



Five Tips for Selecting the Best Mobile Printer

*How to Achieve the Greatest Value and Return
on Investment In a Mobile Printing Application*

WHITE PAPER

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EXECUTIVE SUMMARY

Mobile printers have proven that they can increase productivity, reduce operating costs, improve cash flow and revenues, and enhance customer retention in a competitive market.

But not all mobile printing solutions succeed. Some fail to provide the expected gains in productivity because of excessive downtime related to difficult operation, cumbersome maintenance, or poor reliability. Some fail to provide projected returns because expenses associated with deployment, operation, and maintenance erode cost savings.

Creating a successful mobile printing solution involves more than putting portable printers in the hands of front-line workers. You have to select the best print technology, media, connectivity option, and printer features for the particular mobile application.

The purpose of this white paper is to simplify the mobile printer selection process by providing a framework for determining which mobile printers represent the best value and opportunity for a return on investment (ROI).

The white paper briefly explores advantages and disadvantages of available mobile printing and communication technologies, and presents real-world examples of mobile printing failure and success.

Finally, the paper offers a printer selection guide comprising five tips, or criteria, that help reveal the potential problems and “hidden” costs of ownership, which can diminish returns on a mobile printing investment.

These basic printer selection criteria are:

- **Ease of use.** Printers that impede the mobile workflow because they are inconvenient or difficult to use will limit productivity gains.
- **Reliability.** A printer that fails to operate as required or expected will limit productivity and will increase the total cost of a mobile solution.
- **Power management technology.** How long a printer battery lasts between charges affects both worker productivity and costs of ownership. Battery life is determined more by how well the printer manages power usage than by the battery capacity.
- **Ease of integration.** Underestimating the complexity of printer integration can drive up the cost of implementation, eroding the returns a mobile printer can provide.
- **Customer support.** The level of support available from the printer supplier—both before and after the purchase—can greatly affect total cost of ownership (TCO) and ROI. A mobile printer supplier who is a partner in mobilizing workers, not merely a hardware manufacturer, offers the best chance for success in any given application.

INTRODUCTION: The promise of mobile printing

Once considered complementary but not essential to a mobile workforce solution, mobile printers are proving they can increase productivity, reduce operating costs, and improve customer retention in a competitive marketplace. Mobile printers also can increase revenues and improve cash flow by enabling a mobile worker to accept payment before leaving the customer's premises.

Organizations reporting significant gains from mobile printing include:

- **Field sales and service.** By replacing redundant, error-prone manual processes with mobile printing, these organizations have improved productivity, customer satisfaction, service revenues, and profits. Portable printers eliminate handwritten forms and produce more accurate, legible documents, such as work orders, receipts, invoices, compliance reports, and inspection notices or labels. Customers can review charges before the worker leaves the premises, resolving potential billing disputes on the spot. By using mobile printers with built-in card readers, field workers also can accept payment at the time of service, reducing administrative costs and improving cash flow.
- **Route accounting and delivery.** Mobile receipt printers save time, allowing route drivers to increase revenue by visiting more customers each day or to increase sales opportunities by spending more time with each customer. Portable printers also can be used to print route maps or driving directions, provide customers with updated receipts, accept payment, and document future orders.
- **Warehouse and distribution centers.** By printing inventory and shipping documents at the point of use instead of a central barcode printer, these organizations have increased worker productivity, improved inventory tracking, and reduced inventory returns. Portable thermal label printers, which produce high-quality bar codes, reduce both processing time and errors caused by unreadable or incorrectly placed bar codes.
- **Restaurants and other hospitality venues.** In the hospitality industry, efficiency and customer satisfaction determine profits. Restaurants have improved all three by swiping credit cards and printing receipts at the point of sale instead of a central cash register. Table-side transactions save time, promote faster turnover of tables, and offer customers a greater sense of security. Credit cards never leave their sight.
- **Law enforcement agencies.** Mobile receipt printers have significantly reduced data processing costs and increased revenue from fines, due to both improvements in productivity and the indisputable accuracy of citations and parking tickets. Mobile label printers also have improved evidence management and tracking through the use of bar codes.

Even organizations that once considered mobile printing cost-prohibitive are finding the potential productivity gains, cost savings, and other benefits hard to ignore.

As wireless technologies become more widely available and the prices of mobile computing devices decline, the benefits of mobile printing have become hard to ignore—even for organizations that once perceived mobile printers as cost prohibitive.

Nevertheless, selecting the best mobile printer for any given application can be a daunting process. There are a number of manufacturers, offering multiple models with hundreds of different operating features and

A low price tag does not guarantee a good return on a mobile printing investment.

accessories. There is a great temptation to simply look for a printer with the lowest price tag. Unfortunately, a low price tag does not guarantee a good return on investment (ROI).

