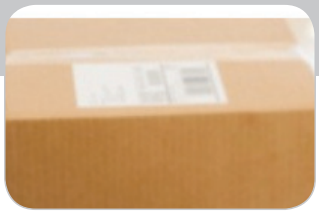
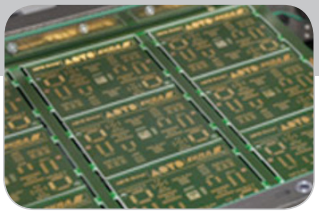
COGNEX id

Expert Guide

Multiple Code Reading Applications Made Easy





Introduction

Reading more than one barcode at a time is a challenging application for many manufacturing and material handling engineers. In these applications there is a need to read multiple codes of the same symbology as well as multiple codes of mixed symbologies within one field of view (FOV). Even more difficult is reading one or more codes on multiple sides of a product to verify that the codes match or to output both sides' read results as one piece of data.

After solving so many variations of these applications we now want to share what we have learned in order to make these applications easy.

Typical Multiple Code Reading Applications

1. Multiple codes of the same symbology within one field of view (FOV)
2. Multiple codes of mixed symbologies within one FOV
3. One or more codes on multiple sides to verify that codes match
4. One or more codes on multiple sides to output both sides' read results as one

Image-based reading technology for multiple code reading applications

When it comes to multiple barcode reading with laser scanners, what are some limitations? Why would you choose an image-based solution for reading multiple barcodes over laser scanning technology?

Laser scanners have difficulty reading codes that are poorly printed, damaged or defective, are at extreme perspectives and that are omnidirectional. They cannot manage when variations occur in part and package positioning. And they cannot read 2-D codes at all, which means that they have no way to compete in two of the four types of multiple code reading applications we commonly see.

Image-based code reading technology can handle much more variation in barcode printing than traditional laser scanners and can also read codes presented at any angle or omnidirectionally. Additionally, the life of an image-based scanner, with no moving parts, is longer and more reliable than a mechanical based laser scanner.

With this information, image-based barcode reading solutions make a great replacement for laser scanners even when reading single barcodes and are especially exceptional with multiple barcodes of the same or different symbology types.

Four Considerations for Barcode Reader Evaluation

Advanced image-based industrial ID readers should be able to adapt as your application changes, especially when presented with more than one code at a time. You need one reader that can do it all: read any code or set of codes, every time; is simple to integrate into your processes, and, is easy to maintain.

Here we describe the top four things for you to consider when purchasing your next barcode reading solution for a multiple code reading application.

