WHITE PAPER

MANUFACTURING

How the Right Printer Can Make a Difference for Manufacturers

Honeywell

summary

Information and documentation are essential components of everything that manufacturers produce and ship today, whether products need to be tracked through the production process or through the supply chain to the customer. Customer requests, regulatory requirements and efficient production processes all need information to flow along with products. While production is often automated, producing the necessary documentation often is not optimized.

Producing the job tickets, component ID and product labels to provide this information is a growing challenge. Unless the process is streamlined with a proper printer and media, manufacturers are building unnecessary cost and inefficiency into every product. This white paper explains how manufacturers can realize tangible improvement. It covers:

- How production processes can be improved by using printed labels and job tickets;
- Why sharing a general-purpose printer for office and production printing is an inefficient arrangement;
- How a dedicated thermal printer can reduce costs and errors.

Honeywell's PM series are a great choice for manufacturers, with their industrial ruggedness.

How Can Printers Help Manufacturers?

Handwritten work orders, job tickets and product labels take more time for workers to produce and process, and often contain errors that can lead to production mistakes, scrap and rework. The more that has to be written or transcribed, the greater the chance of a mistake. Studies have found that workers usually can't remember part numbers longer than seven digits and need to write them down. Once part numbers reach 15 digits, the probability of an error is close to 100 percent. Errors create costs and inefficiency, so company competitiveness should not rely on an employee's memory and handwriting.

Using printers to support production operations can help manufacturers in two primary ways. First, producing job tickets, bills of materials (BOM), work-in-process (WIP) tracking labels and other materials on a printer instead of writing them by hand saves time. Second, printing promotes quality and efficiency by reducing dependence on handwriting and enabling the use of bar coding. Bar coding provides fast, accurate identification and data collection, and it enables many processes that improve efficiency.

Manufacturers commonly use barcode systems to manage raw materials and finished goods inventory, track work in process, document the components installed and processes used to produce each product, automate quality control checks, validate orders prior to shipping and much more. Many benefits are available just by using printers and barcodes to produce job tickets and parts labels, as described below. Bar coding use cases and benefits for manufacturers are too numerous to fully cover here. HSM has numerous case studies, application briefs and white papers that explain barcode applications and document their benefits.

Job Tickets

Job tickets, and similar documents such as work orders or BOMs, may be generated from an enterprise software application and contain information from production control, order management and ERP systems.

If bar coding is used, the job ticket could be scanned at each production step to update manufacturing management and inventory systems in real time. By producing barcode tickets at the start of the process, more production steps can be recorded automatically, which increases visibility and traceability. Some manufacturers integrate bar coding with their production control systems so that scanning the job ticket at a workstation automatically programs the production machine. The scan links the work-in-process to a specific work order. The machine may use the work order information to apply a specific process (e.g. heat treatment), paint the item a specific color, or automatically route it to the next station.

Ideally the job ticket can be sent to a printer installed at the point of production, to eliminate travel time, enable just-intime printing and reduce the chance that orders will be mixed up. By sending print jobs directly from

the software system to the production line, no human intervention is needed to produce or deliver the job ticket. The process saves labor and eliminates errors that result from handwritten tickets.

Part Labels

Manufacturers can build traceability and information into every product by using barcode labels to identify parts, components and work in process. Barcodes can be used to encode product codes, serial numbers, lot codes, configuration information and other data to support production tracking, product genealogy and other applications. Using durable labels with barcodes makes it easy to automatically collect this information and gain visibility into production processes. For more details about these applications, see the Honeywell white papers, “Parts Traceability” and “Product Genealogy and 2D Revolution: How Evolving Business Needs and Improved Technology are Driving Explosive Growth.”

When preprinted labels are used for parts labeling there is high potential to mislabel parts, especially subassemblies that look similar but have different configurations or components. On-demand labeling at the point of use is the best practice to preserve identification integrity, and printing the information on a barcode makes it easiest to track the item throughout the production process. On-demand printing, the alternative to preprinting, also allows variable information (e.g. time of manufacture) to be included in the label. One manufacturer, ThyssenKrupp Budd, has cabled a barcode label printer directly to one of its parts-making machines. As soon as the machine finishes fabricating a part, it signals the printer to produce a part label, which is immediately applied and later scanned at subsequent production processes to provide work-in-process tracking. (See the case study, “ThyssenKrupp Budd Keeps Automotive Parts in Perfect Alignment with Smart Printer System.”)

