

Wireless Technology: Solutions for Retail



A ZEBRA BLACK&WHITE PAPER





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Executive Summary

Wireless printing is a relatively new tool available for retailers. Although wireless networking and computing are widespread in store operations, relatively few retailers have leveraged these investments with complementary wireless printing applications.

Retailers can take advantage of wireless printing regardless of whether they have existing wireless systems. Whether the application is replacing a printer cable or running full applications and downloading graphics from a high-speed wireless network, proven, cost-effective wireless printing technology is available. Most wireless printers are compatible with the most popular current networking options and offer flexibility for easy future upgrades.

Various wireless printing applications can lower total in-store printing expenses, provide total cost of ownership (TCO) benefits compared with traditional printers, improve labor efficiency, reduce store operating expenses, improve safety, and increase customer satisfaction.

Read on to see the specific benefits this emerging technology can provide retailers, examine return on investment (ROI) models, and learn about your application and technology options.

Introduction

The cash register, the bar code, and the self-service kiosk all first proved their value in retail stores before going on to become mainstream productivity tools. Now, another emerging technology is ready to bring retailers new cost savings, operational efficiencies, and opportunities to improve customer service: wireless printing. The characteristics that set wireless printing apart from traditional cabled printer configurations—a smaller footprint, unlimited placement options, improved aesthetics, lower maintenance costs, and improved safety and productivity—are perhaps more valuable to retailers than to any other industry.

"Wireless printers" refers to printers in which a radio frequency (RF) or infrared light (IR) interface is used either to connect the printer to the network, to a controlling PC or hand-held computer, or both. By selectively replacing shelf label printers, pricing guns, shipping label printers, receipt printers, coupon stations, and other label-generating equipment with flexible, wireless printers, retailers can reduce their ongoing printing and labeling expenses while improving customer service and the productivity of their floor staff.

Wireless printers come in different sizes and shapes, from full-featured tabletop models to small, mobile printers that may be clipped to a belt, carried by hand, or worn on a holster. The wireless interface eliminates the need for cables, eradicating a potential failure point and the subsequent repair or replacement cost, in addition to providing a safer and more space-efficient work area.

Best of all, wireless printers are easy to deploy and use. Some existing tabletop printers can be wirelessly enabled through expansion cards or modems without compromising quality or features. New models with native wireless support are available to meet a variety of needs. There are an impressive number of product choices in the mobile category. Both tabletop and mobile models support multiple wireless standards, ensuring compatibility with existing wired and wireless network infrastructures.



This white paper illustrates how you can improve your business with wireless printers by:

- Introducing different back-office and in-store applications for the devices.
- Providing cost-benefit analysis tools to help you see the value in wireless printing and uncover the hidden costs of your current printing operations.
- Providing a complete overview of wireless printing capabilities.
- Helping you select the best solution by understanding printer types, features, communications methods, and media.

A p p l i c a t i o n s

Where can you benefit from wireless printers in a retail environment? Anywhere labels, coupons, receipts, or tickets are used. Where are they a better choice than traditional cabled models? Wherever space is at a premium, aesthetics are valued, the space could be reconfigured to accommodate more selling, storage, or office space, whenever printer output is needed outside the workstation area, and any time mobile models are used.

For retailers, wireless printers are especially valuable in the shipping and receiving area for relabeling, shipping label creation and returns processing, and on the selling floor for shelf labeling, shelf price auditing, price marking, mobile and temporary point-of-sale stations, coupon printing, and sign creation.

Shipping & Receiving

Wireless tabletop printers can handle all the same tasks as their cabled predecessors, and in fact many current tabletop label printers can be retrofitted for use as wireless models. Using wireless printers in the back room gives you the flexibility to place the printers wherever they are needed, eliminating the need for workers to walk from the work area to the computer area to pick up labels. Printers can be moved freely and new printers can be added to the network without incurring the time and expense of rerouting or installing new network cable. Wireless printers can easily be networked to a host computer located elsewhere in the store, which often eliminates the need for a dedicated PC at the labeling area altogether. Other print jobs could be directed from a wireless PDA carried by a store manager, further reducing the need to keep a PC in the back room just to store shipping and label format information.