ROI analysis compares the cost of an investment to the financial gains it can deliver. Returns can fall short of projections, however, if the total costs of acquiring, deploying, and operating mobile printers are not taken into account. The purchase price, or initial acquisition cost, of IT hardware can represent as little as 20 to 25 percent of the total cost of ownership, according to the Gartner Group, which pioneered TCO analysis in 1987. Some of the lowest-priced mobile printers can carry the highest TCO, especially if the supplier made up for the lower price tag by increasing the price of consumables or sacrificing features and services essential to printer durability, ease of integration, or ease of use.

The purpose of this white paper is to simplify the mobile printer selection process by providing a framework for determining which mobile printers represent the best value for different mobile applications. The paper discusses advantages and disadvantages of available mobile printing and communication technologies; presents real-world examples of mobile printing failure and success; and offers five tips, or key selection criteria, that help reveal the potential problems and “hidden” costs of ownership, which can diminish returns on a mobile printer investment.

Defining a mobile printing solution

The first step in defining a successful mobile printing solution involves examining business procedures, the workflow, and the mobile environment in which the printers will be deployed. Not all print technologies, print media, and printer communication options are suitable for every mobile application.

Mobile print technologies and media

Thermal print technologies dominate mobile workforce applications for good reasons. Mobile thermal printers—particularly direct thermal printers—are lighter, easier to carry, easier to operate, more durable, and less costly to maintain than portable ink jet or impact printers.

Mobile thermal printers have fewer moving parts to break, require fewer consumables, and use less battery power. They produce reliable, readable bar codes and support media widths of 2, 3, and 4 inches—the most common widths used in label, ticket, receipt, and invoice applications. Portable thermal printers that support an 80-column format also legibly print traditional 8-inch-wide documents on 4-inch-wide media.

There are two kinds of thermal print technology:

- **Thermal transfer printers** use a thermal printhead to melt (transfer) a thin layer of material onto the surface of a paper or plastic substrate. Because thermal transfer images and media resist damage from heat, light, and moisture, the technology has long been considered the best choice for mobile environments in which label durability is an issue.
- **Direct thermal printers** selectively activate a heat-sensitive coating applied directly to paper or other synthetic media. As the coated media passes over a thermal printhead, text and graphics appear as defined

Improved image and media durability, combined with its operating and cost advantages, has made direct thermal technology the most widely deployed mobile printing solution.

by the heated areas of the printhead. Direct thermal printers weigh less, cost less, and tend to be smaller than their thermal transfer cousins. Plus, there is no need to carry, purchase, or stock replacement ribbons. The only consumables are batteries and media.

Improved image and media durability, combined with its operating and cost advantages, has made direct thermal technology the most widely deployed mobile printing solution.

Communication Options

Most mobile printing applications are going wireless to reduce downtime and safety risks associated with cables.

Mobile printers use cabled or wireless connectivity to receive print jobs, variable data, document and label formats, and other information from a mobile computer or other host device.

Nearly all printer manufacturers offer cable connectivity between the mobile printer and host device. But most mobile printing applications are going wireless. Replacing cables with wireless communication reduces downtime associated with cable failure and eliminates safety risks posed by tangled or dangling wires.

Mobile printer suppliers differ on the wireless options they support. The three most widely available technologies are:

- **IrDA**, short for Infrared Data Association, was the first wireless cable-replacement technology. Infrared waves transmit data between two devices equipped with IrDA ports, which are included on most mobile printers. IrDA is inexpensive, secure, and less power-hungry than other wireless technologies. Nevertheless, IrDA use is declining rapidly, largely because of inconvenient, strict line-of-sight requirements.
- **Bluetooth® wireless technology** has become the top choice for replacing printer cables, especially for mobile applications that require workers to be outdoors or on the road where other wireless options may be limited. Suppliers of mobile applications for transportation, public safety, field sales/service, and route accounting/DSD prefer Bluetooth technology.

Designed for low power consumption, Bluetooth technology has become the top choice for replacing printer cables.

Designed for low power consumption and data transfer rates of 1 to 3 megabits per second (Mbps), Bluetooth technology allows mobile printers to communicate via radio signals with up to seven other Bluetooth-enabled devices within a 30-foot range. Longer ranges are neither necessary nor desirable for cable replacement. Limiting the Bluetooth radio signal helps conserve battery power, reduce data security issues, and avoid interference with other devices operating in the 2.45 GHz frequency band.

Bluetooth-enabled devices should be tested for compatibility and data security. The technology supports several communication profiles and security modes, including link authentication and encryption, but the device manufacturer determines which profiles and modes are supported. Mobile printers that do not support advanced Bluetooth security features could leave sensitive data exposed.

Wi-Fi technology is the choice for mobilizing workers “inside the four walls,” especially for organizations that have already invested in a wireless LAN.

