



Mobility Imaging and the MC9000 Series of Mobile Computers



Introduction

Today, using mobile technology to solve business problems and achieve your goals is essential, especially within competitive industries such as manufacturing, third-party logistics (3PL) and field service. This briefing gives a top-level overview of mobile imaging technology along with the business solutions it offers. Its goal is to detail the direct benefits and explore how imaging fits into your overall mobile computing needs.

In enterprise mobility applications, imaging is defined as the ability to capture images of one-dimensional (1D) bar codes, two-dimensional (2D) symbologies, signatures and photographs (grayscale) using a mobile handheld computer. Image capture capabilities enhance and complement end-to-end mobility for your workforce and operations.

Choosing the Optimal Mobility Solution

Businesses have long recognized the value of bar code laser scanning. It offers virtually error-free data collection - eliminating the higher cost and lower productivity that paper and handwritten data entails. The benefits of imaging are similar to laser bar code scanning - it increases the speed and accuracy of data collection to optimize the efficiency of inventory management, retail, shipping and receiving applications and more. Imaging is not competitive with laser scanning. Leveraging both technologies gives companies a chance to improve their business processes across a number of areas in the enterprise.

Imaging technology extends information capture capabilities wherever 2D bar codes, signature capture or digital photographs are required. If these media are critical or even a portion of the requirement (along with 1D bar codes), imaging creates a convincing value proposition. The additional functionality contained within the same mobile computing device lowers the total cost of ownership and boosts performance.

In this way, imaging capabilities are important for a host of applications in a variety of markets.

Key Markets

- > Parcel and post
- > Manufacturing/warehousing
- > Public safety
- > Third-party logistics (3PL)
- > Transportation and logistics
- > Utilities
- > Airlines
- > Field service
- > Route accounting

Market and Application Analysis

Markets	Applications	Laser	Imager	Both
Manufacturing and Warehouse	Inventory management	X		
	Supply-line Replenishment	X		
	Safety Testing		X	
	Parts Tracking	X		
	Maintenance/repair operations	X		
	Shop floor communications		X	
	Compliance verification	X		
	Receiving/putaway/shipping		X	
	Shipping and receiving		X	
	Inventory turns/visibility	X		
	Asset allocation	X		
Retail	Order fill accuracy		X	
	Warehouse management	X		
	Price audits/changes	X		
	Store receiving		X	
	Inventory management	X		
	Shrinkage control	X		
	In-store communications		X	
Returns processing				X
Wholesale Distribution	Yard management		X	
	Warehouse management			X
	Returns processing		X	
	EDI transactions	X		
Third-party Logistics	Yard management		X	
	Warehouse management	X		
	Proof of condition		X	

	Proof of delivery		X	
	Proof of condition		X	
Field Service	Inventory management	X		
	Logistics optimization	X		
Route Accounting	Automated ordering			X
	Inventory reconciliation			X
	Delivery tracking		X	
	Full service vending	X		
	Competitive services			X
	Shelf space analysis		X	
Public Safety	Route optimization		X	
	Citations and parking tickets			X
	Accident Investigation		X	

Creating a compelling value proposition for imaging involves looking at your specific business applications. First, identify the areas that will benefit most from enterprise mobility and then drilldown into specific tasks to determine whether laser scanning or imaging works best. Going through this initial process ensures a more successful enterprise mobility deployment.

Benefits to Your Business

Organizations whose main business is to move goods from point -to-point achieve new levels of efficiency, productivity and customer satisfaction using mobile imaging systems and solutions. Many of these companies can use this technology to collect and communicate critical data and visual information - with powerful benefits.

Reduce labor costs

Increased accuracy and productivity using 1D and 2D bar code scanning and image capture helps reduce your labor costs. Instead of relying on handwritten notes and manual, paper - based processes, improved accuracy is easily attained with a bar code and image capture mobile solution. Workers become more productive and spend less time on paperwork at each customer location. They deliver more accurate information into your database. This enables you to have fewer workers serving more customers, more efficiently.

Future-proof technology investments

Imaging capabilities provide you with investment protection through a technology that complements or enhances your existing laser bar code systems. Using an imager gives you the ability to capture MaxiCode, DataMatrix, PDF417, QR code and Postal code symbologies. These bar codes are most often used in specialized applications like high -speed sortation and parts marking/tracking, commonly found in transportation and logistics, warehouse, parcel and post and manufacturing applications.

Improve customer satisfaction

With handheld imaging, there's less paperwork per transaction and less time spent on cumbersome communications with dispatchers and the main office. This enables your mobile workers to spend more face -to-face time with customers.

