



Application of Machine Vision & USB3.0/3.1 Active Optical Cable

This article will explore the advantages of using USB 3.0/USB3.1 AOC active optical cable in machine vision applications.

With the improvement in the resolution and frame rate of image sensor as well as the increase in the demand of high-definition video in machine vision market, the bottleneck that machine vision faces is higher requirements for bandwidth. There are various existing interface standards adopted by machine vision camera, GigE, IEEE 1394b and Camera Link respectively support unique functions, but these interface standards should consider and balance the requirements for bandwidth, packaging, cost and power consumption, so it is difficult to achieve once and for all. The most common universal interface standard USB 2.0 in computation and consumer product market occupies a small place in machine vision market, but it is still unable to catch up with other interface standards in terms of bandwidth. The birth of USB 3.0/USB3.1 has changed all that currently.

The operation bandwidth of USB 3.0 has reached 5.0 Gbps (the operation bandwidth of USB3.1 has reached 10Gbps) and it has been greatly improved compared with the interfaces currently used, such as USB 2.0, IEEE 1394b, GigE and Camera Link. With higher available bandwidth, USB 3.0/3.1 can transmit the video contents with high resolution and frame rate without the need of compression, and image quality will not be affected. It can help designers improve image resolution and frame rate and at the same time guarantee image quality.

USB LOGO			
USB Generation	USB 2.0 (HI-SPEED)	USB 3.0 (SUPERSPEED)	USB 3.1 (SUPERSPEED+)
Backward Compatible	USB 1.1	USB 1.1/2.0	USB 1.1/2.0/3.0
Max. Transfer Rate	480Mb/s	4.8Gb/s	10G/s
Charging Power	100 mA	900 mA	900 mA
First Available	2001	2009	2014

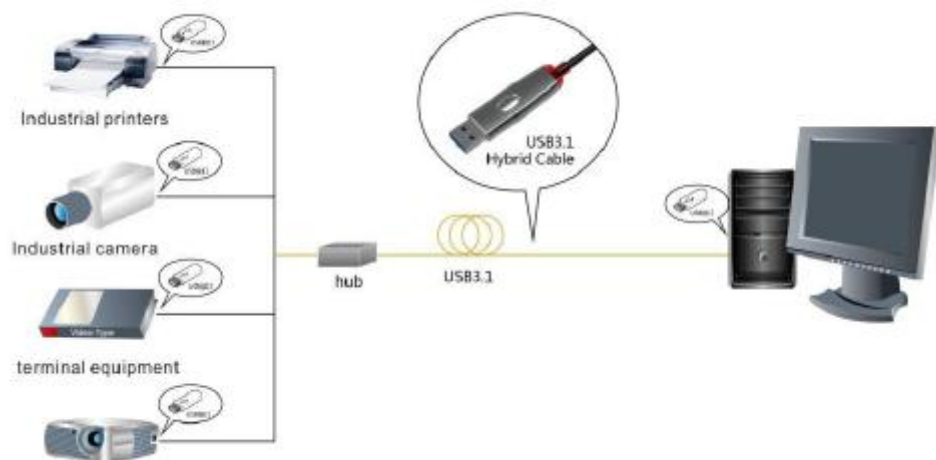
Having higher resolution, frame rate reliability and durability, the USB3.0 machine vision cameras have been widely used in machine vision applications. In many installation environments, we may often meet the application with long transmission distance, while the high-quality copper cable transmission distance (generally less than 3 meters) will limit the long-distance application. The GigaLight USB3.0/3.1 AOC active optical cable transmission solution has successfully solved the long-distance transmission problem and extended the USB3.0/USB3.1 transmission distance to above 100 meters via fiber optic media. This solution has greatly promoted the use of USB3.0/USB3.1 interface under extreme environmental conditions. For example, under the application scenarios of machine vision in industrial field, EMI / EMC problem usually cannot be ignored, and signal transmission is conducted via optical fiber. The USB3.0/3.1 AOC active optical cable of GigaLight has excellent performance to resist EMI / EMC, so it can be used in the industrial field with higher requirements for resisting EMI / EMC.



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