Technology Brief 16: Bar-Code Readers

A *bar code* consists of a sequence of parallel bars of certain widths, usually printed in black against a white background, configured to represent a particular *binary code* of information about a product and its manufacturer. *Laser scanners* can read the code and transfer the information to a computer, a cash register, or a display screen. For both stationary scanners built into checkout counters at grocery stores and handheld units that can be pointed at the bar-coded object like a gun, the basic operation of a bar-code reader is the same.

Basic Operation

The scanner uses a laser beam of light pointed at a multifaceted *rotating mirror*, spinning at a high speed on the order of 6,000 revolutions per minute (**Fig. TF16-1**). The rotating mirror creates a *fan beam* to illuminate the bar code on the object. Moreover, by exposing the laser light to its many facets, it deflects the beam into many different directions, allowing the object to be scanned over a wide range of positions and orientations. The goal is to have one of those directions be such that the beam reflected by the bar code ends up traveling in the direction of, and captured by, the light detector (*sensor*), which then reads the coded sequence (white bars reflect laser light and black ones do not) and converts it into a binary sequence of ones and zeros (**Fig. TF16-2**). To eliminate interference by ambient light, a *glass filter* is used as shown in **Fig. TF16-1** to block out all light except for a narrow wavelength band centered at the wavelength of the laser light.
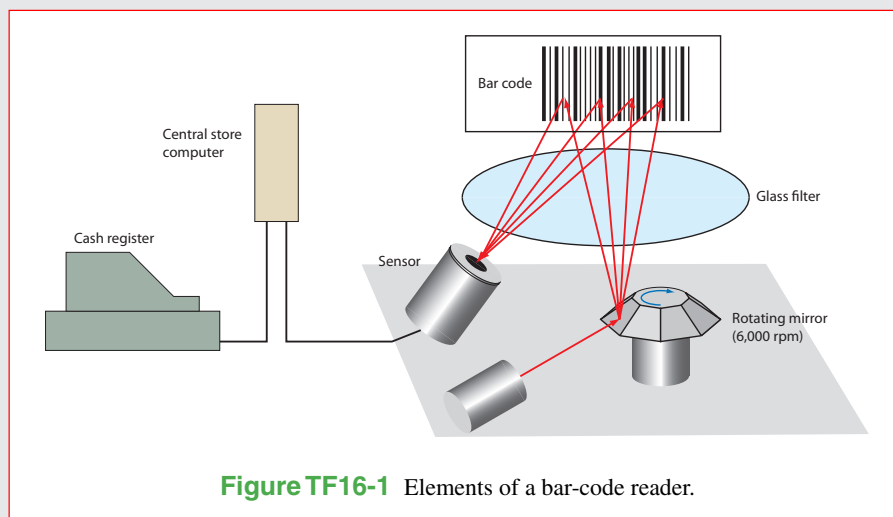

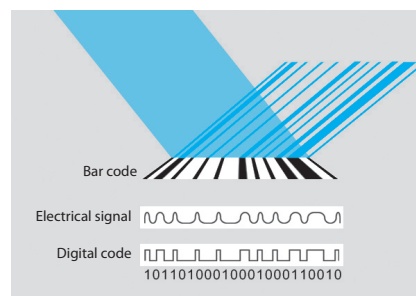**Figure TF16-1** Elements of a bar-code reader.

Figure TF16-2 Bar code contained in reflected laser beam.