



Types of Barcodes: Choosing the Right Barcode

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When choosing the right types of barcodes for your products, inventory or assets, you face many options. Today, we'll help you choose the right types of barcodes by walking through all the major 1D and 2D barcode types. We'll highlight the common uses for each one, as well as constraints that help you narrow down your options: perhaps your products have less than a square inch of printing space, or you might need to print on corrugated cardboard, or you need extra-secure codes. No matter what you need, we have the information you need to get started today.

Let's begin with an overview of 13 major one-dimensional and two-dimensional barcode types. We'll cover UPC, EAN, Code 39, Code 128, ITF (2 of 5), Code 93, CodaBar, GS1 DataBar, MSI Plessey, QR, Datamatrix, PDF417, and Aztec barcodes.

If you need more information related to specific barcode scanning use cases and industry benefits, check out our free eBook [Choosing the Best Barcode for your Business](#).

One-Dimensional (1D) Barcode Types

One-dimensional, or 1D barcodes, systematically represent data by varying the widths and spacings of parallel lines, and may be referred to as linear or one-dimensional. These include some of the traditional, or most well recognized barcode types such as the UPC and EAN code types.

UPC CODE

UPC barcodes are used to label and scan consumer goods at points-of-sale around the world—mainly in the United States, but also in the United Kingdom, Australia, New Zealand and other countries. The UPC-A variation encodes 12 numerical digits while UPC-E is a smaller variation, which encodes only 6 numerical digits.

Industry: Retail

Variations: UPC-A, UPC-E



EAN CODE

EAN barcodes are also used to label consumer goods worldwide for point-of-sale scanning, primarily in Europe. They look very similar to UPC codes, and the main distinction is their geographical application. While EAN-13 (comprising 13 digits) is the default form factor, you'll find EAN-8 (covering 8 digits) barcodes on products where only limited space is available, like small candies.

Industry: Retail

Variations: EAN-13, EAN-8, JAN-13, ISBN, ISSN



1 "525764" 098275"

CODE 39

Code39 barcodes (or Code 3 of 9) are used to label goods across many industries, and are often found in the automotive industry and the US department of Defense. It allows the use of both digits and characters, and its name originates in the fact that it could only encode 39 characters—though in its most recent version the character set has been increased to 43. It's similar to, but not as compact as, the Code 128 barcode, which we'll talk about next.

Industry: Automotive and Defense



CODE 128

Code 128 barcodes are compact, high-density codes used in logistics and transportation industries for ordering and distribution. They're geared toward non-POS products, like when supply chain applications label units with serial shipping container codes (SSCC). Code 128 barcodes are powerful and can store diversified information because they support any character of the ASCII 128 character set.

Industry: Supply Chain



ITF (Interleaved 2 OF 5)

ITF (or Interleaved 2 of 5) barcodes are used to label packaging materials across the globe. Since they can deal with high printing tolerances, they are good for printing on corrugated cardboard. ITF barcodes encode 14 numeric digits and use the full ASCII set.

Industry: Packaging



CODE 93

Code 93 barcodes are used in logistics to identify packages in retail inventory, label electronic components, and even provide supplementary delivery information for the Canadian Post. Like Code 39, it Code 93 comes with full ASCII support, but it improves upon and complements Code 39. It enables additional security within the barcode itself, and its high density and compact size makes its labels around 25% shorter than barcodes produced in Code 39.

Industry: Retail, Manufacturing and Logistics

[Learn more about Code 93 barcodes](#) on the Scandit Blog.



CODABAR

Codabar barcodes are used by logistics and healthcare professionals, including U.S. blood banks, FedEx, photo labs, and libraries. Its main benefit is that it is easy to print and can be produced by any impact style printer, even a typewriter. Therefore, a user can create many Codabar codes using consecutive numbers without the use of a

computer. It was designed to be readable when printed from dot matrix printers for multi-part forms. Codabar is a discrete, self-checking symbology that encodes up to 16 different characters with an additional 4 start/stop characters.

Variations: Codeabar, Ames Code, NW-7, Monarch, Code 2 of 7, Rationalized Codabar, ANSI/AIM BC3-1995, USD-4

Industry: Logistics, Healthcare and Education

[Learn more about CodaBar barcodes](#) on the Scandit Blog.



GS1 DATABAR

[GS1 DataBar](#) barcodes (formerly known as Reduced Space Symbology) are used by retail outlets to identify consumer coupons, produce, and perishables, as well as small objects in the healthcare industry. They are more compact than typical consumer-facing barcodes. GS1 DataBar was introduced in 2001 and became the mandated barcode type for retail coupons in the US.

