

Bar Code Label Problems: "Ladders" vs. "Picket Fences"

Socket occasionally hears from customers complaining that our bar code scanners won't scan a particular bar code on a particular label. Rarely, the reason is that the bar code is based on a symbology (such as the proprietary Italian Pharmacy symbology) that our scanners do not support. More frequently, however, the cause is the poor quality of the bar code label, which is almost always related to (a) the quality and resolution of the label printer, which should be at least 200 dpi; and (b) the formatting of the label and the direction in which it is printed. The quality of any given bar code label printer is easily determined and corrected if necessary, but the formatting and print direction can cause bar code reading problems that most people don't realize.

Label printers are designed to handle a maximum label width. Most label printers will handle 2 - 4 inch wide label stock, and more expensive printers will handle 6 or even 8 inch stock. Label stock is available in many different sizes and shapes, but 2 inch wide and 4 inch wide stock are by far the most popular. Labels requiring a large amount of text and/or bar code(s) can be as long as necessary, such as 2" x 4", 2" x 6" or even 2" x 8". Because of the way a label printer works, however, the orientation of the bar code on any label and how it comes out of the printer is critical to the quality and readability of the code.

Label printers create the characters, images or bar code(s) on a label by hundreds of tiny heating elements in the print head that either cause special label paper label stock to turn black when heated (called a "Thermal" printer) or melt the plastic from a black ribbon onto paper or plastic label stock (called a "Thermal Transfer" printer). These heating elements heat up and cool off very quickly, but not instantaneously and not uniformly, creating irregularities in the leading and trailing edges of individual characters, images or lines on the label.

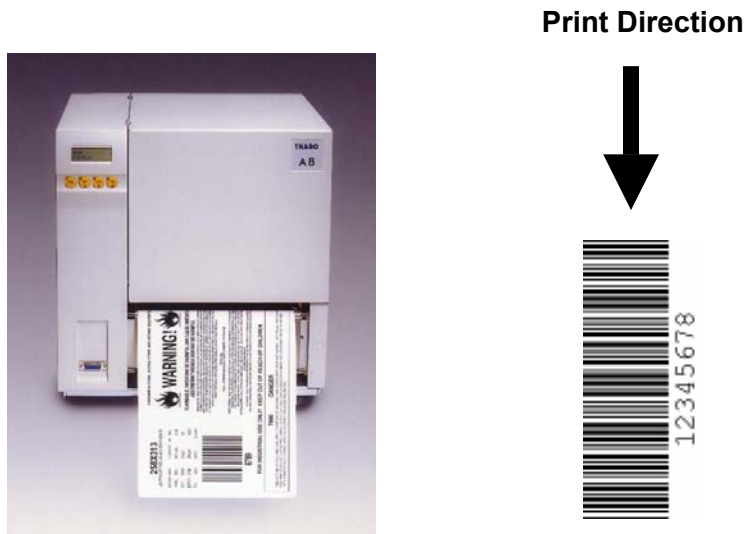
When the lines of bar codes are parallel to the movement of the label stock through the printer, the edges of the lines are typically very straight and crisp, making the code easier to read. This is referred to as printing the bar code as a **"picket fence."** See example below.

Figure 1. Printing a Bar Code as a Picket Fence



Conversely, when the lines of the bar code are perpendicular to the direction of the label stock through the printer, the edges of the lines tend to be fuzzy and irregular, making it much more difficult to read with any bar code reading technology. This fuzziness is usually easily visible and has an even greater negative impact on dense, small font bar codes. This is referred to as printing the bar code as a **"ladder."** See example below.

Figure 2. Printing a Bar Code as a Ladder



If you control the format and printing of the label, it's always best to print the bar codes on the label as "picket fences". If you're trying to read a label printed by someone else, all you can do is forward this document to them and urge them to reformat their labels — all of their customers are probably having the same problem!