

White Paper

10 Reasons to Choose Image-based Barcode Readers

COGNEX

Introduction

Image-based barcode readers are rapidly replacing laser scanners in a wide range of industries including food, beverage, consumer goods, pharmaceutical, and logistics, but 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.

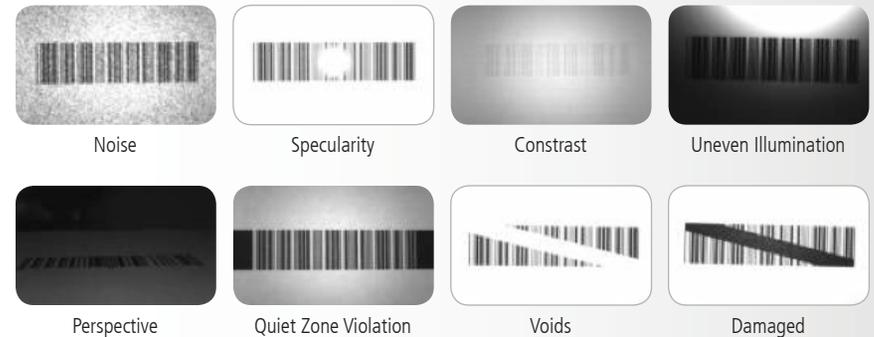
In use, the latest generation of image-based barcode readers has proven to actually outperform lasers in the following areas:

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| 1. Read rate performance | 6. Visualization |
| 2. Omnidirectional code reading | 7. Image archiving |
| 3. 2-D code reading | 8. Barcode quality feedback |
| 4. Multiple code reading and output capability | 9. Communication |
| 5. Long-term reliability | 10. Future proofing |

When considering the transition from laser scanners, it's important to consider the many advantages image-based barcode readers offer.

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. 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 do not read:



Higher read rates help improve product traceability and reduce labor costs for parts/packages that need to be manually handled if a "no read" or a failed read occurs.

2. Omnidirectional code reading

One image-based barcode reader is able to read barcodes in any orientation within a single view. In contrast, 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 in any orientation.

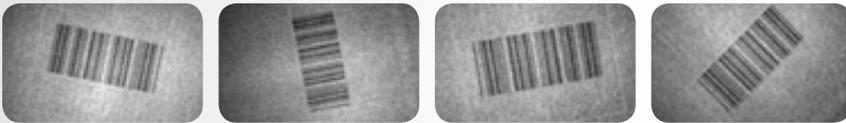


Image-based barcode readers are able to decode 1-D barcodes in any orientation from 0 to 360 degrees

3. 2-D code reading



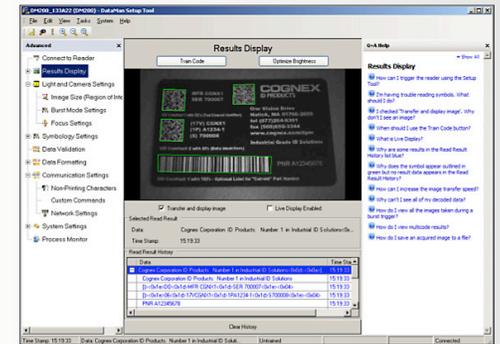
Many industries are making the transition from 1-D to 2-D codes, such as Data Matrix or QR Codes. More information can be stored in 2-D codes to help with product traceability throughout the manufacturing process and the supply chain. Often, 2-D codes are used in conjunction with 1-D barcodes in the production process. However, laser scanners, can't read Data Matrix or QR codes. In contrast, image-based barcode readers can reliably read 2-D codes as well as 1-D barcodes—and even both simultaneously.

In fact, image-based readers are often designed to read the most difficult to read 2-D codes that are directly marked onto the part (also known as direct part mark or DPM). Many 2-D codes are marked onto the part using laser etching or dot peening to create a permanent DPM. 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.



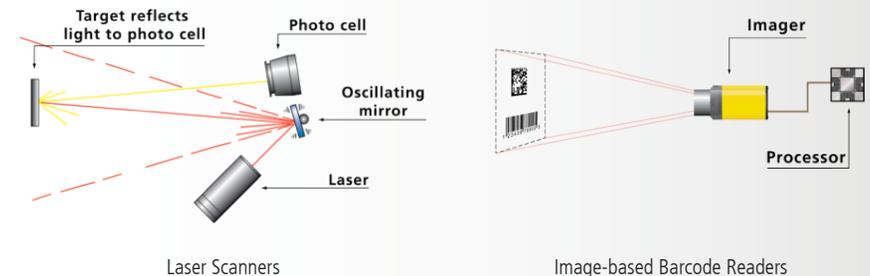
4. Multiple code reading and output capability

