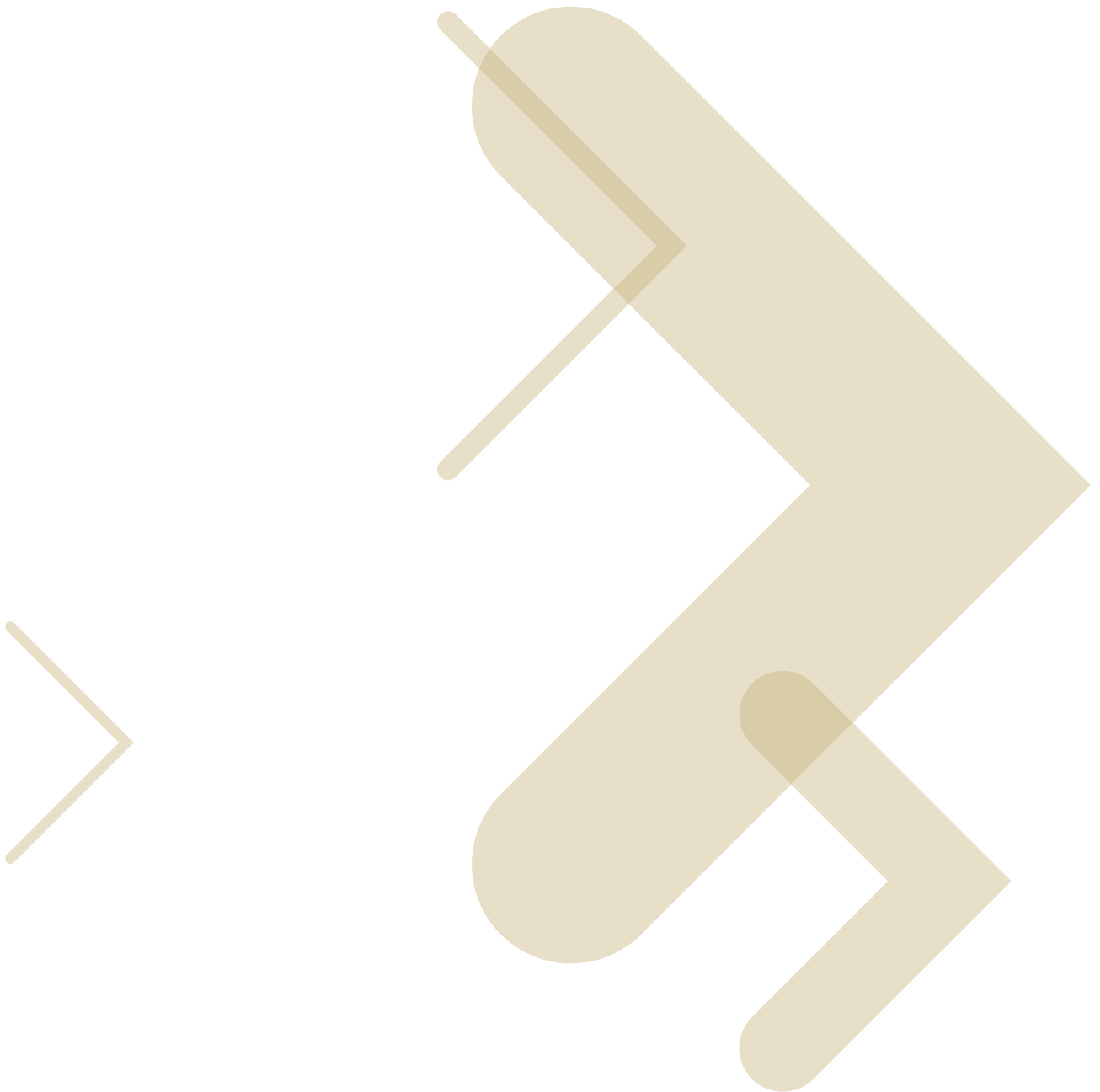




Mobile RFID Readers: Read Points That Move With Your Assets



Until today, there have only been two options for deploying RFID read points: permanently fixed RFID readers designed for traditional choke points, and handheld RFID readers for on-the-spot reading of specific tags. Visibility was primarily limited to entry and exit through key areas, such as dock doors, restricting the potential value of RFID. Inventory movement throughout your facility — for example, through put-away, replenishment and picking operations in the warehouse or from the back room to the retail shelves — remained invisible beyond on-demand handheld reading.