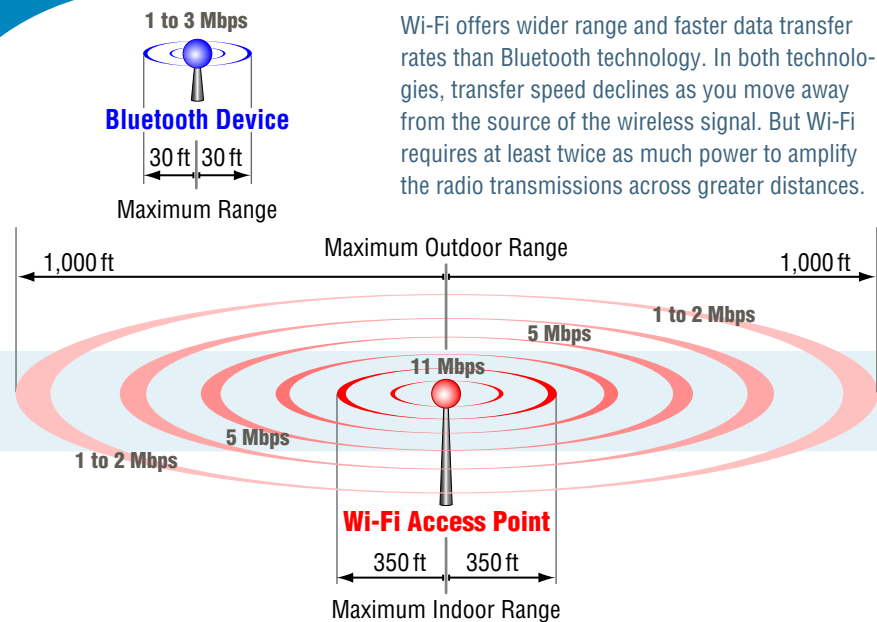
- **Wi-Fi (IEEE 802.11) wireless technology** is the choice for mobilizing workers “inside the four walls,” especially in warehouses, manufacturing shops, hospitals, and retail establishments that have already invested in a wireless local area network (WLAN). Mobile printers

are assigned IP addresses and appear like any other device on the network. Most printers communicate with the network's wireless access point via radio signals in the 2.4 GHz band.

Defined by the IEEE 802.11 standard and amendments, Wi-Fi sacrifices battery life for wider range and faster data transfer rates than available with Bluetooth technology. (See "Bluetooth vs. Wi-Fi" below.) Wi-Fi also can be more secure than Bluetooth technology. At minimum, a mobile printer should support Wi-Fi Protected Access (WPA or WPA2), which provides greater protection than earlier Wi-Fi security protocols.

Bluetooth vs. Wi-Fi

DATA RANGE AND THROUGHPUT



Wi-Fi offers wider range and faster data transfer rates than Bluetooth technology. In both technologies, transfer speed declines as you move away from the source of the wireless signal. But Wi-Fi requires at least twice as much power to amplify the radio transmissions across greater distances.

Why mobile printing solutions fail

When a mobile printing solution fails, it is usually because the wrong printer was applied to the job. Selecting the most appropriate print technology, media, and connectivity does not guarantee success. Several additional factors can determine whether a mobile printer produces all of the projected benefits, as demonstrated by an automobile distribution center in Puerto Rico.

Profile in Failure: Automobile Distribution Center

A major automobile manufacturer deployed a mobile printing solution to improve management of vehicle shipments to Puerto Rico, where workers on the docks processed 300 to 400 incoming vehicles per day.

Each vehicle had to be identified by VIN number, inspected for shipping damage, and sorted for delivery to the appropriate dealership or inventory lot. Workers had to produce an identification/damage label for

Selecting the most appropriate print technology and connectivity does not guarantee success.

each vehicle, as well as documentation transferring responsibility of the shipments to a transportation company, which would then deliver the vehicles to their final destinations.

The manufacturer equipped each worker with a handheld computer, barcode scanner, and thermal transfer printer—identified as the best printing technology and media for labels that could withstand the Caribbean’s sun, heat and rain. The mobile solution should have resulted in significant improvements in worker productivity and more accurate, efficient shipment tracking.

It didn’t.

Workers complained that the thermal transfer printers were bulky and inconvenient to use. They had to carry spare batteries, thermal transfer ribbons, and rolls of label media. The media rolls contained only 80 labels, forcing workers to reload the printers multiple times per shift. The printer difficulties, combined with operation and reliability problems involving the other two mobile devices, resulted in excessive downtime and workers reverting to manual processes as a workaround.

Eventually, the automobile manufacturer did succeed with a mobile printing solution. The new solution cut label-printing time in half and provided more accurate and complete shipment information. (See “Conclusion: Lessons Learned” later in this white paper.)

The difference between initial failure and ultimate success was based on re-evaluating the mobile printer against five basic criteria:

- Ease of use
- Reliability
- Power management technology
- Ease of integration
- The level of support and service provided by the printer supplier.

5 TIPS FOR MOBILE PRINTING SUCCESS

These same criteria are the foundation for the five tips that any organization can use to evaluate mobile printers and their suppliers. The tips are designed to help an organization more accurately determine the total costs of a particular mobile printing solution and, by extension, select a mobile printer that provides the best value and return on investment.

