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LaserWriter Printers: Available Line Screens (1/97)

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TOPIC ----------

This article provides the line screen for all Apple LaserWriter printers, plus some common questions about line screen and printers.

DISCUSSION ----------

Line Screen of Apple LaserWriter Printers
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Here are the default line screens for Apple LaserWriter printers. These values are taken from the PPD files. Many applications such as Quark Xpress, PageMaker, and Illustrator allow you to change the line screen since these applications create their own PostScript code.

Begin_Table

Model	LPI	Screen Angle
LaserWriter	60	45 degrees
LaserWriter Plus	60	45 degrees
LaserWriter IINT	60	45 degrees
LaserWriter IINTX	60	45 degrees
LaserWriter IIf	60	45 degrees
LaserWriter IIg	106	45 degrees
LaserWriter Pro 600	85	45 degrees
LaserWriter Pro 630	85	45 degrees
LaserWriter Pro 810	60	45 degrees
LaserWriter Select 360	85	45 degrees
LaserWriter 4/600	106	45 degrees
LaserWriter 16/600 PS	106	45 degrees
Color LaserWriter 12/600 PS	200/141	
Color LaserWriter 12/660 PS	200/141	

Personal LaserWriter NT	60	45 degrees
Personal LaserWriter NTR	60	45 degrees
Personal LaserWriter 320	53	45 degrees

End_Table

Common Line Screen Questions
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Question: Is line screen dependent on DPI or the printer? - meaning will every 300 DPI printer have the same line screen.

Answer: Not necessarily. There are two different issues here:

1) Line screen IS partially dependent on dpi, and enhancements like PhotoGrade.

2) The line screen on any printer can be changed with programs that generate their own PostScript.

Two 300 dpi printers can have the same line screen, however, may produce different results if one has PhotoGrade; PhotoGrade technology in effect increases dpi.

Line screens (LPI) are based on the number of horizontal dots in a halftone cell and the printer's DPI. Thus, a halftone cell of 2x2 has 2 dots horizontally which provides a 150 line screen on a 300 DPI printer, or a 300 line screen on a 600 DPI printer. A halftone cell of 1x1 has 1 dot horizontally, so produces a 300 line screen on a 300 DPI printer, or a 600 line screen on a 600 DPI printer. Note that line screens equal to the printer's DPI are only useful when printing text since the levels of gray equals 2, black and white -- gray value of 2 is calculated by the following:

((300/300)**2) + 1, or ((600/600)**2) + 1.

Note:
The maximum line screen can never exceed the dpi of the printer (for example, 300 LPI maximum for a 300 DPI printer), and programs such as Quark Xpress only allow certain line screen values between 15 and 400.

Question: Is line screen a fixed number on the printer, or can all printers print at different line screens?

Answer: Line screen is changeable on most all Apple printers. In our tests with the LaserWriter IINTX, for example, you are able to change the line screens to values like 15 LPI, 50 LPI, and 61 LPI and observe noticeable changes - greater levels of gray. On older printers like the LaserWriter IINTX, changing the line screen to greater than half of the dpi (for example >150 LPI on 300 DPI printers) resulted in no noticeable change. These printers have a "threshold" value that they do not exceed. For most of the older 300 DPI printers, the threshold line screen is 150 lpi since that provides 5 levels of gray ((300 DPI/150 LPI)**2) + 1. Any line screen value above 150 for a 300 DPI printer would produce less than 5 levels of gray (which the printer's ROM deems as

useless), so the printer does not go beyond a 150 line screen.

Line Screen Summary
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The following relationship best summarizes what LPI really means:

- Increased LPI results in increased resolution, but decreased levels of gray.
- Decreased LPI results in decreased resolution, but increased levels of gray.
- Basically, as lpi approaches dpi, resolution is increased but the number of dots in a halftone cell decrease, resulting in less number of grays.

The best way to see all of these effects is by printing a picture of a person's face with some large text in the background, at 50 LPI and 100 LPI on a printer like the LaserWriter Pro 630.

Article Change History:
31 Jan 1997 - Added Color LaserWriter 12/660 PS printer.

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