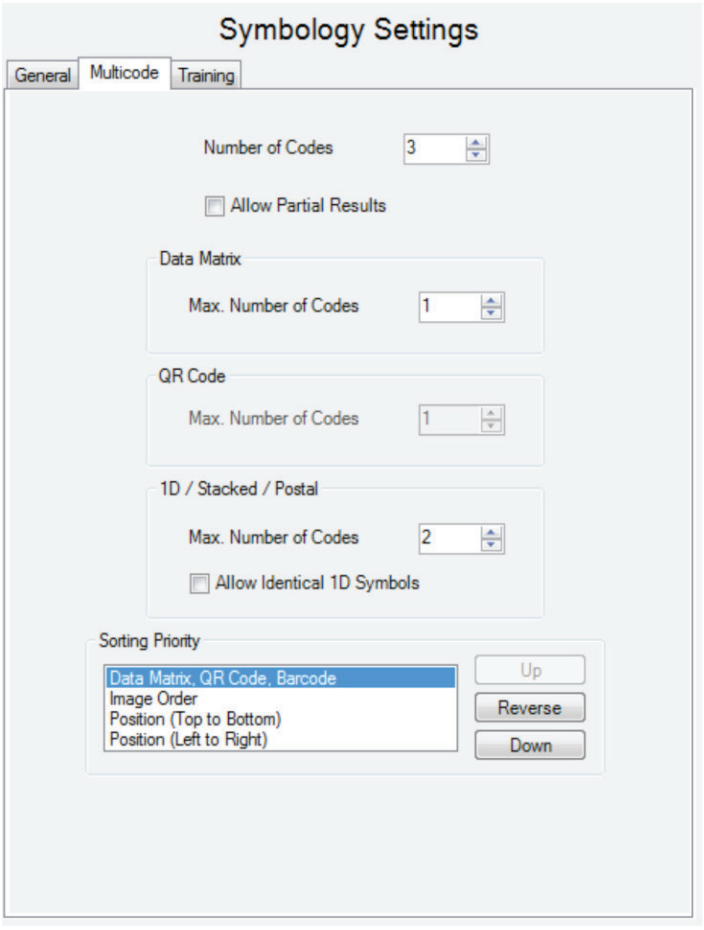
1. Code reading algorithms

Multiple code reading application success must start with solid foundations in code reading technology. Your reader must have the best algorithms to attain the highest read rates. This means that your reader should achieve a high percentage of successful code reads per attempt, with minimal no-reads. With image-based technology, you can look for a reader to provide higher than 99% read rates.

The latest generation of 1DMax+™ and 2DMax+™ algorithms from Cognex set a new standard in terms of giving you the highest read rates of the most challenging codes. When the 1DMax+ algorithm is paired with Hotbars™ image analysis technology, 1-D barcode signals are extracted faster and more reliably for more decodes per second in a wider field of view.

2. Simple setup for one or more readers

You could pay systems integrators to help you set up a multiple code reading application or figure out work-arounds to do the job yourself. Ideally, though, you'll want to invest in a reader that makes setup easy, especially if you require multiple readers to communicate together. It should be as simple as answering the question, "How many codes are you looking for and of what types?"



In the DataMan® Setup Tool, common across all models, you simply select the Multicode tab, and then make your selections.

For a multiple reader system, you may link more than one DataMan unit together. They can be set up independently, but all communicate to one another and output all of their results as one.

3. Data Output, Formatting and Validation

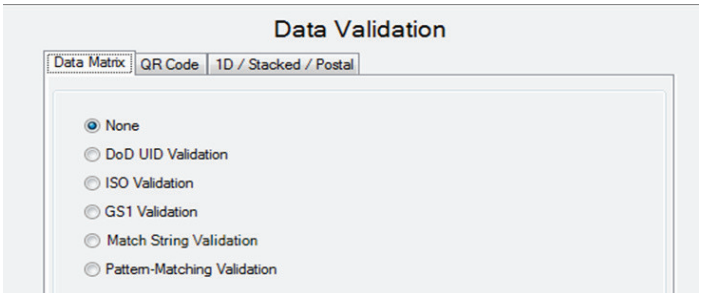
Once you have decoded the barcodes and extracted the data, whether it's from a single reader or from multiple, you will need to control the output. Your chosen reader should provide this capability.

DataMan readers feature various trigger modes during image acquisition. For example, a reader in burst mode can decode and output multiple codes from a sequence of images or in continuous mode can be set to take as many images as necessary to locate a specified number of codes.

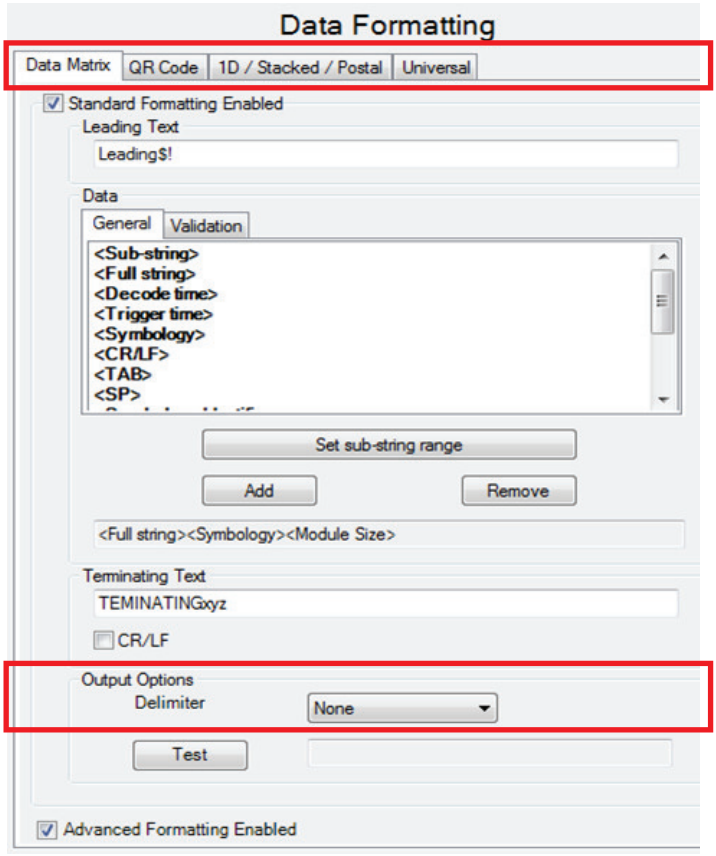
For example, you may always want the 1-D code output first and the 2-D code second, or vice versa. In other examples, your label may always print the codes in the same locations where you might want to output the codes as read from top to bottom, bottom to top, right to left, etc.