1 The printer must be easy to use.

Mobile printers must be simple to operate and convenient to maintain. If the printer is to be worn or carried throughout a shift, it must be lightweight. Operation should be intuitive and should promote a productive workflow. Media, batteries, and other consumables should be easy to replace.

Thinking about how specific mobile printer features can enhance or impede workflow will help maximize the return on investment.

For example, Gencor, an agricultural cooperative that provides artificial

Bulky thermal transfer printers that were inconvenient to use, combined with other operation and reliability problems, resulted in excessive downtime and workers reverting to manual processes.



FIELD SERVICE / AGRICULTURE

GENCOR, a cattle breeder cooperative in Ontario, Canada, equipped its field sales and service technicians with smart phones and Bluetooth-enabled direct thermal printers from PrintekMobile.

TOP MOBILE PRINTING BENEFITS:

- **Increased productivity.** Saved 17,000 hours/year by eliminating handwritten documents and duplicate data entry.
- **Improved cash flow.** Reduced billing errors; faster billing cycles.
- **Increased customer satisfaction:** More complete, accurate, and legible breed registry documentation.

TOP PRINTER SELECTION CRITERIA:

- **Easy to Use.** Technicians easily print 80 documents per shift thanks to fast print speed, extra-large media rolls, and the printer's ability to store and recall eight different graphics from memory.
- **Power Management.** Technicians leave printers on from 7 a.m. to 5 p.m., recharging batteries every other night.
- **Reliability.** Printers operate flawlessly despite being mounted upside-down inside the lids of toolboxes and used in a dusty, outdoor farm environment.

For the whole Gencor story, download the case study at www.printekmobile.com.

insemination services and farm supplies to Canadian cattle breeders, initially considered equipping its field sales and service technicians with basic direct thermal printers. But Gencor's technicians print up to 80 receipts a day, a volume that required frequent media replacement in the basic printer. Downloading and printing multiple receipt formats for each transaction also proved slow, which could erode productivity gains.

Gencor decided to switch to a more full-featured direct thermal printer from PrintekMobile. The MtP300LP printer offered larger media capacity, Bluetooth wireless connectivity, and the ability to easily store and recall eight different graphics from the printer flash memory. By reducing the amount of data that had to be transmitted for each document, the operating print speed increased significantly. Gencor was able to save 17,000 hours per year with its new mobile solution.

When evaluating a mobile printer for ease of use, you should ask:

• Is the form factor a good fit for the application?

Check the location of features that require regular user interaction. Belt clips, straps, and mounting mechanisms should not interfere with media loading, battery replacement, access to common printer functions, or the use of built-in devices. Also check the overall weight of the printer, with batteries and media installed.

• Do operating features promote a productive workflow?

Users should be able to easily determine the status of the printer and any built-in devices (i.e. power on, cable or wireless connections, remaining battery life, media level, and card reader functionality). It should be easy to advance the media and adjust output characteristics, such as contrast, margins, font type, and label gap detection. Printed media should tear off cleanly.

• Will print speed limit the number of transactions per shift?

The amount and type of printer memory, the type of connectivity, the temperature, the kind of media, and the type and density of text and graphics can all affect print speed. Don't judge print speed solely on the basis of the manufacturer's published specifications. Ask for a test of your printed output or documents that closely match it.

• Are media, batteries, and other consumables easy to replace?

Look for drop-in media loading and fast, simple battery replacement. Some mobile printers require the operator to thread media through the printer, much like a grocery store clerk replacing a cash register receipt roll. Threading takes time and limits productivity gains. Some printers require tools or removing a printer from its mount to replace batteries.

• Is battery recharging fast and flexible?

Most printer manufacturers offer charging accessories, ranging from power adapters and special docking cradles to external, multi-bay chargers that can recharge up to four batteries at a time. But some printers do not allow the user to continue printing while batteries charge. Look for mobile printers that can run off an AC wall or DC vehicle power adapter with a fully discharged battery or with the battery removed.

2 Reliability is key to a lower cost of ownership.

Hardware downtime or failure is the single greatest contributor to an increase in TCO for a mobile workforce solution, according to Venture Development Corporation (VDC), a Massachusetts-based mobile technology research and consulting firm.

Mobile printer failure can trigger a chain of potentially costly events that go far beyond repair or replacement expenses. The mobile worker may have to revert to slower, more error-prone manual processes until the problem is resolved. These old processes may delay orders, shipments, customer calls, and payments, which, in turn, can hurt customer relationships, increase administrative costs, and disrupt cash flow.

A reliable mobile printer offers both rugged design and features that help users quickly determine the source of a printing problem.

The best way to avoid the escalating downtime costs associated with printer failure is to buy a reliable mobile printer. But VDC cautions that mobile printer suppliers and end users tend to define printer reliability and failure differently.

