





(illumination) environments, and this understanding has been transferred to IP cameras. However, thanks to the fast development of CMOS sensor technology, the image quality gap between CMOS and CCD sensors is decreasing. In fact, CMOS sensors provide better quality images in some environments, such as strong light environments, since CMOS sensors eliminate much of the smear and blooming effects inherent with CCD sensors. In the near future, we can expect CMOS sensors used with IP cameras to provide a better image quality than CCD sensors.

## Configuring your camera for different environmental conditions

Let's take a look at how to get the best image quality possible from your IP camera. Although good cameras certainly have the potential to produce good quality images, knowing how to configure your camera for various environments can make a big difference in image quality.

### Situation 1: When shooting in bright and high illumination environments, such as in direct sunlight.

#### ***CMOS sensors provide better light inhibition***

A CMOS sensor's light inhibition function will make objects more visible, and eliminate much of the smear and blooming effects inherent with CCD sensors.

#### **CCD camera: with smear**



#### **CMOS camera: without smear**



#### ***BLC and WDR***

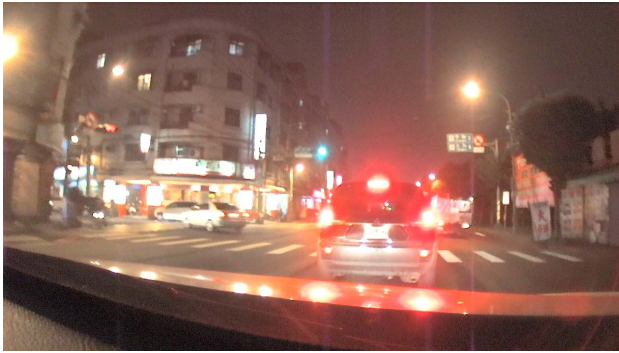
Although most IP cameras have a built-in BLC (back light compensation) function, which can make objects clearer, more recently the WDR (wide dynamic range) function is being used instead.

### Situation 2: When shooting in dark, low illumination environments, such as at night.

#### ***Day and night functions***

Cameras used in dark or low illumination environments should have a day and night capability to make images more visible. The camera will produce color images in high illumination conditions, and switch to black and white with ICR (IR-cut filter) in dark or low illumination conditions.

**Color mode at night**



**B/W mode at night**



**AGC (auto gain control)**

AGC (auto gain control) can optimize the signal level under low illumination conditions. Be sure to configure the AGC to a higher value (such as 64X) to increase the GAIN control value.

**Exposure and shutter time**

In low illumination conditions, increasing the exposure time and reducing the shutter speed will increase the amount of light being received.

**IR illuminator**

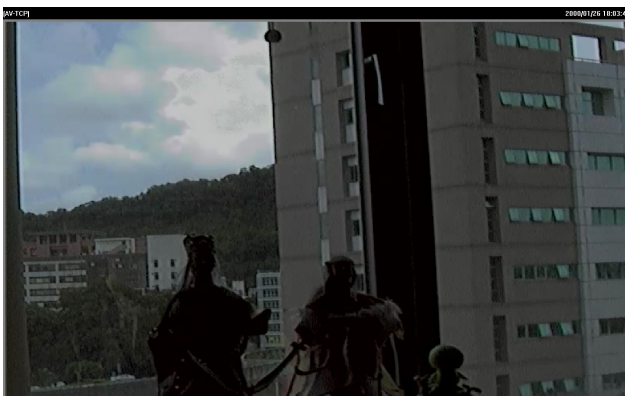
Under dark conditions, such as close to 0 lux, an IR illuminator can be used to increase the amount of IR light.

**Situation 3: When shooting scenes that have bright and dark conditions in the same image.**

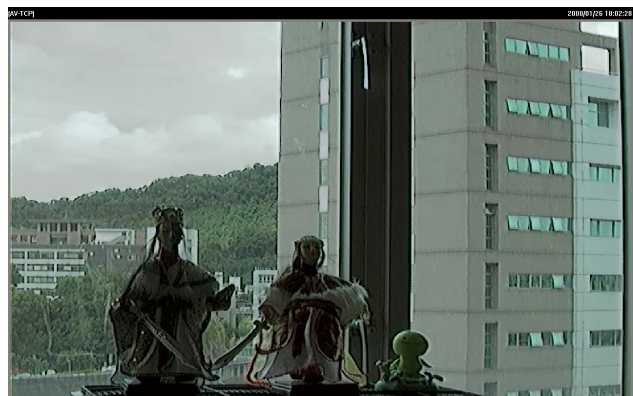
**WDR (wide dynamic range)**

Some environments exhibit both strong light conditions as well as dark areas. In this case, configure the WDR (wide dynamic range) level to improve the image quality.

