 Tech Info Library

PhotoGrade: Description (4/93)

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TOPIC -------------------------------------------------------------
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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.

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DISCUSSION --------------------------------------------------------
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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
while 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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