Variations: GS1 DataBar Omnidirectional, Truncated, Stacked, Stacked Omnidirectional, Expanded, Expanded Stacked

Industry: Retail and Healthcare

[Learn more about GS1 Databar barcodes](#) on the Scandit Blog.



MSI PLESSEY

MSI Plessey (or Modified Plessey) barcodes are used for inventory management in retail environments, such as labeling supermarket shelves.

Industry: Retail



Two-Dimensional (2D) Barcode Types

Two-dimensional, or 2D barcodes, systematically represent data using two-dimensional symbols and shapes. They are similar to a linear 1D barcode, but can represent more data per unit area. These include some newer barcode types such as the QR Code and PDF417 code types.

QR CODE

QR codes are 2D matrix barcodes with a strong consumer focus, often used in tracking and marketing such as advertisements, magazines, and business cards. Free to use, flexible in size, have a high fault tolerance, and have fast readability, though they can't be read with a laser scanner. QR codes support four different modes of data: numeric, alphanumeric, byte/binary, and Kanji. QR code growth began in Japan and use continues to grow today. They are public domain and free to use.

Industry: Retail, Entertainment and Advertising

[Learn more about QR codes](#) on the Scandit Blog.



DATAMATRIX CODE

Datamatrix codes are 2D barcodes used to label small items, goods, and documents

[Datamatrix](#) codes are 2D barcodes used to label small items, goods, and documents. Their tiny footprint makes them ideal for small products in logistics and operations. In fact, the US Electronic Industries Alliance (EIA) recommends that they be used to label small electronic components. Similar to QR codes, they have high fault tolerance and fast readability.

Variation: Micro-Datamatrix

Industry: Electronics, Retail and Government

[Learn more about Datamatrix codes](#) on the Scandit Blog.



PDF417

[PDF417](#) codes are 2D barcodes used in applications that require the storage of huge amounts of data, such as photographs, fingerprints, signatures, text, numbers, and graphics. They can hold over 1.1 kilobytes of machine-readable data, making them much more powerful than other 2D barcodes. Like QR codes, PDF417 barcodes are public domain and free to use.

Variation: Truncated PDF417

Industry: Logistics and Government



AZTEC

[Aztec](#) codes are 2D barcodes used by the transportation industry, particularly for tickets and airline boarding passes. The barcodes can still be decoded even if they have bad

resolution, making them useful both when tickets are printed poorly and when they're presented on a phone. In addition, they can take up less space than other matrix barcodes because they don't require a surrounding blank "quiet zone," unlike some other 2D barcode types.

Industry: Transportation

[Learn more about Aztec codes](#) on the Scandit Blog.



That's it – for now. We've introduced you to the most common one-dimensional and two-dimensional types of barcodes. You should now have a general understanding of where, when and how they're being used around the world in a variety of industries and use cases. When it comes to the decision on which format to use – ask yourself the following questions:

- Will the product be scanned at the point of sale in retail stores? -> UPC, EAN
- Which character set needs to be supported? Alphanumeric characters? -> Code39, Code128, and QR Code.
- How much space is available on the product packaging? -> EAN8, UPC-E, Code128 and Datamatrix offer smaller form factors.
- Which material will you print the barcode on? -> ITF is great for printing barcodes on corrugated cardboard.
- Which barcode type supports the largest amounts of data? -> PDF417 codes are great for storing huge amounts of data.

The answers to the above questions will help guide the selection of best types of barcodes for your needs. Whether you are looking to use one-dimensional or two-dimensional barcodes for your business, organization or personal use, the information we've provided should serve as a great tool to help you select the appropriate types of barcodes.

Once you settle on a barcode type, download the [Scandit Barcode Scanner SDK](#) for your mobile application to begin scanning all major one-dimensional and two-dimensional barcodes with unrivaled speed and accuracy from iOS or Android devices today. You can also take a look our [Barcode Symbology Library](#) page to review all the types of

barcodes and their variations.

Have questions about our Barcode Scanner SDK? Are you interested in leveraging [Scandit products](#) for your business? [Contact](#) a member of our team today for support.

Looking for more? Check out our latest eBook *Choosing the Best Barcode for your Business* [Download the free eBook](#)

Tags: 1D Barcodes, 2D Barcodes, Aztec, Codabar, Code128, Code39, Code93, DataBar, Datamatrix, EAN, ITF, PDF417, QR Code, UPC



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