**Category:** Design & Spec Note
**Sub-category:** Hardware, Integration, Video Quality
**Model:** All Cameras
**Firmware:** N/A
**Software:** N/A
**Author:** Ando.Meritee
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# KCM-5111 Product Introduction

## Contents



## Introduction

KCM-5111 is a new generation of box camera from ACTi with excellent video quality up to 4 Megapixel resolution. KCM-series cameras come with brand new ACTi designed Image Signal Processor with customized algorithm for different lighting conditions. Daytime, low light and night time video quality is even better than before. Better colors, better exposure, more details!

KCM-5111 with bundled 2.8mm lens

**Key Features:**

- 4 Megapixel resolution with 1561 TV lines
- Day and night function with mechanical IR cut filter
- Bundled 2.8 mm / F2.0 Megapixel fixed lens
- P-iris lens supported
- Selectable H.264, MPEG-4 SP, MJPEG compressions with dual streaming
- Up to 4 cropped regions as independent channels
- Serial port for external pan & tilt scanner

## More on KCM-5111

**BSI Technology**

KCM-5111 uses an innovative BSI (Backside Illumination) technology based image sensor which is able to capture clear image even in low lighting conditions. This technology is also used in Apple iPhone 4, and is one of the key factors of its success.

The problem of traditional CMOS sensor is that the matrix of transistors processing the incoming light is placed on the surface of the sensor, thereby reducing the physical size of photosensitive area. As a result, those traditional sensors are less sensitive in low light conditions. The BSI sensors do not have this problem - the transistors are placed behind the sensor so that the whole size of each pixel can be used as a photosensitive area. **BSI technology provides 30% increase in captured incoming light compared to traditional CMOS technology.**

**ACTi Image Signal Processor**

ACTi is proud to announce the release of its newly designed Image Signal Processor that is far more advanced that any other ISP in the market. The standard ISP technology handles either one (day-only) or two (day and night) profiles. Customers using other manufacturers' best cameras have often complained that those cameras can work in daytime or night time, but totally fail during low light conditions – the time of the day where the illumination is between 4-100 lux, almost night but not quite yet. Those images are filled with lots of noise and the colors are below any acceptable quality.

ACTi is the first manufacturer to face this phenomenon by releasing the first **adaptive triple-profile Image Signal Processor** in the video surveillance industry. Using ACTi ISP based cameras, the image quality is excellent in daytime, low lighting conditions and night time. This is a ground breaking approach far ahead of any other surveillance manufacturer, and it's the only way to reliably maintain high video quality in all conditions.

**Multiple Cropped Regions as Independent Channels**

ACTi 4 Megapixel cameras offer a flexible choice of defining up to 4 regions of interest within the full image. Each of those regions acts as an independent streaming channel that may be independently scheduled for recording by NVR. For example, only the entrances within the camera view will be continuously recorded while the other three areas will be live view only. This way, **one camera can act as if there were 4 cameras and saves bandwidth and storage cost at the same time.** You can even set motion detection regions for those areas of interest.

**P-iris**

Although the bundled high quality fixed lens of KCM-5111 covers 80% of the installation scenarios, there may be a need for auto iris in some cases. For such cases it is possible to select the optional P-iris lens, controlled by powerful ACTi image signal processor with highest possible accuracy. The difference between P-iris and DC iris lens is the motor type – P-iris uses stepping motor that allows the size of the iris be controlled very precisely.

P-iris can easily handle the situations with extremely bright sunlight where DC iris control is still too coarse; the size of the iris can be precise yet extremely small – taking full advantage of broad daylight to get **properly exposed image with very long depth of field**.

**Dual Stream**

With the rapid growth of video resolution in IP surveillance, the dual stream technology becomes more and more important – camera sends two streams to NVR, a high resolution stream for recording and small resolution stream for live view. This way live view will no longer overload the client PC even with all 64 channels at the same time. The single stream cameras become a burden for NVR because this way NVR has to decode every high megapixel stream for live view. With today's PC performance, 2-3 cameras is already a very challenging task.

