

# Size Matters: Paper Size vs. Print Size

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## Background

This month we deal with another topic that seems simple on the surface but can get rather complex when you actually start dealing with it. In this article we uncover some differences in how paper is handled by printers and we'll learn how to avoid some common problems that can leave you rather surprised at the difference between the size you *chose* to print and the size that *actually* comes out of the printer.

## How your printer sees your paper

Loading a sheet of 8.5 x 11 paper into your printer seems like such a simple thing. You might be tempted to think that your printer sees the same 8.5 x 11 paper that you see and that it should be able to print any size print up to 8.5 x 11 on that paper.

Unfortunately it is rarely that simple. Most printers default to a mode that can only print on a portion of that 8.5 x 11 paper. Your printer for example, may only be able to "address" an 8.0 x 10.7 inch portion of the paper. To make matters worse, the 8.0 x 10.7 rectangle that is available for printing on the 8.5 x 11 paper is usually off-center meaning that you could print something as large as 8.0 x 10.7 but if you do, it will not appear centered on the page.

So you've fed a sheet of 8.5 x 11 photo paper into your printer only to discover that the printer can only use an 8.0 x 10.7 inch area on that paper, leaving uneven borders around the edge that the printer sees as inaccessible. The reason that your printer cannot print in these edge/border areas is due to physical limitations of the printer itself. The print head must have enough time to accelerate for example and get up to a constant speed before spraying ink and must decelerate at the opposite side of the page, creating the left/right borders. The paper itself must be able to load and be moved accurately by the rollers, which creates the top/bottom borders. These limitations mean that there is a "printable area" on the page that is smaller than the paper itself, and that this printable area is an area inside which the printer can operate optimally to produce the highest quality prints. There are often driver options that can affect these limitations, so read on.

## Understanding print driver jargon

We already mentioned some limitations which may not allow you to use an entire sheet of paper from edge to edge and top to bottom. These limitations cannot be overcome by printing software because the limitations are part of the printer's physical design. If you are willing to live with some compromises, however, they can sometimes be overcome or changed by selecting certain options in the print driver. Let's take a look at some

common print driver options that allow you to change the printable area on a given page.

***Note that not all options are available in all drivers***

- **No options checked:** If none of the options below are checked, it is likely that your printer will only be able to print to a portion of the page as described above. If you do not specifically select any options most printers will have a border along all 4 edges ranging from about .1 inches up to possibly .6 inches. This leaves you with a maximum print size that is smaller than your paper size of 8.5 x 11. Note that some drivers call this default printable area "maximum" in contrast to "centered" below.
- **Centered:** Some drivers have a "centered" option. This option simply adds more margin to the default margins so that the printable area is centered. If the default margins for top and bottom are .3 on top and .5 on the bottom for example, the "centered" option will simply add .2 inches to the top margin so that both the top and bottom margins are .5 inches. Obviously this option has an undesirable side effect in that it will always reduce the size of the printable area. In our example, unchecked you might have been able to print 10.7 inches tall and now with "centered" checked, you can only print 10.5 inches tall.
- **Borderless or "no margins":** Many newer printers offer a "borderless" mode activated by checking the "borderless" checkbox in the driver, usually under the "Page Setup" tab in the driver. Checking this box actually activates quite a number of features along with some compromises. Note that borderless mode may not be available (selectable) for all paper sizes and all types of paper, so you may find the option disabled when you are printing on 8.5 x 11 paper while it is available for 4x6, 5x7, and 8x10 paper. All printer models are different in which paper sizes and paper types support borderless printing. Borderless mode, if it is available for the paper size you are using, will allow you to print on the entire paper surface, but doing so will create a number of issues to be aware of (see "The borderless conundrum" below). Note that "no margins" is similar to borderless except that "no margins" generally only removes the left/right margins: top/bottom margins remain.

## **The borderless conundrum**

We've discussed how most printers and print drivers behave in their default configuration and that you will likely not be able to produce a print as large as the full paper size you are using. Many newer drivers, however, offer an option called borderless printing. Borderless printing basically allows you to put ink on the entire page without having any white space or "borders" on the left, right, top, or bottom. Activating borderless printing by checking "borderless" or "no margins" in the print driver, however, does more than just allow your printer to access the entire page, and creates a new set of issues to deal with.

