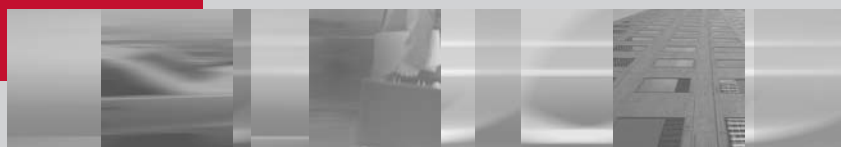
symbol®
The Enterprise Mobility Company™



MAY 2004 ▸ WHITE PAPER

Harnessing the Power of Automation through Mobile Computing

Executive Summary

In the not-too-distant past, when businesses examined their processes, the question was whether or not to automate using mobile computing technology. Regarded as a huge undertaking, automation and process change were often considered and rejected for a variety of reasons:

- Too costly
- Too time-intensive
- Too disruptive to day-to-day business operations during implementation
- Inadequate technical expertise in-house to implement and manage
- No clear-cut benefit or return-on-investment to justify the effort and dollars expended

As technology has evolved, mobile computing solutions have become more affordable and dramatically easier to implement and manage. For example, next-generation switch-based wireless networks work right out of the box. Sophisticated management applications enable the automatic downloading of software to handheld devices, eliminating the many hours previously required to manually load and update each device. Once-cloudy benefits are now crystal-clear, well proven in organizations around the world.

Across industries—from retail, manufacturing and healthcare, to transportation, government and wholesale distribution—mobile computing is streamlining business processes through automation that effectively eliminates errors and delays in the processing of information.

As time and cost are shaved out of core business activities:

- Costs are reduced
- Sales are increased
- Employees are more productive
- Asset utilization is improved
- Profitability is increased

For example, a major manufacturer streamlined route accounting operations, which translated into several hundred additional sales opportunities per year per field representative. A transportation and logistics company implemented an automated mobility solution that cut driver phone and pager costs in half—and also dramatically reduced the accounts receivable collection cycle from 45 days to two days.

In addition to quantifiable financial benefits, the power of automation is also delivering strategic benefits–for example, enabling companies to achieve competitive advantage through better customer service. And the benefits of that improved service again ripple right to the bottom line as higher levels of customer retention translate into increased revenues, overall lower costs and increased profitability.

In the face of such worldwide acceptance and proven results, the question has changed. Companies no longer ask 'if' mobile computing solutions should be implemented to automate processes, but 'where and how'. This paper answers those questions by taking an inside look at typical business processes in route accounting and field service applications as well as in the transportation and logistics industry, examining where mobile computing can be applied—and the resulting business benefits.

Transportation & Logistics

Every day, transportation companies face tough competition, rising operating costs and increasing demands for better service from customers. Typical transportation companies are involved in the delivery of some type of goods, with two core business processes: dispatch (dispatching of vehicles to customer locations) and pickup and delivery (involving the pickup, delivery and collection of proof-of-delivery information). When mobile computing solutions are used to streamline these two essential business processes, the resulting automation delivers reduced costs, better customer service, and maximum driver, vehicle and administrative personnel productivity.

Traditional Manual Processes

The dispatch and pickup/delivery processes often use pen and paper to collect and disseminate a wide variety of information—from manifests that include customer, product and quantity information, to route sheets that contain information on when and where deliveries are to be made, and the collection of proof-of-delivery or POD (customer signatures) information at the customer site. Manual execution of these processes involves a wide variety of personnel—from dispatchers and dockworkers to truck drivers and office clerks—to track information manually (pen and paper) which is then later entered into a computer by yet more staff. The labor-intensive, time-consuming processes result in:

- Errors from illegible handwriting, manual data entry and mistakes in the identification, counting, loading and unloading of shipments
- Critical delays in obtaining information due to the lag time between manual data collection and data entry
- Slower posting of transactions, billings and collections

The result is a significant increase in the cost of delivering cargo, parts and the service customers expect.

