



The new class of Direct Part Marking (DPM) solutions:

A new level of performance, functionality, flexibility
— and return on investment





Executive summary

The expense and limitations associated with direct part marking solutions have prevented the pervasive growth of the use of DPM technology. Today's high-end systems consist of multiple components — a high-end camera system integrated with a high-end computer for digital processing of the direct part marks. These systems are often very complex, requiring the presentation of the direct part marks at an exact angle with the proper lighting. This complexity renders the system inflexible and difficult to move to address new mobile requirements, for example, manufacturers that need to accommodate changes in the assembly line. And the high cost, complexity and static positioning requirements for these systems have prohibited the use of DPM technology as a viable data capture solution outside of the factory environment. But new business needs have emerged. Safety regulations require some industries to be able to read DPM marks in the field. Ever-shrinking margins translate into the need for more cost-efficient DPM systems. And the rapid pace of evolution of many products requires more flexible DPM solutions that can easily and quickly adapt to changes in production lines. This white paper examines the newest class of DPM solutions developed to meet these new business requirements. In the following pages, we take an in-depth look at the unique benefits and new functionality these new DPM solutions offer, and when and where they make the best investment sense.

Business drivers for the development of a new generation of DPM solutions

Today's DPM systems are well suited for very well defined and controlled environments, for example, static assembly line deployment. But changing business needs have created the need for a more flexible and cost-effective DPM solution.

New manufacturing techniques have been developed to meet customer demands for new levels of product customization with faster delivery times. Where in the past, a single assembly line was used to build a specific car, today's assembly line may need to accommodate the assembly of many different types of vehicles with many different options. The presentation of different parts on the

assembly line that will be varying distances from the DPM camera creates a need for a flexible focus range — something today's high-end systems cannot accommodate.

A new need for mobility in DPM solutions has also surfaced. Once a rarity, modifications to assembly lines have now become more common as product lines evolve at a much more rapid pace and companies seek to increase the 'lean' factor of their manufacturing operations. But high-end DPM systems-based solutions cannot be easily moved. In addition, safety regulations have created a new need for DPM in the field. For example, enterprises in the aerospace industry must maintain an up-to-date genealogy for all parts utilized in aircraft engines to ensure timely and proper maintenance routines as well as the rapid location of that part in the event of a recall. However, maintenance often takes place in hangers in an airfield, requiring mobile DPM solutions that can allow on-the-spot scanning of parts at the point of service.

A variety of business conditions are creating the need for more cost-effective DPM solutions. Large DPM systems are typically required in just a few locations in the enterprise — at strategic positions along the assembly line, for instance. But today enterprises often need to deploy many DPM readers — for example, in hangers throughout many cities to track and trace aerospace engine parts — creating the demand for more cost-effective DPM solutions. In addition, new trends in business, such as offshore manufacturing, are forcing prices down, while the costs of materials and labor are on the rise. As a result, today's businesses are experiencing new levels of pressure on pricing and profitability. To address these issues, enterprises are deploying mobility throughout business processes. New levels of automation and cost efficiencies are achieved by enabling the capture of 1D and 2D bar codes and RFID tags as well as direct part marks, right at the point of activity — creating the need for flexible yet cost-effective solutions capable of capturing a broad range of data types.

It is today's business environment that led to a new set of requirements for DPM solutions. And it is those requirements that led the way to the development of new DPM solutions designed to address those needs by providing a new level of performance, flexibility, affordability, durability and mobility.

The new generation of mobile DPM readers can be less than one quarter of the cost of the average first generation fixed DPM readers — yet offers triple the functionality.

Choosing the right DPM solution to meet business needs of today — and tomorrow

To ensure a solid return on investment in a DPM solution, enterprises will need to assess available DPM capabilities and functionality, as well as the long-term business needs:

Variable focus capability

Large fixed-system DPM readers are based on a fixed focal length, requiring the direct part mark on the component to consistently be presented at a specific distance each and every time – or the mark cannot be read. The fixed focal length also required the purchase of multiple readers to handle different sizes of marks, adding significantly to the cost of implementing and managing the technology.