Because wireless tabletop printers can accept a variety of media types, they can be used in the receiving area to create UPC price labels, private brand labels, and promotional labels (e.g., "Hot Buy" or "New Item") for placement on individual items before they are put out for sale. If a big shipment arrives that requires high-volume relabeling, additional printers may be deployed in temporary locations without the expense and delay of running network cable. Similarly, label printers from the back room may be "borrowed" for use in other areas of the store, and are instantly on the network when placed in their new locations.



Shelf Labeling

Producing shelf price labels and promotional flags with wireless mobile units, instead of centrally located printers, can save retailers thousands of dollars per store location annually through improved productivity and reduced media costs. Using a mobile printer interfaced wirelessly to either a hand-held computer or to a host computer in the office or back room, workers can receive data to print shelf labels and in-aisle promotional flags at the precise location where they are needed. This ensures labels are placed in the correct location and eliminates trips to the back of the store to pick up printed labels.

One retailer studied the time required to conduct shelf labeling and learned that an average of 30 minutes are wasted walking back to retrieve labels and waiting for them at the busy printer. By multiplying the time wasted by the number of shelf price changes, the retailer discovered a loss of 182.5 hours per store each year to wasted effort, at an average wage of \$10 per hour. The retailer quickly converted to a mobile printing solution, saving money and improving customer service by freeing workers to spend more time assisting customers.

Because mobile printers use thermal media, they produce shelf labels and flags at a lower cost per label than laser printers. Producing labels on demand eliminates waste from partially used laser sheets. A pharmacy chain that makes an average of 300 weekly SKU changes per store compared the cost of producing shelf labels with a laser printer and a wireless portable thermal model. Although the incremental cost of adding new mobile printers was slightly higher than the cost of buying and maintaining tabletop lasers, the additional expense was offset by a \$262.48 monthly per-store savings in media costs. The mobile units provided a lower total cost of ownership, and the pharmacy realized a full return on investment (ROI) in less than four months.

Shelf Price Auditing

The City of Cleveland recently sued a drug store chain over discrepancies between prices displayed on retail shelves and prices charged at the checkout. Other municipalities took notice and are considering their own class-action suits. Retailers, who already struggle to maintain pricing integrity, now have another legal and public relations threat with which to contend.

Fortunately, retailers also have a new tool at their disposal to detect and correct potential pricing errors: wireless shelf price auditing. Store associates can audit shelf price accuracy by using a hand-held computer with a bar code reader to scan the UPC codes of items on the shelves. The scan initiates a price lookup in the UPC database (either preloaded onto the hand-held computer or through a wireless interface) that is used to charge items at the checkout. The checkout price is then displayed on the portable computer.

If the price displayed differs from the price on the shelf label, the associate can instantly print and place a new, accurate shelf label. Wireless shelf label auditing and label production verifies that price updates made to the central database are instantly communicated throughout the store, ensuring a consistent customer experience. Lag time that occurs when new shelf labels are created at a central printer and remain there until someone picks them up and places them on the retail shelves is eliminated.

Shelf price auditing helps preserve customer loyalty and satisfaction through accurate pricing and the resulting reduction in delays at the checkout. It also protects the store from lost revenue when pricing errors are in the customers' favor.



Price Verification Kiosks

Price verification kiosks are another tool for preventing shelf pricing errors and also provides customer convenience. Shoppers use the kiosks to scan the U.P.C./EAN bar code on items to get an accurate price check. Some kiosks offer shoppers the option of printing their own price labels, which often eliminates the need for stores to print and apply price labels for each item.

When shoppers scan the U.P.C./EAN symbol, the kiosk transmits the information to the store's price lookup (PLU) database over a wired or wireless network. Ideally, the kiosk is interfaced with the same database as the point-of-sale scanners in the checkout lines. The database returns current pricing information to the kiosk, where it is displayed on a screen. By working from a single database, errors related to price changes being made in one system but not another are eliminated. Data latency and unsynchronized systems are leading causes of checkout errors—and resulting class action lawsuits. Price verification kiosks are an important safeguard against the high costs associated with these legal actions.

