



8 REASONS TO CHOOSE IMAGE-BASED BARCODE READERS

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Image-based barcode readers are rapidly replacing manual processes and laser scanners in a wide range of industries including food, beverage, consumer goods, pharmaceutical, and logistics. When considering a transition from laser scanners to image-based barcode readers, many think the investment cost is too high. Thanks to advances in technology, image-based barcode readers are not only comparable in price to laser scanner technology, but are also more powerful.

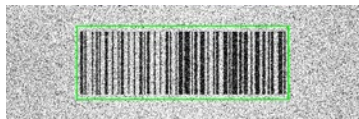
Today's most advanced image-based barcode readers have overcome the technical and economic hurdles and now offer a more attractive alternative to industrial laser scanners on the factory floor. In use, the latest generation of image-based barcode readers has proven to actually outperform lasers in the following areas:

1. Read rate performance
2. Omnidirectional code reading
3. 2D code reading
4. Lenses and lights
5. Image visualization and archiving
6. Barcode quality feedback
7. Communications
8. Cost of ownership

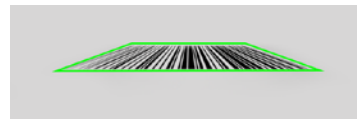
1. READ RATE PERFORMANCE

The most important way to review barcode reader performance is by its read rate performance. Read rate is the number of barcodes read divided by the number attempted. It's usually expressed as a percentage and the closer to 100% the better. Said another way, read rate is the best measure of how reliable and robust the reader is to the barcodes seen in applications. Higher read rates help improve product traceability and reduce labor costs.

Image-based readers view the entire barcode, not just a single line, so they can use advanced algorithms to overcome quiet zone violations and other code damage issues that cause laser scanners the most trouble. In addition, image-based barcode readers are able to use light sources to read codes that lasers cannot see, including barcodes printed with UV ink. In this way, image-based barcode readers achieve much higher read rates, even with the most challenging codes that laser scanners cannot read.



Noise



Perspective



Specularity



Quiet zone violation



Contrast



Damaged



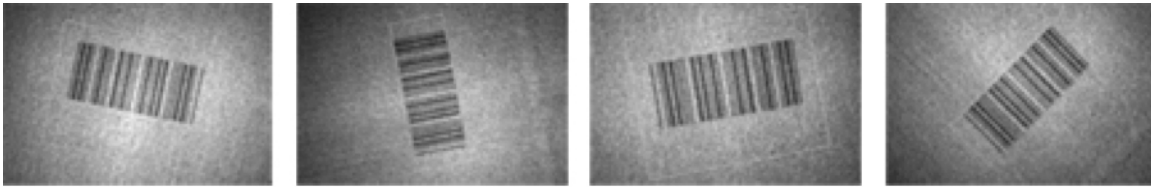
Uneven illumination



Voids

2. OMNIDIRECTIONAL CODE READING

One image-based barcode reader is able to read barcodes in any orientation within a single view. With few exceptions, 1D codes must be scanned from left to right by laser scanners. Multiple laser scanners are often required to be configured together to read barcodes in applications where orientation is not repeatable. Image-based barcode readers not only handle the typical ladder or picket fence orientation of barcodes, but also are able to locate and read barcodes from any angle or orientation.



3. 2D CODE READING



Many industries are making the transition from 1D to 2D codes, such as Data Matrix or QR codes. More information can be stored in 2D codes to help with product traceability throughout the manufacturing process and the supply chain. Often, 2D codes are used in conjunction with 1D barcodes in the production process.

