

Barcodes Decoded;

An Overview of What Barcodes Are and How They Can Be Used

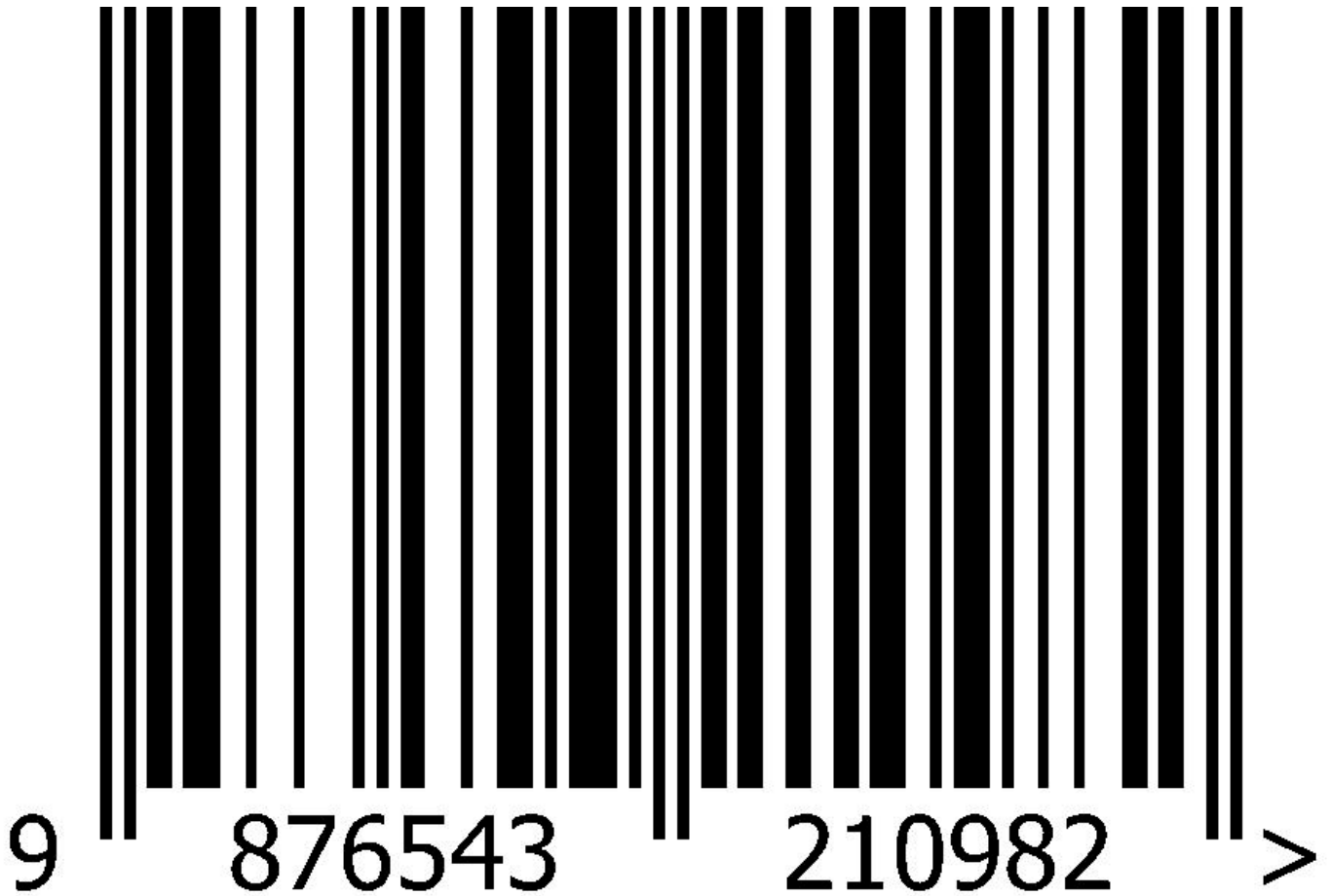


Table of contents:

