Lightfinder
Outstanding performance in difficult light conditions

Table of contents

1. Introduction

A day and night camera is designed to be used in outdoor installations or in indoor environments with poor lighting. A day and night, color network camera delivers color images during the day. As light diminishes, the camera can automatically switch to night mode to make use of near infrared (IR) light to deliver black and white images. Maintaining image sharpness and low noise, particularly in varying outdoor lighting conditions, has proved challenging.

Axis Communications' research and development have led to the introduction of the new and revolutionary Lightfinder technology. The Lightfinder technology is the result of a meticulous choice of the right sensor and the right lens, together with the elaboration of the image data coming from the combination of sensor and lens. The fusion of these factors – sensor, lens, in-house chip development and knowledge in image processing – provides network cameras incorporating this technology with outstanding performance.

Figure 1. Example of cameras incorporating the Lightfinder technology, AXIS Q1602 and AXIS Q1602-E

2. Lightfinder background

The Lightfinder technology incorporates a CMOS sensor with exceptional light sensitivity. However, the Lightfinder technology is much more than just the sensor. As per Axis' proven image processing, already used in all its network video products, the elaborate software sets the degree of filtering and sharpening to give the best image quality possible. The outstanding performance in low light is the result of well-founded decisions regarding the sensor and lens combined with carefully tuned image processing.

Compared to any analog camera, the Lightfinder technology will give a better resolution and more lifelike colors, especially in low-light conditions. The noise reduction of the Lightfinder technology is vastly improved compared to any analog camera on the market, which in combination with the light sensitivity of the sensor gives a superior image quality. Also, since cameras incorporating the Lightfinder technology are digital, it opens a broad range of possibilities, such as the usage of a progressive scan sensor, video intelligence analysis and video surveillance systems.

The advantages of the Lightfinder technology are high light sensitivity, excellent image quality with low noise but a wealth of details, and better color reproduction in low light. Cameras with the Lightfinder technology also have all the advantages of other network cameras, such as progressive scan, and can easily be integrated with the industry's largest base of application software through Axis' Application Development Partner Program.

3.   Applications

Network cameras incorporating the Lightfinder technology are the perfect solution for indoor and out-door surveillance in low-light conditions, especially where users require color information in the video to enhance recognition and identification of objects. In contrast to conventional day and night cameras that switch to black and white in darkness, cameras incorporating the Lightfinder technology can maintain colors even in very dark conditions.

There are many situations where surveillance video with color is an important factor for successful identification, and this capability greatly enhances the user's possibility to effectively identify people, vehicles and incidents.

These cameras will be especially beneficial in demanding video surveillance applications and they can be used in a variety of low-light applications, such as parking lots, city surveillance, schools and campuses, and construction sites. The Lightfinder technology can be used for outdoor perimeters such as power plants, water treatment plants and prisons, as well as railway surveillance. In extremely low light conditions, such as constructions sites, that might only be lit by a single light at night, they can be supplemented with IR illuminators, but the high light sensitivity of the Lightfinder technology makes IR illumination unnecessary in many cases.

4.   Comparison during night time and poor lighting

A comparison between three different surveillance cameras, an AXIS 221, an AXIS Q1602/-E built on the Lightfinder technology and a competitor quality low-light analog camera, took place during night time, and in different scenarios. The comparison shows that the network camera incorporating the Lightfinder technology gives a better image quality with less noise at full frame rate, and that in some light conditions the analog camera does not deliver images with colors.

Figure 2: Perimeter surveillance with no street illumination during night time (10:40 p.m.) and approximately 0.1 lux.

Left: AXIS 221
Below left: a quality low-light analog camera
Below right: AXIS Q1602-E with the Lightfinder technology

In absence of nearby illumination, AXIS Q1602-E is able to deliver color images, while the analog camera delivers black/white images.

Figure 3: Building entrance surveillance during night time (11:50 p.m.) and illumination ranging between 4 and 6 lux.

Left: AXIS 221
Below left: a quality low-light analog camera
Below right: AXIS Q1602-E with the Lightfinder technology

The image delivered by AXIS Q1602-E shows less noise compared to the quality low-light analog camera.

Figure 4: Storeroom surveillance in poor light conditions.

Left: AXIS 221
Below left: a quality low-light analog camera
Below right: AXIS Q1602 with the Lightfinder technology

Color identification is easier with the image delivered by AXIS Q1602, providing also less noise and sharper image than the quality low-light camera.

5

5. The future

Development will continue to move towards network cameras with the same high degree of light sensitivity that the Lightfinder technology has, but with even better resolution. Improved light sensitivity and less image noise will be key features in any new imaging technology in the future. Since Axis always uses the latest sensor technology and continually develops smarter software, Axis will continue to lead the fast product development on the low-light application market.

6. Useful links

For more information, see the following links:

Axis Communications – 'In the best of light – The challenges of minimum illumination'
www.axis.com/files/whitepaper/wp_light_sensitivity_41137_en_1011_lo.pdf

Axis Communications – 'CCD and CMOS sensor technology'
www.axis.com/files/whitepaper/wp_ccd_cmos_40722_en_1010_lo.pdf

Axis Communications – 'Lighting for network video – Lighting design guide'
www.axis.com/files/whitepaper/wp_lighting_for_netvid_41222_en_1012_lo.pdf

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About Axis Communications

Axis is an IT company offering network video solutions for professional installations. The company is the global market leader in network video, driving the ongoing shift from analog to digital video surveillance. Axis products and solutions focus on security surveillance and remote monitoring, and are based on innovative, open technology platforms.

Axis is a Swedish-based company, operating worldwide with offices in more than 20 countries and cooperating with partners in more than 70 countries. Founded in 1984, Axis is listed on the NASDAQ OMX Stockholm under the ticker AXIS. For more information about Axis, please visit our website at www.axis.com.

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