

What is DAC? Direct Attach Cable, referred as DAC. DAC is divided into passive DAC (Passive Copper Cable) and active DAC (Active Copper Cable). The transmission of the DAC is all electrical signals, and it does not involve the conversion of electricity to light or light to electricity.

Passive DAC uses shielded high-speed differential copper cables, and there are no chips on the circuit boards at both ends, and no signal processing is done during the entire signal transmission process (referred to Figure 1). The prior solution for short-distance applications is the use of passive DAC. It is commonly used for data transmission between the data center of the same rack or adjacent racks. Its advantages are low cost, ultra-low power consumption (less than 0.1 watt) and high reliability.

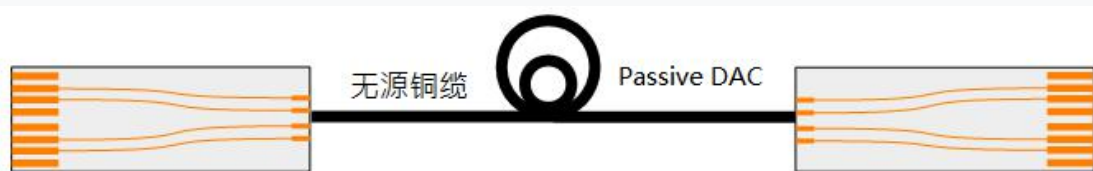


Figure 1

Active DAC is similar to passive DAC. It also uses shielded high-speed differential copper cables. However, it has high-speed electrical signal compensation chips with the function of pre-emphasis and equalization, compensating the attenuation during electrical signal transmission. It can increase the data transmission distance between non-compensated switches and other devices. (referred to Figure 2). Compared with passive DAC, its cable is thinner and the transmission distance is longer.

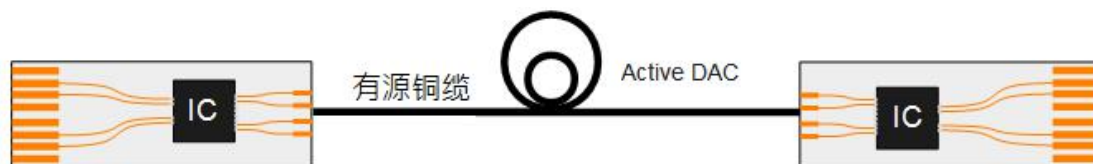


Figure 2

What is AOC? Active Optical Cable, referred as AOC. There are two modules at both ends of the AOC, and a section of optical fiber in the middle (referred to Figure 3). There are optical transmitters and optical receivers on the circuit boards of the modules at both ends of the AOC. Their function is to convert electrical signals into optical signals at the transmitting end, transmitting them into the optical fiber, and then convert the optical signals into electrical signals at the receiving end. Because it is optical signal transmission, compared with DAC, the transmission distance is longer, but because it involves photoelectric conversion, the design and processing technology are more complicated, the cost and power consumption are also higher.



Figure 3

Type	Transmission medium	Cable diameter	Transmission distance	power dissipation	cost
Passive DAC	Copper cable	coarse	Short($\leq 10m$)	Ultra low	low
Active DAC	Copper cable	middle	Middle($\leq 15m$)	middle	middle
AOC	fiber	slimsy	Long($\leq 30m$)	high	high

DAC and AOC are commonly used in high-speed, high-reliability interconnection transmission, such as the signal transmission among the data centers, high-performance computers and large-capacity storage devices.

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