Industrial ID readers should also offer simple ways to help format and validate the data so that your PC or PLC (Programmable Logic Controller) can use the data as intended.

Match string validation or pattern matching validation ensures, for example, that you are reading the same barcode every time. Perhaps your application includes both a 1-D UPC and a 2-D Data Matrix code where part to part the UPC code is always the same code even though the Data Matrix code changes. With match string validation, you can confirm that the UPC code is correct.



When necessary, the DataMan Setup Tool can set validation parameters. It can be configured separately by each symbology type. The tool makes complex applications really easy to set up.



In the DataMan Setup Tool, you can format the data based upon symbology group and choose a delimiter to separate the data from multiple codes.

4. Communication

You now have data formatted the way you want. It's in the right order, has the proper delimiters defined and you've checked the data. So how do you send it to your control center? The most efficient method is via Ethernet. Choose a solution that can communicate with your PC or PLC without complexity—one that supports the most typical industrial networking standards such as EtherNet/IP (with Rockwell® Add On Profile (AOP)), PROFINET (with Siemens® GSD), Modbus/TCP, MC Protocol, TCP/IP, etc.

COGNEX CONNECT

Cognex Connect™ is a communications suite of Industrial Ethernet protocols that ensures a seamless and reliable communications link between Cognex DataMan fixed-mount and handheld readers and the factory network.

Multiple Code Reading Applications by Industry

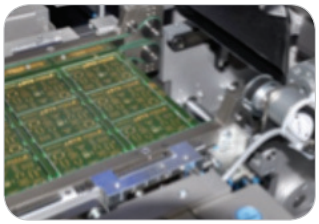
LOGISTICS

The key in hand presentation scanning of packages with multiple codes is for the reader to not re-read codes. If the application is to look for and read two codes, then the reader should only output the data of those two codes.

High speed material handling systems also move packages with multiple codes. Sometimes one or more codes are on multiple sides and the read results must be outputted as one.

CONSUMER GOODS

In packaging we generally see two of these applications: multiple codes with the same symbology within a single field of view and multiple codes of mixed symbologies within a single field of view. Like food and beverage, we see that consumer products and packaging are now really trending towards adding 2-D codes along with UPC codes to add additional data to each product.



ELECTRONICS

Here we typically see multiple codes of the same symbology, either 1-D barcodes on labels or 2-D Direct Part Mark (DPM) codes within a single field of view of a PCB (printed circuit board) or on a panel or tray of multiple PCBs. High resolution fixed-mount readers should be able to read all of the barcodes, identify them, count them, make sure they all match and then output the data.

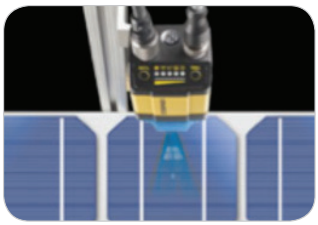
FOOD AND BEVERAGE

There many applications where we have multiple codes of mixed symbologies within a single field of view for these industries. Very often there is a need for more data than just the UPC code so we see the addition of 2-D Data Matrix codes to help control traceability and aid in the manufacturing process.

In allergen applications, one or more codes on multiple sides must be verified to match. For example, the code on the lid of a container must match the code on the container itself to ensure proper labeling. If mismatched lids and containers hit the market, then an allergic consumer could be put in harm's way.

PHARMACEUTICALS

There are many types of these applications in the pharmaceuticals industry: multiple codes of the same symbology as well as multiple codes of mixed symbologies within a single field view. Regulations require unique identifiers to control traceability and to combat counterfeiting from the single unit, to the package, to the carton, shipping boxes and pallets.



SOLAR

A SEMI standard, PV29-0212, requires the marking and reading of four redundant 2-D Data Matrix DPM codes on solar wafers so that if one, two or three get damaged, you can still read it to ensure part traceability.

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