If a price label is desired, the information can be sent over the network to a printer integrated with the kiosk, using a wireless or wired network connection. The Commonwealth of Massachusetts recently amended its retail pricing laws to allow price verification kiosks with label printers as a substitute for individually marking items with a price label. While not all customers will want a label, the law mandates that they must have the ability to print one out. These labels are not meant to be used as barcodes for scanning at the register, but rather are intended for the customer's edification. By printing labels at the kiosks, they will know how much the value of their basket of goods is, without going back to check each shelf label. With the introduction of this new system, consumers will know what the prices of their items are, and there will be fewer discrepancies at the register. Kiosks give consumers the convenience of being able to check prices or find items in the store without seeking out store associates, while giving retailers in Massachusetts and other states that are considering similar legislation a way to avoid fines.

Price Changes & Item Labeling

Wireless mobile printers can also be used to create new shelf and item labels for planned price changes. Daily or weekly price changes can be loaded into a hand-held computer with software that plans the most efficient route for workers to manage the aisles. The mobile printers are used to create new shelf or item labels and wirelessly send a confirmation to the pricing database.

The wireless network can be used also to send messages or alerts notifying associates of price changes during store hours and directing them to the aisle location to create new labels. The two-way wireless connection enables the associate to send a confirmation when the new price label has been placed, so the new price can then take effect at the point of sale.

One retailer with an average of 1,000 weekly price changes eliminated a 20-person, six-hour night shift after switching to mobile wireless printers to create new shelf labels and price audits. Now, a smaller team completes the same work in just one hour before the store opens. Total man hours for the operation were reduced from 120 to just two to three.

Using mobile printers to create new shelf and item labels can also eliminate the need for price sticker guns, or "Marking guns." A retailer that used an average of 25 Marking guns per store reduced annual price marking expenses by \$1,715 by replacing Marking guns with wireless mobile printers. Using the printers for other applications leverages your investment and results in an even faster ROI.



Mobile POS

Why have a temporary or mobile point-of-sale (POS) station if it does not have the flexibility to relieve congested areas or requires customers to stop by the office to pick up their receipt on the way out? Using a mobile POS during busy periods, including holidays and special sales, can reduce line lengths or wait times and improve the customer experience. Adding a lightweight thermal printer to the POS system enables you to print quality receipts, return labels, and name tags or VIP badges with printed bar codes, graphics, and security indicia, instead of the low-quality receipts associated with impact printers. Thermal printers are also durable enough to be used outdoors at garden centers, building supply stores, and by other retailers offering seasonal goods like mulch, flowers, or Christmas trees.

Returns Processing

Wireless printers add convenience and security to returns processing operations, both in the back room and on the retail floor. Using wireless printers in the back room to create shipping labels and inter-store transfer labels delivers all of the benefits discussed in the shipping and receiving section, in addition to those discussed below.

Security and customer convenience can be improved by using wireless mobile printers on the retail floor. If your stores use a centralized returns area or customer service counter, thermal printers can create returns slips with quality logos, graphics, and security indicia, including two-dimensional (2D) bar codes.

Roaming store associates can process returns anywhere when they have a mobile printer. Customers with returns can be intercepted as they enter the store, providing convenience for them and security for you because merchandise does not need to be carried throughout the store. Returns can also be accepted in outdoor retail areas or even the parking lot, which is a great advantage for bulky or high-volume items. As with a mobile POS, mobile returns processing shortens lines before customers run short on patience.

In addition to the specific application benefits of wireless printing illustrated above, there are general benefits to using wireless interfaces related to total cost of ownership (TCO) and ergonomic safety. These benefits are a direct result of reducing and eliminating the amount of cables and wires in the workplace.

Disable Your Cable Costs

Eliminating cables does more than improve user convenience, productivity, and safety. It removes an expense that significantly adds to the printer's cost of ownership over time.