“From the supplier’s vantage point, failure is defined as those products that break/fail due to mechanical errors—often caused by external trauma such as shock, vibration, dust, water, etc.,” VDC reported in its 2005 study of mobile transaction printers. “End users, on the other hand, may relay failure as any problem that prohibits the printer from printing, such as network communication failure, paper jam, and software problems as well as mechanical failure rates.”

A reliable mobile printer, therefore, should offer both a rugged design and features that help users quickly determine the source of any printing problems, thus avoiding excessive downtime.

Evaluating Rugged Design

Mobile printers must operate in environments that can destroy typical office printers. They are routinely exposed to dust, rain, fluctuating temperatures, and vehicle vibration. They are jarred, banged, and dropped repeatedly, even by the most careful mobile worker.

The ability to handle such abuse is why “ruggedized” mobile printers, despite a higher price tag, provide a significantly lower TCO than commercial-grade models, VDC reported in its 2003 mobile hardware study. The study found that commercial-grade devices failed up to three times more frequently than rugged devices in mobile applications. The higher service, support, and downtime costs associated with those failures outweighed the lower initial acquisition costs of the commercial-grade devices.

Suppliers of rugged mobile printers use ingress protection (IP) ratings and drop tests to demonstrate how well a printer can withstand dust, water, vibration, and shock.

Rugged mobile printers should carry an IP rating of at least IP54, which means the unit is protected, but not sealed, against dust (5) and is resistant to sprays of water (4). Because printers must have openings for outputting printed media, a higher IP rating would be difficult to achieve without negatively affecting ease of operation.

IP Rating Table

SOLIDS (First Number)	LIQUIDS (Second Number)
0 No protection	0 No protection
1 Protected against objects > 50 mm (hands)	1 Protected against dripping water or condensation
2 Protected against objects > 12 mm (fingers)	2 Protected against sprays of water 15° from vertical
3 Protected against objects > 2.5 mm (tools, wires)	3 Protected against sprays of water 60° from vertical
4 Protected against objects > 1 mm (small tools)	4 Protected against water sprayed from all directions
5 Protected against dust, limited ingress	5 Protected against low pressure jets of water
6 Totally protected against dust	6 Protected against heavy seas
7 N/A	7 Protected against effects of immersion
8 N/A	8 Protected against submersion

Source: IEC 529 Example: A rating of IP68 would indicate a dust tight device that can withstand total submersion in water.

Manufacturers use widely differing drop test methods to arrive at ratings published on product data sheets.

Rugged mobile printers should be able to operate successfully after repeated drops from a height of 3 ½ to 4 feet—the distance a printer would fall if it were dropped or knocked off of a table or other surface.

It’s a good idea to view drop test claims with skepticism. Mobile printer manufacturers use widely differing test methods to arrive at the ratings published on product data sheets. For example, one manufacturer may drop the printer from a height of 4 feet to bare concrete, repeating this test twice for each of 6 different angles (12 total drops). Another manufacturer may drop a printer from a height of 4 feet to plywood, repeating this test twice for only one angle (2 drops). Both manufacturers could claim their printers survived repeated 4-foot drops, yet the test methods would yield decidedly different levels of durability.

To determine how rugged a mobile printer is, you should ask:

- **What standards and test procedures were used to arrive at published drop test, ingress protection and temperature ratings?**

Various organizations publish “ruggedness” standards and testing methods, some more stringent than others. Many printer manufacturers follow International Electrotechnical Commission standards for drop tests (IEC 68) and ingress protection (IEC 529).

- **How does the printer supplier define a successful test?**

Sometimes the printer can pass a test even though certain components or aspects of printer operation failed. Make sure the printer was tested with power on and built-in options installed.

Reliability is more than a rugged case

Not all printer problems result from mechanical failures that can be minimized with a rugged design. Some fairly common operating conditions—a low battery, an empty media roll, or a dropped wireless signal—become reliability issues if they cause excessive downtime.

For example, a mobile printer known for rugged design stopped printing during an evaluation test. The printer gave every indication that it was powered up and operating. The technician could print a self-test page from the printer menu. The printer’s communication lights indicated the Bluetooth radio was on and functioning. Yet, the PDA could no longer

Rugged design minimizes mechanical failure, but it does not help workers avoid common operating conditions that can cause excessive downtime.

detect the printer. If the problem had occurred in the field, the worker probably would have called the IT department or a help desk for support. The problem, however, was a low battery, an operating condition that could have been rectified easily and without excessive downtime had the printer clearly indicated battery status.

To prevent or minimize downtime, be sure to ask:

- **How does the printer indicate hardware faults?**
- **How does the printer indicate common operating conditions?**

The printer should provide unambiguous indication of such conditions as power on/off, low battery power, battery charging, established or dropped network communications, and low or no media levels.

3 Compare power management technologies.

Stopping several times a day to replace or charge printer batteries is both inconvenient and non-productive. A mobile printer should provide at least one full shift of operation on a fully charged battery.

Ultimately, how long a battery operates between charges is a function of how well the printer manages the varying power demands of operation and communication. An efficient power management system design provides maximum operating time, while minimizing battery size, weight, and replacement costs. (See sidebar).