With so many types of image-based barcode readers available today, it's important to note that they are not all equal. The best image-based barcode readers use advanced algorithms that can locate and decode multiple barcodes of any type (1-D or 2-D). These barcode readers also allow the user to configure the order of readout to make it easier to integrate the reader into the production process. In many applications, the order that encoded information is output from the reader is very important. For example, it may indicate which test tube the code is read from or which part on a pallet is in which location. Additionally, these advanced image-based readers offer powerful scripting languages that allow the user to program logic, such as ensuring the 1-D barcode data matches the 2-D code data, which can help further ensure product quality/traceability.



5. Long-term reliability

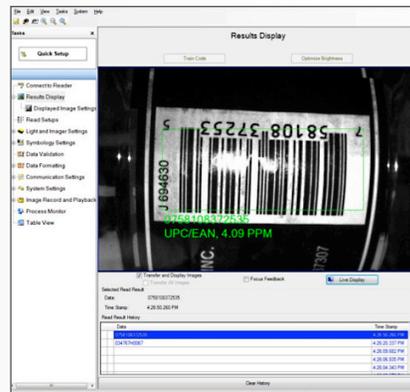
Laser scanners use an oscillating scan mirror to move the laser beam rapidly across the barcode, creating the laser line that reads the code. These moving parts often wear out or break requiring repair or replacement of the laser scanner. Image-based barcode readers have no moving parts and are designed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



6. Visualization

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 improvement and throughput.

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.



7. Image archiving

With a laser scanner, there is no way to understand what happened if the scanner did not read the barcode. The most powerful image-based readers can be set up to archive images of reads. Most often, users archive failed reads to understand what caused it to occur for process improvement. For example, the image can be used to see if the barcode was not present or was too severely degraded to decode.

8. Barcode quality feedback

In many production lines, it is important to maintain the barcode print quality at a high level to ensure that the code can be read by other readers in the product distribution chain. Image-based readers can provide feedback on the quality of the print so the manufacturer can make adjustments before they ship badly printed codes to their customers.

9. Communication

Industrial protocols like Ethernet/IP and PROFINET allow image-based barcode readers to be easily integrated into the factory network. Direct communication with PLCs allows both data communication and control to make the reader part of the quality control process.

10. Future proofing

While many industries are adding 2-D codes, such as Data Matrix or QR, to provide additional tracking information, not all industries are adopting these types of codes as quickly. If this is the case, it’s important to know that some image-based barcode readers help make the transition from laser based to image-based reading easier, with a lower cost model. These readers offer omnidirectional 1-D barcode reading and lower risk with the ability to upgrade those 1-D barcode reading models to enable 2-D codes such as Data Matrix and QR codes. In addition, the most advanced image-based barcode readers also have firmware update programs, ensuring that the reader’s firmware 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.

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.

About Cognex® Corporation

Cognex Corporation designs, develops, manufactures and markets machine vision sensors and systems, or devices that can “see.” Cognex vision sensors and systems are used in factories around the world where they guide, inspect, gauge, identify and assure the quality of a wide range of items during the manufacturing process. Cognex is the world’s leader in the machine vision industry, having shipped more than 850,000 machine vision systems, representing over \$3 billion in cumulative revenue, since the company’s founding in 1981. Headquartered in Natick, Massachusetts, USA, Cognex has regional offices and distributors located throughout North America, Europe, Japan, Asia, and Latin America. For details, visit Cognex on-line at www.cognex.com.

Cognex is the world leader of image-based industrial barcode readers and is the only company that can support all of your 1-D barcode and 2-D barcode reading requirements. Cognex DataMan® barcode readers are offered in either fixed-mount or handheld models (handheld models available wired or wireless) and offer a variety of models with different lighting, optics, and communication options.

1-D Barcode Reading

Cognex DataMan barcode readers provide the best overall read rates for 1-D barcodes handling extreme variations of code degradation with 1DMax+™ and patent-pending Hotbars™ image-analysis technology. With better read rates and no moving parts, DataMan reads barcodes in any orientation and can read multiple barcodes simultaneously.

2-D Code Reading

From easy to read 2-D codes on labels to Direct Part Marks (DPM) on electronics components, plastic, ceramics, or metal, to high density codes on glass—DataMan barcode readers provide the most robust reading reliability for all industries with the patented 2DMax+™ reading algorithm and UltraLight® illumination technologies. These technologies have enabled DPM 2-D codes to be applied to a wide range of products that previously were difficult to identify and track through their manufacturing and usage lifecycle.



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

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