

How Mobile Thermal Printers Cut Forms Cost Down to Size



A ZEBRA BLACK&WHITE PAPER





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Executive Summary

Quality, cost, convenience, and reliability advantages propelled thermal printers past impact printing and three-part forms as the output method of choice for mobile printing operations. Thermal printers now account for more than 70 percent of all printers used to support field service, direct store delivery (DSD), and other mobile operations, compared to just 16 percent for impact printers¹. Thermal printing has displaced impact as the technology of choice for mobile operations because of the total cost of ownership (TCO), reliability, and print quality advantages it provides. Organizations can reduce their supply costs alone by more than 55 percent by using compact thermal receipts and invoices instead of three-part forms. Many organizations that continue to use impact technology do so because of reluctance to change legacy operations, or because of misperceptions about thermal printing capabilities.

This white paper will compare thermal and impact printer performance for mobile applications, document the cost savings attainable by switching from 8 1/2-by-11-inch (216-by-279-mm) forms, explain why thermal technology is a cost-effective choice for invoice and receipt printing, and describe how thermal printers provide reliability and performance advantages.

Comparing the Technologies

Impact printers are similar to typewriters. Tiny needles strike a ribbon, which transfers ink to paper. Impact printers can mark three-part forms and were popular for operations that required this feature, although legibility often declines from the top copy to the bottom. Multi-part form marking provides no advantage in automated applications where records are stored electronically and only a single hard copy invoice, ticket, or receipt is printed for the customer.

Direct thermal printers create images using a printhead with multiple heating elements to apply heat to chemically coated paper. Each element heats an area directly below it on the paper. This produces a chemical reaction that causes a black dot to form in that area. The image is built by rows of dots that are formed as the media passes beneath the active edge of the printhead. No ribbon or ink is required because the image results from a chemical change in the paper itself.

Thermal printing provides immediate and long-term print quality advantages. Quality thermal printers and media produce crisp text, images, and bar codes that don't smudge when printed or fade over time. Some media can be archived for 10 years or more, which is important for service records and invoices that must be kept on file and is a major upgrade over many documents and three-part forms produced on routes.

Company logos and other graphics can be preprinted on thermal media or produced on demand. The need to improve print quality and the desire to enhance the graphics on its invoices motivated Heineken to switch from impact printers to thermal for route operations at its Spanish distribution subsidiary. The legacy impact printers frequently produced poor quality invoices, and could not print the well-known Heineken logo, which the company wanted to include on invoices to support its brand image. Converting to rugged thermal printers and high-quality media gave Heineken the flexibility to include logos and variable information on invoices, in addition to fast print speed and much better quality.

1. Venture Development Corp., "Mobile Transaction Printers: A Global Market Demand Analysis," March 2005

Measuring Supply Costs

By eliminating the ribbon, direct thermal printers eliminate a direct cost from mobile printing applications. A Zebra customer previously used impact printers to create customer invoices on its direct store delivery routes. The company purchased an average of just four \$3 replacement ribbons annually per route. Impact printing directly added \$12 per route to the company's operating costs, not including the time spent ordering and changing ribbons. Converting to thermal printing saved the company \$36,000 annually in ribbon costs alone. Higher-volume operations would save significantly more.

Thermal paper costs less than three-part forms, which gives thermal printing a significant long-term total cost of ownership advantage over impact. Common 8 1/2-by-11-inch (216-by-279-mm) three-part forms cost about 6 cents each. An 11-inch (279-mm) thermal invoice or receipt costs about 4.9 cents. Therefore, companies can reduce paper costs by 18.4 percent, or \$11 per 1,000 forms printed, merely by converting from impact to thermal for existing forms printing, exclusive of ribbon savings.

Updating route forms to the common 4-by-6-inch (102-by-152-mm) format can produce more dramatic supply savings. One Zebra customer redesigned its full-page route receipts to fit a 4-by-6-inch (102-by-152-mm) form, which has plenty of room for all the information and graphics used on the larger form. Because of the clarity of thermal printing, printouts are crisp and clear—even on the smaller document. The cost-per-invoice of the smaller forms is 2.7 cents, compared to 6 cents for the full-size sheet. The 3.3-cent cost-per-invoice reduction represents a 55 percent savings that will provide sustainable improvement to operating expenses. The high-volume distributor issues approximately a million invoices a month and will gain six-figure supplies savings. The standard 4-inch (102-mm) media rolls used in the company's mobile thermal printers last more than two days, so route professionals spend much less time changing paper than they did with impact printers.