Transportation Industry Pain Points

The errors and delays inherent to manual processes affect the quality, efficiency and overall cost of the dispatch and pickup/delivery processes in eight key areas:

- Dispatch
  1. Poor labor productivity, resulting from the time-consuming paper and pen-based processes.
  2. Incorrectly loaded trailers, resulting in unnecessary costs for re-ships and expedited delivery as well as unhappy customers.
  3. Poor utilization of trucks and drivers. Time spent on manual checking procedures at the beginning and end of each shift negatively impacts asset utilization ratios by reducing the number of possible deliveries per day.
- Pickup and Delivery
  4. Poor freight visibility. This prohibits proactive management of the inventory pipeline, resulting in the need to maintain higher levels of costly buffer stock.
  5. Proof of delivery (POD) problems. The slow, manual, data-collection process and resulting delays in availability of data impacts the cash to cash cycle as well as customer service issues.
  6. Low overall fleet productivity. Driver identification and counting errors result in costly delivery issues that can impact the entire fleet's productivity.
  7. Poor driver productivity. Paperwork-intensive processes associated with pickup and delivery further reduce the number of possible deliveries as well as the delivery time.
  8. Reduced efficiency and productivity of dock personnel, office clerks and dispatchers. This results from poor information quality and delays in access to information.

Automating of Processes

With mobile computing solutions, data is automatically captured and moved through the dispatch and pickup/delivery processes, eliminating the delays and errors inherent in manual paper and pen-based procedures. Paper forms are

» Through the automation of many cumbersome, labor-intensive and error-prone procedures, mobile computing solutions resolve many business issues related to manual processes in both dispatch and pickup/delivery operations. And the automatic capture and movement of data through the dispatch and pickup/delivery processes eliminates the delays and errors inherent in manual paper and pen-based procedures.

replaced with electronic versions and other data that can be sent and received in seconds. Illegible handwriting and data entry mistakes are eradicated. Common dispatch activities that can be easily automated include:

- Routing and planning of loads
- Loading of plans
- Validation of manifest information (via scanning and bar code technology)
- Driver check in, truck inspection, load verification and route planning

Proper management of these activities provides best-practice standard pickup and delivery processes, including:

- Verification of packages at pickup and delivery (via scanning of tracking numbers on each package with a mobile computer)
- Signature collection complete with time and date stamp for proof of delivery for every shipment
- Recording of returns, OS&D and/or freight collection information
- Automatic transfer of delivery data to the corporate database system in either batch or real-time via WWAN connectivity

Complete Process Improvement Coverage

Mobile computing solutions can streamline many areas in the transportation and logistics process, from outbound to the customer location to inbound activities. The resulting automation reduces costs, improves customer service, and increases productivity for drivers, vehicles and administrative personnel.

- Instant access to delivery information, enabling customer service personnel to provide up-to-the-minute information, and enabling new services such as a web-based system for customer self-tracking

Resolving Transportation Industry Pain Points Through Mobility Solutions

Through the automation of many cumbersome, labor-intensive and error-prone procedures, mobile computing solutions resolve many business issues related to manual processes in both dispatch and pickup/delivery operations. The ability to capture data right at the point of activity and move it instantaneously through the supply chain results in a dramatic improvement in the speed and accuracy of data capture, the productivity of all involved personnel, and the efficiency and utilization of the vehicles and equipment.

Transportation and logistics companies can easily integrate real-time information into the supply chain with mobile computing, achieving powerful improvements in the dispatch and pickup/delivery processes:

- Dispatch

1. Increased general labor productivity. Automatic capture and movement of information eliminates time-consuming manual procedures and the errors from illegible handwriting and manual data entry.

2. Increased accuracy of trailer loads. Eliminates unnecessary re-shipping and expediting charges as well as the related customer service issues.

3. Improved driver and equipment utilization. Dramatically reduces time required to perform administrative tasks at the beginning and end of each route, enabling an increase in deliveries with the same number of drivers and trucks.

- Pickup and Delivery

4. Reduced buffer stocks/lower inventory costs. A more predictable delivery process provides greater freight visibility, enabling the projection of timely and accurate inventory requirements.

5. Automation capture of POD. Dramatic reduction of collection periods for accounts receivables, improved driver productivity and customer service at each stop through the instant capture of POD data and instant automatic transmission to corporate headquarters.