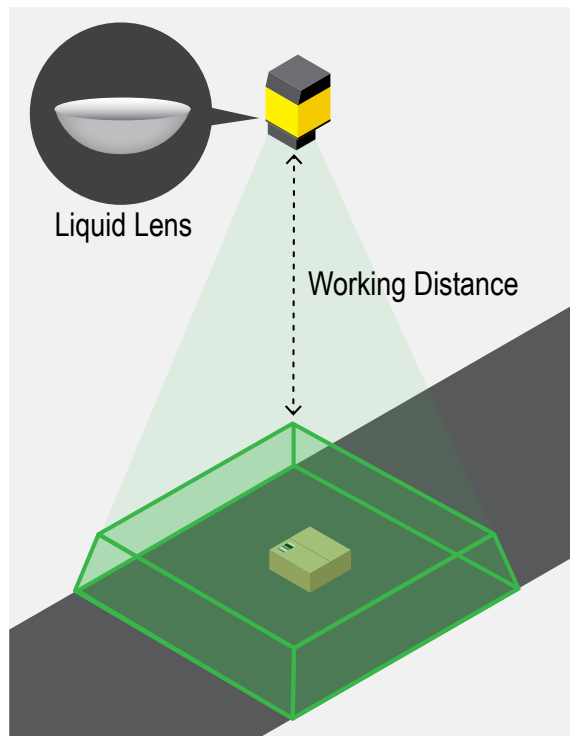
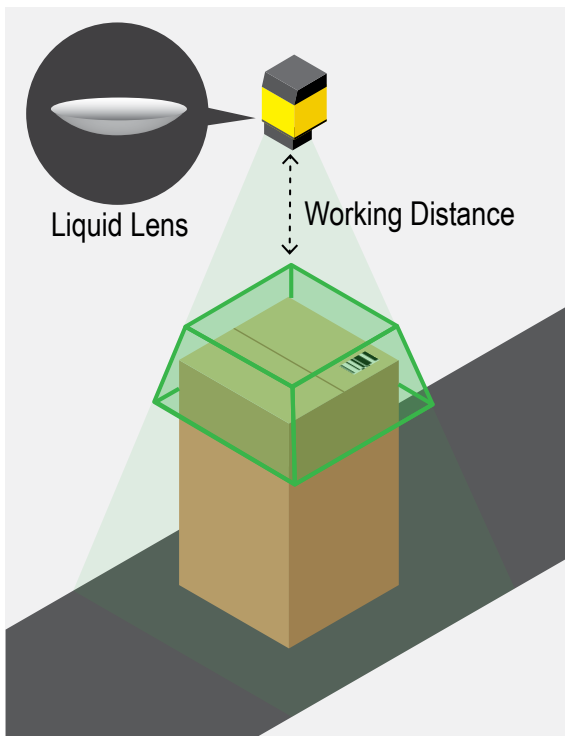
However, laser scanners cannot read

Data Matrix or QR codes. In contrast, image-based barcode readers can reliably read 2D codes as well as 1D barcodes—and even both simultaneously. In fact, image-based readers are often designed to decode the most difficult to read 2D codes that are directly marked onto the part (also known as direct part mark or DPM). Many 2D codes are laser etched or dot peened onto the part to create a permanent mark. Even challenging to read codes, due to poor marking or codes that are marked on a challenging surface like glass or something curved, can be read reliably with advanced code reading algorithms.

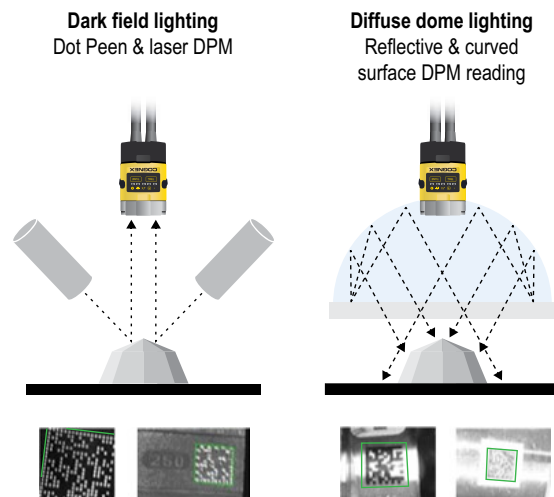


4. LENSES AND LIGHTS

An image-based barcode reader's optics are key for acquiring a good image of the code. Quality readers offer several lens options depending on the amount of resolution required at a given working distance. The latest readers offer autofocus or liquid lens technology, which allows the reader to adapt to changes in working distances for variable applications. It works in the same way as the human eye, reshaping and bending in order to focus. The refocus is accomplished through software, thus avoiding an operator manually adjusting the lens in the field or on the line.



