

Green text: transitions from previous section
Maroon text: overviews
Red text: transitional words or devices

How a CD-ROM Works

Chapter Overview

Now that you have installed your CD-ROM drive, you are ready to learn how a CD-ROM works.

This section outlines two concepts to explain the CD-ROM's operation:

- ◆ Make-up of a CD-ROM Disc
- ◆ Parts of a CD-ROM Drive

How a CD-ROM Works

Make-Up of a CD-ROM Disc

The CD-ROM disc is an essential part of a CD-ROM's operation. **The two main elements that make up the disc are**

- ◆ Spiral Track
- ◆ Protective Coating

Spiral Track

Encoded data is stored in microscopic pits, which are arranged in a single spiral track.

The spiral track on a CD-ROM disc is more than three miles long. **This track** is made up of pits (low spots) and lands (high spots) impressed on one side. There are 2.8 billion pits on single CD-ROM, and each pit is one-half micron wide.

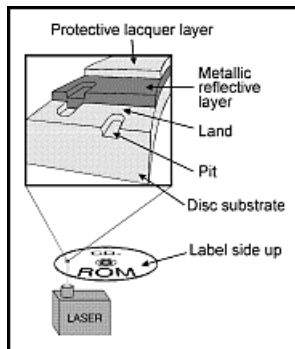


Figure 5- 1 Elements of a CD-ROM Disc

Protective Coating

While the spiral track holds the data on a disc, a coating of clear polycarbonate and lacquer protects the disc from everyday wear and tear. The discs are **also** coated with a silvery metallic aluminum coating. **This metallic layer** forms a reflective coating over the surface that the laser beam hits (see Figure 5-1).

Parts of a CD-ROM Drive

Along with the make-up of a CD-ROM disc, the parts of a CD-ROM drive are **also** important to a CD-ROM's operation. **The four main elements of a CD-ROM drive are**

- ◆ Optical Head
- ◆ Laser Beam
- ◆ Turntable

Optical Head

A CD-ROM drive contains an optical head mounted on a sled or swing arm. **This device** shines a laser on the disc surface, **then** travels to the location of the data. After the optical head finds the data, it positions itself within the spiral track and refocuses to read the data.

The optical head is composed of three main parts:

- ◆ Laser Diode
- ◆ Lens
- ◆ Photodetector

These three parts enable the optical head to read data on the disc (see Figure 5-2).

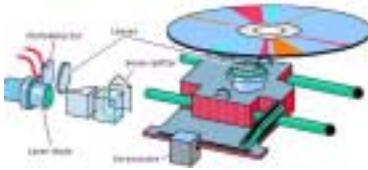


Figure 5- 2 Optical Head

The photodetector contains several photodiodes (sensors that sense light and its intensity and convert it to an electrical signal) and reads the laser reflections from the disc. **These photodiodes** ensure that the laser beam is focused and is correctly following the disc's spiral track.

Laser Beam

In addition to the optical head and its components, the laser beam is a major element in the CD-ROM drive. The CD-ROM drive measures reflections from the laser beam, which is guided along the length of the track. The laser light bounces back into a light-sensing detector that “sees” the beam when the tightly-focused laser beam reflects off a land. **However**, when the beam encounters a pit, no laser light is reflected into this detector.

A sensor detects a change in reflection when it encounters a transition from a pit to land or land to pit. Each transition is read as a “1” and the lack of transitions is read as a “0”.

These interruptions in light reflection are decoded into music, text, or pictures (see Figure 5-3).

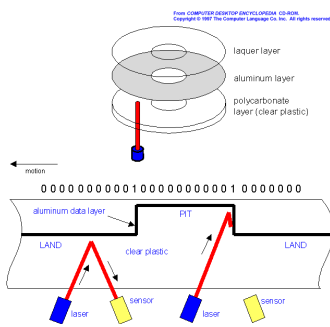


Figure 5-3 Laser Beam and Sensor Reflection

Turntable

Another crucial component of the CD-ROM drive is the turntable. The turntable spins the disc at a variable rate of speed, depending on where data is located. The speed is constant, no matter what location on the disc it occupies.

Summary

The make-up of a **CD-ROM disc and the parts of a CD-ROM drive** are essential to a CD-ROM's operation. After reading this chapter, you should have an understanding of how a CD-ROM works.