



### Micro Local Cameras – Best Practices

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With an investment in one or more tower and rooftop cameras (we call them Micro-Local cameras there are going to be some high expectations from viewers as well as station management. Adding reliability and security to these cameras doesn't have to be complicated. There are a few things you can do to make sure your teams get everything they expect from your investment by following a few suggestions we will present in a series of articles called Best Practices. Today's White Paper:

#### Best Practices - Camera Settings

Camera used as Micro Local Cameras are typically manufactured for the security market. The objective of a security camera is different from those of cameras built to use on live television.

There are several features and settings that work well in a security setting, are not optimal for an on-air camera. Unfortunately, since most of these cameras are sold for security purposes – the factory defaults are always best for security use – not on-air.

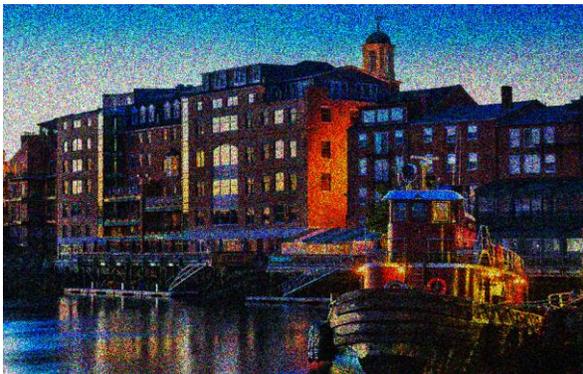
Let's review a few of the most critical:

#### Gain

Cameras that allow amplification of dark imagery are, by default, going to be set too high for on-air use. Since security is the default goal – it's important that a camera produces *something*, even when it is very dark. At Videstra we like to say: *Dark is better than noise*. A camera with a high-gain setting will introduce noise into dark video. Sometimes a lot of noise. It will depend on the scene, but a camera set to allow for high gain can produce very objectionable noise.

On Axis cameras the default setting for a Q6135-LE is 51 db. This is very high. We recommend reducing this to either 9 or 12(max).

...we like to say: Dark is better than noise.



Low Light/High Gain (51 db)



Low Light/Low Gain (9 db)

Perhaps you can appreciate that the noise isn't an objectionable element (within reason) in an image that's captured someone breaking into a bank vault.

The kind of noise in the *high gain* image above, however, will not be acceptable on air – even though more detail is visible. When it comes to live video of a skyline, a sunset, or an iconic building, our mantra of “*Dark is Better Than Noise*” is an important one to consider. In the *low gain* image above the image is indeed dark, but relatively free of noise. Although dark, the low noise image is far more acceptable than the noisy one for on-air use.

For general use we always recommend keeping the gain on Micro-local camera set very low. Almost all brands have gain settings – and whenever possible set them low.

Keep gain low

The gain setting on newer cameras is really the *maximum* amount of gain the camera is permitted to use – it is not a hard setting. The camera may look very clean and noise-free most of the time. Only during low light settings will the gain “kick-in” to make the video look poorly.

### IR Filter

All security cameras employ an IR filter. Because video image sensors are very sensitive to infrared (IR) light – manufacturers install IR filters to prevent the IR light from overwhelming the sensor. Under normal lighting conditions there is a great deal of IR light in our environment. Of course, we can’t see this light as it is outside of the visible light spectrum. Lots of IR light can make it difficult, or impossible, for an image sensor to work well in the visible light spectrum. But there is an upside to a sensor being able to “see” IR light. At night, long after the sun has gone down there is still plenty of IR light. This gives a sensor the opportunity to see perfectly well – *even in total darkness*. But there will be no color. Our perception of color is totally dependent upon the visible light spectrum. At night if the IR filter is removed then the sensor can see everything clearly – but in black and white.

By default, security cameras IR filters are “flipped” out of the way at night. IR Filters will typically have three settings: On, Off, Automatic (in Bolin cameras these are Day, Night and Automatic). They are normally set to automatic. For on-air use this should be set to ON or DAY (meaning the IR filter is always on). This way you will always get full color – or the best the light can provide.

### Low Shutter Speed

Many cameras have a setting to *Allow Low Shutter Speeds*. This gives the camera permission to two things:

1. User shutter speeds lower than 1/30<sup>th</sup> of a second
2. Reduce the frame rate to reduce the possibility of image blur due to any shutter speed slower than 1/30<sup>th</sup> of a second (e.g., 1/15<sup>th</sup> of a second)

The decision is up to you; however we do recommend you allow a shutter speed to go as low as 1/15<sup>th</sup>. This gives the camera 100% *more* light than a slowest speed of 1/60<sup>th</sup> of a second – and the drop in frame-rate will likely go unnoticed.

### Zip Stream

Security cameras often have features that are “smart” and reduce resolution on parts of the image that have no motion. In Axis this is called “ZipStream™” and is designed to favor higher resolution around any part of an image area that is moving. Ostensibly this preserves details in things like faces, vehicles, license tags, etc. While this is desirable when recording hours, or days of security footage – the loss of resolution in static parts of an image can make for soft video of buildings, trees, and scenery – important aspects of video used on-air.

## Auto Focus

For a PTZ camera always set the system to Auto Focus. You may select fixed focus (or manual) for a fixed camera. If the camera has a setting to skew auto focus for “distance” select that. The distance setting will help prevent the camera from focusing on raindrops that may cling to the dome or front-window of the camera.

## White Balance

There is rarely a need to select anything than automatic. In some cities where there may be a mix of high-pressure sodium vapor (warm) and mercury vapor (very cold) light you may find a manual selection results in better color rendition. The Videstra native controls allow various white balance settings, but you must remember to return the setting to automatic for when the outdoor lighting changes – such as sunrise.

## HDR

This is a matter of taste. The Videstra native control for Axis and Bolin cameras allows you to turn this on or off, but both cameras do allow for various levels within their own web-based UI. Too much HDR and your video tends to look almost cartoonish – and often *washed out*.

Below is an *exaggerated* example of HDR run-amok. The image on the left has a very small amount of HDR applied while the image on the right has the HDR level set to ... ridiculous.



The amount of appropriate HDR will depend on many factors such as subject, lighting and personal taste. For some *any* HDR can be too much.

Another point about HDR – at least two images must be blended for each frame the camera delivers. This means the camera takes two exposures, blends them, and send the frame. It must do this at least 30 times a second for full frame-rate video. This puts a strain on the camera CPU – and in fact turning HDR on in some cameras will limit other features.

## WAGL It

This is one of my favorite acronyms – and when it comes to finding the right camera settings it applies perfectly. **WAGL** stands for **Wander Around, Get Lucky**. This is simply the process of exploring all the menu and setting options a camera has to offer.