Most mobile printers use Lithium-ion (Li-Ion) batteries, which deliver more power in a smaller, lighter package than nickel cadmium (NiCAD) and nickel metal hydride (NiMH) technologies. Li-Ion batteries also retain their

Battery Size vs. Battery Life

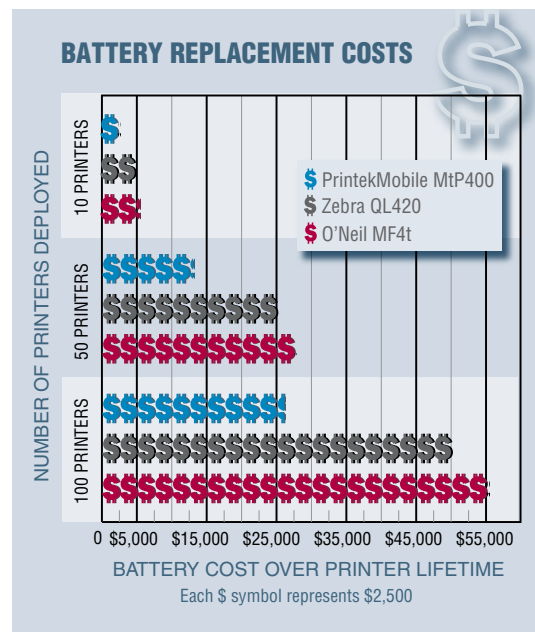
BIGGER IS NOT NECESSARILY BETTER

Most manufacturers publicize the type and capacity of batteries used in their mobile printers, promoting the false assumption that larger battery capacity equals a longer operating cycle. In reality, battery capacity is a truer indication of TCO than battery life.

To illustrate the point, PrintekMobile placed its MtP400 direct thermal printer in a side-by-side power management test with comparable mobile printers manufactured by Zebra Technologies and O'Neil Product Development.

All three printers proved they could operate at least one full 8-hour shift on a fully charged Li-Ion battery, while communicating over the most power-hungry wireless technology—Wi-Fi (802.11b). But the MtP400 printer used a smaller, less expensive 2200 mAh battery to do the same job as the larger battery packs in the Zebra (4000 mAh) and O'Neil (4400 mAh) printers.

As the chart at right shows, the cost savings represented by smaller batteries can easily add up to thousands of dollars over the average six-year life of a rugged mobile printer. The smaller batteries sell for about half the price of the larger battery packs.



Print volume, text/graphic density, and wireless connectivity are just some of the factors that affect battery life.

charges longer and can be recharged more times before performance deteriorates. A Li-Ion battery typically provides at least 300 charge/discharge cycles at 100% capacity and up to 500 cycles at 50% capacity before they must be replaced.

A number of factors affect the power demand on batteries, including print volume, text/graphic density, print frequency, and wireless connectivity. To conserve battery power, printer manufacturers employ various techniques, from the selection of power-saving hardware to automatic or user-selectable operating modes that supply only as much power as the application requires at any given moment. For example, a printer may turn off as many internal functions as possible after a minute or two of inactivity, then automatically return to full operating status as soon as the operator presses a key or the printer detects a data transmission.

The best way to evaluate battery performance is to test the printer with your actual application. Since that is not always possible, you should ask:

- **What test data can the supplier provide to show that the printer will deliver a full shift of battery life for your specific application?**
- **How does the printer protect against data loss in all possible operating states, including low power and power failure?**
- **How does the printer indicate power-saving modes and battery status?**
- **What is the cost of spare or replacement batteries, power adapters, and battery chargers?**

4

Do not underestimate the complexity of printer integration.

The expanding world of mobile devices and applications has created a constantly shifting landscape of operating systems, programming languages, computing platforms, and communications and security standards. The last thing you need is another obstacle that could delay deployment or prevent a successful mobile application.

Unfortunately, printer integration can be one of the most challenging and time consuming aspects of a mobile computing project. Most mobile printers use their own defined printer description languages to convert data, fonts and graphics to the required output format, whether it is a receipt, a label, an invoice or a parking ticket. Some printer manufacturers even use different printer languages for each printer model they offer. And most printer suppliers do not provide print drivers or sample source code for all mobile operating systems, devices and applications.

That means system integrators frequently must develop drivers, output formats, custom print interfaces, and sometimes, entire printing infrastructures for the native language used by a specific mobile printer. The time and resources required for this development can add significantly to the overall cost of a mobile solution.

To determine whether a particular mobile printer will be difficult or costly to integrate, you should ask:

Printer integration can be one of the most time consuming aspects of a mobile computing project.

It is important to work with a printer supplier who truly understands integration and can provide comprehensive support and integration aids.

- **What printing languages does the printer support?**

This is especially important when integrating new mobile printers with a legacy system or with packaged mobile applications. The only way to protect an existing investment in printer integration is to ensure that the new printers will speak or emulate the same print language used in developing the legacy system or application.

