

5.3.4 Optical Media Facts

DVD (Digital Video Disc or Digital Versatile Disc) is an optical media standard that can be used to store large amounts of different types of data (computer data, video, audio).

Optical Media	Characteristics
Compact Disc (CD)	<p>CDs were first developed to store digital music. Later, the CD technology was adapted to store digital computer data. A CD:</p> <ul style="list-style-type: none"> Can hold 74 to 80 minutes of audio Is 120 millimeters in diameter Is 1.2 millimeters thick <p>CD-ROM stands for compact disc read-only memory. CD-ROMs are identical in appearance to audio CDs, and data is stored and retrieved in a very similar manner. CD-ROMs:</p> <ul style="list-style-type: none"> Have lands and pits and use reflective light to interpret the data on the disc. Hold about 737 MB of data with error correction or 847 MB total. Transfers data at a rate of 150 KBps. Drive speeds are measured as multiples of this original speed. To calculate an estimate of your CD-ROM drives transfer rate, multiply its speed by 150 kilobyte (1x = 150 KBps, 2x drive = 300 KBps, 4x drive = 600 KBps, 72x = 10,800 KBps). <p>CD-RW stands for Compact Disc-ReWritable.</p> <ul style="list-style-type: none"> CD-RW can be written, read many times, erased, and rewritten. CD-RW has a capacity of about 650 MB. CD-RW is a removable hard drive, because you can insert the disc into the disc drive on one PC, add and delete data, eject it, and insert it into another disc drive on another system and have all your data immediately accessible. CD-RW drives can burn or write to CD-RW discs, erase CD-RW discs, and read a CD-ROM disc. CD-RW drive speed rating includes three parameters: a write speed, a rewrite speed, and a CD-RW read speed. All of these are multiples of the original 150 KBps 1x speed defined by the first CD-ROM drives. For example, if you have an 8x4x32 CD-RW drive, this means that it can write at 1,200 KBps, it can rewrite to a CD-RW disk at 600 KBps, and it can read at 4,800 KBps. The bottom surface of a CD-RW drive is coated with a photo reactive crystalline coating. A red laser causes a crystal to form which creates the reflective and non-reflective areas on the bottom of the CD-RW disc. A CD-RW drive has a second, high power write laser. When this laser hits the bottom of this photo reactive material on the bottom of the CD-RW disc, it causes crystals to form. This is called phase shifting or a phase shifting media. A crystal forming on the bottom of a CD-RW disc is like a land on a CD-ROM disk, because it reflects light.
Digital Versatile Disc (DVD)	<p>DVD (Digital Versatile Disc) is an optical media standard that can be used to store large amounts of different types of data (computer data, video, audio).</p> <ul style="list-style-type: none"> Most DVD drives can read and write. Older drives or older DVD players might only support DVD-R. A DVD with a single side of data can hold about 4.7 GB.

	<ul style="list-style-type: none"> ■ A DVD-ROM is read-only memory. ■ DVD-RW is a rewritable DVD format. ■ DVD-RW uses a crystal encoding on the bottom of the DVD disc. ■ A DVD-RW DL employs two recordable dye layers, each capable of storing about 4.7 GB; the total disk capacity is 8.5 GB. ■ Some DVDs can store data in two different layers on the same side. <ul style="list-style-type: none"> ■ The outer layer is semi-transparent, allowing the laser to read data from the inner layer. ■ Dual-layer discs can hold up to 8.5 GB of data. ■ Dual-layer recordable discs cost more than single layer discs. ■ Dual-layer DVDs are recorded using Opposite Track Path (OTP). ■ Most newer drives can read both single and dual layer discs. However, older drives might not support dual layer discs. ■ DVD speeds use a multiple of 1.35 MBps (1x = 1.35 MBps, 2x = 2.7 MBps, etc.) or 11 Mbps (1x = 11 Mbps, 2x = 22 Mbps, etc.).
Blu-ray Disc (BD)	<p>Blu-ray Disc (BD) is a newer optical disc format that is capable of greater storage capacity than DVDs.</p> <ul style="list-style-type: none"> ■ Blu-ray was originally developed for high definition video (and expanded content on movie discs), but can also be used for data storage. ■ Blu-ray uses a blue laser instead of the red laser used with CDs and DVDs. The blue laser light has a shorter wavelength, which allows data to be packed more tightly on the disc. ■ A single layer Blu-ray disc holds 25 GB; a double layer disc holds up to 50 GB. Experimental 20 layer discs can hold up to 500 GB. ■ Blu-ray discs can be read-only (BD-ROM), recordable (BD-R), or rewritable (BD-RE). ■ A 1x Blu-ray drive reads data at 4.5 MBps. ■ Most Blu-ray drives include a second read laser for reading CDs and DVDs. Without this additional laser, Blu-ray drives would not be able to read CDs or DVDs. ■ Blu-ray is intended to eventually replace DVD. ■ Blu-ray has become the accepted HD video standard as the last movie studio stopped distributing HD DVD movies.

Be aware of the following when working with optical drives:

- When you place a disc in the drive, it can take several seconds for the drive to recognize the new disc and spin up to speed. If you receive a message saying that the drive is not accessible after trying to access a recently inserted new disc, wait a few seconds and try again..
- If you install a new hard drive, the drive letter for your optical drive might change. Software programs or shortcuts that rely on the old drive letter will likely not run properly until they have been told the correct drive letter for the drive.
- Access time is a general measure of drive performance. Like hard drives, average access time includes average seek time and average latency time. However, it also includes average spin up/down time. This is the time required for a drive to spin up or down to the proper speed to read the data from that particular location of the disc.
- If the drive tray won't open for some reason, you can insert a straightened paper clip in the small hole beneath the drive door to push the drive tray out of the drive.

Use the following precautions to protect discs:

- Some recordable discs use a foil placed on the top of the disc instead of imbedding the foil inside the plastic. Be very careful when working with these types of discs. A scratch or even some types of markers can damage this layer..
- To help prevent scratching, keep the disc in its case when not being used.
- To minimize the effect of scratches that might be generated while wiping a disc, wipe the disc in straight lines from the center to the edge (like the spokes of a wheel).
- Keep the disc away from direct sunlight and other sources of heat.

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