Bar Code Mystery



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THESE days, it is rare to find a product in retail shops that does not come with a bar code. A bar code is just a combination of bars and spaces of varying widths, which carry important information about the particular product and is only readable by machines. Many of you might be curious about how it works. I have tried to satisfy your curiosity in this article.

Actually bar coding is a method of automated data collection. It is a way to rapidly, accurately, and efficiently gather and transmit information to a computer.

Widely accepted statistics suggest that keyboard data entry results in 1 error per 300 characters, while the accuracy of bar codes is less than 1 error in 1 to 3 million characters scanned. Data entry using the bar code is also 5 to 10 times faster than using the keyboard. This makes bar codes very popular in high volume supermarket point of sale checkouts, inventory tracking, attendance at work, health care and other applications. Bar codes are also ideal for automated applications such as warehouse re-stocking, automotive assembly control, etc.

How Bar Code Works

You don't need to be a rocket scientist to understand how bar codes work. They are just a different way of encoding numbers and letters by using a combination of bars and spaces of varying widths. Think of them as another way of writing since they replace keyboard-data entry as a method of gathering data. This may come as a surprise to you! A barcode doesn't contain descriptive data. Just as your student number doesn't contain your name or address, a barcode is also a reference number that a computer uses to look up an associated record that contains descriptive data and other important information.



For example, a bar code found on a tag of a T-shirt doesn't contain the product name, type of shirt, or price; instead it contains a 12-digit product number. Now, when this number is scanned by the cashier at the check-out, it's transmitted to the store's computer which finds the record associated with that item number in its database. The matching item record contains a description of the product, vendor name, price, quantity-on-hand, etc. The computer instantly does a "price lookup" and displays the price on the cash register (it also subtracts the quantity purchased from the quantity-on-hand.) This entire transaction is done instantly; think of how long it would take the cashier to key in a 12-digit number for every item you wanted to buy!

How Data Is Read

Bar code technology uses different types of symbologies. A symbology is a language to communicate between bar code label and the scanner. There is a wide variety of symbologies currently in use, but all are fundamentally based on the same principles as Code 39. They all use spaces and bars arranged in groups to stand for individual characters. The grocery industries use UPC symbology. In Code 39, each character in the code contains nine elements. Three of those elements must be wide. All wide and narrow elements (both bars and spaces) in Code 39 have a binary value of 1 and 0 respectively.



Bar code readers interpret the codes by scanning and decoding the sequences of bars. The reader consists of the scanner and decoder. The scanner emits a beam of light that is swept past the bar code (either manually or automatically) and senses light reflections to distinguish between the bars and spaces. The light reflections are sensed by a photo detector which converts the spaces into an electrical signal and the bars into absence of an electrical signal. The width of the bars and spaces is indicated by the duration of the corresponding signals. Computer converts these electrical signals into binary numbers (0 and 1) and also interprets these binary numbers into some alphanumeric characters (letters and numbers). In code 39 system for every character there is a 9 digit binary code.

These numbers or letters stand for a reference number for associated descriptive data about the product like price, quantity etc.

To recap: A bar code typically has ID data encoded in it, and that data is used by a computer to look up all specific information associated with the data.

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