Imagine being able to capture information about your products and assets regardless of where they move and when they move – rather than only as they travel to defined points in their path. You have imagined the newest development in RFID — the mobile RFID read point. This new type of read point moves with your assets, complementing your fixed and handheld readers by eliminating the ‘visibility gap’ when inventory is on the move. The result is an entirely new level of visibility for your inventory — and greater benefits from your RFID system.

This white paper will explore this new technology, examining the requirements that drove development, the applications that will benefit from deployment, as well as the value to the enterprise.

Background

As product flows through your supply chain, there are many important points of movement along its journey — product is received at the dock; possibly stored in the yard; transferred to warehouse shelves; picked to fulfill orders; shipped; and delivered to the customer. But today’s fixed RFID readers can only capture the movement of product as it passes through major choke points, such as dock doors.

Handheld computers with RFID provide on-the-move workers with portable RFID reading capabilities and are not designed to read the volumes of products as they travel through the enterprise. These types of RFID readers were designed primarily for on-demand, on-the-spot RFID reading, allowing mobile workers to read a tag on a specific item on an as needed basis.

To date, companies have primarily relied on fixed readers for RFID information — and the visibility gap that fixed readers cannot fill translates into limited inventory information. Your data is only as good as the last read – which occurs only at major junctions (choke points) in any given product’s journey. With granular-level end-to-end visibility the inherent

premise for RFID, the inability to fully leverage your RFID system to track product and assets traveling through and within your enterprise does not allow you to fully benefit from the promise of RFID – or fully maximize the return on investment (ROI). For example, in the warehouse of a manufacturer or distribution center, out-of-stocks may affect order fulfillment and potential orders, even though the product may actually be somewhere in your warehouse. On the retail floor, you may be able to see that a specific item color or size is in the store, but the visibility gap and inability to locate that item can result in a lost sale.

A mobile RFID reader would enable the deployment of RFID read points at virtually every key junction of movement. This cable-free wireless reader can be deployed virtually anywhere a fixed reader cannot:

- Affixed to moving vehicles in manufacturing and distribution environments, such as forklifts, pallet jacks and clamp trucks, enabling the tracking of items as they move from the dock doors to the warehouse shelves through order fulfillment and shipping.

- On mobile carts where readers are moved to inventory on shelves and racks, enabling a quick and highly accurate inventory count of garments, CDs, electronics and more.
- In challenging stationery areas where size and other environmental conditions previously prohibited fixed reader deployment, such as the swinging doors between the retail front and back rooms.
- Extended read times for improved read accuracy — Product passing through dock doors and other choke points typically has a limited read period of five to ten seconds. Inventory on material handling equipment has a much greater read-time window, often 100-200 seconds.
- Flexible power options — Battery and DC operation provide needed support for mobile deployment as well as stationery installation in hard-to-reach areas.

Achieve maximum RFID reader flexibility

Mobile RFID readers offer the best of both current reader form factors, combining the automated instant reading of a high volume of tags provided by fixed readers with the mobility of handheld RFID readers. But unlike fixed read points, these new mobile RFID read points are completely self contained, and do not need either power or network cables. And unlike handheld mobile computers with RFID reading capability, they do not require operator intervention. The result is a device that delivers maximum deployment flexibility through a variety of enabling technology features:

- Real-time wireless connectivity — Integrated wireless networking and Bluetooth enables real-time transmission of data.
- Small low-profile form factor eliminates previous size restrictions — The device is designed to fit just about anywhere RFID is needed and incorporates all the necessary on-board technology, including antennas and wireless LAN radios.
- Application flexibility — The device can be used alone or in conjunction with other mobile devices, enabling enterprises to instantly leverage captured data in applications that streamline business processes. For example, forklift operators with vehicle mount computers can receive the specific put-away location and the fastest route throughout the warehouse to that location when the tag on a pallet of products is read. Managers with mobile computers or electronic digital assistants (EDAs) can receive process alerts from asset automation equipment in the event that key process indicators (KPIs) dip below set limits. And the ability to write as well as read RFID tags, either via the mobile reader or a mobile computer, helps enterprises achieve cost-effective regulatory compliance — for example, in the pharmaceutical industry where certain drugs require a complete pedigree of product movement from the moment the product is created through delivery to the pharmacy shelves.
- Rugged design for reliable performance — The ability to endure the heavy demands of the warehouse and retail environments includes the ability to tolerate the vibration of material handling equipment; extreme temperatures; the dust, grease and humidity in the warehouse; everyday drops and bumps; and more.



