

Learning about the Total Zoom Capability of Document Cameras

What is the patented AVerZoom™?

Jan 2011
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When it comes to the total zoom capability of a document camera, people often hold the preconceived notion that higher total zoom specifications equals to better image quality. However, this understanding does not always hold true.

Introduction to Total Zoom Capability

Optical zoom and digital zoom are general methods to compose the total zoom capability of a document camera in the market.

One of the most important features of a document camera is the ability to zoom. It is a commonly used feature that can enlarge graphics, objects and even small 6-point size text for easy reading and viewing.

Normally there are two types of zoom in the market: optical zoom and digital zoom. The two zoom types can be combined together to deliver multiple zoom effects. To calculate the total zoom capability of a document camera, you simply multiply the degree of optical zoom by the degree of digital zoom. Take the AVerVision530 as an example; it is equipped with 12X optical zoom and 8X digital zoom.

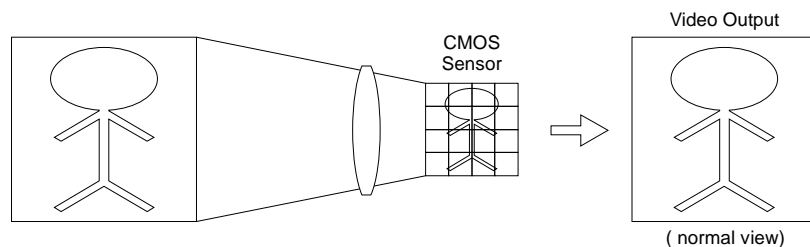
Therefore, the total zoom capability of the AVerVision530 is 96X total zoom:

$$12X \text{ optical zoom} \times 8X \text{ digital zoom} = 96X \text{ total zoom}$$

Optical zoom and digital zoom have respective pros and cons; by combining these methods, document cameras can help users achieve a certain balance between image quality and zoom level.

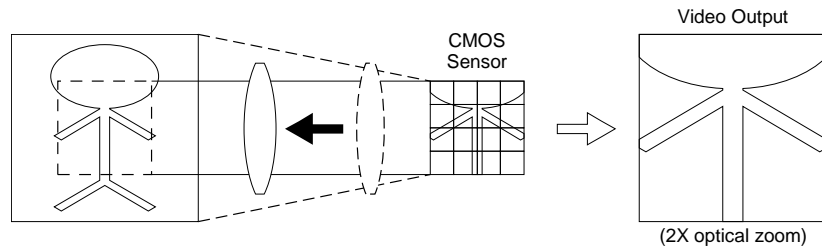
Basic Principles of a Camera

To give you insight into how a camera works, the image of the object passes through the lens just like our eyes. It receives visual information, and that visual information is translated into an electronic signal from the sensor. The image is then displayed by sending a video signal to a video display device, like a TV, a VGA monitor, or an LCD/DLP projector.



Optical Zoom

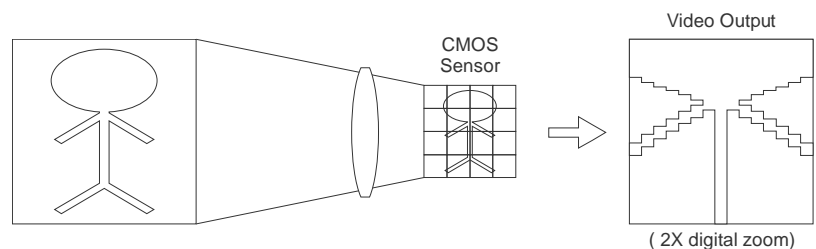
Optical zoom works by actually moving the camera's lens back and forth to change the magnification of the image while the image quality remains the same. As shown in the illustration below, you will see the image is magnified through the lens and directly displayed via the video output device.



Optical zoom usually delivers enhanced clarity while magnifying an object, but both the material cost and manufacturing process of optical zoom lens lead to an overall higher cost. Also, optical zoom lacks the ability to pan images. These weak points limit the adoption of optical zoom on entry-to-mid level document cameras.