- **Are there compatible printer drivers for your chosen mobile device, operating system, and development system?**

Since most mobile operating systems do not support the concept of true “device drivers,” it is important to work with a printer supplier who truly understands integration and can provide the most detailed and comprehensive support and integration aids. To reduce development time and expense, look for printer suppliers who offer templates, sample source code, and demonstration programs that help create printed output for the specific programming language used in the mobile application.

- **What fonts and character sets are provided?**

Most printer suppliers offer a collection of fonts and graphic character sets for creating the required output. But if the collection does not include the font or character set you need to produce a particular document, barcode label, or foreign language, the printer may not support them or you may need to buy them separately. Purchasing multiple font and character sets, plus the additional memory to use them, can get expensive.

- **What is required to configure and install the printer?**

Printer suppliers approach configuration and installation in a variety of ways. Some printers accommodate common setup procedures through a display and/or menu on the printer itself. Others provide utilities or applications to manage printers on the host or network; to configure communications and security parameters; or to load and manage fonts, graphics, and logos. At the very least, there should be a simple means for copying a known configuration from one printer to many printers, which saves time in large-scale rollouts or updates.

5 Look for a supplier willing to support your application before and after the purchase.

All mobile printer manufacturers offer customer support after the purchase, even if it's only a standard warranty. Some offer extended warranties, maintenance plans, training programs, and help desk support—generally for a price. Some even offer hardware, firmware, and software upgrade programs.

Few mobile printer manufacturers offer customer support before as well as after the purchase.

Very few mobile printer manufacturers offer customer support before the purchase, which is when many organizations really need the help defining a mobile printing solution that will meet their ROI goals.

Direct access to technical assistance before a purchase can be vital to controlling development and integration costs and ensuring compatibility of the mobile printer with new and evolving technologies. The only way



FIELD SERVICE / REFRIGERATION

EXCELL REFRIGERATION of South Carolina equipped its field service technicians with rugged handheld computers and PrintekMobile direct thermal printers.

TOP MOBILE PRINTING BENEFITS:

- **Increased productivity.** Eliminated the need to add administrative staff.
- **Improved cash flow.** Reduced billing disputes; faster billing cycles.
- **Improved customer satisfaction:** Customers praise the documentation accuracy and additional services that the mobile solution provides.

TOP PRINTER SELECTION CRITERIA:

- **Customer Support.** PrintekMobile provided a free evaluation printer and answered questions quickly.
- **Reliability.** The printer withstood repeated 4-foot drops, including a 6-foot roll after the drop.
- **Easy to Integrate:** The printer was compatible with the chosen software and handheld. Old 8-inch-wide documents fit the 4-inch format without major changes.
- **Easy to Use.** Rollout required minimal training. Technicians comfortably carried the printer on a shoulder strap.

For the whole Excell story, download the case study at www.printekmobile.com.

to accurately assess the ease of use, reliability, and power management technology of a mobile printer is to test it against the demands of the specific mobile application. For that, you need an evaluation printer—preferably one that is up to date and available free or for a modest fee that can be credited toward purchase.

For a small commercial refrigeration service company like Excell Refrigeration of South Carolina, the ability to easily evaluate a printing solution, along with the full support of the supplier, was the key to success. Company President Glenn Taylor believed he could avoid adding a fifth person to his four-person administrative staff if he could put together a mobile printing solution that improved the efficiency of his 21 field service technicians. He had the software. He just needed the mobile hardware to complete the solution, including rugged mobile printers. After some research, he found the MtP400 direct thermal printer from PrintekMobile.

“Just the fact that Printek was willing to provide an evaluation printer to us with no upfront charge made a difference,” Taylor said. “We respond to a company that wants to build a relationship as much as make a sale.”

With direct technical assistance from Printek and the handheld computer supplier, Excell developed a mobile printing solution that eliminated the need for additional staff. The printers also improved customer retention in a competitive market by helping Excell project a competent, professional image. Customers praised Excell for the improved documentation.

When evaluating mobile printer suppliers, be sure to ask:

- **Is direct access to technical support available before purchase?**
- **Is an evaluation printer available for development and testing?**
- **What level of assistance is available during integration and implementation?**
- **What are the availability and costs of warranties, maintenance programs, upgrade programs, training, and other post-purchase support?**

CONCLUSION: Lessons learned

Organizations that evaluate mobile printers and suppliers against the five tips have a much greater chance of realizing the full benefits of a mobile printing solution, as demonstrated by the automobile distribution center in Puerto Rico.

After its first mobile solution failed, the automobile manufacturer went back to the drawing board. This time the company enlisted the help of Caribbean Technical Services, Inc., a value-added reseller with 20 years experience implementing custom software and hardware solutions. CTS quickly determined that replacing the older handheld computers and wand-type barcode scanners with newer technology—a rugged mobile computer with a built-in barcode scanner—would resolve some of the reliability, accuracy, and operating problems.

