

# Video Quality Enhancement

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## Introduction

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MT9M131 is the 1/3-Inch SOC Megapixel CMOS Digital Image Sensor manufactured by Micron and applied in all ACTi CMOS Megapixel cameras.

By constantly striving towards best possible performance of our MT9M131 based megapixel cameras, major world class video quality enhancements were achieved.

There were four major improvements made:

- Quicker white balance adjustment
- No color rolling for any of our CMOS cameras
- Better colors for default camera setting
- Less noise under low light conditions

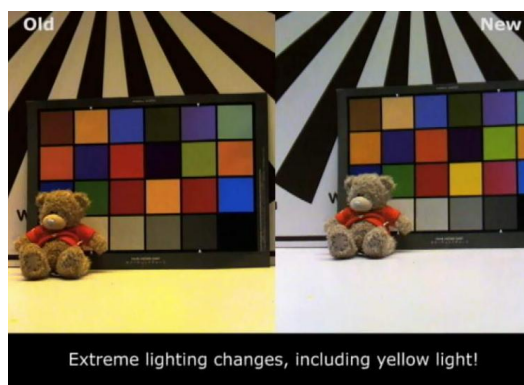
As a result, the best possible video quality was achieved. A megapixel camera with the best sensor performance – it is the ideal solution for customers.

## Improvement 1 - Quicker White Balance Adjustment

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Because of the enhanced white balance calculation formula, DSP needs less time to adjust to the new light source and detect the proper white color. In the past, it took several seconds to find the proper white balance, while now it takes less than a second.

As a result, even if we turn on or off different types of lamps, open or close curtains of windows, we will always see the proper white color (and consequently all the other colors) instantly.

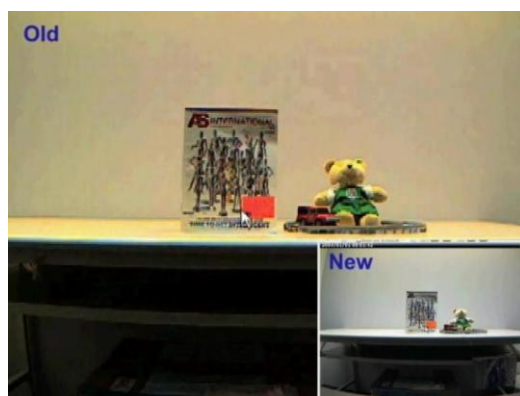


[Video: Quick White Balance](#)

## Improvement 2 - No Color Rolling

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Because of quicker white balance adjustment and comprehensive analysis formula, the new profile will not produce color rolling. For more information – please refer to [“What is color rolling?”](#)



[Video: Color Rolling](#)

### Improvement 3 - Better Colors

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There are two main factors that affect the color performance of the new profile. First is the proper adjustment of white balance, the second one is properly adjusted saturation and contrast.

With careful testing and re-adjusting the default profile based on ISO standards of proper color measurement, the best possible colors were achieved.

It means, without knowing the environment where the camera is to be installed, the default color profile of the camera has to be satisfying for most common lighting conditions. With properly adjusted saturation and contrast, the colors of CMOS look just perfect!



Old profile: Normal colors



New profile: Excellent colors

### Improvement 4 - Less Noise

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By perfectly adjusted contrast and saturation, the noise reduction was achieved as well. Since higher contrast and saturation are producing more noise, therefore lowering their levels significantly reduces noise, too.



Old profile: More noise



New profile: Less Noise

## How to Get the New Profile?

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Although new profile brings lots of benefits in terms of video quality, the upgrade to the new profile is optional. If your camera is installed in the environment where the existing profile is doing an excellent job, then you **do not need to upgrade the profile**. However, if you want to enhance the video quality or are interested in trying out the latest technology then please follow the profile upgrade procedure below.

### **Check the Camera Model and Profile Version**

There are two ways to check the camera model and profile version:

Use IP Utility, you will get the list of all the cameras and their profiles.

Use Web Configurator, go to System Info and find Profile ID there.

### **Compare the Profile Version against New Profile List**

The [full profile list](#) is provided in this document. If the profile of your camera does not match with the one in the list then the camera is using an old profile and you can proceed with the next step.

### **Download the New Profile Pack**

Go to [http://www.acti.com/support/Products\\_Resource\\_Matrix.asp](http://www.acti.com/support/Products_Resource_Matrix.asp)

If you have ACM-series products to be upgraded, then please pick any of the ACM-products in the list there and download the latest firmware v3.11.13, while for TCM-series products please download the firmware v4.06.09. After extracting the Firmware Pack, you will find both firmware files and the profile pack in there. The same profile pack can be used for all the cameras of the same series (ACM or TCM).