Case in Point: Shipping/Receiving Applications

Mobile computers with imaging capabilities are ideal for loading dock applications. All day long, corporate loading docks are busy shipping out products, parcels and postal materials. These items are tracked for shipment status in addition to partial or completed shipments of goods. At the same time, loading docks receive inbound materials that need to be logged for acknowledgment of receipt, proof of condition and other purposes. With mobility imaging, each of these transactions is expedited.



For the associates working at the dock, information about outbound packages is captured via a mobile computer with an integrated imager. This allows the associate to take a digital image of the parcel, add a time stamp to log the time and date of shipment. The employee then uses a software application tailored to shipping and receiving to input the weight, type of delivery (overnight, ground) and courier. Once all of the information is complete, the loading dock associate submits the electronic shipping form along with the proof of shipment digital image to the corporate database. Customer interfacing associates - or even the customer - are notified of all the relevant shipping information and know exactly when to expect the package to arrive.

With all of this data collected at the loading dock plus the customer data gathered by drivers in the field, the corporate database is transformed into an easily accessible information resource. Accounts payable teams use the courier information to allocate payment for courier services. And the central order administration team can readily provide shipping status and tracking information to answer customer inquiries. By automating the capture of information on the loading dock, your company improves its operational efficiency and increases customer satisfaction.

Inbound deliveries realize the same efficiencies. An associate accepts delivery from a courier at the loading dock and captures the package data right at the point of activity. Proof of receipt is captured so the dock associate then logs the signing party and proof of package condition. This information is transmitted via wireless local area networking (WLAN) or wireless wide area networking (WWAN) to the corporate database in real time - right when the parcel arrives at the loading dock door. By collecting the proof of condition, the dock associate captures images of damaged parcels and notifies shipping parties immediately, which reduces the lead -time for replacement materials and the cost of returned shipments.

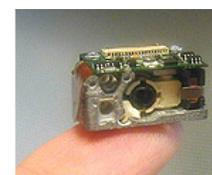


What You Should Know about Imaging

There are some basics to understand about advanced data capture and mobile computers whenever you are considering imaging for various activities. Although most companies use laser bar code scanners, imaging plays an equally important role. It expands your capabilities into proof of delivery/contents/condition, signature capture and parts marking and identification applications.

The choice between laser scanners and image capture devices for reading bar codes is sometimes contingent upon meeting specific productivity goals. Laser scanners are more cost efficient for 1D scanning applications. However, when it comes to applications where signature or grayscale photo capture is necessary, imaging is the best and only way to go. Today, there are new, exciting technology developments that allow you to choose either imaging or scanning options for your mobile computers.

While imagers are sometimes compared to consumer -grade digital cameras, it's not always a useful way to assess the value of this technology. Handheld imagers are more sophisticated than the digital cameras used by consumers. Mobile computers with integrated imagers offer many features that are designed for enterprise -level applications.



Imagers: Important Technical Features and Capabilities

There are two kinds of imagers: linear and area. Linear imagers use a single line of charge coupled device (CCD) or complementary metal oxide semiconductor (CMOS) sensors that work together to read a section of a 1D bar code and then translate that image into data. Linear imagers are unsuitable for capturing signatures or images because of this single -line limitation. However, area imagers have CCD or CMOS sensor arrays that can read a 1D or 2D bar code or capture a signature or photo. An area imager is more appropriate for proof of delivery, store receiving and other related applications.

Sensors

Today, the two most popular sensors used for image capture in both linear and area imagers are CCD and CMOS. CMOS sensors are smaller in size and slightly more cost - and power - efficient. However, these features are tempered by a lower quality image and greater system power draw compared with CCD -based systems. Although CMOS sensors are making excellent progress, CCD -based systems deliver a better quality image while drawing less power. This makes them very attractive for use in digital cameras ... and in mission -critical mobile computing applications.

Focusing

For area imagers, focusing presents a tradeoff between speed of image capture and your user's working range. Whether your users are reading signatures or capturing bar code data in the distribution center or on the road, the ability to read high -density bar codes up close and capture pictures at a distance is vital.

Aiming

The technology and procedure required for reading an entire shipping label or a bar code is very different from what's needed to capture a customer signature. For the shipping label image capture, the aiming feature must deliver a clear and immediate indication to users for successful imaging and maximum productivity. A distinct and visible frame of the field of view delivers assurance that the entire bar code, signature or photo is captured. Most imagers only offer a single aiming line which does not define the field of view.

Top Considerations for Imaging Deployment

Cost reduction and productivity gains are often the key objectives when selecting and deploying imaging technology.

Cost reduction

Proof of delivery, proof of contents and proof of condition applications are critical to maximizing cost efficiencies in a mobile imaging solution. For example, the cost of moving and storing paper documentation may be close to the cost of moving and storing digital images today. However, future technology advances have the potential to reduce the costs of digital imaging, whereas the cost of paper storage is expected to rise. Adding still area image capture capabilities also helps you save money by reducing mis -shipments and errors. With area imagers, you have the ability to catch and correct errors long before they become a problem. Capturing images digitally may also resolve shipping disputes to further reduce costs. You can also save payroll costs with fewer keypunch operators.

