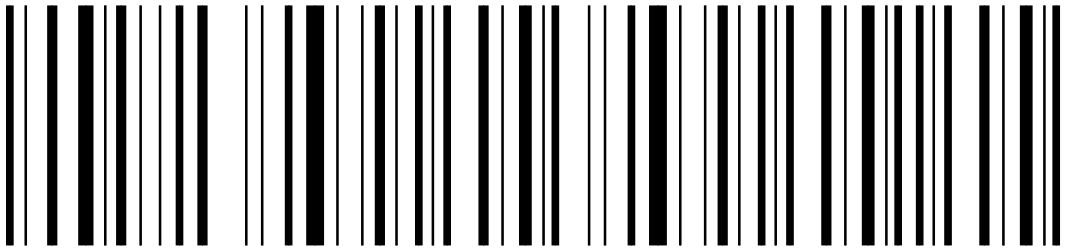
Improving Route Accounting with Mobile Printing Applications



APPLICATION WHITE PAPER

Zebra Technologies

Executive Summary

In every industry, competitive and revenue pressures are transforming the role of mobile workers. Service and delivery personnel are being asked to pursue new revenue opportunities and to encourage customers to purchase upgrades, while salespeople are required to perform more services for their customers.

Workers need better tools to satisfy these new demands, which is why route accounting is one of the fastest growing applications for mobile computing deployments. Route accounting covers a wide range of activities but generally refers to servicing customers at their place of business with a route sales force. Large beverage, bakery, and food distributors tend to use separate route agents for sales and delivery, but typically one driver is responsible for all customer interaction on his or her route. Route accounting is used in industries such as food, beverage, consumer packaged goods, retail, apparel/footware, media publishing, houseware/appliances, and pharmaceuticals.

Companies large and small are learning to profit by replacing route books with mobile computing systems. Whether the application includes delivery, service, sales, or invoicing, automated systems typically provide a fast return on investment and improvements to nonmobile operations such as accounting and customer service. Generally, the more daily transactions that are performed by route personnel, the faster the return on investment from route accounting systems. Route accounting is a leading driver of the fast-growing mobile computing and wireless data markets.

Supporting computerized route accounting applications with mobile printers can produce tremendous quality and efficiency benefits throughout the organization. Mobile printing provides a series of quality improvements and timesaving benefits that are often overlooked, but can have a significant impact on the bottom line.

This white paper will:

- Describe uses for mobile printing in route accounting applications.
- Provide return on investment calculation tools to measure the financial impact mobile printing can have on operations.
- Demonstrate how mobile printing processes can improve billing, distribution, and customer service operations.
- Provide an overview of mobile printer and wireless communications options for route accounting systems.

Introduction

A fundamental shift is under way in how companies view their delivery and service operations. In 2002, for the first time ever, a majority of companies classified their field service operations as profit centers, not cost centers, according to the Association of Field Service Management International (AFSMI), an international trade association of 5,000 service professionals. The significance is that service and delivery operations now carry corporate responsibility to make money and are not simply accepted as a cost of doing business. Mobile workforce managers are responding by requiring their staffs to be more productive and provide additional services.

The best way for mobile workers to meet the challenge is to improve their efficiency by satisfying customer needs on the first visit, which minimizes the need for follow-up or further interaction with sales, repair, or customer service personnel. Automated route accounting systems are an effective tool for providing these benefits.

For many companies, applications that save time also lead to increased revenues. Route drivers are able to spend more time with customers when they are freed from tedious data entry, billing, and report preparation. Mobile computers can be used to give route sales professionals access to enterprise applications and valuable customer information. Armed with more time and more information, route sales agents can encourage additional customer purchases by suggesting complementary items and reviewing new products.

Route accounting impacts sales, billing, inventory, distribution, and customer service operations. Receipts, invoices, and other outputs from mobile printers help route professionals and their customers get transactions right the first time, which raises quality, efficiency, and profitability throughout the enterprise. Typically, companies that have automated have been able to increase their service area and customer base without adding personnel. The following section will demonstrate how mobile printing improves productivity for typical route accounting activities.

Applications

In route accounting environments, mobile printers can be used to generate receipts, invoices, reports, order forms, inspection labels, service records, and other documentation. Producing these records on site helps increase customer confidence and loyalty, and helps the mobile workforce earn a reputation for professionalism. Companies can use these benefits to differentiate their service from rivals, which provides a sustainable competitive advantage.

Pre-delivery

Mobile computers and printers begin providing benefits even before they go out on the route. Drivers arriving at the distribution center can automatically receive their daily route assignments on their mobile computers over a wireless network connection to the host computer system. Wireless networking eliminates the need to wait in line to check in with a dispatcher, and helps drivers begin their routes earlier. The wireless network connection also can be used at the end of the shift to receive daily records and orders from returning drivers.