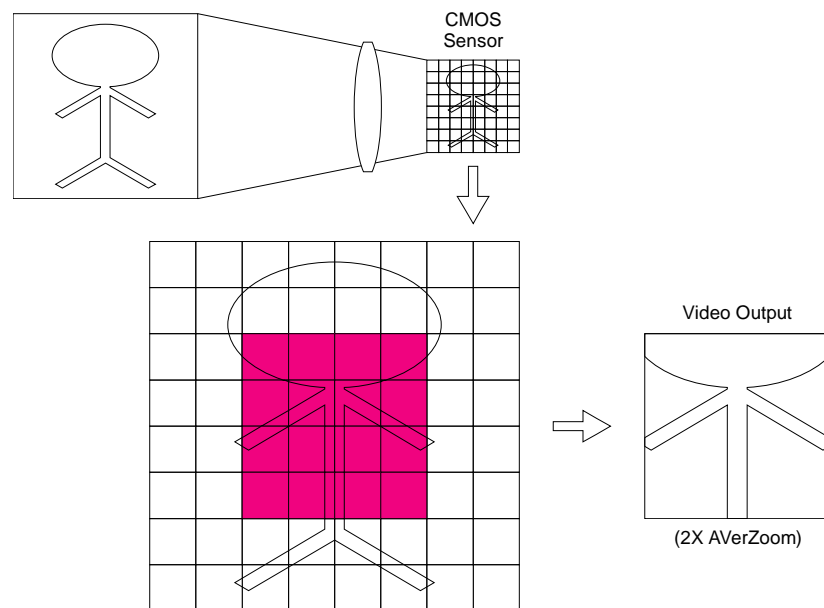
Digital Zoom

Digital zoom brings zero additional cost to a document camera; it is the most basic zoom type for nearly all document cameras, and it is an effective way to increase the total zoom capability. The principle of digital zoom is to interpolate two true pixels, then create a third pixel between them, which scales up the image higher than the original one. However, the displayed image would gradually become blurry when it is being zoomed digitally, and the resulting image degradation may render the image useless to the users. Because of the resulting graininess in the image, the current highest level of digital zoom is around 8~16X digital zoom.



Revolutionary Optimum Zoom Alternative – AVerZoom™

AVerMedia's patented AVerZoom™ feature is a quasi-optoelectronics technology applied to nearly all AVerVision Visualizers (document cameras) that displays image quality superior to optical zoom and lessens the need for an expensive lens. As illustrated below, instead of interpolating the image to simulate 2X magnification, AVerZoom™ directly picks up true pixels from the image sensor and displays that section of the image sensor. In applying this method, there is no pixel interpolation involved, no loss of image quality, and yet you can pan left, right, up and down without having to physically move the object under the camera.



What is AVer® Optical Zoom?

AVer® Optical Zoom is the combination of the patented AVerZoom™ with optical zoom. Like before, AVerZoom™ works by directly picking up true pixels from the image sensor and displaying that section of the image sensor. This allows AVer® Optical Zoom to double your maximum amount of optical zoom without degrading the quality of the image. What makes AVer® Optical Zoom equivalent to normal optical zoom is that you have the added ability to pan captured images; plus, you get the same image quality as a comparable optical lens. As illustrated in the following example, the quality of an image captured at 10X optical zoom is identical to that of an image captured at 10X AVer® Optical Zoom (2X AVerZoom™ + 5X optical zoom).

10X AVer® Optical Zoom



10X Optical Zoom



The Conclusion

Image clarity is the most important factor to consider when choosing a document camera.

These three zoom methods have their respective pros and cons for document camera applications, and can be combined to deliver different zooming results to satisfy varied demands. However, it is important to keep in mind that the true value of a document camera is determined by its ability to deliver crisp and sharp images for the user to view. That is why it is best to invest in a document camera that not only gives the user sufficient zoom capabilities, but crystal clear images, as well.