A survey of store associates at one retailer indicated that two minutes per day, per terminal/printer system were devoted to troubleshooting cable-related problems. On an annual basis, this translated into thousands of hours of "non-productive" labor chainwide. For this example, let's assume that 15 minutes per day, per store is spent addressing cable issues. For a 100-store chain, this equates to 9,000 hours of non-productive labor annually. At an average rate of \$12 per hour, managing cable issues can cost the retailer upwards of \$100,000 per year.

In addition to these labor savings, substantial direct capital expense savings can be achieved by going wireless. Cables used to facilitate communication between mobile printers and hand-held terminals can run as high as \$50 to \$60. As the cables age (along with the serial ports on both the printers and the terminals), it is not unusual to replace them at a rate of two cables per terminal, per year. This 100-store chain, using five portable terminal/printer units per store, saw cable replacement costs approaching \$60,000 per year. By switching to wireless printing, this retailer realized a return on investment within nine months through the elimination of cable replacement costs.



Total Benefit From Cable Elimination

Labor Savings: \$100,000 per year

Cable Savings: \$ 60,000 per year

Grand Total: \$160,000 per year

The performance benefits described above can be replicated in virtually every circumstance in which wireless printers are used. The following section describes additional important yet difficult-to-quantify benefits that wireless printing has over less cable-free operations.

Improved Safety

When workers fall down on the job, profits fall with them. Retail trade ranked sixth among all industries in the number of fatal occupational injuries in 2000, just behind manufacturing and ahead of mining, according to the Bureau of Labor Statistics. Grocery stores and department stores each placed in the top six of locations with the highest total number of nonfatal workplace injuries. Retailers lose millions of dollars every year because of workplace injuries, so improving workplace safety is in everyone's best interest.

Wireless printers can improve retail safety on the store floor and in the back room by eliminating unnecessary cords and cables. Falls are the second-leading cause of death in the workplace, behind automobile accidents. In 2000 there were 47,400 cases of retail employees missing time from work due to nonfatal injuries sustained from falls on the same level (for comparison, there were only 8,700 cases of repetitive-motion injuries like carpal tunnel syndrome). The median time lost from fall-related injuries was five days, although 20.2% of injured workers missed 31 days or more.


If only one-tenth of one percent of these falls resulted from tripping over a cord or from becoming entangled in a cable, it would mean that retailers lost 237 labor days from cord-related injuries ($47,400 \text{ total injuries} \times 0.001 = 47.4 \text{ injuries} \times 5 \text{ days median lost work time} = 237$). The lost work time does not include the negative economic impact from related health care costs, worker's compensation claims, OSHA fines, or potential lawsuits and settlements.

Direct Store Delivery (DSD) Management

Direct store delivery is often very challenging for retailers and vendors. Before the development of the DEX (Direct Exchange) UCS (Universal Communications Standard), a vendor typically would deliver a certain quantity of items, scratch out an invoice for the retail store manager to file away (and hopefully enter into inventory), and deliver a copy of that invoice back to the vendor's own accounts receivable department for processing. Retailers frequently disputed bills submitted for payment because of pricing discrepancies, or charge-backs for unauthorized deliveries. Payments were slow and often incomplete.

As a result of this tedious process retailers suffered from inaccurate inventories and sales ticket errors while vendors were troubled by lengthy check-in times, high administrative costs and struggles with remittance. In response to these struggles, the DEX standard and related equipment were created to ease the DSD process. DEX allows direct store delivery vendors to transmit invoice detail into a store's receiving system automatically.

The most common method for uploading this information is via a DEX interface connector that is mounted to a wall in the retailer's receiving area. The DSD representative uses a handheld computer to transmit delivery quantities and pricing data to the DEX connector, which is wired to the store's computer system. Discrepancy messages would be sent to the vendor's handheld for immediate on-site resolution.



Because the invoice could be uploaded directly to the store server via the DEX interface connector, retail accounts payable departments no longer required statements of information from the vendor. While this business process increased DSD efficiency tremendously, the cost of wiring connectors for all the stores in a chain could be significant. Stores that have both front door and back door vendors often needed to install multiple interface connectors.