Newsways Distributors, a magazine and periodical distributor in Los Angeles, switched from paper forms to mobile computers and Zebra® Cameo® 3 printers to record daily sales and returns and issue receipts on its routes. At the end of each day, drivers return to the Newsways facility and dock their computers into cradles that transfer all the day's transaction information into the host computer system. Newsways reported an almost immediate return on investment because of the tremendous labor savings from data entry, counting returns, and correcting errors. The quality of information also improved because data entry errors were eliminated and data was available much sooner.

Salespeople for Pozuelo, a leading Central American producer of crackers and cookies, record customer orders on handheld computers and send them nightly via modem to the company's order management system. System software determines how trucks should be loaded and calculates the optimal route for the company's route sales drivers. The drivers use mobile computers to record deliveries and track inventory on the trucks. They issue receipts, invoices, and other documentation with Cameo 3 printers. The system has saved significant time in preparing and processing paperwork, improved inventory accuracy, sped up invoicing, and given Pozuelo and its sales staff better control over materials and records. Following the successful implementation in Costa Rica, Pozuelo is expanding the application to 80 new routes in El Salvador, Guatemala, and Nicaragua.

Receipt Issuance

Receipts can be an effective tool for improving operational quality and efficiency. Route sales representatives can print delivery receipts and review them with their customers to ensure that orders are accurate and that customers are satisfied with the delivery. Reviewing receipts during the delivery process provides route sales representatives an opportunity to resolve discrepancies immediately, leading to timely, cost-effective resolution.

To understand the power of receipts, companies first must understand how mistakes hurt their business. Assume a company fulfills 1,000 orders per month and has a shipment error rate of 7 percent, which is considered an accepted average across all industries. The volume of errors should generate 70 calls to customer service representatives (CSRs) or account managers. If calls take an average of 12 minutes to resolve (a conservative assumption, considering the time required for order lookup, investigation, credit authorization, and computer entry), the company would spend 14 hours per month resolving errors. If CSRs earn $10 per hour, the direct labor cost for error resolution is $140 per month per 1,000 orders. If the company earns a healthy 25 percent margin, it must win $560 in new business to offset the cost of errors.

At the average shipment error rate, companies would need a full-time customer service representative dedicated to error resolution for approximately every 12,000 orders shipped.

Each 1 percent reduction in delivery errors would save the company $20 per 1,000 orders filled. Users of bar code-based distribution systems with delivery verification typically achieve better than 99 percent accuracy. In the above example, that result would save the company $120 per 1,000 orders. The benefits calculation does not include additional savings from preventing rush shipments and additional deliveries to fulfill orders, lost-revenue prevention from unreported over-shipments, and labor costs associated with returns processing.

Invoicing and Payment Processing

Printing invoices at the time of delivery gives route sales drivers the opportunity to review them with customers, providing many of the same benefits as receipt printing. Adding on-site payment processing will have a significant impact on cash flow.

The alternative to on-site invoicing is for drivers to turn in sheaves of paperwork to billing clerks at the end of each shift. This creates another opportunity for errors to enter the system as clerks re-record the billing information. More significantly, it also adds costly delays to the billing cycle. Consider a driver who finishes his Monday shift and turns his daily invoices into the billing department. In the best case, the information will be entered into the billing system and invoices mailed the next day. The customer will receive them in the mail two or three days later, a total of three to four days after the visit. Companies that follow this standard business practice are thus at a three or four day cash-cycle disadvantage compared with their competitors that bill on site. They also add $0.37 in expenses for each order simply for postage needed to mail invoices.

The cash-cycle advantage can be accelerated significantly by using mobile printers to accept payment on delivery. Many companies routinely wait 30 days or more to pay invoices. Requiring payment on delivery eliminates the billing lag time and invoice processing delays, improving the cash cycle by at least a month. Mobile printers with integrated credit card readers make it convenient and simple to accept mobile payment and improve cash flow.

Grupo Elektra, the largest home electronics, furniture, and computer retailer in Mexico, saves hundreds of hours in administrative time a day by issuing mobile printers and computers to its collection force. Elektra has about 3,000 collections professionals who each visit between 30 and 40 customers each day to take monthly payments. Previously, all transactions were recorded by hand onto paper forms. Each night, approximately 800 regional supervisors entered all the information into the computer system, a process that took hours and was rife with mistakes.

Today, Elektra collection professionals record all transactions on handheld computers and quickly generate receipts and documentation on Bluetooth®-enabled Cameo 3 printers. At the end of the shift, information is uploaded from the mobile computer to the host system in minutes, instead of hours. The system enables workers to collect and access more customer information, resulting in improved collections and more customer visits per day. Ultimately, such solutions enable organizations to service more customers without adding route staff, which produces significant labor cost savings.

