How to Select the Right Printer for Your Applications

Selecting the right bar code printer requires more than understanding basic printing requirements; it takes understanding the entire printing and labeling environment from data source through the life cycle of the label itself. There are many variables to account for, but by following a few basic steps, and asking the right questions, selecting the right printer can be a straightforward task.

You need to understand:
- Printing location and environment;
- Label requirements (end use);
- Label environment (life cycle);
- Throughput requirements;
- Duty cycle and load requirements.

This article covers label printing, but many of the same principles apply to printing wristbands and cards.

Understanding the Labeling Environment

Look at where the label is to be printed and by whom. Will it be printed by a receptionist in an office, on a production line, in a laboratory, or in a yard or lot? Zebra offers a range of printers that meet labeling requirements for these environments and many more. For example, a metal casing may be required for industrial and warehouse settings while a smaller, more attractive, plastic-cased desktop model may be more appropriate for a reception area.

Investigating the printing location will usually provide good insight about what the label will be used for, how often labels will be printed, and what peak demand might be. This knowledge provides an opportunity to see if processes can improve. For example, would a mobile or cart-based printer make workers more productive? Would a wireless printer provide more flexibility in facility configuration?

Understanding Printing Requirements

Determine what type(s) and size(s) of media will be required for each printing location. Some locations need a variety of labels and media depending on the time of day, activity cycle, end use and other location specific variables. In some cases, you can suggest additional uses for the printer to optimize operations and printer utilization.

While a 4-by-6 inch label is common, some applications require larger formats. Although it's tempting to assume that a 4-inch print width is adequate, required throughput, optimal print speed and label quality must be considered to determine the best label size.

For example, if bar code symbols will be printed on a label, consistent bar code quality at maximum print speed is achieved when printing in the "drag" mode—that is, with the bars perpendicular to the direction of feed. That means for many 4-by-6 inch label formats, a 6-inch-wide printhead may be a better choice. Alternately, a pair of 4-inch printers might be appropriate to provide the required throughput without running a single printer at its maximum duty cycle. This would also provide the benefit, in mission-critical labeling environments, of ensuring at least 50 percent capacity in the event of printer failure, maintenance or another reason that a printer must go off line.

Printer selection also depends on duty cycles. It's important to understand total label production and peak production requirements. Does label production remain steady during the day, or will most labels be produced in a short period? What print speeds are required? Are there other factors that affect production requirements?

Printers that are run at maximum capacity for extended periods of time will need more frequent maintenance and cleaning. Specifying a printer with a greater maximum capacity than is minimally required will result in longer-term satisfaction.

There are more considerations for RFID smart labels. Encoding the RFID chip adds to the total time required to print a standard shipping label with bar code and human-readable information. There is also a small failure rate among RFID inlays which will require printing a new label. If RFID is to be included, now or in the future, this additional time and reprinting must be factored into throughput rates.

Understanding Label Life Cycle Requirements

Today's direct thermal media is more durable and less heat-sensitive than previous direct thermal media, but long-term durability usually requires thermal transfer media. Media selection is a separate topic but is one that must be included in selecting the appropriate printer. For long-term performance, it is important for the printer to be matched with the right media.

Understanding the Data and Format Environment

Whether you need to print labels, cards or wristbands, the data to be printed must come from some source. Zebra printers can be connected to wired or secure wireless LANs or run directly from a PC, controller or other data source. Zebra offers numerous interface ports and software solutions for connectivity with different IT systems and applications. Determine the current and potential connectivity requirements to ensure the printer is compatible.

Label designs and layouts can be generated externally or, with sufficient printer memory, invoked from stored formats, resident or downloaded images, files, designs and fonts. Evaluate the benefits of printer resident formats versus those of keeping them in a central location.

Labels can be output directly from Windows®, SAP® , Oracle®, and other applications using Zebra's XML and other integration resources, which provides flexibility not only in current applications but for future requirements as well. This flexibility also means that the label can be designed or populated with data in one location and actually printed in a different physical location—even in a different country. The ZebraNet™ Bridge Enterprise solution allows label formats and printers to be managed remotely from a single location.

Understanding the Corporate Environment

It's also important to understand future plans even if they aren't completely clear. With increasing requirements from end customers for RFID labeling, companies purchasing printers today should consider whether one or more should be a Zebra field-upgradeable RFID Ready printer to efficiently meet future demands. Whether or not RFID will be required, most companies plan on growth. Make sure that the specified printer has sufficient capacity over its life expectancy to handle reasonable growth.

As you can see, specifying the right printer for a particular application involves a number of interrelated factors. The checklist below helps guide organizations through the numerous printer options to find the model and features that best meet their needs.

Top Ten Topics for Specifying a Printer

Here's a basic checklist of questions to ask for each printing location:

1. What are the media requirements?
   • Will more than one type of media (label stock) be required?
   • What is the largest label to be produced?
   • Will RFID labeling be required now or in the future?

2. What is the purpose of the label—product labeling, shipping label, file folder, etc?
   • What are the durability requirements—customer or in-house?
   • What will be the label's environment—e.g., office, outside, in-transit, storage/handling?

3. What type of image(s) do you need to print?
   • Bar codes; what symbology and density?
   • Human-readable; which fonts, what size?
   • Graphics and logos?

4. What's the volume—day, week, month, annually?
   • How many labels are required in how much time; i.e. 1,000 all at once, or spread over three shifts?
   • What is the peak volume (number of labels produced)?
   • How many labels per minute need to be produced at peak times?
   • How often will peak volumes be required each shift?

5. Will the labels be used as they are printed, or will they be printed in batches for later use?

6. Are there any other bar code printers within the company?

7. Who will be using the printer?

8. What will the physical printing environment be?
   • Hot or cold?
   • Dirty?
   • Wet?
   • Inside or outside?

9. What is the host computer?
   • Hardware type
   • If PC based—networked or standalone?
   • Main application software—where will the data come from?
   • What type of interface is required; parallel, RS-232, Ethernet, wireless, USB, twinax, coax?

10. Where will the label formats be generated or stored?
   • In the printer
   • Label design software
   • Spreadsheets or databases
   • Other applications, e.g., SAP, Oracle, WMS, etc.