» By leveraging the power of mobile computing, one transportation company reduced the accounts receivable collection period from 45 days to two days, reduced proof of delivery write-offs, re-deliveries and shrinkage by 5%,reduced phone and pager expenses by 50%, and decreased overtime per driver by two to three hours a week.

6. Increased overall fleet productivity. Automated driver identification and counting procedures effectively eliminate issues that reduce overall fleet productivity, enabling more deliveries without increasing fleet size.

7. Increased driver productivity. Elimination of time spent on manual pickup and delivery processes enables the same number of drivers to handle more deliveries in a day.

8. Increased general labor productivity. Automatic capture and movement of information ensures accurate and timely access to information, increasing productivity for workers on the dock, in the truck, in the office and at the customer site.

The Bottom Line

Transportation and logistics companies are realizing quantifiable benefits that easily justify the implementation of mobile computing solutions, including:

- A reduction in the average accounts receivable collection period from an average of 45 days to as few as two days

- A 5% reduction in proof of delivery write-offs, re-deliveries and shrinkage

- A 50% reduction in phone and pager expenses

- An average of one to two additional deliveries per day—resulting in a reduction of two to three hours per week in overtime per driver

Regardless of whether you select to automate dispatch and pickup/delivery procedures, or yard management and fleet management and compliance operations, mobile computing solutions will not only strengthen your competitive positioning, but will contribute directly to your company's bottom line.

Field Service

In a wide variety of industries, field service operations struggle to control spiraling costs of labor, travel, and inefficient inventory management, increase field service productivity—while increasing customer satisfaction. A critical link to customers, it is field service that provides one of the few face-to-face interactions with customers post-sale. How can companies drive costs down in this operation yet ensure that this valuable opportunity is used to strengthen customer relationships? Mobile computing solutions can arm a field service organization with the tools and information to make sure this valuable connection with the customer results in outstanding service, stronger relationships and higher retention rates, while driving costs down, productivity up, and in a business unit traditionally considered a 'cost of doing business'—a surprising increase in revenues.

Traditional Manual Processes

Field service is often a manual paper-intensive process with myriad forms used in a wide variety of tasks, including:

- Scheduling, dispatching and tracking of field service personnel
- Parts procurement for service calls (picking and loading)
- Tracking of repairs (returned products, repair status, re-delivery to customer)
- General inventory management (including return of defective parts)
- Work orders
- Proof of service
- Billing—processing of receipts and invoices
- Warranty tracking and processing of fee-based, out-of-warranty repairs
- Time sheets

Disparate time-consuming paper-based processes, errors due to incorrect transcription of handwritten information and manual data entry, lag time while information travels from the written form to its ultimate destination and the inability to communicate in real time cripple this business unit's ability to control costs and improve customer satisfaction.

Field Service Pain Points

The lack of an integrated real-time process and two-way communication between field personnel and systems inside the company result in:

1. Reduced employee productivity. Time-consuming manual procedures including completion and processing of paper forms reduce time field personnel could spend servicing customers; additional labor costs when second person touches the same forms again (i.e. for data entry).
2. High costs associated with lack of real-time scheduling and dispatch: inability to view the location of field personnel in real time prevents the most efficient routing, contributing to increased labor costs (in hours worked), travel costs, and additional wear-and-tear on fleet of vehicles.
3. Slow billing cycles and high administrative costs to support accounts receivables. Manual collection and transmission of information to support later processing, printing and mailing of receipts and invoices adds unnecessary administrative and postage costs.
4. Spiraling inventory costs. The inability to track inventory in real time requires maintenance of increased stock levels to ensure adequate parts on-hand for repair calls.
5. Longer repair cycles. This is caused by time-intensive processes and the inability to better collect, manage and disseminate timely information to and from field personnel (for example, inability to order parts while at customer site).
6. Increased service costs. A lack of visibility into prior work history while at the customer site reduces the ability to accurately trouble-shoot and repair the problem in a single visit, affecting both the quality of the service call, customer satisfaction and costs.

» When automation shaved an hour off the workday of each representative in an 800-person field service organization, the resulting savings of approximately $20 million per year easily justified the cost of a mobile computing solution.