The new mobile DPM readers offer multi-focus functionality, capable of switching between near and far focal distances on the fly. This dynamic capability eliminates the prior requirement for a predictable pre-set distance, enabling accurate reading of a wide range of mark sizes at different distances with a single reader. The resulting increase in flexibility opens up a new world of applications and cost-efficiency for DPM solutions. For example, an automotive manufacturer can implement sequencing, enabling the assembly of many different types of vehicles on one assembly line with just one DPM reader. The need to purchase multiple readers to capture marks of varying sizes

at different distances is eliminated, reducing capital and operational costs — and improving the value and return on investment.

Multiple data capture options

In addition to direct part marks, today's manufacturers need the flexibility to capture a wide variety of data types that are utilized throughout the business – from 1D and 2D bar codes and RFID tags on boxes and pallets to RFID shelf tags on warehouse racks. Until today, manufacturers were forced to purchase disparate systems and devices to capture these different data types.

But the latest DPM readers are no longer 'silo' solutions, capable of reading only DPM marks. These best-in-class DPM solutions offer the ability to capture virtually any type of bar code or RFID tag. The reduction in the number of devices to purchase and manage significantly reduces capital and operational costs — and simplifies your overall technology architecture.

High performance reliable first-time every-time data capture

Large high-end DPM systems are deployed to simply enable reading of DPM marks — the complex systems are unable to achieve the high levels of performance required to deliver acceptable throughput levels that can improve productivity. One major limitation in large systems-based DPM solutions is their susceptibility to presentation angle. In order to read the square or rectangular datamatrix codes, the DPM must be presented

squarely in front of the reader – any angling of the code resulted in a visual skewing of the square or rectangle into a parallelogram, which prevents the reader from recognizing and reading the mark. These DPM systems must be finely tuned and require a high level of set up in order to ensure first time accurate capture of the marks.

In addition, the harsh environment of manufacturing often results in ‘noisy’ DPM marks — marks with scratches or other damage that makes the marks more difficult to read. This compounds the challenges for older systems, which require a clear image for a successful read. In addition, these readers sometimes require elaborate illumination schemes in order to capture low contrast marks or marks on highly reflective surfaces — common occurrences in DPM applications.

The technology in today’s mobile high-performance DPM solutions delivers a new level of performance not only for DPM marks, but for 1D and 2D bar codes as well. Regardless of what type of data you need to read, your DPM system should offer the advanced processing required to allow you to accurately capture marks and labels, regardless of whether they are noisy, damaged, printed on a very shiny surface and more. In addition, omni-directional functionality allows the marks to be presented at any angle — and the reduction in time spent precisely aligning the mark with the reader improves productivity and throughput. Finally, the availability of miniature diffusers enables a new level of integration that eliminates the earlier complexities associated with achieving proper illumination.

Mobile DPM capabilities

Customer requirements and new government regulations translate into the need to read DPM marks at the receiving or shipping dock to capture the change in custody for parts that must be traced, expanding the need for DPM in the manufacturing environment beyond the typical fixed environment of the assembly line. Service personnel in the field might need to scan parts to access or add to a component’s history file, or to identify and track high value assets out in the field.

But the strict requirements associated with obtaining an accurate scan in first generation fixed systems were not conducive to the development of a mobile DPM reader. Users would not be able to easily constrain distance from the mark or

presentation angle in a handheld DPM reader, and the diffusers would render a handheld reader too large and cumbersome for mobile applications.

Miniaturization, rugged design and high-performance scanning enable the creation of a new class of DPM readers: small, cost-effective, easy-to-use and easy-to-hold portable devices capable of rapid on-the-fly reading of any direct part mark as well as 1D and 2D bar codes and RFID tags. These readers are capable of offering the dynamic ability to switch between different types of data capture, enabling users to scan 1D, 2D and DPM marks on the fly without changing settings or configuration. Tiny diffusers can now be integrated into a small device that can be environmentally sealed — suitable for use in environments that are dusty or moist, or with dramatic temperature and humidity swings. Drop testing can ensure that devices are built to handle the rigors of everyday mobile use — including the inevitable drops on the concrete floor of the warehouse or yard. The dramatic size reduction enables the design of ergonomic devices that provide all-day comfort for users, even in scan-intensive environments. And the addition of wireless LAN and WAN connectivity provides the instant data access needed to improve productivity on the assembly line, in manufacturing cells, on the receiving dock, out in the yard and out in the field.

