One of the reported advantages of Canon's ipfx100 series of printers is their speed. In fact, in this document http://www.digitalgraphicsresources.com/Pr...ive%20Guide.pdf, which is labeled a competitive brief, the claim is not only made that the Canon printers are faster ... but remarkably faster than even Epson's fastest printer, the 11880. In this article it states "Customers who need to work efficiently may be frustrated by the Stylus Pro 11880 printer's slow throughput speeds. In Fine Mode (720dpi), it prints at approximately 51 square feet/hr; in SuperPhoto Mode, it slows down to around 24 square ft./hr., making it approximately 60% to 70% slower than the iPF9100 printer!"

I happen to have both an iPF6100 as well as an Epson 11880, as does Michael Reichmann, and we have both expressed our opinion we feel the 11880 printer seems faster of the two. I use both printers extensively .. the Canon at my office, and the Epson when I am home. I have used them without regard to quality or speed, as I feel they are very close and both produce stunning quality. This seeming speed contradiction has been discussed, with some requesting some testing to try and understand it.

Unfortunately, it isn't as easy as throwing a sheet of typing paper into each printer with a stopwatch. In fact, the statement quoted earlier leaves out one important concept ... is the quality of the print the Canon produces at this faster speed as good? Or even nearly as good for that matter? These two printers are very different animals, with different base resolutions, different dot densities, indeed different screening algorithms. As a case in point, the Epson 11880 is capable of applying approximately 45% more dots per square inch of material than the Canon (2880x1440 vs 2400x1200, or 4,147,000 dots/sq. inch vs 2,880,000 dots/sq. inch). Additionally, it's minimum dot size is slightly smaller, and according to Epson, it can place those dots at a far more consistent size, shape, and with a greater degree of accuracy than any other printer at this time.

The Epson has 3 useful resolutions, SuperPhoto (2880dpi), SuperFine(1440dpi), and Fine (720dpi). Within those base settings, 3 other options are available. The most obvious is High Speed .. when enabled the printer operates bi-directionally, otherwise it operates uni-directionally. Another setting is labeled Microweave. According to Epson, this setting reduces banding and thus may improve output quality. It is enabled by default at 2880 dpi and cannot be turned off, it is optional at the other two settings. The last option is called Finest Detail, and according to the documentation this setting is not designed for use with photographic subject matter, and is also not recommended for large files. This leaves us with 10 possible high quality settings available for photographic images. The printer has lower quality settings as well, but these are only available for lower grade paper types, and not even available for any photographic quality papers.

The Canon printer also has a myriad of quality options. It is a little more complicated because they are more limited by paper types than the Epson. The basic quality levels are 600dpi Highest, 600dpi High, and 600dpi Standard. In the Windows drivers, and in previous drivers on the Mac, these correlated to "passes" ... 16 pass (Highest), 12 pass (High) and 8 pass (Standard). Again, all 3 settings can be done bi-directionally or in a single direction,

leaving us with 6 levels of potential quality. However, on certain paper types, another option is allowed, called High Precision printing. This setting is not available using their "special" paper types, but many of the photo gloss and photo satin paper types allow this option. When selected this enables what is described by some as "32 pass" printing, and represents the printers highest potential quality output. This leaves the Canon with a total of 8 levels of potential quality. The Canon also has some lower quality options that become available with lower grade papers, again not available for higher quality photographic grade papers.

I first set about trying to quantify the throughput speeds of each printer. This isn't too challenging, pretty much print something with a known size using a stopwatch, and do the math. I used Bill Atkinson's Lab Test Page.tif, and simply cropped a 24"x15" (2.5 sq. ft) section from the center of it. I also created a 60x15" version of it by duplicating that section so the entire page was covered to use on the Epson with 60" paper. The resulting document requires nearly 100% ink coverage. I by-passed the safety interlock of the Canon cover so I could easily see the head, and proceeded to time how long it took to print this document at various quality settings. Time was started when the head began moving across on it's first pass until it stopped on the last pass. Not perfect, but within a second or so. On the Canon I timed the plug-in versus the OS driver and verified this didn't affect print speeds. Obviously this test only applies to how fast each printer lays down ink. All tests were done with Mac OS X 10.5.1 and the latest drivers I could find. One thing I found with both printers was using the built in Ethernet interface can affect speed ... the network itself may not be able to handle the data, and cause the printer to hesitate between some passes. I've observed this before and have never paid too much attention to it, but to eliminate this issue and increase accuracy I used the USB connection for both printers. This eliminated any visible hesitation.