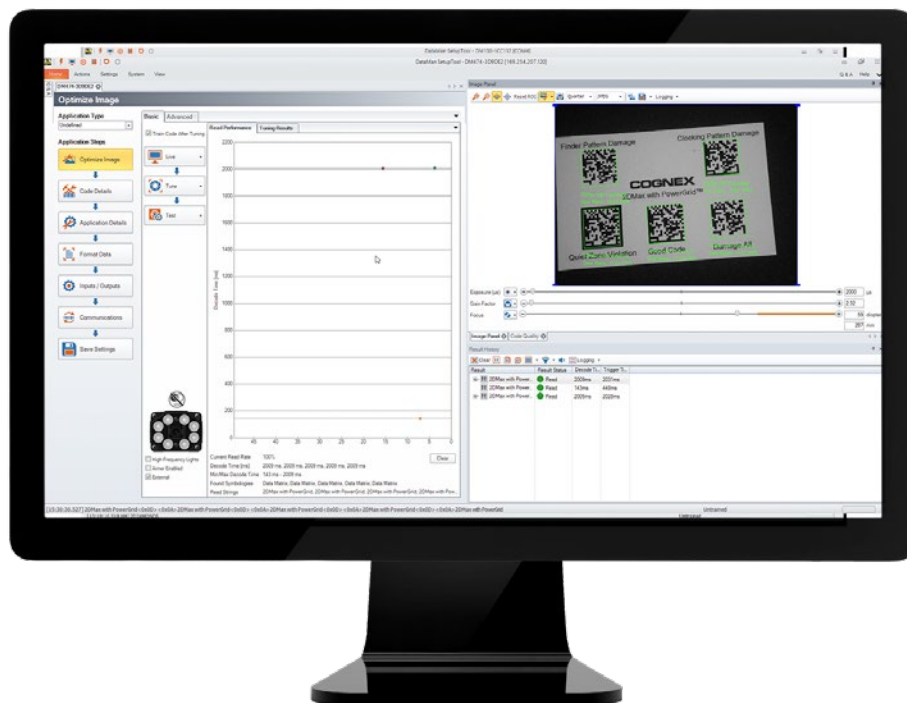
Lighting also has an important role to play in acquiring a good code image. Image-based barcode readers offer various combinations of integrated and external lighting options based on the application environment. In many instances, the combination of highly reflective parts and light sources often create hotspots that confound laser scanners.



5. IMAGE VISUALIZATION AND ARCHIVING

Image-based readers are inherently different than laser scanners because they take pictures of the products as they go by and locate the barcode within the image for decoding. When the image-based barcode reader is running on the production line, operators have options that allow them to monitor the read rate statistics and look at the images that the barcode reader takes. This allows the operator to understand how the system is working and to quickly recognize what is happening if there is a no read. Being able to quickly respond to errors, such as labels not being applied or low ink in the label printer, enable process improvements.

In addition to being able to “see what the reader sees,” the operator can also make simple adjustments to the barcode reader through the online view without having to find a manual to understand how to make setup changes.



6. BARCODE QUALITY FEEDBACK

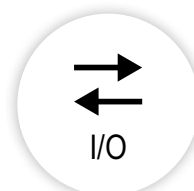
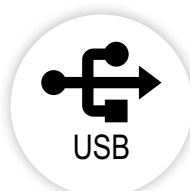
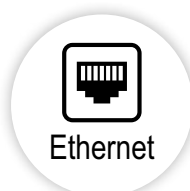
In cases where a barcode verifier is not required to comply with international quality standards, image-based barcode readers can provide barcode quality feedback. Some businesses use basic process control metrics (PCM) to monitor barcode quality. There are also options to add robust verification software directly on an image-based barcode reader to provide more accurate grades. By monitoring barcode quality feedback, issues with code modulation or contrast can be identified and corrected right away to avoid dips in performance, downtime, or chargebacks.



Property	Value	Grade	Average
ISO/IEC 15416 * (UPC/EAN: 6942023334844-OG:C,SC)			
Symbol Grade		C	✓
Symbol Contrast	+0.625	B	✓ B
Modulation	+0.537	C	✓ C-
Minimum Reflect...	+19.400	A	✓ A
Edge Contrast M...	+0.337	A	✓ A
Edge Determinat...	+60.000	A	✓ A
Defects	+0.149	A	✓ A
Reference Deco...		A	✓ D
Decodability	+0.585	B	✓ C

7. COMMUNICATIONS

Image-based barcode readers offer a full range of industrial communication protocols including Ethernet, USB, RS-232, discrete I/O, Ethernet/IP, PROFINET, and Modbus TCP/IP. This simplifies integration between the reader and factory networks, which is critical not only for reading and sending product tracking information, but also for storing archived images of codes.

