New Storage Interface Could Replace USB and Firewire

Key Points

- eSATA extends the internal SATA storage interface to the outside world and can even utilize the same controller electronics used to interface with internal storage
- eSATA provides direct attached storage data rates that are 3 to 6-times faster than USB 2.0 and IEEE 1394b (Firewire)
- Data rates for eSATA are currently 3 gigabits per second but these could rise to 6 gigabits per second within 3 years
- eSATA is being built into consumer and computer devices especially for video applications where the high data rate is advantageous
- The higher data rates and lower potential implementation cost for eSATA could displace USB and IEEE 1394 for direct attached applications

The SATA (serial advanced technology attachment) interface has taken over from the older and slower parallel ATA (or PATA) technology used in hard disk drives for laptop, desktop, consumer and lower cost enterprise storage applications. SATA interfaces run up to 3 gigabits per second ($3X10^9$ bits per second, SATA II) and the next generation product due to be out within 3 years should run at 6 gigabits per second ($6X10^9$ bits per second). This data rate is over 6-times faster than USB 2.0 which operates at 480 megabits per second ($4.8X10^8$ bits per second) and over 3-times faster than IEEE 1394b (Firewire) over Category 5 cable (800 Mbps) and 2-times Gigabit Ethernet (up to 1,500 Mbps).

There is an external version of the SATA interface called eSATA which also operates up to 3 gigbits per second. This is an interface for external direct attached devices which uses the same command structure and even the same controllers as internal SATA connections. Besides the very fast data transfer rates possible with eSATA it can also lead to a significant cost savings with a native implementation versus using USB or IEEE 1394 for external device connections. The advantages become very important for large data files such as video files. For instance standard definition (SD) video requires a data rate of 173 megabits per second and high definition (HD) video requires 1,000 megabits per second. Thus a USB 2.0 interface can support 2-SD streams and no HD streams, a IEEE 1394b interface can support 4-SD streams and no HD streams while eSATA at 3 gigabits per second can support 17-SD streams and 3-HD streams.

With the home consumer market moving to high definition content and with demand for devices that can support multiple simultaneous video streams (for instance recording and playback at the same time and perhaps for more than one programming channel) these markets will demand higher performance interfaces than USB and IEEE 1394 can provide. This is why all the new DVR enabled set top boxes from companies such as Scientific Atlanta/Cisco are coming with eSATA interfaces built into them. An eSATA external storage box can provide data rates making it possible to store additional video content so that that the internal storage doesn't need to be so large and so that set-top boxes will not become obsolete to soon.

Likewise there are many computer applications that are using high performance video content including the rising quantity of personal video and editing to support such phenomena as social networking and video sharing over the internet. This demand for ever richer content for entertainment and personal use could drive the growth of a lower cost and higher performance interface such as eSATA.

Could we eventually see eSATA ports replacing USB flash memory and other devices with these devices becoming eSATA devices? Could eSATA become a sort of ad-hoc network storage for some applications? Time will tell but there are many companies such as Silicon Image and Seagate providing eSATA chips and storage products that could turn these possibilities into reality.