An emerging application is the use of wide-area wireless data networks for credit card payment authorization. Route agents swipe the credit card through a reader integrated into a Zebra printer, which transfers the data to a mobile computer or cell phone through either a cable or short-range wireless interface. The cellular network or other wide-area wireless data service is then used to send the credit authorization request. The transaction is processed securely and efficiently in seconds, eliminating the need for batch processing at the end of the shift.

On-site payment processing is also beneficial to companies because it reduces the resources needed to support the route sales operation. Billing departments have fewer invoices to process and customer service has fewer calls to resolve because customers will review and approve invoices with their route sales representatives. Assuming billing inquiries take an average of 15 minutes to resolve, companies can save $620 in invoice processing expenses for every 1,000 orders billed ($250 in reduced customer service labor and $370 in postage). At 25 percent margin, the savings is equivalent to $2,480 in new sales.

Direct Store Delivery (DSD) Management

Direct store delivery is often challenging for retailers and vendors. Before the development of the DEX (Direct Exchange) UCS (Universal Communications Standard), a vendor typically delivered a certain quantity of items, scratched out an invoice for the retail store manager to file away (and, it is hoped, entered into inventory), and delivered a copy of that invoice back to the vendor's own accounts receivable department for processing. The time lapses from invoice transmission to accounts receivable and further delay in data entry lengthened the cash cycle and often led to billing problems. 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 details 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 computer 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, who benefited by receiving payment sooner after delivery. 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 UCS 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 confirms transmission 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.

Documentation and Reports

Route sales and service personnel can also use mobile printers such as Zebra's RW 420 to create reports, maintenance records, inspection seals, service reminders, and other documentation. All the required formats are stored in the printer memory, eliminating the need for mobile workers to carry numerous forms. Creating documentation electronically using inputs to a mobile computer is faster and more accurate than writing records on a clipboard, and eliminates the need for transcription and data entry at the office. The forms are also more legible and professional, which contributes to the firm's reputation for quality and helps avoid confusion and conflicts. Additionally, the RW 420 offers a simple push button release cradle for storage and charging while in the truck.

Leaders in service management automation are 25 percent more profitable than average companies, according to a study by AMR Research. The same study found that the average manufacturing company misses 50 percent to 70 percent of potential service revenue because of poor record keeping and management. Service organizations can use mobile printers to create reorder reminders and service reminder stickers, similar to oil-change reminder stickers that are placed inside the windshield. These items keep the company in front of the customer after the representative leaves and help build repeat business. Similar to service reminders, inspection labels leave behind a permanent record of when service was performed, providing documentation needed to resolve warranty claims. These simple reminders can be powerful profit builders.

There are many other possible uses for mobile printers in route accounting. In nearly every instance where field sales representatives put pen to paper, mobile printers can be used to save time and improve quality.

Technology

Mobile printers for route accounting may be worn on a belt or shoulder strap or securely mounted in the vehicle. Printers are used with mobile computers and interfaced by either a cable or wireless connection. Mobile printers can also have direct connections to wireless networks. Regardless of the form factor, mobile printers are able to print text, logos, graphics, and bar codes on long-lasting forms and labels of different sizes and thicknesses. Some models have integrated magnetic stripe readers for credit card processing and other applications. The key printer performance criteria for route accounting are durability and battery life. These and other mobile printing options and features are described below.

Form Factors and Ergonomics

Printers are available in a variety of designs to meet the needs and preferences of each mobile workforce. Mobile printers must be comfortable and easy to use or they will not deliver any productivity benefits. They also must be fast enough not to slow down the route agent, or else users won't make printouts unless the customer insists. While overall weight is important, balance, grip, and ease of carrying and operation should not be overlooked.

Handheld models combine the printer and mobile computer in a single unit. Printer-computer combinations may offer bar code readers, wireless networking, and other options associated with mobile computers. The printer

may be a removable component that clips onto the terminal or may be integrated into a one-piece unit. The combination printer-handheld design eliminates the need for a cable or wireless connection between the printer and computer. Cabled solutions aren't favored for route accounting because the connections tend to break under normal usage conditions.

Integrated units for route accounting pose a challenge because they aren't often durable enough to perform after being dropped. Additionally, integrated units are not always designed ergonomically correct, which can cause some discomfort to the user.

Wireless Connectivity

Mobile printers may use two forms of wireless connectivity. Short-range wireless can be used instead of a cable to connect the printer and mobile computer. Printers may also have a direct connection to enterprise wireless networks. The wireless interfaces perform separate functions and can be used simultaneously. The dominant industry wireless networking technology is 802.11b. Zebra is a leader in 802.11b printing solutions. It is important when using these technologies that organizations select a provider like Zebra that supports wireless security products.

Route drivers can access wireless networks when they are in their own distribution centers or other company facilities to receive their daily routes and instructions, download customer lists and inventory records, and transfer transaction data at the end of the shift.