### **Upgrade the Profile**

There are two ways to upgrade the profile. You can use the latest version of IP-Utility (3.5.23 at [http://www.acti.com/ip\\_utility](http://www.acti.com/ip_utility)) if you want to upgrade the profile in multiple cameras at the same time, or use Web Configurator for a single camera upgrade. The table below explains in which case either of the upgrade methods can be used:

Product Series	Firmware Version	Web Configurator	IP Utility 3.5.23
ACM-Series	v3.08.08		
	v3.09.14		Y
	v3.10.22		Y
	v3.11.13	Y	Y
TCM-Series	v4.04.06		Y
	v4.06.09	Y	Y

## Reference – What is Color Rolling?

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Color rolling is the phenomenon where the colors of the scene keep changing endlessly – the whole scene becomes too blue at one moment, and the next moment it is too red or yellow.

The cause of color rolling is the confusion of the camera about what the true white color is under given lighting condition. Every time the Digital Signal Processor (DSP) analyses the captured image, it tries to understand the dominant source of light and adjust White Balance accordingly. If the calculation of White Balance is too slow, the next image will be captured with longer delay – by that moment, the frequency of light source may have changed, especially for the light from AC-powered lamps. Having received a new contradictive signal, DSP re-adjusts white balance, assuming that the color temperature has changed (light source has changed).

The more light sources are mixed on the scene, the more difficult it is for DSP to decide the correct white color. The most typical environment for color rolling is: in the room with windows, daytime, room lights turned on at the same time, different types of lamps used, sunlight penetrating through the window.

## Reference - More about MT9M131

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The Micron® Imaging MT9M131 is an SXGA-format single-chip camera with a 1/3-inch CMOS active-pixel digital image sensor. This device combines the MT9M011 image sensor core with fourth-generation digital image flow processor technology from Micron Imaging. It captures high-quality color images at SXGA resolution.

The MT9M131 features DigitalClarity, Micron's breakthrough, low-noise CMOS imaging technology that achieves CCD image quality (based on signal-to-noise ratio and lowlight sensitivity) while maintaining the inherent size, cost and integration advantages of CMOS.

The sensor is a complete camera-on-a-chip solution designed specifically to meet the low-power, high fidelity demands of products such as security, biometrics, and videoconferencing cameras. It incorporates sophisticated camera functions on-chip and is programmable through a simple two-wire serial interface.

The MT9M131 performs sophisticated processing functions including color recovery, color correction, sharpening, programmable gamma correction, auto black reference clamping, auto exposure, automatic 50Hz/60Hz flicker avoidance, lens shading correction, auto white balance (AWB), and on-the-fly defect identification and correction.

Additional features include day/night mode configurations; special camera effects such as sepia tone and solarization; and interpolation to arbitrary image size with continuous filtered zoom and pan. The device supports both Xenon and LED-type flash light sources in several snapshot modes.

## Reference - Mapping Table of Cameras and New Profiles

Profile	Camera
MT9M131-RA0_VyymmddA	ACM-4200, ACM-4201, ACM-5601
MT9M131-RA5_VyymmddA	ACM-3401
MT9M131-RA8_VyymmddA	ACM-8201
MT9M131-RA9_VyymmddA	ACM-3701, 3703
MT9M131-RB0_VyymmddA	ACM-5611, AMU-9411
MT9M131-RB1_VyymmddA	ACM-1231, ACM-1232, ACM-7411, ACM-1511, ACM-3511
MT9M131-RB2_VyymmddA	ACM-1231, ACM-1232, ACM-7411, ACM-1511, ACM-3511, AMU-9711
MT9M131-RB5_VyymmddA	ACM-3411, AMU-9401
MT9M131-RB8_VyymmddA	ACM-8211
MT9M131-LA0_VyymmddA	ACM-4000, ACM-5001, ACM-4001
MT9M131-LA5_VyymmddA	ACM-3001
MT9M131-LA6_VyymmddA	ACM-3601, ACM-3603
MT9M131-LA7_VyymmddA	ACM-4000E, ACM-4001E
MT9M131-LB1_VyymmddA	ACM-1011, ACM-3011
MT9M131-LB2_VyymmddA	ACM-1011, ACM-3011
MT9M131-TA0_VyymmddA	TCM-4301, TCM-5601
MT9M131-TA1_VyymmddA	TCM-5201
MT9M131-TA2_VyymmddA	TCM-4201
MT9M131-TA3_VyymmddA	TCM-3401
MT9M131-TB1_VyymmddA	TCM-5211, TCM-5212
MT9M131-TB2_VyymmddA	TCM-8600, TCM-5411, TCM-2111
MT9M131-TB3_VyymmddA	TCM-3911, TCM-7711, TCM-7712
MT9M131-TB4_VyymmddA	TCM-7411, TCM-3511, TMU-9911, TCM-1231, TCM-1232, TCM-1511
MT9M131-TB5_VyymmddA	TCM-3411, TMU-9611, TMU-9811
MT9M131-TB6_VyymmddA	TCM-5611
MT9M131-SA0_VyymmddA	TCM-4101, TMU-4001
MT9M131-SA1_VyymmddA	TCM-4000