Productivity

Think about the number of mistakes that occur in the course of daily operations. One mistake in the movement and storage of goods is costly throughout many areas of your operation. Translated into productivity, the time lost by drivers in tracking missing shipments and illegible delivery orders also impacts your profitability. Adding still image capture capabilities for obtaining signatures or proof of contents and condition streamlines the amount of paperwork involved in each transaction. Less paperwork means that your drivers are even more productive and can serve more customers per day.



Applying the Right Technology to Solve Your Business Challenges

There are many differences between imaging and laser bar code scanning. Most comparisons are made based on specifications, performance and cost. But the true test for any scanner is not in the technology being used, such as laser or imaging. It's in how the mobility systems work when put to use with your applications. The ultimate performance metric is found in how well the handheld's specifications and features adapt to various users and applications.

For many applications, signature and image capture clearly offer an enhanced level of efficiency. And there are clearly pros and cons for selecting either imaging or laser bar code scanning technology. To determine the technology that works best for you, it's often useful to test these solutions with your users in a real -world environment. You can even conduct a beta test across your entire organization.

MC9000 Mobile Computers Meet All of Your Advanced Data Capture Needs... and More



The MC9000 series offers the choice of laser bar code scanning or imaging for data capture. Choosing one or the other or even a mixture of both technologies is best to maximize the benefits of mobile computing to your business. MC9000 mobile computers deliver application -specific tools in three different models: the grip form factor MC9000 -G for scan-intensive applications; the handheld MC9000 -K for mobile applications "inside or outside the four walls;" and the compact form factor, handheld MC9000 -S for truly mobile field applications. Combined with accessories, applications software, device management software, and services, your mobile workers can accurately and securely capture, move and manage the information that's critical to your business.

Features and capabilities designed for investment protection

- Common high -performance hardware and software platform delivers three distinctly rugged form factors to address mobile computing requirements across a wide range of market applications architecture
- > Common application -development architecture - Windows CE - across the three rugged form factors so that applications written for one form factor run on other form factors within the Symbol MC9000 family
- > Durable design for harsh environments: MC9000 mobile devices sustain multiple 6 -ft (1.8m) drops to concrete and IP64 sealing protects from dust and moisture damage
- > Advanced new scan engine and imager supports standard - and long-range scanning and imaging; sophisticated imager captures a variety of bar codes and images
- > Wireless networking - MC9000-K and MC9000-S feature "tri-mode" communications:
 - > GSM/GPRS or 1XRTT CDMA wireless WAN
 - > 802.11b wireless LAN
 - > Bluetooth™ -enabled wireless personal area networking (PAN)
- > Intel® XScale™ processor architecture with superior power management capability for deploying rich -media applications software

MC9000: key imaging features

- > **Omnidirectional area imager:** takes pictures of signatures plus grayscale photos and reads 1D and 2D bar codes from any direction
 - > Captures still images in JPEG, TIFF, BMP formats
 - > Offers real-time video display for use in framing picture before still image capture
- > **CCD technology:** uses CCD sensor technology in a 2D array for the best image quality and bar code performance; delivers better system power consumption than CMOS
- > **Smart focus system:** breakthrough optics system enables superior image capture quality with uncompromised bar code reading performance, across symbologies and densities; a single configuration reads bar codes across densities with greater working range and captures images from a distance
- > **Built-in intuitive aiming system:** gives your workers clear and immediate indication on the field of view by framing image to read and capture information faster and more accurately; it's easy to use and takes the guesswork out of bar code decoding and image capture
- > **Built-in LED illumination:** reads 1D and 2D bar codes in any kind of light, from total darkness to bright sunlight to enable your drivers to get the right information at the right time in any environment
- > **Working range:** with one of the best working ranges in the industry, imager reads bar codes at both short and long distances

MC9000: key laser bar code scanning features

- > **Variable range scan engine:** allows short - (4-in /0.10 m) or long-range (40 ft/12.2 m - MC9000-G only) 1D bar code scanning in one device

- **variable range scan engine:** allows short-range (7-in./0.18 m) or long-range (40 to 12.2 m - MC9000-C Only) 1D bar code scanning in one device
- » **Intuitive scan angle for user comfort:** ergonomically designed to prevent user fatigue even after hours of use
- » **Highly visible aiming line for fast decoder:** reduces scan time, making it easier for users to align laser scan line with bar code to increase productivity
- » **Supports wide range of industry standard 1D symbologies with wide working range:** enables increased laser scanning performance and support for most 1D bar codes

To learn more, additional information is available at

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