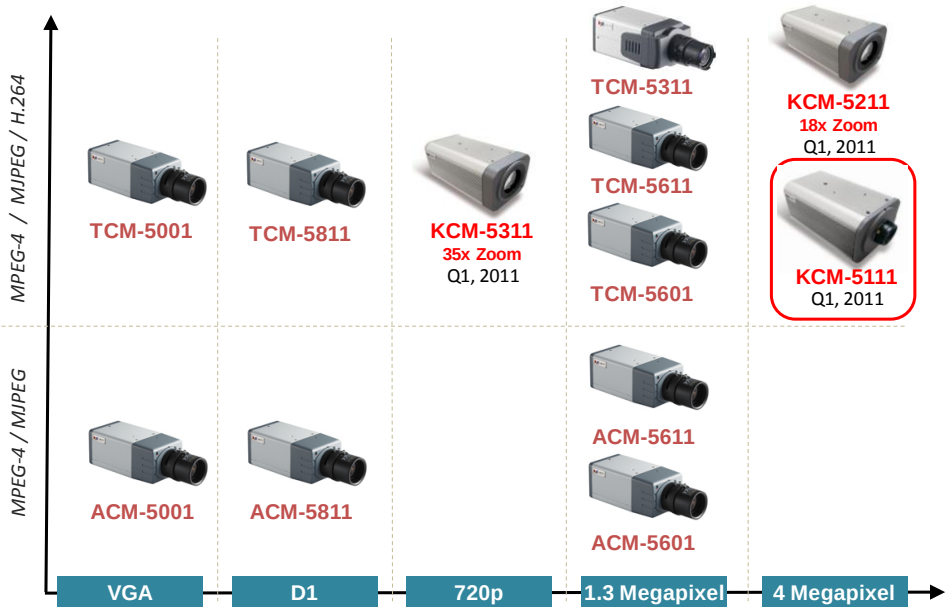
Therefore, **if you plan to go for a high megapixel cameras, make sure the camera and the NVR both support "dual stream technology".** For example, the high quality video evidence is recorded with 4 Megapixel resolution with H.264 compression while the live view is made with smooth VGA-sized MJPEG stream within the 64-channel layout view.

ACTi is putting much focus on dual stream technology because **ACTi is not only the camera manufacturer but also a full solution provider** – it is our duty to make sure that the whole solution starting from video capturing and ending with storing and live view would work properly without any problems.

The other camera manufacturers that try to sell high megapixel single stream cameras do not tell you how these camera really work a surveilance system, especially when NVR has to manage large amount of cameras at the same time.

## Product Positioning

In order to understand the position of **KCM-5111** among the other ACTi box cameras, please look at the product position map below:




You may notice that in addition to fixed camera KCM-5111 there will also be two zoom cameras released in the first quarter, 2011 – KCM-5211 with 18x optical zoom and KCM-5311 with 35x optical zoom.

## Why ACTi 4 Megapixel Camera Video Quality Is the Best

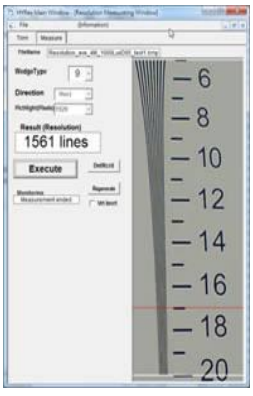
**Video quality is not determined by number of pixels alone. The whole chain of video processing needs to be properly designed, from the lens to the compression chip inside the camera. Any bottle-neck in the chain hurts video quality.**

Many camera manufacturers in the market today put a high megapixel sensor into the camera with a poor lens in front, and use ISP or compression chips that cannot handle such a large amount of data. With the ever-shrinking pixel size, much less light is available for each pixel. Adding up all these means users get blurry, grainy images with plenty of color noises that take a ton of storage with annoyingly slow frame rate.

When you have watched the images from those high megapixel cameras you find that despite the high number of pixels, the details did not become any clearer even when you zoom in digitally.

Then how did ACTi make it work? How is it possible that the details are so clear when you zoom in digitally? The answer is – ACTi has carefully refined covered the whole chain of video processing, from the lens to compression. A key advantage is the ACTi designed Image Signal Processor, which is the best one in the surveillance market today!

Now you may want to ask, how to compare ACTi video quality with other 3-5 Megapixel cameras in the market in terms of numbers, as you already learned that pixels alone cannot prove the video quality. The answer is – use TV Lines instead. TVL is a classic video quality measurement already in wide use from the analog CCTV industry, which accurately defines the real video quality. The higher is the TVL value, the more details you can see when you zoom into the image. For example, a 5 megapixel camera with a poor 1 megapixel optical lens and poor ISP processing will have much smaller TVL value than a 4 megapixel camera with a proper lens and a powerful ISP.




**ACTi 4 Megapixel camera has 1561 TVL!!** For comparison, the 5 megapixel cameras you find in the market today have the TVL value in the range of 800-1200. That is why their images look so blurry when you zoom in.

If you want to see the real life evidence of the 1561 TVL, please look at the next chapter.

## 4 Megapixel Video Quality (2032x1920)

The 4-Megapixel BSI sensor with powerful ACTi Image Signal Processor can produce high quality images even **during motion**. Captured images can be digitally zoomed in for more details.


This video was captured by KCM-5111 with its bundled 2.8 mm lens. Although the approaching car was moving rather fast, the license plate is extremely clear upon digital zoom.