To let retailers capitalize on 802.11b wireless frameworks already installed in many retail stores, Zebra created a solution to help cut DEX usage costs by eliminating the wiring expense. Instead of plugging in to a DEX port, the vendor can send the information via a cable to a QL 420™ wireless printer. The printer can then communicate that data over the 802.11b network back to the store server. The server confirmation transmission is done via the QL 420. The vendor could accept or reject and send the invoice back to the store server, while printing an invoice for the store manager's records on the QL 420 if desired. Because the QL 420 has a wireless interface to the host computer, it offers more placement flexibility than interface connectors. When the printers aren't being used for DSD, clerks can use them for price markdowns and shelf labeling applications that are eased by simple wireless LAN communication to the store server.

Wireless Printing Technology

In traditional configurations, the printer is physically connected to either a host device (usually a PC for tabletop printers and a hand-held computer for mobiles) or to a local area network (LAN). Connection to the host is through a cable and connection to the network is by network cable. In wireless printing, the cable or network connection, or both, is replaced by a wireless interface. There is no loss of functionality when the physical connection is replaced by a wireless one. Different wireless interfaces are available and are selected based on the application and required performance.

For cable replacement applications, the printer and host device (usually a hand-held computer, but sometimes a PC, digital scale, or other device) must each be wireless-enabled. Data transmission range is usually small, up to a few feet or meters.

Networking applications require the printer to be wireless-enabled (either through factory-installed native ability or through add-on peripherals like modems or expansion cards) and a wireless network infrastructure. The wireless network includes antennas that provide coverage throughout the building and base stations to process transactions. In wireless networks, printers, portable computers, and other devices are the clients and the base station is the server. The base station is usually integrated into a wired network providing access to the complete IT system.

In all wireless applications, data transfer rates decrease as range increases. Speed and coverage may be improved by adding repeaters and additional antennas to the network.

Wireless communication is conducted either by radio frequency (RF) or infrared light (IR) transmission. RF is the dominant wireless transmission method, and there are multiple technologies available to meet the needs of retail applications in different environments. Following are capsule summaries of the most commonly used wireless technologies:



Cable Replacement Technologies

Short Range Radio Frequency (SRRF)

Short range radio frequency technology is primarily used as a cable replacement to enable communications between a mobile printer and a portable computer carried by an operator or mounted on a cart or forklift. Power output is low, which limits data transmission range and minimizes interference with other radio devices. SRRF products are available in the 916MHz and 2.45GHz frequencies to provide flexibility and allow compatibility with inconsistent frequency allocations around the world.

Infrared Light (IR)

Infrared is the only non-radio technology used in wireless printing. It employs infrared light signals, the same technology used in television remote controls. IR is used for cable replacement but not for networking. Unlike all RF technologies, infrared communications requires a direct line of sight between the devices that are communicating. If the line of sight is interrupted, data may be lost and the transmission must be retried. It can take up to eight seconds for IR devices to re-establish contact following an interruption. IR is often found in older devices, and many proprietary IR transmission protocols are in use. Most currently available devices use IR protocols that conform to the Infrared Data Association's (IrDA) Line Printer version 1.1 standard.

Some portable computers that use RF for cable replacement or networking also use IR to transfer data when the computer is placed in its communications cradle (where range, line of sight, and speed limitations are not factors). In this application, IR is used in place of physical contacts, which tend to wear over time.


Bluetooth™ Technology

Bluetooth is a standardized short-range RF technology. With its colorful name, it has attracted a lot of attention since it was first proposed a few years ago. Bluetooth was developed as a wireless personal area networking (PAN) technology designed to allow computers, printers, and other devices to interface with each other in peer-to-peer networks without going through a centralized hub or server. Bluetooth got its name from an ancient Danish king who united Denmark's many tribes, leading to a period of prosperity. Technical developments and standards certification is handled by the Bluetooth Special Interest Group, which has hundreds of members from the computing and communications industries.