A variety of other features are available today that take the guesswork out of reading DPM marks. Sharp and clear, intuitive aiming patterns similar to the crop marks in a camera enable mobile workers to easily capture the complete mark or bar code — first time, every time. Easy-to-read screens ensure visibility in any lighting condition — critical in the industrial environment where lighting can vary. Audible tones provide feedback to confirm the successful capture of data.

As a result of these technology advances, DPM reading can now be enabled wherever it will benefit the enterprise, adding a new layer of flexibility to the design of enterprise mobility solutions — and a new level of benefits.

Total cost of ownership (TCO)

The high cost and limited single purpose of first generation fixed direct part marking readers translate into a high total cost of ownership that prohibits pervasive use of the technology throughout the enterprise — and limits the benefits.

Today's manufacturers seek smart technology investments that can reduce costs to respond to heavy competitive pressures — and new DPM solutions deliver. Where first generation DPM technology offers an expensive and complex large systems approach, newer DPM solutions simply add DPM capability to existing mobile bar code readers. The result is instantaneous proven multi-use products that offer a truly dramatic decrease in cost — and increase in value.

For example, the new generation of mobile DPM readers can be less than one quarter of the cost of the average first generation fixed DPM readers — yet offers triple the functionality. First generation readers can only interpret direct part marks — but the new generation of mobile DPM readers can also read 1D and 2D bar codes as well as RFID tags. And where first generation systems-based handheld DPM readers deliver low performance and are cumbersome and hard to handle, the new generation of DPM readers are designed for mobility from the ground up, offering superior ergonomics for ease of use and all day comfort.

The new class of mobile DPM readers not only offers more functionality at a lower cost, it also offers the rugged design required for dependable operation in the harsh environment of manufacturing, extending product lifespan while maximizing uptime and providing a lower total cost of ownership.

The new multi-function capability reduces the number of devices that must be purchased and managed, further reducing costs.

And finally, wireless connectivity delivers two key benefits:

- The real-time transfer of captured data to your business systems enables a new level of process automation and error proofing, driving inefficiencies out of the enterprise and profitability in.
- Wireless connectivity eliminates the previous need for complex and expensive cabling for fixed mount and handheld systems – further reducing costs.

Reap the benefits of the latest in DPM technology innovation — with Motorola

As the leader in enterprise mobility, Motorola understands your business — and your business needs. Motorola's next generation DPM solutions are designed to deliver a new level of affordability, functionality and performance for a rapid return on investment and real bottom line impact.

Through the invention of new DPM technology, Motorola delivers real value to the enterprise. Motorola brings a dramatic reduction in cost and increase in flexibility to fixed DPM solutions, enabling cost-efficient changes to assembly lines to improve business agility. By bringing mobility to DPM solutions, Motorola helps enterprises achieve strategic objectives by enabling real-time visibility into business data. For example, the ability to connect the DPM reader directly to your inventory systems provides real-time inventory visibility. And that visibility can translate into reduced stocking inventory requirements and less required associated warehouse space. The development of multi-function devices capable of scanning direct part marks as well as 1D and 2D bar codes and even RFID tags enables companies to purchase one cost-effective device to support data capture in many applications. Thoughtful device design provides the comfort and ease of use required for rapid user adoption. And the rugged device design ensures continuous device availability and a low total cost of ownership.

And finally, Motorola offers true end-to-end solutions with the expertise you need to get and keep your DPM solution up and running, at peak performance — from planning and design to deployment and ongoing support. Companies all over the world turn to Motorola for the experience and understanding of best practices, gained from the deployment of mobility solutions in the smallest to the largest of enterprises in nearly every industry.

For more information on how Motorola can help you reap the benefits of next-generation DPM solutions in your enterprise, contact us at +1.800.367.2346 or +1.631.738.2400, or visit us on the Web at www.symbol.com/dpm



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