

There are two basic types of color cameras, raw color and processed color.

Processed Color

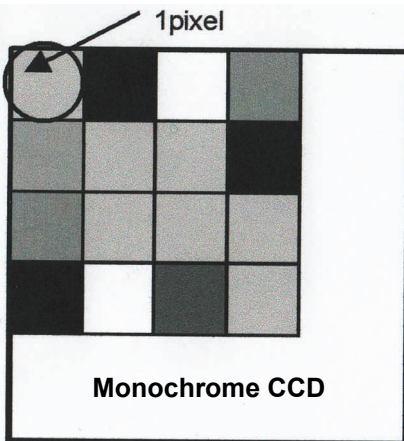
The color processing is handled internally in the cameras DSP circuits for consistent color.

Raw Color

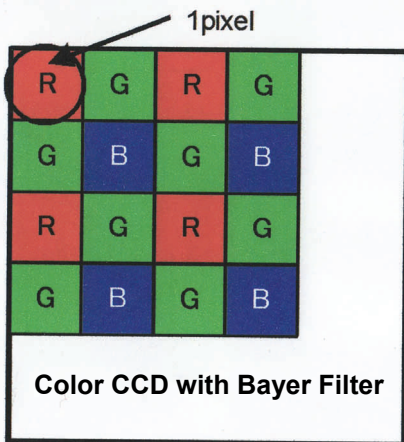
A raw color camera is in simple terms a monochrome camera where the monochrome sensor has been replaced with a color sensor. The output video image data of the camera is output without any internal color processing, resulting in a higher frame rate as compared to a typical color camera.

Advantages: Higher frame rate
Color processing takes place in the PC

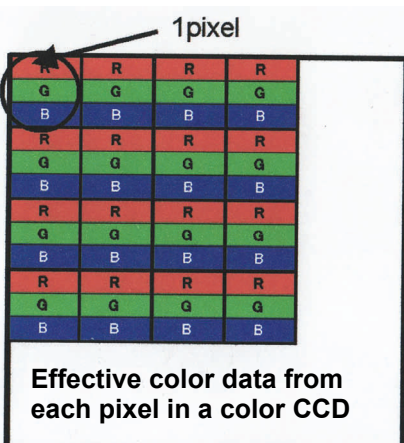
Disadvantages: Color accuracy and fidelity is determined by the frame grabber
Color processing features are determined by the frame grabber



Pixel layout for a monochrome camera. The output level or brightness of the pixel is determined by the amount of light falling on it. The data for each pixel is output with a minimum of processing. Typically black and white levels are adjustable and the gamma curve may be selectable in the camera. The data may be output as 8, 10, or 12 bits per pixel using the Camera Link interface.



Pixel layout for a camera using a color sensor with a Bayer filter. In a camera with a raw color output, each pixel is output with a minimum of processing. The frame grabber keeps track of the pixels for each color and performs the color processing by mixing the proper outputs of the red, green and blue pixels determined the light intensity on each pixel. White balance is performed by the frame grabber. The data for each pixel is output as 8, 10 or 12 bits per pixel using the Camera Link interface. The color accuracy and fidelity is determined to a large extent by the frame grabber. A camera with a raw color output has a faster frame rate compared to a similar camera with a processed color output.



In a camera with a processed color output the CCD layout is the same as is shown above for the raw color CCD. The data from the main pixel (in this case red) is combined with the average data from the surrounding green and blue pixels to produce a color sample that is equal to the sum of the outputs of the red, green and blue pixels. The output data is sent out as 24, 30 or 36 bit RGB data over the Camera Link interface. In a processed color camera, the camera handles the white balance along with all of the color processing and any additional features such as 6 vector color correction that the manufacturer elects to design into the camera. The frame rate is slower due to the additional processing time required in the camera, however color fidelity is more consistent because it is not dependent on the frame grabber.