Automotive component maker Webasto Roof Systems provides a good example of the benefits of work-inprocess labeling and tracking. Webasto manufactures sunroofs and must ship them to automakers in an exact sequence to support just-in-time production. When each sunroof passes the quality control inspection it receives a barcode label with a unique ID number.

A clerk scans the barcode label for each sunroof in the order in which it is loaded onto the shipping rack. The barcode scanner is interfaced to a printer, which holds the customer order and sequence requirement in an onboard database. If all the sunroofs on the rack belong to the order, and they have been loaded in the correct sequence, the printer automatically generates a shipping label. If not, it alerts the operator. Webasto credits the system with helping it attain 100 percent shipment accuracy, which eliminated $190,000 in annual expenses related to shipment error resolution.

These examples show just a few of the ways that manufacturers can benefit by using dedicated printers to support production. They also illustrate some of the drawbacks to the common arrangement of preprinting production documents and labels on a general-purpose printer that is shared among departments.

Why Use a Dedicated Printer?

Manufacturers periodically retool their shop floor as the production mix requires it or better equipment becomes available. Production printing and labeling operations also require periodic retooling, but many manufacturers maintain outdated processes. Why use handwritten job tickets that travel with work-in-process, or produce component and product identification labels on general-purpose printers, when more efficient processes are available? Using the right tool for the job leads to higher accuracy and efficiency.

Creating production documents and labels on a printer and adding barcodes saves time and improves accuracy. However, production printing can create other non-value-added costs. Sharing a general-purpose page printer among office and production workers adds unnecessary time, cost and errors to operations.

When a printer is shared for office and production purposes, productive time is lost each time the media is changed to support document, ticket or label printing. Plus, media options are somewhat limited, because laser and inkjet printers do not support all the label sizes and durable materials used for parts labeling and other industrial applications. More time is wasted if the printer is located in an office and the output needs to be delivered to the shop floor. The few minutes required for these tasks may seem inconsequential, but they add up to a surprising amount of labor time, as the following calculations show.

Assume a facility needs to print production materials (e.g. job tickets, parts labels) four times a day, and it takes about a minute each time to switch the media in the printer. In a year, media loading requires more than a day and a half of labor, which is an unnecessary productivity loss that can easily go unnoticed. The following calculation documents the time loss for the low-volume labeling process described above.

One minute to change & replace media done four times a day = 4 minutes per day.

4 minutes/day x 5 days/week = 40 minutes per week.

40 minutes/week x 52 weeks/year = 2,080 minutes per year.

2,080 minutes/year ÷ 60 minutes/hour = 4 days of labor spent annually changing media.

The PX series is built for round-the-clock manufacturing operations, for maximum uptime.

Now assume it takes just three minutes, round trip, for someone from the office to deliver the printed material to production, or for someone to leave production and pick up the labels.

3 minutes/trip x 4 trips/day = 12 minutes per day.

12 minutes/day x 5 days/week = 1 hour per week.

1 hour/week x 52 weeks/year = 5.5 days spent annually walking between the printer and production area.

Based on a 40-hour work week, the time spent picking up or delivering printed material equals 2.5 percent of a full-time equivalent's (FTE's) working hours.

Add the 52 hours per year required to deliver materials to the 34.67 hours spent changing the media to print them, and the total labor time required to use an office printer to support production operations is 85.67 hours annually, or more than two weeks of work for a full-time equivalent. Multiply this time by the average hourly wage and benefit costs for the employees to perform these tasks to see the labor cost impact of shared-printer processes. The average U.S. hourly wage for all production-related jobs was $16.79 per hour according to a May 2013 U.S. Bureau of Labor Statistics report.2 At that rate the printing process described above creates $1,391.28 in annual labor costs. A purpose-built printer to supplement manufacturing can be purchased for much less than that.

The Hidden Costs of Printing Problems

Lag time may be an even bigger problem than wasted time in shared printer operations. Instead of printing job tickets and parts labels as they are needed, many businesses preprint these materials at the start of the day to avoid repeated interruptions to office work processes. Preprinting has several drawbacks. First, it is inflexible. If production schedules, work orders, BOMs or the variable information used on parts labels changes, the related documents and labels will need to be reprinted, resulting in wasted time and materials. A more common problem is that workers apply the wrong preprinted label to parts, components, work-in-process or finished goods. This rarely occurs when labels are produced on demand, but becomes more common the more time elapses between when labels are printed and when they are applied.

