



# Tech Info Library

## PhotoGrade: Description (4/93)

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### TOPIC -----

This article describes PhotoGrade printing technology, Apple's proprietary technology that uses grayscaling and halftoning to provide high-quality graphic images on Apple laser printers.

### DISCUSSION -----

#### How Grayscale Images are Produced -----

While many graphic images are grayscale, laser printers can only print black dots or no dots (which produces white areas). To print gray images, laser printers must convert grayscale images into black and white images for printing. This process is called halftoning.

Screening, the most popular halftoning technique, uses a matrix of black and white pixels to simulate shades of gray. Each matrix of pixels is also known as a halftone cell or screen. As you add more pixels to the halftone cell, you have more shades of gray available.

The size of the halftone cells determines the screen frequency. Screen frequency is defined as the maximum effective image resolution of the printer for a given size halftone cell. As the screen frequency increases, the number of gray shades decreases.

#### How PhotoGrade Works -----

PhotoGrade optimizes graphic images to provide the maximum possible screen frequency with the largest possible number of gray shades.

PhotoGrade increases the number of gray shades available. It uses a custom ASIC to allow the laser to fire at shorter than normal intervals, which produce smaller dots than normal. This, in itself, produces more gray shades. Once smaller dots are produced, PhotoGrade can intelligently select which gray shades are most distinct and thereby provide more apparent gray shades.

PhotoGrade also combines halftoning with its grayscaling ability. Because PhotoGrade has so many more gray levels for each pixel, a much smaller

halftone cell can be used while providing more gray shades. This results in a higher effective resolution and produces sharper images.

PhotoGrade can produce up to 91 levels of gray on the LaserWriter Select 300 and LaserWriter Pro 600 and 630 with a 106 line halftone screen. Without PhotoGrade, 600 dpi laser printers produce 33 levels of gray and 300 dpi laser printers produce 9 levels of gray with a 106 line halftone screen.

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