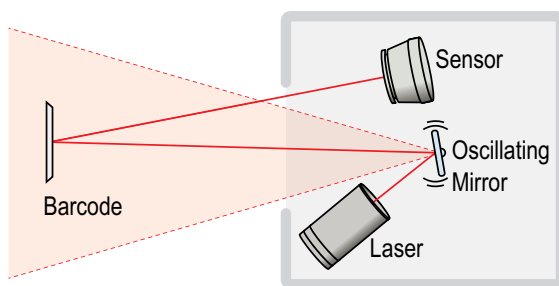


8. COST OF OWNERSHIP

With the additional power and flexibility of image-based barcode readers, you might expect the cost to be considerably more than laser scanners. While that was true in the past, the latest image-based readers cost about the same as industrial laser scanners that have far less functionality. New microprocessors and CMOS digital sensor chips also mean image-based systems can be nearly as fast as the fastest laser scanner.

Laser scanners use an oscillating scan mirror to move the laser beam rapidly across the barcode, creating the laser line that reads the code. These moving parts often wear out or break requiring repair or replacement of the laser scanner. Image-based barcode readers have no moving parts and are designed for long term reliability and low maintenance.

In addition, the most advanced image-based barcode readers have firmware and software update programs, ensuring that the reader can be upgraded with the latest decoding methods and new code types. The idea of future proofing the line allows the user to start transitioning from laser scanners to image-based barcode readers at a lower cost, and allows the flexibility to upgrade in the future without having to replace the readers again and again.



Laser Scanners

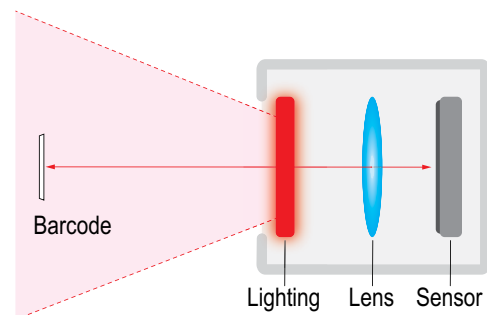


Image-based Barcode Readers

FINAL THOUGHTS

If you are currently using laser scanners, now is the time to investigate the advantages of image-based barcode readers. You may find that image-based barcode readers open up new opportunities for you to identify, track, and trace products and components more effectively throughout the supply chain.

IMAGE-BASED BARCODE READERS

Fixed-Mount Barcode Readers

Compact but powerful DataMan® fixed-mount barcode readers offer unmatched code reading performance with patented 1D and 2D code reading algorithms. The flexible options, easy setup, and quick deployment make them ideal for the most demanding industrial applications.



Handheld Barcode Readers

Versatile DataMan handheld barcode readers provide best-in-class performance for 1D, 2D, and DPM codes, where ruggedness and speed are critical to success. A range of field-changeable communication options ensure these readers are ready to meet your application requirements.

Mobile Terminals

The MX series of mobile terminals leverage the latest iOS® and Android® smartphones in a rugged housing, tough enough to stand up to the most challenging environments—all while providing superior read rates.



BUILD YOUR VISION

2D VISION SYSTEMS

Cognex machine vision systems are unmatched in their ability to inspect, identify and guide parts. They are easy to deploy and provide reliable, repeatable performance for the most challenging applications.

www.cognex.com/machine-vision



3D VISION SYSTEMS

Cognex In-Sight laser profilers and 3D vision systems provide ultimate ease of use, power and flexibility to achieve reliable and accurate measurement results for the most challenging 3D applications.

www.cognex.com/3D-vision-systems



VISION SOFTWARE

Cognex vision software provides industry leading vision technologies, from traditional machine vision to deep learning-based image analysis, to meet any development needs.

www.cognex.com/vision-software



BARCODE READERS

Cognex industrial barcode readers and mobile terminals with patented algorithms provide the highest read rates for 1D, 2D and DPM codes regardless of the barcode symbology, size, quality, printing method or surface.

www.cognex.com/barcodereaders



COGNEX

Companies around the world rely on Cognex vision and barcode reading solutions to optimize quality, drive down costs and control traceability.

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