There were initial concerns that Bluetooth devices would cause interference for other wireless networks used in retail and industrial settings. Testing by the Wireless LAN Association (WLANA) showed that not only could Bluetooth coexist with other common wireless networks, but is well suited as a cable-replacement technology. Bluetooth was developed to enable devices to interface with each other within a 30-foot (9 m) range, independent of a server or access points. The technology allows a maximum of eight devices communicating with each other in what is called a "piconet." Retailers should consider it for cable replacement applications and evaluate Bluetooth's price-performance value accordingly.

Networking Technologies

802.11 (pronounced eight-oh-two-dot-eleven) is a series of wireless networking standards developed and maintained by the Institute of Electrical and Electronics Engineers (IEEE). The IEEE 802.11 committee has ratified several standards and is working on several more. All the 802.11 standards enable wireless connections with standard Ethernet networks. They differ mainly in data transmission rates and frequency allocations.



802.11b (also referred to as Wi-Fi™) is the most widely used standard and offers performance sufficient for most retail needs. It allows up to 11Mbps (megabits per second) data rates. There are two versions of the 802.11 standard: frequency hopping (FH) and direct sequence (DS), which differ in the way data is transmitted over the available frequency spectrum. Printers on a wireless 802.11 network have an IP address and appear like any other device on the network. The 802.11b standard supports only direct sequencing transmissions and meets the Wi-Fi standard for network compatibility.

Spectrum24®

Spectrum24 is a family of proprietary wireless networking products developed by Symbol Technologies, the leading provider of wireless systems to retailers. The Spectrum24 line includes products developed before the 802.11 standard was created plus fully compliant 802.11b offerings. Spectrum24 uses 2.4GHz RF technology at data rates from 2–11Mbps, depending on the product.

OpenAir™

OpenAir is another commonly used family of wireless networking products that predates 802.11. OpenAir is a proprietary technology developed by Proxim and supported by multiple vendors that manufacture compatible PC cards, access points, and other products. OpenAir uses 2.4GHz frequency-hopping RF technology and offers 1–2Mbps data rates.


Wireless Printer Options

Both types of printers—stationary and mobile—can be wireless. There are several ways to wirelessly enable a printer, including native support, or retrofitting with a PC card, internal card socket, or external modem. Following are the available options:

Internal Radios

Printers with native wireless support offer superior convenience and flexibility. The radio is factory-installed inside the printer and is matched to the user's wireless network. Zebra Technologies offers its customers flexibility and security by supporting all the leading wireless networks used in retail, including 802.11 (frequency hopping and direct sequence), OpenAir, Spectrum24, and WaveLAN® from Lucent Technologies. When the power is turned on, the printer is available to the user's wireless network. No external interface ports are used for the wireless network.

Of course standards change, and a printer with native support has to be returned to the factory if the network frequency changes. To circumvent this limitation, Zebra's newest mobile printers have QuickLink™ modules that can be easily removed and replaced in the field. Modules are available currently with 802.11b, Bluetooth, 916MHz, 2.45GHz, or IrDA connectivity.



Printers with a PC card (PCMCIA) expansion slot can be included in a wireless network by inserting a radio card. The PC card serves as the radio for communication with the network. Zebra Technologies supports 802.11b cards from leading manufacturers, including Cisco Systems and Symbol Technologies. The ZebraNet® Wireless Print Server enables Zebra's XiIIIPlus, 105SL, Z4Mplus/Z6Mplus, and R-140™ printers for wireless use. The ZebraNet Wireless Print Server is installed inside the printer and provides an easily-accessible PC card slot.

A rarely used option is to plug a wireless modem into one of the printer's interface ports. This option is disappearing as printer PC card slots are becoming widely available. Using a PC card slot instead of a modem provides a more durable and space-efficient configuration.

Cart Configurations

Desktop and larger printers can be mobilized by mounting them on a rolling cart. The Zebra PS 2100™ Series products provide a fully integrated cart-mounted solution. This configuration is used in circumstances that call for mobile printing but require the added functionality that a mobile printer cannot provide. Typical applications include distribution centers, sign making, dual media, and other print jobs that require high-volume output or large media sizes. Cart-mounted printers require a power supply and are typically used with a PC or portable computer mounted with the cart.