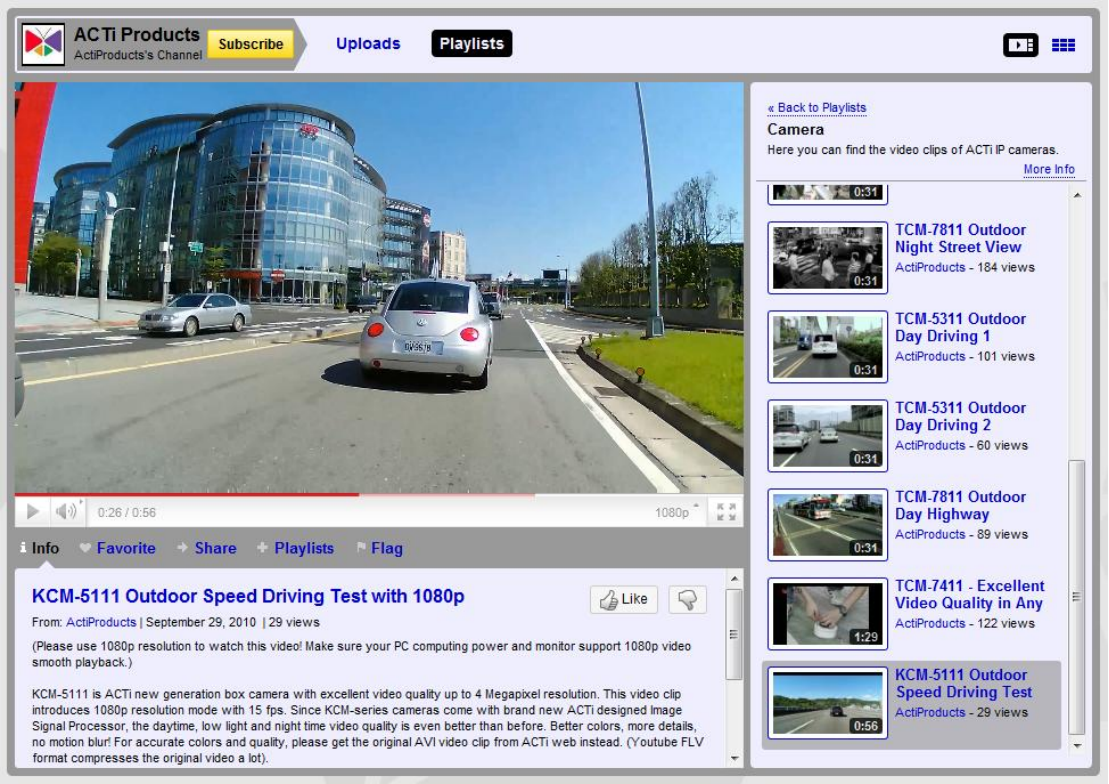
**Seeing is believing!** If you want to be even more convinced then please look at the AVI video clips in ACTi Knowledge Base, containing the clip where the snapshot above was captured from.

- AVI Clip 1
- AVI Clip 2

## 1080p Video Quality (1920x1080)

We have recorded several video clips for your reference and published them in both YouTube and ACTi website.

Note: The original video size is 1920x1080. **Please remember to change from default YouTube resolution 360p to 1080p for best possible video quality experience!** Please make sure your PC computing power and monitor support 1080p video smooth playback.




KCM-5111 Outdoor Speed Driving Test with 1080p

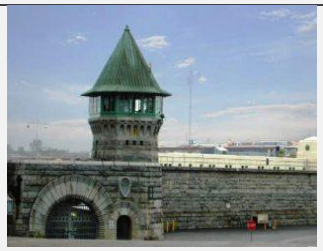
Please note that although YouTube videos are extremely convenient because of their instant playback capability, the YouTube FLV video format compresses the original video a lot which may impact the overall quality. In order to experience absolutely the best video quality, please download the original **AVI** video clips instead.

- AVI Clip 1
- AVI Clip 2
- AVI Clip 3

## Where to Use KCM-5111

KCM-5111 is a day and night box camera that can be used either indoors or outdoors (with housing).