- **Quality:** Most of the time, print quality will decline near the edges of the paper. You may be warned about this when you select borderless in the driver. Honestly, I've never seen any noticeable decline in print quality except some slight banding on older printers. The difference in print quality in the middle of the page versus the edges is subject to many factors including printer model and the type of paper being used.
- **Overspray:** First we have to realize that paper loading mechanisms are not perfect. There is some "slop" when your printer loads the paper and it can be off by as much as 1mm left-to-right when loading and the paper rarely aligns perfectly parallel with the guides. This slop in the mechanism means that if you were to print a 4x6 print on 4x6 paper, you would end up with tiny slivers of white on one side and a tiny sliver of the print missing off the other edge. The bigger the print size, the harder it is to keep the paper aligned through the entire printing process. To overcome this problem, most drivers create some overspray which actually prints part of your photo off the edge of the paper onto a sponge. That way, if the paper slips a bit one way or the other, something is still being printed all the way up to (and beyond) the edge of the paper, thus eliminating white slivers at the edges of the paper.
- **Expansion:** If you print a photo at 4x6 inches on 4x6 paper, for overspray to be able to account for slack in paper loading, there obviously must be some expansion (enlargement) of the image. In reality, your 4x6 photo has to be expanded to something like 4.2 x 6.2 inches so that about .1 inch of the photo prints off the edge of the paper. This is where most of the confusion begins with borderless printing. Due to the fact that your print driver expanded your 4x6 print and is printing part of the photo off the edge of the paper, there will be some cropping of the image at the edges. Some print drivers allow you to adjust the "amount of extension" but be aware that most drivers will not allow you to turn expansion (AKA extension) off completely because doing so usually results in small slivers of white on one or more edges.
- **Print size surprises:** Due to the way print drivers enlarge images when borderless mode is selected, your prints will always be a little larger than the size chosen. This is usually not a big problem if you are printing one photo that covers the entire page such as a 4x6 on 4x6 paper because the fact that the photo is slightly enlarged to 4.2 x 6.2 and a small sliver of the photo is missing at the edges will go unnoticed unless important parts of the photo are very close to the edges. If you decide to print four 3x2 prints on borderless 4x6 paper, however, you will notice that your 3x2 prints are a little larger than expected due to borderless size expansion. You may also notice that a small piece of your 3x2 prints is missing along each edge of the paper because the side adjacent to the edge of the paper will have some "overspray" that printed beyond the edge of the paper. These issues can be confusing when exact cropping and sizing are needed. It can be very difficult to obtain exact cropping and sizing when using a print driver in borderless mode.

- **Printer maintenance surprises:** If you are someone who prints almost everything in borderless mode, you may eventually be surprised with a printer maintenance message after printing thousands of borderless prints. Most printers keep track of how much ink is being sprayed onto the overspray sponges or overspray tanks and you may get a message that the printer needs maintenance to clean/empty the sponge/tank that holds the ink overspray. You may not even be able to continue printing until the maintenance is performed. The counter that tells the printer when the overspray sponge/tank might be full is only incremented when borderless mode is being used so be aware that excessive borderless printing may actually result in extra printer maintenance. Please don't email me and ask how many borderless prints you should expect before this happens because I have no idea and I do not believe that information is readily available. :-) I only know from experience that I've seen it happen on inkjet printers from more than one manufacturer.

### Some borderless printing tips

- Borderless printing is usually fine if you are printing a single photo per sheet such as one 4x6 on 4x6 borderless paper, one 5x7 on 5x7 borderless paper, etc. The fact that the driver slightly enlarges the photo so that some of it prints beyond the edge of the paper is of little consequence for most snapshots.
- You should probably try to avoid borderless printing if being able to get an exact crop (an exact portion of the image) or being able to print at a specific size is paramount. When important details in the image lie near the edges or there is a frame that is being printed around the image, remember that your print is being "stretched" a bit so it won't be exactly the size that you specified and also remember that your frame or other important details near the edge of the photo may be cut off slightly. Borderless mode is also not recommended when printing posters that span multiple pages because it is likely that the edges of your poster will not align properly.
- Many Canon print drivers offer a selection called "amount of extension". If you slide the "amount of extension" slider all the way to the left, you can actually disable the driver expansion but be aware that doing so may cause small slivers of white border to appear on your paper because the paper cannot align exactly every time. Most other non-Canon drivers do not allow you to completely disable the print size expansion but some allow you to select less/more overspray which equates to less/more expansion.
- Qimage has an option that allows you to disable borderless print expansion even if the driver does not allow it to be disabled. You can click "Page", "Borderless Overspray/Expansion" and then choose "disable" and Qimage will reverse the effects of the print driver enlarging your photos. While disabling overspray/expansion will ensure that your prints print at exactly the size chosen, you will be subject to the slop in the printer's paper loading mechanism and you may see some small slivers of white along one or more edges. If your printer's paper loading mechanism is consistent in that it always loads the paper a little

too far left creating a tiny white sliver on the left of the page, you can compensate using margins in Qimage. With a little experimentation, this method of borderless printing will allow you to get exact sizes without the driver's artificial enlargement and will also allow you to eliminate all but the thinnest sliver of unprinted white border.

- Whether your driver allows you to disable expansion completely in the driver or you do it with software such as Qimage, be aware that with expansion disabled, you will now be printing exactly the size that you specified. Printing exactly a 4x6 on paper that is exactly 4x6 inches means that any slop in the paper loading mechanism is going to show up on your prints as a white sliver on one side and a sliver of the image missing off the opposite side. Loading more sheets of paper or even a different brand paper may cause paper to load differently which can cause the slop in the loading mechanism to change. In general, you can usually remove all but a tiny hairline margin that may or may not be bothersome depending on the type of work you are doing. Just be aware that disabling borderless expansion has its tradeoffs.

## **Summary**

Your printer has some inherent physical limitations that will likely not allow it to print over the entire surface of the paper you are using regardless of paper size. These limitations are recorded as unprintable margins which are reported to printing software. Printing software will honor these limitations/margins. Unprintable margins can be eliminated by using borderless printing mode, if available in the print driver, but borderless printing opens up a new set of potential problems such as unwanted print (size) enlargement and cropping due to overspray and expansion by the driver. Being aware of the limitations of each printing mode as they relate to what you can actually print on your paper will help you avoid surprises when printing.