

Non-Removable Storage Devices – Feb. 1, 2012

A hard disk drive (HDD; also hard drive, hard disk, or disk drive) is a device for storing and retrieving digital information, primarily computer data. It consists of one or more rigid (hence "hard") rapidly rotating discs (often referred to as platters), coated with magnetic material and with magnetic heads arranged to write data to the surfaces and read it from them.

Hard drives are classified as non-volatile, random access, digital, magnetic, data storage devices. Introduced by IBM in 1956, hard disk drives have decreased in cost and physical size over the years while dramatically increasing in capacity and speed.

Hard disk drives have been the dominant device for secondary storage of data in general purpose computers since the early 1960s. They have maintained this position because advances in their recording capacity, cost, reliability, and speed have kept pace with the requirements for secondary storage

Types of Hard Drives

Parallel ATA (PATA), originally AT Attachment (old term IDE), is an interface standard for the connection of storage devices such as hard disks, solid-state drives, floppy drives, and optical disc drives in computers. The standard is maintained by X3/INCITS committee. It uses the underlying **AT Attachment (ATA)** and **AT Attachment Packet Interface (ATAPI)** standards.

The Parallel ATA standard is the result of a long history of incremental technical development, which began with the original AT Attachment interface, developed for use in early PC AT equipment. The ATA interface itself evolved in several stages from Western Digital's original **Integrated Drive Electronics (IDE)** interface. As a result, many near-synonyms for ATA/ATAPI and its previous incarnations are still in common informal use. After the introduction of Serial ATA in 2003, the original ATA was renamed *Parallel ATA*, PATA for short.

Parallel ATA cables have a maximum allowable length of only 18 in (457 mm) Because of this limit, the technology normally appears as an internal computer storage interface. For many years ATA provided the most common and the least expensive interface for this application. It has largely been replaced by Serial ATA (SATA) in newer systems

Serial ATA (SATA or Serial Advanced Technology Attachment) is a computer bus interface for connecting host bus adapters to mass storage devices such as hard disk drives and optical drives. Serial ATA was designed to replace the older parallel ATA (PATA) standard (often called by the old name IDE), offering several advantages over the older interface: reduced cable size and cost (7 conductors instead of 40), native hot swapping, faster data transfer through higher signaling rates, and more efficient transfer through an (optional) I/O queuing protocol.

SATA host-adapters and devices communicate via a high-speed serial cable over two pairs of conductors. In contrast, parallel ATA (the redesignation for the legacy ATA specifications) used a 16-bit wide data bus with many additional support and control signals, all operating at much

lower frequency. To ensure backward compatibility with legacy ATA software and applications, SATA uses the same basic ATA and ATAPI command-set as legacy ATA devices.

As of 2009, SATA has replaced parallel ATA in most shipping consumer desktop and laptop computers, and is expected to eventually replace PATA in embedded applications where space and cost are important factors. SATA's market share in the desktop PC market was 99% in 2008. PATA remains widely used in industrial and embedded applications that use CompactFlash storage, though even here, the next CFast storage standard will be based on SATA

External hard drives typically have one of two interfaces - USB or Firewire. USB hard drives commonly use the USB 2.0 interface because it supports data transfer rates of up to 480 Mbps. USB 1.1 only supports transfers of up to 12 Mbps, which would make the hard drive seem slow to even the most patient people. Firewire drives may use either Firewire 400 or Firewire 800, which support data transfer rates of up to 400 and 800 Mbps respectively.

The most likely users to need external hard drives are those who do audio and video editing. This is because high-quality media files can fill up even the largest hard drives. Fortunately, external hard drives can be daisy chained, which means they can be connected one after the other and be used at the same time. This allows for virtually unlimited amounts storage.

Users who do not require extra storage may still find external hard drives useful for backing up their main hard drive. External hard drives are a great backup solution because they can store an exact copy of another hard drive and can be stored in a safe location. Using the drive to restore data or perform another backup is as simple as connecting it to the computer and dragging the necessary files from one drive to another.

While most external hard drives come in heavy, protective cases, some hard drives are designed for portability. These drives usually don't hold as much data as their larger desktop counterparts, but they have a sleek form factor and can easily be transported with a laptop computer. Some portable drives also include security features such as fingerprint recognition that prevent other people from accessing data on the drive in case it is lost

A solid-state drive (SSD), sometimes called a **solid-state disk** or **electronic disk**, is a data storage device that uses solid-state memory to store persistent data with the intention of providing access in the same manner of a traditional block i/o hard disk drive. SSDs are distinguished from traditional magnetic disks such as hard disk drives (HDDs) or floppy disk, which are electromechanical devices containing spinning disks and movable read/write heads. In contrast, SSDs use microchips that retain data in non-volatile memory chips and contain no moving parts. Compared to electromechanical HDDs, SSDs are typically less susceptible to physical shock, are silent, have lower access time and latency, but are more expensive per gigabyte (GB). SSDs use the same interface as hard disk drives, thus easily replacing them in most applications.

As of 2010, most SSDs use NAND-based flash memory, which retains memory even without power. SSDs using volatile random-access memory (RAM) also exist for situations that require even faster access, but do not necessarily need data persistence after power loss, or use external power or batteries to maintain the data after power is removed.



An SSD in standard 2.5 inch (64MM) form-factor

A hybrid drive combines the features of an HDD and an SSD into one unit, containing a large HDD and a smaller SSD cache to improve performance of frequently accessed files. These can offer near-SSD performance in most applications (such as system startup and loading applications) at a lower price than an SSD. These are not suitable for data-intensive work, nor do they offer the other advantages of SSDs.



Seagate Momentus XT