From the retail floor to the warehouse and more, mobile RFID readers move with your assets, providing visibility whenever your inventory is on the move.

The benefits of deploying mobile RFID readers in your organization

Mobile RFID readers provide a wealth of strategic and financial benefits throughout the enterprise, regardless of whether they are deployed in the warehouse or on the retail floor.

Real-time, end-to-end inventory visibility to better manage business

Mobile RFID readers deliver very granular data on the real-time movement and location of your products and assets. This information can then be leveraged to:

- Reduce out of stocks as well as lost sales — A reduction in errors in put-away, replenishment and let-down operations ensures instant and accurate inventory visibility. As a result, inventory can be located quickly and easily, minimizing the opportunities for an out-of-stock situation and the resulting impact on revenue.
- Reduce errors in put-away, picking and shipping — Improve customer satisfaction and retention through prompt processing of orders and an automated crosscheck to ensure that orders are fulfilled correctly.

Increased process automation improves productivity

The ability to extend RFID applications to new business functions enables the automation of tasks — and the elimination of paperwork. For example, manual paperwork for incoming shipments at the receiving dock can be completely eliminated by deploying the mobile RFID reader on a portable skatewheel conveyor. As shipments are unloaded, they can be automatically compared to orders in your business system, complete with exception processing, eliminating delivery paperwork.

When a mobile RFID reader is deployed on a forklift in conjunction with a fixed vehicle mount computer, paper put-away orders can be completely eliminated. And in the retail store, the ability to simply roll a cart with a mobile RFID reader through the aisles of the front and back room enables a complete inventory to be taken in minutes — without any paperwork.

The result is the ability to drive the inefficiencies associated with paper-based processes out of your business processes, dramatically improving employee productivity and reducing errors.

Better asset management

In addition to tracking the movement and status of inventory, rugged mobile RFID readers are an ideal way to track and locate assets with RFID asset tags. For example, RFID tags on containers in the yard can be quickly identified for prompt delivery to the receiving dock — and tagged pallets, material handling equipment and trucks can be easily tracked for improved management of these valuable capital assets.

Leverage existing technology investments

Mobile RFID readers allow you to maximize the value of your existing technology investments. Your existing wireless LAN can be utilized to transmit real-time RFID data from the mobile RFID reader to your business systems. And when a mobile RFID reader is used in conjunction with mobile devices, such as vehicle mount and handheld mobile computers, your wireless LAN enables real-time connectivity to your business applications. The incremental benefits that result from this additional level of visibility — from more accurate order fulfillment to improved customer service — can significantly improve the ROI for your existing wireless LAN and your mobile computing devices.

Outstanding return on investment

A number of factors enable mobile RFID readers to offer an exceptional value to the enterprise. The return on investment (ROI) for a fixed RFID read point mounted at typical choke points is dependent upon the product traffic through that portal area, such as the dock doors. In the average distribution center, only 20 to 30 percent of the dock doors may be active at any given time, translating into a significant amount of time during the day when the device is not utilized — and reducing the potential return on investment for individual readers.

By contrast, mobile RFID readers are typically in operation every moment of an entire shift — and the constant or near constant utilization delivers a higher ROI. The increased usage and read opportunities:

- Improves the average utilization for all your RFID readers
- Increases the overall system usage rates
- Improves the ROI for your entire RFID system
- Increases inventory redundancy, granularity and visibility

Mobile RFID readers have actually given birth to a new formula for calculating the total cost of ownership (TCO) and ROI for RFID systems: equipment cost divided by the number of seconds of read opportunities. This new mobile RFID technology dramatically increases the number of seconds of read opportunities in your environment, which in turn can significantly increase benefits — and improve ROI. Other factors that contribute to an outstanding return on investment include:

Multi-purpose usage

Mobile RFID readers can be securely attached and detached in seconds to mobile carts, skatewheel conveyors, pallet jacks and more. This allows companies to utilize a single mobile RFID reader in different areas throughout the workday. The need to purchase a reader for every area in which you want to deploy RFID is eliminated, making mobile readers an easy and cost-effective means to begin implementing RFID technology into the enterprise.

