

HOW DO BARCODES WORK?

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Running a warehouse, operating a functioning factory and even purchasing your weekly shopping at the supermarket has never been easier now, thanks to the wonderful thing that is the barcode.

Everything from cereal packets to library books have a barcode and while they may seem simple, these black and white zebra stripes are essential to the smooth running of many operations. While we see the humble barcode every day, do you ever stop to think how they actually work?

In the Beginning

Before we had barcode technology, our processes and structures were somewhat simpler. However, while they were manual, they caused more errors and data wasn't as accurate as it today. There's no doubt that [the invention of barcodes has made life much easier](#).

The barcode was initially invented by Norman Joseph Woodland and Bernard Silver in 1948 to make reading product information much easier during checkout processes. The first prototype used ultraviolet ink, however, this didn't work as the pair had hoped. While the first attempt didn't fully work out, it didn't stop the inventors from trying again. They then adapted a version made from the structure of Morse code, where they utilised dashes and dots.

To read the barcode an incandescent light bulb would shine light over the barcode pattern, through the paper and then onto a super sensitive light detector. The black lines on the barcode absorb the light, and the white parts of the barcode would shine through and be detected.

It's in The Physics

The modern-day one-dimensional barcode is read using a scanner. This scanner sends out a laser which detects the pattern. When the laser of a particular frequency sweeps across the barcode, some of the light is absorbed, while the rest is reflected. This is the reason for the use of black and white; the black lines are absorbed, and the white spaces are reflected.

The scanner detects the amount of light, which is then translated into a set of digits, or data. Using the set of numbers, information can be retrieved from a computer database.

Dots and Lines

So, we now know how the lines are scanned, but what about those numbers underneath? While a computer can trump the human brain in many ways, they can still only essentially read binary, or base 10; 0's and 1's. This is one of the main reasons why a barcode looks the way it does. Think of the black and white as 0's and 1's, or on and off.

Taking into consideration what we know about the light reflection, the black parts don't reflect very well, therefore are recorded as a 1, and the white parts are recognised by the light scanner, so are seen as 0's.

All barcodes will represent a twelve-digit number, which are usually printed underneath as a backup for possible complications. Here are what the numbers represent:

First Number: Product Type

Next 5 Numbers: The Manufacturer Code

Next 5 Numbers on the Right: Product Code

Final Number: Check Digit (a Self-Policing System)

Unseen to The Naked Eye

Each element of a 1D barcode (1 digit in barcode language) is divided into 7 vertical modules, which consist of individual bars and spaces. So, while you may not necessarily notice it, there are in fact 95 evenly spaced columns on each barcode, all with separate detailed data. These groups are interpreted by the computer as 1 digit only. For example, the number 1 is actually 0011001 (or a series of spaces and bars).

However, there are a variety of diverse types of barcodes. UPC or Universal Product Number, while the most common type is restricted to around 20 alpha-numerical characters. Any more than that would need a QR (2D Barcode) code.

So, the barcode. Essentially it is a rapid way of inputting numerical data, and there is no doubt about it that they make processes much easier, and quicker.

If you are ready for a [total integrated barcoding solution](#) for your business, GSM Barcoding can help. Ready and waiting with the latest and innovative technology, we can take your business to more streamlined and smooth structures. Simply [get in touch](#) today.