Mislabeling can have serious consequences. If it occurs to a part, component or work-in-process assembly, a misconfigured final product could result. The misconfiguration will either go undetected, resulting in the wrong product being delivered to the customer, or will be detected and require rework or scrap. If finished goods are mislabeled, inventory will be inaccurate and the wrong product will be shipped to a customer, which could cause a new set of problems. These range from a simple complaint that results in an order correction (with additional shipping costs), to customer refusal of the order and possibly even fines or deductions, which are common in the retail industry.

A dedicated printer improves convenience – and productivity – by enabling labels and tickets to be printed exactly when and where they are needed. On-demand printing reduces costs in several ways. Reducing misidentified or unlabeled items reduces scrap and rework and the costs of making wrong orders right with customers. On-demand printing also saves time, and as the calculations presented earlier showed, the time spent changing printer media and delivering printed material to workers adds up to real money. These labor savings alone are enough to offset the cost of a printer and provide full return on investment (ROI) in less than one year.

Depending on the print technology and model chosen,a dedicated printer can also produce substantial supply savings compared to document printers that are used to print tickets and labels.

Printing processes impact the bottom line in ways most manufacturers do not realize. By carefully evaluating manufacturing printing processes and the printers used to support them, manufacturers can lower their operating costs and labor requirements, build quality control into processes and create a sustainable cost advantage.

Economy printers, like the PC42t shown here, lower the acquisition cost for thermal printing technology.

Why Use a Thermal Printer?

When you invest in new equipment, do you choose a product that can do a little bit of everything, or one that excels at the function you need it to perform? To remain competitive, does your business generally need to improve its responsiveness and expertise, or become more of a generalist? Do you apply these same principles to your printers?

Thermal printers are designed to produce labels and tickets in a range of working environments. Industrial models are available that have feature sets to enable high quality printing and a long product lifecycle in manufacturing environments, minimize maintenance and troubleshooting time for both users and IT support staff, and simplify integration with enterprise networks, host computer systems and software applications. These features provide reliability, convenience and quality advantages, and make dedicated thermal printers highly cost effective to support manufacturing.

Thermal printers have several distinct advantages over laser and inkjet models for manufacturing label and ticket printing. These advantages are summarized below.

- **Barcode convenience and quality** – Thermal printers can print many leading barcode formats right out of the box without requiring any additional software or font upgrades. For barcodes to be readable, the bars and spaces must be produced to very exact width specifications and must provide sufficient contrast between dark and light elements. Thermal printers produce very precise images, which is a major reason why thermal is the most-used technology for barcode labeling. Barcodes produced on laser and inkjet printers often look fine to the human eye but are unreadable by barcode scanners because of smudges, rounded edges, pock marks and other by-products of the printing process.

- **Speed** – Purpose-built thermal printers generally excel at first label out and total print time performance because they are optimized to print labels instead documents, have native support for barcode formats and can print commonly used label formats from on-board memory without having to access the files from a PC or server. The common printer speed metrics of pages-perminute (ppm) and inches-per-second (ips) do not provide a good measure of label printing speed. When comparing label printers, it is important to measure the time to first label (also referred to as first label out), which is measured as the elapsed time between when a user hits <print> and when the label is presented for use. Time how long a worker will have to wait for materials before he or she can complete the task at hand. Another metric, total print time, should be evaluated if operations call for workers to produce multiple labels simultaneously. Some printers require a pause between each label produced to process the next print job, while others can print nearly continuously after output begins.

- **Solution Customization** – Some thermal printers offer programming capability. This valuable feature enables manufacturers of any size or scope the ability to purchase or create and tailor their own custom labeling applications for their specific needs. Common USB devices and peripherals such as keyboards and scales can be attached directly to these printers providing a comprehensive labeling solution without the need for a computer. This provides an immediate cost advantage over traditional implementations, saving companies thousands of dollars in un-necessary hardware costs. This attractive feature set isn't just reserved for high-end industrial thermal printers either. Some of the newer thermal desktop printers offer this solution advantage, at a highly affordable price point.

- **Media support** – When inkjet or laser printers are used, the label media chosen is often based on what the printer can accept, rather than what material is best for the item being labeled and its production and storage conditions. Exposure to high temperatures, moisture, steam, chemicals and other conditions common to manufacturing can cause non-optimized labels to fade, run or dissolve, resulting in unreadable labels. Thermal label printers are designed to accommodate tag stock, polyester labels and other materials that would cause jams in generalpurpose document printers.