7. Lost sales. The lack of adequate information to support up- and cross-selling is created by the inability to deliver real-time information on warrantee status and other services appropriate for the particular customer.

8. Low customer satisfaction ratings. The lack of real-time scheduling and dispatch causes the number one customer complaint: large service windows (i.e. between 9 am and 2 pm, instead of between 9 am and 11 am).

Automating of Processes

The seamless collection and transmission of real-time information via mobile computing devices enables the automation of a number of processes in field service organizations, as well as visibility into a wealth of new information, including:

- Real-time Service Dispatch and Scheduling—dispatcher visibility of the location of every field technician at all times via mobile computing and/or GPS
- Electronic transmission of work orders to off-site technicians
- Electronic transmission of customer-specific information, including: warrantee expiration, other available and appropriate products and services to offer, and any past repair history
- Ability for field representatives to print receipts and invoices on-the-spot
- Ability for field personnel to electronically process and close-out work orders
- Ability to order parts from a customer location
- Ability to track inventory in real time

Resolving Field Service Pain Points Through Mobility Solutions

Mobile computing systems not only provide needed automation, but also critical two-way communications with service personnel in the field. The tightly integrated system provides a new level of visibility across the various functions of field service operations, from dispatch and scheduling to billing and inventory management. Following is a synopsis of how and where mobile computing solutions increase productivity and decrease costs, while raising customer satisfaction, revenues and profits:

1. Increased field representative productivity. Due to elimination of time spent on manual processes, the same number of field personnel can now handle more service calls per day.

2. Reduced labor and travel costs, as well as wear and tear on fleet vehicles. This is created by real-time automatic routing, wireless dispatch and re-routing of the closest available employee form the last known location.

3. Faster cash flow cycles. The ability to process and print receipts and invoices on site dramatically decreases the accounts receivable cycle time.

4. Reduced inventory costs. Real-time visibility enables reduction in minimum stock levels for on-hand repair parts.

5. Shorter repair cycles. Rapid and complete transfer of all pertinent information reduces repair times—from elimination of manual processes to ordering of replacement parts while onsite at customer locations to access to complete customer repair history.

6. Reduced overall cost of service. Access to complete customer repair history enables more accurate trouble shooting and first-visit successful repair, eliminating the cost of subsequent repeat trips.

7. Increased sales. Information availability of warrantee information and other products and services appropriate for a specific customer enables field sales personnel to double as salespeople, opening up untapped revenue opportunities.

8. Better customer service ratings: Real-time scheduling and fleet/driver visibility enables delivery of narrow service window (i.e. between 9 am and 11 am—instead of between 9 am and 2 pm).

