
Glossary

Charge-coupled Device (CCD). A CCD is a miniature photometer that measures incident light and converts the measured value to an analog voltage. The CCDs in a scanner are arranged in an array.

Desktop Scanner. A desktop scanner is a device that uses a light source, a color-separation method, and a charge-coupled device (CCD) array to capture optical information about an object (e.g., photographs or documents) and transforms that information into a digital light-intensity map for computer processing (see Fig. 1). The digital data is a two-dimensional map of pixels in which each pixel holds an intensity measurement corresponding to the reflectance (for paper) or the transmittance (for transparencies) of the object at the location represented by that pixel.

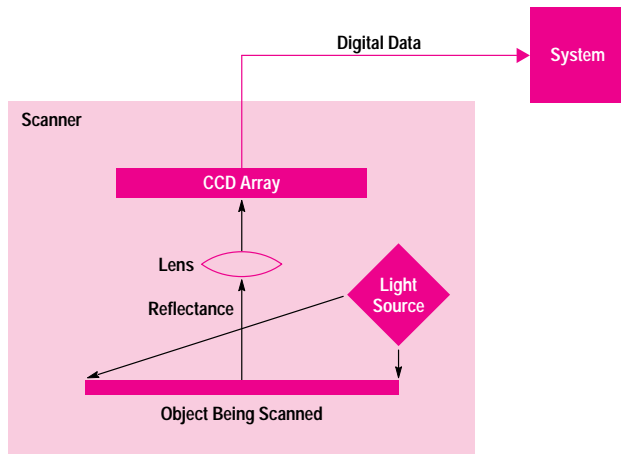


Fig. 1. The basic components of a desktop scanner.

dpi (dots per inch). The number of dots that can be printed per inch by a laser or inkjet printer.

Intensity. The amount of light reflected or transmitted by an object with black as the lowest intensity and white as the highest intensity.

Optical Sampling Rate. This is the number of samples, in pixels per inch (ppi), that are taken by a scanner per linear distance as determined by the CCD array, the optical system, and the motion of the carriage. The optical sampling rate for a scanner is specified as the pixels per inch in the x direction (across the page) and the y direction (down the page).

In the x direction, the optical sampling rate depends on the CCD layout and the magnification of the optical system. For example, a CCD with 2,550 elements applied across an 8.5-in image width has an optical sampling rate of $2250/8.5 = 300$ ppi in the x direction.

In the y direction, the optical sampling rate depends on the distance and speed at which the carriage moves relative to the exposure time of the of the CCD. For example, if the carriage moves $1/300$ in during a CCD exposure time, the y-direction optical sampling rate is 300 ppi.

ppi (pixels per inch). Ppi is often used interchangeably with dpi, although a dot is a bilevel entity, either on or off, and a pixel can hold multiple levels of information. For example, for an eight-bit scanner, one pixel has 256 possible values.

Resolution. For a scanner, resolution is the degree to which the scanner can distinguish detail. Resolution is dependent on items such as optical sampling rate, lens quality, filter quality, and carriage motion.

Threshold. A value to which a signal is compared when transforming from a multilevel value to a binary value. In a binary scan, parts of the image below the threshold will be recorded as black and parts above the threshold will be recorded as white.