So here are the raw speed numbers from both printers at a multitude of quality settings. All times are on 24" wide paper unless noted.

Epson 11880 2880 dpi uni-D, Microweave on, 12.33 sq. ft/hour
Epson 11880 2880 dpi bi-D, Microweave on, 21.42 sq. ft/hour
(increases to 25.5 sq. ft/hr on 60" wide paper)
Epson 11880 1440dpi (uni-D), Microweave on, 23.43 sq. ft/hour
Epson 11880 720dpi (uni-D), Microweave on, 31.47 sq. ft/hour
Epson 11880 1440 dpi bi-D, Microweave on, 33.08 sq. ft/hour
Epson 11880 1440 dpi bi-D, Microweave off, 40.9 sq. ft/hour
Epson 11880 720dpi (bi-D), Microweave on, 43.9 sq. ft/hour
Epson 11880 720dpi (bi-D), Microweave off, 50.56 sq. ft/hour
*Epson 11880 360dpi (bi-D), Microweave on, 116 sq. ft/hour
(all tests are Finest Detail off. This setting is not designed for photographic images and is not recommended for large files)

Canon ipf6100, 32 pass, 600dpi Highest (uni-D), Precision on, 8.55 sq.ft/hour
Canon ipf6100, 16 pass, 600dpi Highest (uni-D), Precision off, 17.14 sq. ft/hour
Canon ipf6100, 32 pass, 600dpi Highest (biD), Precision on, 17.45 sq.ft hour
Canon ipf6100, 12 pass, 600dpi High (uni-D), 22.22 sq.ft/hour
Canon ipf6100, 16 pass, 600dpi Highest (biD), 34.75 sq/ft hour
Canon ipf6100, 12 pass, 600dpi High (biD), 44.11 sq/ft hour
Canon ipf6100, 8 pass, 600dpi Standard (biD), 66.6 sq ft/hour
*Canon ipf6100, 300dpi Standard (biD), 133.3 sq ft/hour
(Precision is only available at the Highest setting on certain paper types, unless noted precision was off)

*Please note that on both printers the fastest setting is listed as a reference, is a setting I would never use, and is not even available on any high quality paper types.

As you can see, each printer's speed is affected dramatically by the quality choices selected. At the maximum quality setting available to each printer, the Epson is faster (12.33 vs 8.55 sq. ft/hr.) As you move to lower quality settings, both printers trade quality for speed. But here's where it gets complicated ... which settings on which printer are "equivalent" quality? The quote from the article specifically states SuperPhoto mode, and 24 sq. ft/hour as being 60% to 70% slower than the Canon iPF9100. In SuperPhoto mode with 24" paper my tests shows throughput of 21.4 sq. feet per hour. If I extrapolate out the speed being referenced by this article, it sounds like they are comparing the Epson to the speed of the Canon at its 600dpi Standard mode.

Let's be honest ... if I want to print things faster, I can also do so on the Epson ... I can print things much faster. But after printing extensively on both printers, one thing I'm quite confident of ... the Epson at 2880dpi SuperPhoto mode is definitely higher quality than the

Canon at 600dpi standard mode. Why they think it is acceptable to compare the speeds at these two quality settings is beyond me ... not appropriate by any stretch.

I decided to make some attempt at establishing which settings might be comparable between the two printers. This is a pretty difficult task, and I'm sure many "experts" will challenge my methodology, but I'm not an expert, so I devised a somewhat simplistic approach .. print a bunch of prints and compare them visually. Sure, I could scan them and look at dot patterns and density, but to be honest, when you do that you are dismissing the very property that makes the printing process work ... the way our eyes blend the dots into colors and details.

One other thing makes this task very challenging ... both printers produce outstanding quality, and it is difficult to find anything in any of them to say one is better. This even applies to prints from the same printer ... prints at various quality settings on each printer yields remarkably identical output, and what differences can be found are extremely minor.