Using wireless for cable replacement improves ergonomics and productivity. Wireless systems can also be more reliable because there is no chance for printer cables and pin connectors to break. This is a tremendous advantage in route accounting, where users are often miles away from their headquarters and do not have immediate access to replacement parts.

Bluetooth technology is emerging as the top choice for cable replacement because it provides excellent range, speed, and connectivity, and is cost-competitive with older short-range radio frequency (SRRF) and infrared (IR) technology. Zebra supports all the cable-replacement wireless technologies, including Bluetooth, and infrared light.

Wireless LAN (WLAN)

All the IEEE standards enable a wireless connection to standard Ethernet networks. 802.11b is the most widely used wireless network standard and offers excellent performance for distribution and dispatch operations. It uses the 2.45 GHz frequency band and allows up to 11 Mbps (megabits per second) data rates. Printers on a wireless LAN network have an IP address and appear like any other device on the network, which lets users take advantage of the many excellent software products available for network management and security.

Zebra manufactures several mobile printers with 802.11b networking connectivity and also offers connectivity software, security, wireless network monitoring, and control tools. Zebra is committed to this market-leading technology and will support new WLAN enhancements for security, speed, and connectivity as they become available.

Bluetooth

Bluetooth is a standardized short-range RF technology. Bluetooth got its name from an ancient Danish king who united Denmark's many tribes, leading to a period of prosperity. The Bluetooth Special Interest Group has hundreds of members from the computing and communications industries and seeks to unite them in the development of easy-to-use wireless network standards. Bluetooth was developed as a wireless personal area networking technology that enables up to eight computers, printers, and other devices to interface with each other from up to 30 feet (9 m) away in peer-to-peer networks without going through a centralized hub or server.

Bluetooth is an outstanding technology for cable replacement in route accounting. It provides extremely fast and reliable printing because of its data transfer speed and resistance to interference. Bluetooth can even be used simultaneously with 802.11b network transmissions. Because it is widely supported by a variety of device manufacturers, route drivers could use their Bluetooth printers to print receipts, invoices, and reports without the need for a cable.

Infrared Light (IR)

Infrared employs infrared light signals, the same technology used in television remote controls, and is the only nonradio technology used in wireless printing. IR is more susceptible to interference and broken connections than RF. Sunlight in particular can interrupt IR transmissions, which is one reason the technology is a poor choice for route accounting environments. Unlike all RF technologies, infrared communication 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 8 seconds for IR devices to reestablish 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 IrDA's 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.

Zebra Wireless Options

Zebra Technologies supports all the wireless technologies described above. For maximum flexibility, Zebra offers QuickLink™ removable radio modules for its QL™ series of mobile printers. QuickLink radios come in Bluetooth and 802.11b (Symbol® Compact Flash and Cisco® PCMCIA form factors). For more information about wireless technology, see the Zebra white paper *The Benefits of Wireless Printing*.

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 for optimum efficiency and performance of a mobile printing application. These factors are briefly described below.

Power Management

How the printer manages its power supply is 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. It is critically important in route accounting applications to have enough battery life to power computers and printers for the entire shift or else workers may not be able to complete their daily jobs.

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 percent more power than a nickel metal-hydride pack, with half the volume and half the weight.

Media

Modern mobile printers accept a variety of form, label, tag, ticket, and other media for producing durable receipts, invoices, return labels, inspection labels, security marks, and other labels. Gone are the days of portable printers that print only low-quality receipts that curl at the edges. Top-coated media resists ultraviolet light and remains readable for years, eliminating the problem of receipts that fade after a few days. Many types of liner-less media are also available, which eliminates the waste and disposal problems associated with peel-away liners used with adhesive labels.

Wearable and vehicle-mounted printers can carry more media than handheld models without negatively affecting convenience or comfort. They can also accommodate larger media sizes than integrated units, although this capability isn't as important as it was a few years ago because few businesses still require full-sheet receipts and other documentation. Route accounting customers usually accept label- and ticket-size receipts in addition to full-page forms. The smaller receipts are easier to store and ultimately save the issuer money because less paper is used. Some companies use mobile printers to print variable information like invoice amounts or delivery contents on labels that are applied to forms. This satisfies customer desires to keep using familiar forms but eliminates handwriting and manual recording.

Conclusion

By adding mobile printing to route accounting operations, companies position themselves to win competitive advantages in service and profitability. Mobile printers provide a means of delivering the output to meet the growing needs of field sales and service personnel. Issuing receipts and invoices on site brings quality controls to the front lines of enterprise operations that results in greater customer service and lower overall costs. The invoices themselves become tools for improving cash flow and working capital by shortening the billing cycle.

Zebra Technologies offers the widest range of mobile printers in the industry. Contact Zebra today to learn more about how our products and expertise can help improve your route accounting operations.

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