Low installation and maintenance costs

Mobile RFID readers are completely self-contained. There is no cabling, no wiring, no external antennas to install, and low maintenance costs, significantly reducing the complexity and typical costs associated with RFID deployments.

Whether you choose to install the mobile RFID reader permanently (for example on a forklift or in an environmentally challenging area such as swinging doors), or whether you need to install RFID in a number of temporary areas throughout the workday (such as on mobile carts, pallet jacks or skatewheel conveyors), installation is quick and easy. For example, in just seconds, Velcro can be used to enable physical installation of the device for temporary use cases. A variety of other flexible mounting solutions enable permanent installation to be completed in minutes.

Reduced management

The integration of all required components — including the WLAN radio, antennas and power options — dramatically simplify management of mobile readers. The result is a significant reduction in the time and costs associated with day-to-day management and support.

Low total cost of ownership

RFID readers that are truly designed for mobile use will deliver an extraordinarily low TCO. To maximize your RFID investment, look for mobile readers that:

- Offer rugged construction to withstand the environmental demands of the warehouse, manufacturing plant and retail store — from heavy vibrations and constant pounding of material handling equipment; to wide temperature swings at the dock door; exposure to grease, dust, and moisture; and even drops.
- Are designed to perform reliably with minimal downtime in spite of exposure to some of the toughest conditions all day, every day.

Challenges

The challenges associated with mobile RFID readers are similar to the challenges of any mobile device: management. While these devices are often on the move all day long throughout your facility, you will need to be able to monitor, support and update them in a cost-efficient fashion.

The addition of mobile RFID readers can also significantly expand the infrastructure of your RFID system, which could potentially complicate your mobility architecture. Today that might mean determining how to manage two RF technologies — WLAN and RFID — and in the near future, it could extend to additional wireless networking technologies such as mesh networking and WiMAX.

To address these challenges, it will be important to establish an integrated WLAN and RFID architecture that can offer simplified management of these — and future — RF technologies. Failure to do so could result in mounting management costs capable of eroding some of the benefits of your RF networks.

Recommendations

Companies with RFID implementations in place should examine existing RFID process flows to determine if additional read points in the inventory 'travel path' will deliver benefits that would justify the addition of this new technology. Take a look at the 'dead zones' — the areas where there is no visibility, and map out:

- The value of the visibility into product movement in areas that are currently invisible — For example, visibility on forklifts that are picking product to fulfill orders would provide a real-time deduction against your available inventory — instead of waiting for that inventory deduction to occur at shipping. And, in the retail store, visibility of brought from the back room to the front room shelves or racks.

- Look at the new applications that could be enabled at the various points in the inventory 'travel path' — For example, warehouse workers involved in put-away operations could be directed to the exact storage location to eliminate inventory that is lost in the warehouse. And in the retail store, the ability to take a complete and accurate inventory daily in just minutes would not only reduce the administrative time and cost associated with inventory takes, but also provide the information needed to keep shelves properly stocked — especially during critical seasonal buying periods.
- Strategic business value — Take a look at how the increased granularity in business information might benefit the business as a whole. For example, the new level of real-time inventory visibility could lead to the ability to reduce stocking inventory levels, positively impacting capital expenditures, inventory turns and profitability. And a reduction in stocking levels could also lead to a reduction in warehouse or storage space requirements, freeing up valuable space that could then be reallocated to other business uses — for example, for manufacturing or order processing.

Companies who have not yet implemented RFID and are in the planning process can now take a look at the entire path of travel for inventory and determine all the areas of movement where visibility will return value. No longer bound by the limitations of fixed and handheld reader deployments, enterprises can take a fully process-driven approach when planning an RFID system. The result will be an RFID implementation that will enable you to best leverage RFID data throughout your business applications and processes to achieve the greatest value from your RFID technology investment.