But I at least needed to try, or the speed tests have little meaning. As I said, my methodology was pretty simple. I resized Bill's Lab Test Page.tif WITHOUT interpolation to a 20" tall print. This yielded an image file that was not native to either printer. I printed the print at most of the quality settings available (on the Epson I enabled Microweave for all prints, on the Canon I used the plug-in in 8bit mode). All prints were printed on a brand neutral paper, Kodak Professional Glossy. Both printers were profiled using Bill Atkinson's 5202 target, read with an EyeOne i0 table, and generated with ProfileMaker 5.08. The Canon profile is a new one, and does use the correct "color match" option. Finally, I decided to use the Relative Colorimetric Intent with Black Point compensation on to avoid variations that may be due to the way the Perceptual Intent was created in the profile. The profiles were made on the Epson at 2880 dpi, on the Canon at 600dpi Highest with precision off. (16 pass). I will admit for "perfect" results I would need to profile both printers at each setting, but I don't have that kind of time, and to be honest, most of the differences are not seen in saturation and gradations, but more in visible dithering in some regions ... and I believe the dithering would remain unchanged despite the profiles. Additionally I had each printer perform an auto head alignment before printing the test prints.

Once the prints were made, I asked a colleague of mine who happens to be a great photographer but also very technically savvy to help me examine the prints. We looked at several "sets" of prints, but were unaware when looking at the prints which printer and settings was used. The first set was to take all of the prints from each printer individually and order them by quality. I knew this would be challenging, and indeed there are no visible differences in almost the entire print, but we discovered a couple of areas in each print where dithering could be seen to change visibly, this is without the aid of a loupe, only reading glasses in my case. When we were finished it was apparent that both printers increase in quality directly corresponds to it's decrease in speed. While each step the difference is quite miniscule, there were differences.

We then compared the top 2 prints from each printer. All four of these prints are remarkable quality, but the Epson at 2880dpi uni-directional print had the least amount of visible dithering in the skin tones in the 4 portraits, with the Canon 600dpi Highest precision on uni-directional print next, followed by the Epson bi-directional and the Canon bi-directional. Again, we placed these prints in this order without knowing which print was printed on which printer. We felt the Epson prints were very slightly sharper in a couple of very select regions, such as the printing in the face of the clock.

We then compared the Epson midrange quality against the Canon, and here we both order the 1440dpi prints from the Epson very slightly ahead of the Canon prints at Highest or high. Another set of prints included the 720dpi uni-directional print against the Canon Highest and Epson 1440 bi-directional, and we were surprised the 720dpi uni-directional print seemed the best.

Finally we compared the Epson 720dpi with microweave on against the Canon at Highest and High. In the first case, they are very close. The Epson still seemed to have an edge on sharpness, but the word miniscule may be overstating the difference. However, the Canon seemed to have a slight edge in the visible dithering in the skin tones. We ordered the prints Canon Highest, Epson 720dpi, and Canon High, feeling that the dithering in the Epson and Canon High were nearly identical, but the Epson had that miniscule edge in sharpness.

The Canon at Standard had increased dithering, less sharpness, and a light loss of saturation. It didn't seem to measure up to any of the other prints in the test. I will admit this saturation loss could be from the profile. The Epson profile worked great at every quality setting, (which surprised me a little). This perhaps didn't work as well for the Canon, and I plan on testing it. So while the profile admittedly may resolve the saturation issue, and may even improve apparent sharpness, I do not believe it will compensate for the increase in dithering.

So there you have it. I believe Canon's statement I quoted earlier is misleading, and even somewhat irresponsible. When I try to "match" quality levels, the Epson is a faster printer. At the top end this is very apparent, especially if you want to use uni-directional mode where the Epson has a distinct advantage, because it returns the head at about 3x it's printing speed, whereas the Canon head moves at a constant speed whether it is printing or not. The speed differences were less so as you move to a notch below maximum quality. Only if you accept the Canon's lowest high quality setting as good enough will it win over the Epson in speed, but 66 sq. ft/hour vs 50. sq. ft/hr isn't any 60% to 70% faster, and is only obtained by again slightly decreasing quality ... in fact this is a setting which the Epson has no equivalent. Personally I never use that setting, and never will.

In conclusion, let me state one last time that the differences are extremely small. Even comparing the Epson at it's highest quality settings available at 2880 dpi against it's own much faster settings available at 720 dpi yields differences so small that most comparing them side by side may not even see them, or may dismiss them as insignificant. My goal

wasn't really to prove the 11880 was faster, but more in the response to the ridiculous claim quoted from the article. However, at the ranges I tend to use in both machines on my various choices of paper, my personal impressions stated earlier tend to be true, the Epson is faster.