The real challenge was finding the right label media and mobile printer. The label had to remain attached and readable for as long as 10 months exposure to the Puerto Rican climate—a definite vote for thermal transfer

technology. But the printer had to be lighter, more compact, and easier to use than a thermal transfer printer.

Innovation was required. It came in the form of a new media technology, Self Contained Thermal Transfer Label (SCTTL) media, and a direct thermal printer flexible enough to use it. The new media carried the thermal transfer film on the same roll as the label substrate, which meant that workers no longer had to carry spare thermal transfer ribbons.

CTS worked with the customer to evaluate mobile printers from Printek, Zebra, Sato, O'Neil, and Intermec against the five key selection criteria, as well as their ability to print the new media. The MtP400LP direct thermal printer from PrintekMobile emerged as the clear favorite.

The new mobile printing solution operated as promised, delivering all of the envisioned productivity improvements.

- **Ease of Use:** The MtP400LP was lightweight and comfortable to carry. Drop-in media loading required less time and effort. And the printer's generous media capacity—label rolls up to 2.625" in diameter— meant that workers had to carry fewer spare rolls of media.
- **Reliability:** The printer proved its reliability in the field. Not only did the printer live up to its rating of repeated 4-foot drops to concrete, its clear status indicators for battery power, wireless operation, and media levels made it easy for workers to avoid downtime. The new SCTTL media rolls fit and fed through the printer predictably and repeatedly.
- **Power Management Technology:** Workers also no longer had to carry spare batteries. Battery life exceeded a full shift using Bluetooth wireless communication.
- **Ease of Integration:** The MtP400LP printer emulated the printer language of the old thermal transfer printer, providing a drop-in solution that saved significant development time. CTS did not have to rewrite the old code and application to accommodate a new mobile printer from a different manufacturer.
- **Customer Support:** "There is no doubt that the service and support that comes with a PrintekMobile printer differentiated their offering in our minds," CTS President Carlos Bonnett said. "CTS had immediate and ongoing access to pre-sales technical support as the solution was proven—to both our and the customer's satisfaction."

The new mobile printing solution operated as promised. By evaluating mobile printers and suppliers against the criteria covered in the five tips, the automobile manufacturer was able to select a printer that delivered all of the productivity improvements envisioned. The company now hopes to repeat the success by adding similar automation at the other end of the delivery route, where options and accessories are added to the vehicles.

**Superior
Customer Support**
+ Quality Products
**= Unsurpassed
Value**

THE PRINTEKMOBILE DIFFERENCE

PrintekMobile's mission is to deliver unsurpassed value to customers and partners through quality products and superior support from first contact to last. This philosophy is rooted in Printek's more than 25 years experience designing and supplying innovative printing solutions to organizations of all sizes.

The PrintekMobile group has a proven record of delivering compatible, cost-effective, on-the-go printing solutions across a wide variety of mobile environments, industries, and applications, including: field service, warehousing, route accounting, transportation, manufacturing, distribution, retail, public safety, and hospitality.

PrintekMobile's line of rugged, direct thermal printers are designed to provide reliability and a low total cost of ownership. In addition to long battery life and support for cabled or wireless communication (Wi-Fi, Bluetooth, or IrDA), the printers offer many features aimed at making integration, setup, and operation fast, flexible and simple:

- **EASI Suite™ development, integration, and setup tools.** Use this comprehensive set of tools to load fonts, graphics and updates; set up multiple printers; and develop a printing application. The suite includes drivers, sample source code (C/C++, C#, .NET, JAVA, eVB), and demonstration programs for computers, PDAs, smart phones, and other mobile computing devices using Microsoft® .NET connection software or Windows®, PPC, and Palm® operating systems.
- **Emulation of all popular mobile printer languages.** Use the printers as a “drop in” solution for many mobile applications and legacy systems, including those with output formats and application code developed around ZPL®, CPCL, OPDL and Ex.PL printer languages.
- **Easy remote or on-board configuration.** Set network, communication, and security parameters using the printer's display, menu, and control panel, or the bidirectional remote setup utility with an easy-to-use Windows interface. Set all critical Wi-Fi parameters with or without an established network connection.
- **Advanced Bluetooth wireless features.** Configure the Bluetooth role policy for printer operation as master or slave to prevent compatibility problems with some handheld computers. Prevent unauthorized access to data, quickly pair specific printers with a specific Bluetooth host, and lock out detection by other Bluetooth devices after the host has discovered the printer and stored communication parameters.
- **Flexible, simple content management.** Store up to five different printer configurations (i.e. receipt, invoice, label) for recall automatically or at the touch of a button. Create and automatically print variable custom graphics or promotional messages, such as coupons or new product/service advertisements, at the end of each document.

PrintekMobile printers also come with unparalleled customer support—before and after purchase. The technical sales and support staff work directly with system integrators, software developers, mobile hardware manufacturers, VARs, and wireless service providers to develop cost-effective, innovative mobile solutions using the latest technologies.



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