Summary

Mobile RFID readers allow the expansion of RFID applications through the addition of a valuable new layer of read opportunities. The result is a significant increase in the overall ROI of your RFID system, WLAN and existing mobile computing devices. And the addition of this vital new technology can enrich the benefits of your existing RFID system, as well as delivers new benefits, including:

- Improved product and inventory visibility
 - Reduction in lost sales resulting from out of stocks
 - Improved productivity through process automation and paperwork reduction and elimination
 - Reduced errors in the placement and storage of stock
 - The ability to better manage stock, including a possible reduction in stocking levels and potential warehouse space requirements, and an increase in stock turns
 - The ability to better manage assets, from material handling equipment to containers and pallets
- And, for companies who are seeking to begin implementation of RFID, mobile RFID readers are ideal for pilots and initial RFID applications, offering cost-effective rapid deployment, management simplicity and a low TCO.

For more information on how your RFID system can benefit from the addition of mobile RFID readers, contact us at +1.800.722.6234 or +1.631.738.2400, or visit us on the web at: www.symbol.com/RD5000



Since mobile readers can be easily attached and detached in seconds, a single reader can enable different RFID applications in various enterprise locations. For example, a mobile reader that may be deployed on a pallet jack in the warehouse to streamline picking and put-away operations can be quickly and temporarily re-deployed on a sskatewheel conveyor to automatically identify and reconcile incoming shipments.

The RD5000 Mobile RFID Reader

The features you need for true RFID mobility

The RD5000 from Motorola offers comprehensive functionality needed to maximize the benefits of mobile RFID read points. The completely cable-free RD5000 is:

... designed for low-cost installation and maintenance

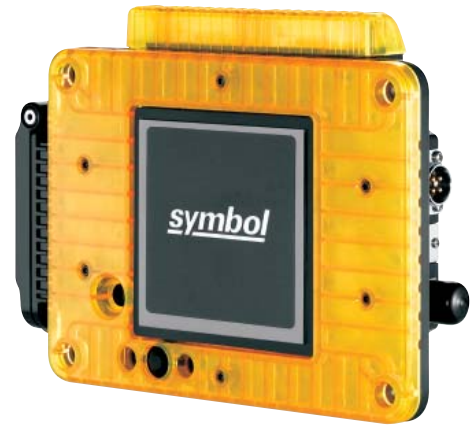
- Reliable and seamless 802.11a/b/g wireless LAN connectivity eliminates the need for network cables.
- Integrated Bluetooth enables seamless integration with on-board and mobile computers.
- Integrated rugged antenna.
- Self-contained power source for true mobility eliminates the need and expense of running power cabling.

... designed for the challenges of mobilizing RFID read points

- Motion-smart capability detects movement to conserve and maximize battery power for example, when deployed on a forklift, the device can remain in low power mode until movement is detected).
- Proximity sensor enables the reader to activate read mode only when an object is detected in front of the reader, conserving battery power.

... designed for the toughest environments

- IP66 sealing rating protects against dust, dirt, jets of water and more to ensure reliable operation despite demanding environments and everyday use.



- Able to tolerate everyday drops without affecting performance.

... designed for demanding enterprise applications

- Industry standard Intel XScale 624 MHz PXA270 processor enables easy integration with your current IT systems.
- Advanced Microsoft Windows CE 5.0 operating system provides robust application support.

... designed for maximum application flexibility

- Can be utilized alone or in conjunction with mobile computers.
- Can be deployed as a multi-purpose device, for example at the dock doors for incoming shipments and on the retail floor for inventory counts or to locate a specific item.

... designed to leverage existing Motorola and other technology investments

- Compatible with virtually any wireless networking infrastructure.
- Compatible with Motorola's new Wi-NG (Wireless Next Generation)-based RF-agnostic wireless switches that extend support beyond the traditional WLAN to include RFID, mesh networking, WiMAX, and more.
- Compatible with almost any Motorola mobile computing device, from the MC50 and MC70 in retail stores to the MC9000 Series for manufacturing, distribution center and warehouse environments.
- Compatible with MC9000 series battery and chargers.



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