Some companies have justified conversion from impact to thermal mobile printers almost entirely on the return on investment generated from media savings. Use the worksheets below to calculate the cost difference between impact and thermal supplies.

Annual supply costs for impact printing

Supply	Cost	# used annually	Annual cost
8 1/2-by-11-inch (216-by-279-mm) form	6¢		
Ribbon	\$3		
Total annual cost	–	–	

Annual supply costs for thermal printing

Supply	Cost	# used annually	Annual cost
8 1/2-by-11-inch (216-by-279-mm) form	4.9¢		
4-by-6-inch (102-by-152-mm) form	2.7¢		
Ribbon	–	0	\$0
Total annual cost	–	–	



Cut Costs, Not Content

Organizations that want to cut costs with 4-inch media usually don't need to cut content from legacy full-size forms. There is a misperception that full-size forms are necessary for receipts, invoices, and other materials used in mobile operations, when in reality smaller forms are acceptable and effective. Thermal printers can print information on the blank side of media that has been preprinted with terms, conditions, and other static information on the other. To enhance branding and create attractive printouts, other content can also be preprinted on the thermal paper, such as color logos, highlighted sections, or watermarks. Perforated media is compatible with thermal printers. Thermal printers can also produce all the same graphics, OCR characters, text, and images as impact printers, and the resulting form can last without fading or smudging.

With UV-coated thermal paper, receipts can last up to a year in normal conditions, and longer when kept in a file. Thermal print quality is often superior, especially when compared to the third page of a three-part form. Recall that at least four times more thermal printers than impact models are currently used for mobile printing applications; this is a clear indication that organizations have successfully adapted their output requirements to take advantage of reliable and cost-effective thermal printing.

Productivity Considerations

The combination of thermal media and smaller forms can also reduce the amount of time operators spend handling the printer, because roll-fed thermal printers can often produce more forms between media changes than sheet-fed impact printers.

Several thermal printer design features and available options create reliability and productivity advantages in mobile environments. Ribbon-free printing is an obvious example. Print-quality problems commonly occur when mobile workers forget to check and change printer ribbons. These problems often go unnoticed until a customer or office clerk complains about faint printing, by which time many more invoices or other documents may have been issued.

Many thermal printers offer Bluetooth® wireless connectivity to eliminate the cable between the printer and host computer, which improves ease of use and helps prevent damage. Bluetooth improves reliability and uptime in mobile operations by eliminating a source of cable damage and the resulting lost productivity and replacement costs. Bluetooth also gives the flexibility to remove the printer and use it apart from a computer, vehicle mount, or carrying case. Thus mobile thermal printers can be easily clipped to a belt or carried on a shoulder strap so workers don't have to make a time-wasting trip back to the vehicle to generate a receipt or invoice.



Conclusion

Organizations can improve print quality and simultaneously reduce supply costs by more than 55 percent by converting from three-part forms to compact thermal media. Modernizing mobile printing operations also enhances productivity without sacrificing the ability to print any desired information in the field. The widespread and growing adoption of thermal printers affirms the value and advantages the technology provides.

For more information about mobile printing technology and topics, visit Zebra's Web site, www.zebra.com, to access many free white papers and case studies, including *"Understanding Mobile Printing Technology and Capabilities,"* *"Improving Route Accounting with Mobile Printing Applications,"* and *"Take a Total Approach to Maximize Mobile Printer Performance and Value."*

Zebra Technologies has provided reliable thermal printers and supplies for thousands of routes and other mobile applications around the world. Zebra offers a complete line of mobile printers; more than 1,000 media options; top-quality replacement batteries, printheads, parts, and accessories designed specifically for use with its printers; and several flexible service plans. Zebra carefully designs, builds, and maintains its products to provide reliable performance in mission-critical applications. More than 90 percent of Fortune 500 companies use Zebra®-brand printers. Visit www.zebra.com for more information about Zebra mobile printers, supplies, parts, and service programs.



Notes



Zebra Technologies

333 Corporate Woods Parkway
Vernon Hills, IL 60061-3109 U.S.A.

T: +1 847 793 2600 or +1 800 423 0442

F: +1 847 913 8766

www.zebra.com

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