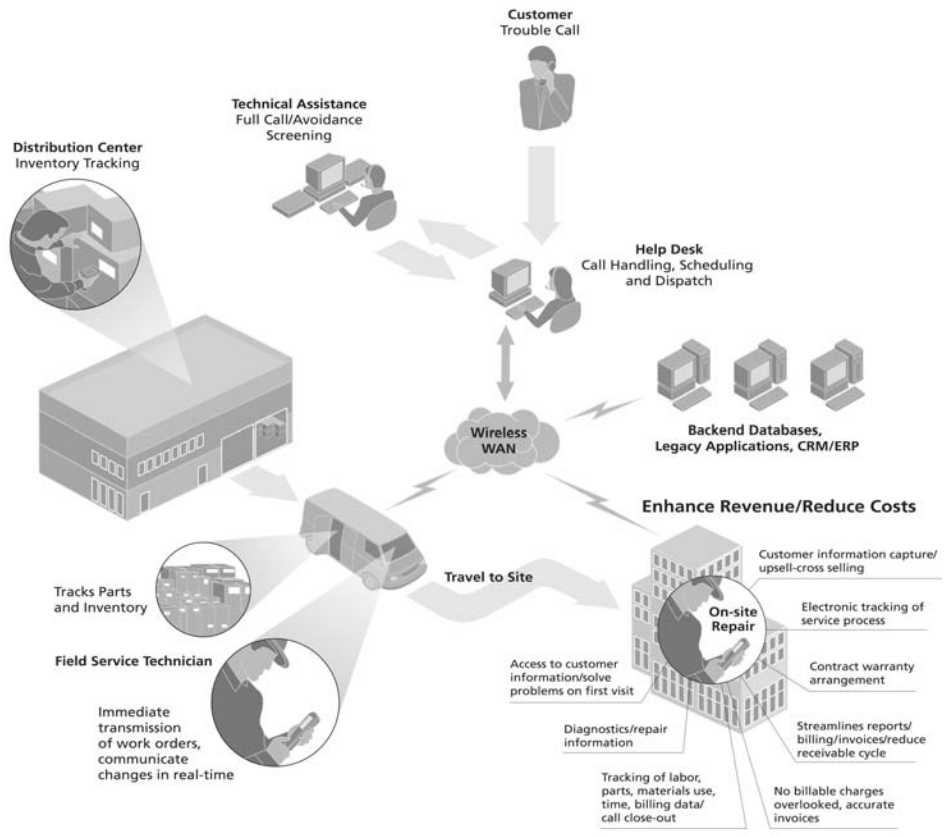
The Bottom Line

In a day and age when service offerings have become a key competitive differentiator, mobile computing solutions deliver the power to change field service operations from a typical 'cost of doing business' to a strategic business unit that contributes heavily to the overall profitability of the company and a dramatic improvement in its competitive position.

Through a combination of technology such as bar code scanning, image capture devices, mobile handhelds and wireless networking, mobile computing solutions reveal a wealth of strategic information that can be used at all levels in a company—from the analysis of an individual services call to planning for a more effective field service operation and identification of repair patterns that can lead to uncovering unknown product weaknesses and better manufacturing.

How much impact can a mobile computing solution have on a field service organization? One company shaved one hour of labor off of the workday for each of its 800 field service workers. The total 800 hours in labor savings daily translated into 200,000 hours per year (or 250 workdays). With an average fully loaded cost per hour of $100 per field worker, the company realized a savings of approximately $20 million per year, easily justifying the investment in mobile computing technology.

Wireless Field Service Management



Wireless mobile computing solutions can greatly increase the efficiency of many areas in field service operations. Better tracking of parts leads to better inventory management. Wireless transmission of work orders—and changes—in real time increases the efficiency and productivity of field service personnel. And the ability to instantly access and transmit information on site ensures that field representatives have all critical and pertinent information, enables cross-selling, and streamlines billing and receivables cycles.

Route Accounting

Companies engaged in route accounting are operating in a time of tremendous challenge—and tremendous opportunity. Slim product margins, a highly competitive struggle for 'shelf space,' ever-changing and increasingly complex product lines and sales models, and vendor-managed inventory are key everyday challenges. And as the world continually changes and evolves, new issues arise. For example, constantly changing consumer preferences, such as the recent trend towards low-carbohydrate foods, require changes in product line and positioning. And the threat of terrorism presents the need for a new level of safety for food products. How can mobile computing solutions address these challenges?

Streamlining the Supply Chain

Supply chain strategy is key to addressing the many issues in route accounting. While operations are typically automated to some degree, the search for more efficient and effective processes is ongoing. The processes required to support the distribution of products (such as beverages and snacks to convenient stores, or health care and beauty products to drug stores) are labor intensive by nature—time consuming and prone to errors that result in increased costs, lost productivity and missed merchandising opportunities.

Next-generation technology can enable an unprecedented level of automation in the supply chain, stripping millions of dollars of cost out of operations and creating significant revenue growth opportunities. The result can be the difference between a struggling or thriving operation. Today's most robust mobile computing solutions offer open, standards-based platforms that easily and cost effectively support the ongoing refinement and further development of automation levels in route accounting activities, enabling companies to continually sharpen their competitive edge through better customer service, reduced costs and increased profitability.