**without WDR**



**with WDR**



**Situation 4: When shooting in foggy, rainy, or dusty conditions**

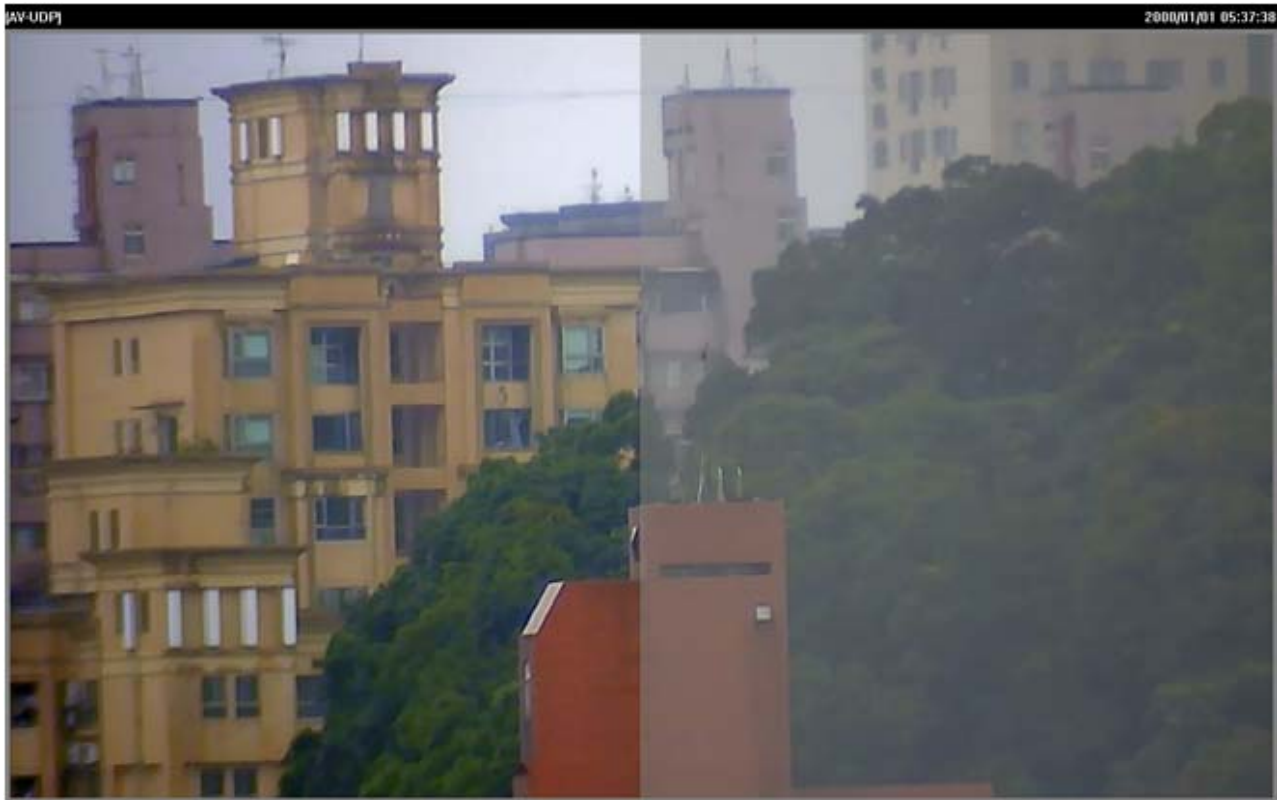
**De-mist function**

Eliminating the blurred images caused by foggy, rainy, and dusty conditions can be achieved with a de-mist camera function, which uses an intelligent video analysis algorithm to enhance the image definition.

## The Trends of IP Cameras

De-mist on

De-mist off



### Situation 5: When shooting color-rich objects

#### ***AWB function***

Color-rich objects can cause images to have a color cast (i.e., a tint of a particular color). In this case, the AWB (auto white balance) function can be used to correct the color.

### Situation 6: When shooting under high noise conditions

#### ***DNR function***

A camera with a built-in 2D or 3D DNR (digital noise reduction) function can reduce the effects of excessive image noise, which can degrade the video signal. The DNR function reduces the amount of image noise, resulting in a clearer image.

### Situation 7: When shooting in conditions affected by AC power frequency

#### ***Flickerless function***

An AC lamp can cause a flicker effect, which is a consequence of the AC power frequency (50 or 60 Hz). To eliminate flicker, configure your camera to PAL (60 Hz) or NTSC (50 Hz) modes.

Color-rich objects can cause images to have a color cast (i.e., a tint of a particular color). In this case, the AWB (auto white balance) function can be used to correct the color.

## Moxa's Solutions

Moxa's series of rugged HD (1280 x 720) IP cameras feature a cutting-edge HD CMOS sensor and powerful codec chip. The cameras provide good light inhibition, 2D/3D\_DNR (digital noise reduction), WDR (wide dynamic range), de-mist, and good performance in low light conditions. Moxa's cameras compare favorably with other major IP cameras on the market, and provide the best image quality available. A box-type IP camera is currently available, with fixed-dome-type and PTZ speed dome IP cameras under development. For more information, visit Moxa's website at [http://www.moxa.com/IP\\_camera](http://www.moxa.com/IP_camera).

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