**Popular outdoor applications:**

| | | |
|---|---|---|
|  City Traffic |  Highway |  City Square |
|  Railway Platform |  Entrance |  Bus Stop |
|  Parking Lot |   Airport |  Residential |
|  Park |  School Campus |  Prison |

**Popular indoor applications:**

| | | |
|---|---|---|
|  Airport Terminal |  Bank |  Railway Station |

## Datasheet

For technical details of KCM-5111, please refer to the datasheet below:

| | | |
|---|---|---|
| **Device** | Device Type | Box Camrea |
| | Image Sensor | OmniVision BSI Progressive Scan CMOS |
| | Sensor Size | 1/3.2 " (4.5 x 3.4 mm) |
| | Horizontal Resolution | 1561 TVL |
| | Day / Night | Yes |
| | Minimum Illumination | Color: 0.1 lux at F2.0<br>B/W: 0.05 lux at F2.0 |
| | Color to B/W switch | ISP based switch, configurable |
| | Mechanical IR Cut Filter | Yes |
| | IR Sensitivity Range | 700 - 1100 nm |
| | IR LED | No |
| | Electronic Shutter | 1/25 - 1/2000 sec (50Hz); 1/15 - 1/2000 sec (60Hz) (manual mode)<br>1 - 1/2000 sec (auto mode) |
| **Lens** | Focal Length | Fixed Focal, f2.8mm / F2.0 |
| | Iris | Fixed Iris |
| | Focus | Manual Focus |
| | Mount Type | CS mount (interchangeable lens) |
| | Lens Option | Compatible lenses are available |
| | Horizontal Viewing Angle | 82.59° |
| **Video** | Compression | H.264, MPEG-4, MJPEG |
| | Maximum Frame Rate<br>vs. Resolution (H.264, MJPEG) | 8 fps at 2032 X 1920<br>15 fps at 1920 X 1080<br>30 fps at 1280 x 720<br>30 fps at 640 x 480 |
| | Maximum Frame Rate<br>vs. Resolution (MPEG-4 SP) | 5 fps at 2032 X 1920<br>10 fps at 1920 X 1080<br>24 fps at 1280 x 720<br>30 fps at 640 x 480 |
| | 4 Cropped VGA Mode (All Compressions) | 15 fps at 640 x 480 |
| | Multi-Streaming | Simultaneous dual streams based on two configurations in single view mode;<br>Multiple streams based on single configuration in 4 cropped VGA mode |
| | Bit Rate | 28 Kbps - 6Mbps (per stream) |
| | Bit Rate Mode | Constant, Variable |
| | S/N Ratio | More than 58dB |
| | Image Enhancement | Backlight compensation; White balance: automatic, hold and manual; Brightness, contrast; Automatic gain control; Digital noise reduction; Flickerless |
| | Privacy masks | 4 configurable regions |
| | Text Overlay | User defined text on video |
| | Image Orientation | Image flip and mirror |
| **Audio** | Audio | 2-way |
| | Compression | 8 kHz, Mono, PCM, 16 bit encoding |
| | Audio-In | 3.5mm Phone Jack |
| | Audio-Out | 3.5mm Phone Jack |
| **Network** | Protocol & Service | TCP, UDP, HTTP, HTTPS, DHCP, PPPoE, RTP, RTSP, IPv6, DNS, DDNS, NTP, ICMP, ARP, IGMP, SMTP, FTP, UPnP |
| | Ethernet Port | 1, Ethernet (10/100 Base-T), RJ-45 connector |
| | Security | IP address filtering; HTTPS encryption; Password protected user levels |
| **Alarm** | Alarm Trigger | Video motion detection 3 regions in single view mode,<br>1 region each in 4 cropped VGA mode; External device through digital input |
| | Alarm Response | Notify control center; Change camera settings; Command other devices; E-mail notification with snapshots; Upload video, snapshot to FTP server; Activate external device through digital output |
| **Interface** | Iris Connector | External connector for P-iris lens |
| | Digital Input | 2, TTL, terminal block |
| | Digital Output | 2, TTL, terminal block |
| | Serial Port | RS-485, RS-422, terminal block |
| | Local Storage | MicroSD/SDHC memory card slot (card not included) |
| **General** | Power Source / Consumption | PoE Class 3 (IEEE802.3af) / 8.64W<br>DC 12V / 7.54W |
| | Weight | 600g (1.32lb) |
| | Dimensions (W x H x D) | 126.2 mm x 76 mm x 71.4 mm (4.97" x 2.99" x 2.81") |
| | Operating Temperature | 0°C ~ 50°C (32°F ~ 122°F) |
| | Approvals | CE, FCC |
| **Integration** | Unified Solution | Fully compatible with ACTi software |
| | ISV Integration | Software Development Kit (SDK) available |
| | Firmware Access Browser | Microsoft Internet Explorer 6.0 or newer |

## When and Where to Buy?

**The KCM-5111 along with the other KCM-series cameras will be available from the first quarter, 2011.**

There are two ways to purchase ACTi products:

1) **Contact ACTi sales**
   http://www.acti.com/corporate/SearchbyCountry.asp
   Professional advice and support by ACTi sales and engineers;
   Goods and money through regional distributors for your convenience;

2) **Contact regional ACTi product distributor**
   http://www.acti.com/corporate_old/disti2.asp