The Traditional Processes

Since sales and delivery of goods is the primary activity, all processes are focused on the support and tracking of inventory as it passes through the various areas of the supply chain, including:

- Physical inventory
- Receiving
- Loading/pallet builds
- Cross docking/transfer
- Fixed asset inventory
- Payroll integration
- Update maintenance and customer support team

Daily major functions performed in route accounting include:

- Customer identification
- Planning
- Sales management
- Placement of orders
- Routing of trucks
- Loading and check-out of trucks
- Management of truck inventory
- Printing of invoices
- Merchandising at stores
- Accounts receivables: collections
- Check-in and reconciliation
- Settlement
- Unloading
- End of day reconciliation

Process Automation: A Perpetual Cycle

All route accounting operations enjoy some level of automation—but to remain competitive, companies engaged in route accounting must always be evaluating the current level of automation within the company versus the

level of automation that can be achieved with new and upcoming technology. In the quest to keep mobile route accounting personnel as productive as possible, companies must keep a continual eye on what new technology can further streamline processes, increase efficiencies, reduce errors and transmit transaction information more cost-effectively to company headquarters.

Companies with older technology can look to the latest mobile computing solutions with the following technological advances to deliver a new level of automation that can assist in providing superior customer service and a competitive edge:

- Very lightweight and ergonomic devices
- Communication options including WLAN (802.11b) and WWAN enable real-time, high-speed wireless communications within the depot or from remote locations
- Ruggedly built to withstand the toughest environments and harshest weather conditions, while outlasting the average mobile computing device for outstanding total cost of ownership (TCO) of mobile devices

» One extra stop per day for route accounting representatives can translate into thousands of additional sales opportunities per year.

» Continual streamlining and automation pays off in route accounting operations. Continual streamlining and automation pays off in route accounting operations. A wireless demand-forecasting application on a rugged mobile device significantly reduced out-of-stocks, out-of-dates and backroom inventory issues—and cut costs for support and repair of mobile devices in half.

- Displays that can be easily viewed in any environment regardless of lighting and can support any level of graphics—from simple to multimedia, black and white to full color
- Robust processing power and substantial increases in memory combine to enable support for the most demanding of applications
- Dramatic improvements in power management architectures, delivering significant improvements in battery life in smaller and lighter form factors
- Reliability, which translates into less repair and support center cost
- Real-time access to warehouse inventory data enables up-to-the-minute stock availability, instant order processing, and more
- New portable printers for on-the-spot printing of customer invoices

Route accounting applications are rapidly reaching beyond the automation of the typical accounting functions that reduce operational costs to new capabilities that increase sales, ultimately leading to the achievement of a key business initiative: Better shelf space. Advanced functionality that can help increase sales includes:

- Automated ordering based on historical sales data
- Competitive marketing analysis point-of-sale displays, tracking, elaborate pricing models, multimedia promotions and new product introductions
- Support for a dramatically increasing number of items (or SKUs)
- Route optimization analysis
- Improved shelf space management
- Flexible application modules capable of adapting to a variety of delivery models including pre-sale, merchandiser, delivery or conventional route delivery

The Bottom Line

Is the continual fine-tuning of automation worth the effort and cost? Consider a mobile computing solution that enables drivers to make just one

continued

more stop per day. That extra stop translates into hundreds or thousands of additional sales opportunities (depending upon the size of the organization)—route accounting representatives can use the additional time to either sell more products on a scheduled stop, or make an extra unscheduled stop at a different account. For example, a company engaged in the delivery of coffee reduced the connection time required to send and receive order and delivery information from an average of 15 minutes to two minutes, enabling route personnel to spend much more time servicing and selling customers. The Pepsi Bottling Group®, with a million customers and a field sales and service force of 12,000, deployed a wireless demand-forecasting application with one of the most rugged devices available, achieving both strategic and financial benefits:

- Strategic: A reduction in out-of-stocks, out-of-dates and backroom inventory issues
- Financial: Support and repair calls and the associated costs for mobile devices deployed in the field were cut by 50%

Through the continual fine-tuning and increase of automation levels, corporations engaged in route accounting are better positioned to better obtain and sustain premium shelf space—ultimately contributing to increased sales and stronger competitive positioning in the marketplace.