Mobile Printers

The current generation of mobile wireless printers are lightweight, easy to use, durable, and offer outstanding print quality and graphics previously found only on less portable tabletop printers. Wireless mobile printers can be used to produce high-quality labels, receipts, coupons, and tickets using a variety of media. Many retailers already use wireless hand-held computers in their stores for inventory, shelf-price auditing, and other applications. By complementing these devices with a mobile printer, retailers can leverage their initial wireless investment and take advantage of a whole new range of cost-reduction opportunities.

In retail applications, mobile printers are typically used in conjunction with hand-held or wearable computers. In wireless applications, the portable computer usually runs the application and serves as the connection to the network, with no direct printer connection to the network. The printer receives its commands from the portable computer through either a cabled, infrared, or RF connection. Because mobile printers are designed to be compact and easy to carry, most wireless models use an internal radio or IR connection. RF applications require a radio in the printer plus a radio and controller board in the portable computer. IR applications use the standard port built into each device.

Because the printer can be worn on a belt or a strap, some retailers prefer to put the network connectivity board into the printer to keep the hand-held device as light as possible. Another popular option for wireless connectivity is the Zebra Portable Radio. This clip-on unit attaches to Symbol Technology's SPT 1700/1800 Palm OS® and PPT 2700/2800 (Windows® CE) hand-held device and adds SRRF point-to-point connectivity in under eight ounces.

When retailers first began using portable computers, most applications ran in batch mode. Today, wireless has displaced most batch applications because of the convenience and cost savings it provides. Retail mobile printing is undergoing a similar transformation, with wireless rapidly gaining acceptance for many of the reasons previously described.



Wireless mobile printing systems are easy to set up and use. The only difference users notice is the lack of awkward cables connecting the printer to the portable computer. While choosing to go wireless benefits nearly every mobile printing application, there are other important factors to consider to maximize the efficiency and performance of a mobile printing application. These factors are briefly described below.

Ergonomics

Mobile printers must be comfortable and easy to use or they will not deliver any productivity benefits. While overall weight is important, balance, grip, and ease of carrying and operation should not be overlooked. Weight is less of a factor if the printer is not carried by hand. Mobile printers are available in hand-held, belt-clip, or over-the-shoulder models to meet a variety of application needs and user preferences.

Power Management

How the printer manages its power supply is very important to overall battery life and application effectiveness. Battery life varies widely based on how the printer is used. Print volume, label size, the amount of wireless transactions, and other factors all affect how long batteries last before needing to be recharged or replaced. Users should test their applications to ensure that the batteries they use consistently perform as needed and will not contribute hidden expenses to the total cost of ownership. For example, Nickel Metal-Hydride (NiMH) batteries have a higher initial cost than Nickel Cadmium (NiCAD) products, but have less performance degradation over time, are more efficient at holding their charge, and have a longer life span. Lithium-ion (Li-Ion) cells represent the latest in mobile battery technology. Though more expensive than either nickel cadmium or nickel metal-hydride cells, lithium-ion cells offer the highest power-to-volume and power-to-weight ratio of the three. For example, in a typical printer application, a lithium-ion battery pack producing 7.2 volts has 30% more power than a nickel metal-hydride pack, with half the volume and half the weight.

Media

Modern mobile printers accept a variety of label, tag, ticket, and other media for producing durable shelf labels, coupons, receipts and return slips, name badges, security marks, signs, and other labels. Gone are the days of portable printers that print only low-quality receipts that curl at the edges. Many types of linerless media are also available, which eliminates the waste and disposal problems associated with peel-away liner material used with adhesive labels.

S u m m a r y

Wireless printing provides increased efficiency, safety, and flexibility that retailers can turn into lower operations costs and improved customer satisfaction. Retailers see an almost immediate return on investment after implementing wireless printing solutions.

No one offers more wireless and mobile printers or has implemented as many wireless printing solutions as Zebra Technologies. Contact us to see how we can help you improve your printing processes and boost your profitability.



Notes



Notes



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