- **Media cost** – Thermal paper and label media generally costs less than comparable media for inkjet and laser printers. Thermal printers also result in less waste because laser and inkjet page printers cannot conveniently create single labels. An entire sheet of media needs to be loaded into the printer, even if only a single label is needed. The rest of the sheet will either be wasted, or can be reloaded, which then requires extra steps – one to reload, another to direct the printer (using the word processing or labeling software on a PC) to print on the remaining labels instead of on the backing where labels already have been peeled off.

- **Installation flexibility** – Thermal printers can be installed at the point of production because they are compact and durable enough for use on the shop floor. Wireless printers can be used where there is no network connection, and battery- operated models are even available for use where there is no power supply. This installation flexibility provides more than convenience. It makes workers more productive because it minimizes the distance traveled and time spent to pick up printed output.

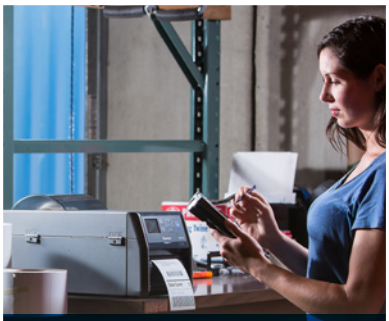
For more information about the cost and performance differences among laser, inkjet and thermal printers, see the HSM white paper, "How To Select the Right Label Printer." It includes a brief overview of how electronics manufacturer Belden saved $800 per month in supply costs by switching from inkjet to thermal printers. Another white paper, "Printer Productivity From Start to Finish," provides an in-depth presentation about features that affect user convenience and productivity.

Conclusion

When manufacturers need job tickets, parts labels and other product identification, the printing process and technology used should be a strategic consideration, not an afterthought. Printer location, print technology and whether or not to use barcodes all contribute to total operating costs because these variables impact labor time requirements, accuracy and error rates and your bottom line.

As information needs and cost pressures for manufacturers grow, so does the value of using a dedicated thermal printer. Sharing a general-purpose office printer for production printing builds inefficiency and cost into operations, because office printers are not optimized for the job. A dedicated thermal printer can quickly pay for itself simply by reducing the time spent collecting and delivering printed materials. The return on investment is even better when the error prevention and quality control benefits that thermal printers and the barcode processes they enable are considered.

Thermal printers are the right tool for many production printing jobs. They can efficiently provide the convenience of on-site, on-demand ticket and barcode label printing that manufacturers need, while preventing hidden, non-value-added costs they cannot afford.



With Smart Printing, there's no need to attach a PC to the printer; it can run standalone.

About Honeywell Printers for Manufacturers

Honeywell offers a number of printers ideal for manufacturing environments: the PX, PM, PD and PC series printers. These printers include many features that simplify setup and operations for manufacturers:

- Simple-to-follow icons or text instructions in one of ten native languages guide you to produce tickets and labels, change media and perform simple maintenance.
- Onboard intelligence enables standalone operations – eliminating the cost and complexity of an attached PC.
- Connect to other systems through Ethernet, CCX-compliant 802.11, Bluetooth, USB, serial and parallel interfaces.
- Support for common printer control languages, XML and RFID to provide compatibility with label formats and software applications that businesses already have in place.

Furthermore, these printers are compatible with existing infrastructure, are built durable to handle manufacturing duty cycles, and include powerful remote configuration capabilities – all of which makes first-time installation and maintenance easier. Use PX, PM, PD and PC series printers to enhance operations or replace other printers to take advantage of faster printing, more flexible media support, and native 1D and 2D barcode capabilities to add convenience and control to production labeling and tracking.

About Honeywell

Honeywell Scanning & Mobility (HSM) is a leading manufacturer of high-performance image- and laser-based data collection hardware, including rugged mobile computers and bar code scanners, radio frequency identification solutions, voice-enabled workflow and printing solutions. With the broadest product portfolio in the automatic identification and data collection industry, HSM provides data collection hardware for retail, healthcare, distribution centers, direct store delivery, field service and transportation and logistics companies seeking to improve operations and enhance customer service. Additionally, HSM provides advanced software, service and professional solutions that help customers effectively manage data and assets. HSM products are sold worldwide through a network of distributor and reseller partners.

For more information on Honeywell Scanning & Mobility, please visit **www.honeywellaidc.com**.

For more information:
www.honeywellaidc.com

Honeywell Scanning & Mobility
9680 Old Bailes Road
Fort Mill, SC 29707
800-582-4263
www.honeywell.com

How the Right Printer Can Make a Difference for Manufacturers
Rev A 05/15

Honeywell