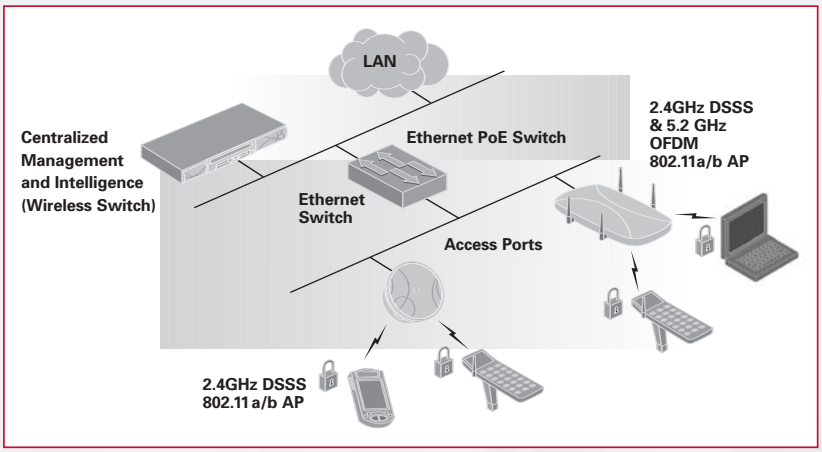
The Piece Parts of a >> Mobile Computing Solution

Mobile computing solutions consist of three main components: mobile computing devices, application software, and a wireless communication infrastructure. Mobile computing devices offer a wide range of features and functionalities that enable the selection of the right device for a specific industry and application, including:

- Bar code scanning and image capture
- Wireless communication options (WLAN, WWAN, WPAN)
- Data entry options such as keypad and touchpad
- Form-factors such as a pistol grip or small handheld
- Choice of operating systems

Legacy applications can be integrated and custom applications can be designed to perform specific tasks. The wireless infrastructure is usually a combination of a wireless local area network (WLAN) and a wireless wide area network (WWAN), enabling real-time communications via mobile computers between the employee in the field and employees and systems inside the company. Many mobile computing solutions take advantage of existing WLANs, enabling enterprises to maximize existing investments. Other companies choose to upgrade WLANs as part of a mobile computing solution to the advanced second-generation architecture, wireless LAN switching. This new architecture is more cost-effective than first-generation WLANs, and can be easily upgraded to accommodate new features, functionality, and standards to ensure maximum investment protection.

Next Generation Wireless Switch Network Architecture with Access Ports



About Symbol Technologies

Symbol Technologies, Inc., The Enterprise Mobility Company™, delivers solutions that capture, move and manage information in real time, from the point of activity to the point of decision. Symbol solutions integrate advanced data capture technology, ruggedized mobile computers, wireless infrastructure, enabling software and high-ROI applications from our business partners and Symbol Enterprise Mobility Services. Symbol enterprise mobility solutions increase business productivity and velocity, reduce costs and realize competitive advantage for the world's leading retailers, transportation and logistics companies and manufacturers as well as government agencies and providers of healthcare, hospitality and security. More information is available at **www.symbol.com**

For system, product or services availability and specific information within your country, please contact your local Symbol Technologies office or Business Partner.

Corporate Headquarters
Symbol Technologies, Inc.
One Symbol Plaza
Holtsville, NY 11742-1300
TEL: +1.800.722-6234/+1.631.738.2400
FAX: +1.631.738.5990

For Asia Pacific Area
Symbol Technologies Asia, Inc.
(Singapore Branch)
Asia Pacific Division
230 Victoria Street #05-07/09
Bugis Junction Office Tower
Singapore 188024
TEL: +65.6796.9600
FAX: +65.6337.6488

For Europe, Middle East and Africa
Symbol Technologies
EMEA Division
Symbol Place, Winnersh Triangle
Berkshire, England RG41 5TP
TEL: +44.118.9457000
FAX: +44.118.9457500

For North America, Latin America and Canada
Symbol Technologies
The Americas
One Symbol Plaza
Holtsville, NY 11742-1300
TEL: +1.800.722.6234/+1.631.738.2400
FAX: +1.631.738.5990

Symbol Website
For a complete list of Symbol subsidiaries and business partners worldwide contact us at: **www.symbol.com**
Or contact our pre-sales team at: **www.symbol.com/sales**

symbol™
The Enterprise Mobility Company™

Part No. HPAWP Printed in USA 05/04