

Each lens has a focal length. The longer a camera's focal length, the longer the range of that lens. For any camera, its focal length can be converted to its effective range quite easily. A camera with a focal length of X mm can see

- behavior at 2X yards
- features at X yards
- details at (X/2) yards

Thus, a camera with a short 5mm focal length could see that someone in your yard

- was scratching their chin from 10 yards away,
- had a red goatee from 5 yards away, and
- wore small round glasses from 2.5 yards away.

The side effect of focal length is that cameras with a larger focal length have a narrower field of view. Note that the focal length of varifocal lenses changes with zoom.

Also, note that cameras with 3MP and 5MP resolutions do not provide video in letterbox format; they have an aspect ratio of 4:3. If you intend for your surveillance system's monitors to use a letterbox (16:9) aspect ratio, you are better off using 2MP or 4MP cameras to avoid image clipping or distortion. Thus a 2MP camera operates natively in full HD resolution and fits your 1080p television perfectly.

## Installation Basics

Ensure each camera is grounded to avoid ground-loop interference. This is especially important when mounting a camera on a metal building.

For outdoor installation, place the camera between 10 and 30 feet off the ground, depending on need.

For indoor installation, we recommend 6 to 13 feet off the ground.

With specialty applications like narrow halls or side yards, rotate the lens to give you a taller view, and use the recorder's or camera's software to reorient the image to an upright state.

Avoid condensation by adding a new silica pack to the camera, and ensure that the gasket and caulking provide a good weathertight seal.

When installing a dome on a wall with no eaves or other overhead covering, ensure that any overhead lighting won't reflect off the interior of the dome surface and into the lens.

## Cleaning Lenses and Dome Housings

Camera lenses (and dome housings) should be treated as more fragile than eyeglasses, because while our brains can compensate for our eyes' blind spot by filling in details, a recorder cannot compensate for a scratched or dirty lens.

Do not manually wipe dirt from the lens; doing so actually grinds the dirt across the surface of the glass, causing scratches. Instead, use compressed air or water to get rid of dirt granules in a safe manner.

Microfiber and similar cloths are likewise abrasive. To avoid damage, only use a dry eyeglasses cloth or a disposable eyeglass wipe when cleaning a lens.

## Extra Dome Considerations

Since they have a protective glass as well as a lens, dome cameras require extra attention.

Do not discard the rubber foam gasket that is mounted on the front of the lens. It is designed to reduce glare.

During installation, do not remove the protective plastic that covers the dome until you have finished installation and aiming, and have secured the dome cover in place. The plastic helps to prevent the dome from getting scratched by a tool, the wall, or whatever.

After installing and aiming the camera, be sure that the gasket over the lens is aligned properly and does not cover the IR emitter.

After installation and alignment, clean the inside of the dome carefully; the gasket may have rubbed against the inside of the lens and left a mark.

## Motion Considerations

Motion detection is most effective when the subject is crossing the camera's field of view from side to side. Motion detection is less effective when the subject is likely to be approaching the camera head-on. Take this into account when positioning your camera.

Also, remember that motion detection cannot tell the difference between "normal" environmental motion and the movement of an intruder. If there are ferns waving in the camera's field of view, the camera will log them as moving objects. Draw your motion-detection areas carefully to avoid natural movements caused by wind and the like. This helps eliminate false positive motion events.

## Infrared Considerations

If you are installing a dome, do not discard the foam lens gasket. It is an essential part of the camera, and minimizes the reflection of the camera's own IR emitters.

Ensure that you clean the dome very well, using proper procedures. Scratches, dust, and other imperfections on the dome can interfere with the camera's performance. This effect is much greater at night when the IR kicks in. Also clean the area around the camera. Webs and other debris can reflect infrared and ruin the image.

Do not use a zoom lens as a wide-angle camera. Zoom lenses typically have IR emitters that are powerful and focused; when used as a wide-angle lens, this creates an infrared hot spot in the center of the image.

Avoid soffit glare by positioning your camera so that the soffit is not visible in the view. If adjusting the aim cannot remove the soffit from view, use an angle or extension mount to move the camera away from the wall or roof.

With wide-angle lenses, use other illumination or provide supplementary IR illuminators for distant objects. If there is sufficient lighting, you can turn off the camera's IR in the camera's settings. This may result in a better overall picture.

## Recommended Settings

Due to network bandwidth concerns, you must often choose between higher frame rate, better resolution, or video quality (bitrate). In most cases, it's better to get fewer frames at higher resolution. Standard installs typically use a frame rate of 8–12 fps and maximum camera resolution. Our recommended bitrate varies by camera resolution, as shown here:

Resolution	Main Stream	Sub Stream
4MP	4096Kbps	1024Kbps
2MP	3072Kbps	512Kbps

It's easiest to change the frame rate and bitrate of the camera **before** adding the camera to NVR. If you connect the camera to NVR first and then adjust the bitrate, remember to adjust the bitrate of event stream as well.

## Security Settings

The internet of things means that more gear is vulnerable, which has spurred an increasing number of attacks. **Change the account passwords from their default settings; leaving them at their default value is a security risk, and you may be locked out of your own system by hackers.** Use a password that cannot be found in a dictionary (like "security") or any generic entry (like "p@ssword"). Longer passwords that merge two or more words are much more secure (for example, "JohnsonLuma").