WHAT ARE BARCODES?	4
WHAT ARE BARCODES USED FOR?	4
<i>Retail Stores</i>	4
<i>Libraries</i>	5
<i>Driver's Licenses</i>	5
<i>Couriers</i>	5
<i>Hospitals</i>	5
<i>Businesses</i>	5
TYPES OF BARCODES	6
RETAIL BARCODES	6
<i>EAN-13 Retail Barcodes</i>	6
<i>UPC Retail Barcodes</i>	7
CARTON AND PALLET BARCODES.....	8
<i>ITF-14 Carton Codes</i>	8
<i>SSCC Pallet Barcodes</i>	9
BOOK AND MAGAZINE BARCODES.....	10
<i>ISBN Book Barcodes</i>	10
<i>ISSN Magazine Barcodes</i>	12
2D BARCODES (OR MATRIX CODES)	14
<i>What are 2D Barcodes?</i>	14
<i>QR Codes</i>	14
<i>PDF417</i>	16
<i>Data Matrix</i>	16
<i>Maxi Code</i>	17
<i>Aztec Code</i>	17
ASSET TRACKING BARCODES	18
<i>Code-39 Asset Tracking Barcodes:</i>	18
<i>Code-128 Asset Tracking Barcodes:</i>	18
<i>The Difference between Code 128 & Code 39:</i>	18
GETTING AND USING RETAIL BARCODES	19
OBTAINING BARCODES FOR YOUR RETAIL PRODUCTS.....	19
HOW CAN THERE BE BARCODES OUTSIDE OF GS1'S CONTROL?.....	20
HOW TO IMPLEMENT BARCODES ON YOUR RETAIL PRODUCTS?.....	21
<i>EAN-13 Barcode Symbol Dimensions (at 100% magnification):</i>	22
DIFFERENCES BETWEEN UPC-A CODES AND EAN-13 CODES	24
GS1 COUNTRY CODES.....	25
COMPANY PREFIXES	25
BARCODE REGISTRATION.....	26

BARCODE ENCODING.....	27
THE CHECK-SUM DIGIT.....	27
HOW BARCODES ARE ENCODED.....	28
UPC-A.....	28
EAN-13:.....	28
BARCODES FOR SPECIFIC PRODUCT CATEGORIES.....	29
GREETING CARD AND POSTCARD BARCODES.....	29
BARCODES FOR BOOKS.....	29
BARCODES FOR MAGAZINES.....	30
BARCODE SCANNING & APPS.....	31
BARCODE SCANNING APPS.....	31
1D Barcode Scanning Apps.....	31
2D Barcode Scanning Apps (QR Code).....	31
BARCODE SCANNERS AND SYSTEMS.....	31
Purchasing Barcode Scanners.....	31
FAQ'S.....	32
WHERE DID THE BARCODE SYSTEM COME FROM?.....	32
DO I NEED A BARCODE?.....	32
HOW MANY BARCODES DO I NEED?.....	32
WILL MY BARCODE WORK FOR ANY RETAIL PRODUCT?.....	32
WILL MY BARCODE WORK INTERNATIONALLY?.....	33
WHAT INFORMATION IS CONTAINED IN A BARCODE?.....	33
CAN THE BARCODE BE PRINTED IN COLOUR?.....	33
WHAT NUMBERS ARE REQUIRED FOR BOOKS AND MAGAZINES?.....	33
HOW CAN INDIVIDUAL BARCODE NUMBERS BE SOLD?.....	34
GLOSSARY OF TERMS:.....	35
USEFUL LINKS:.....	39

What are Barcodes?

A Barcode is an image used to contain a small amount of information that can easily be read by a barcode scanner or cell phone app. Usually the information encoded is simply a number; however, depending on the format or type of barcode a wide variety of other information can be encoded. 2D Barcodes like QR Codes can encode anything from a website URL to an e-business card.



As can be seen above, barcodes come in a variety of shapes and forms. However, in all cases barcodes are scanned by an electronic device in order to quickly transfer information into a computer or mobile device. To be able to scan easily barcodes must only have a small amount of information encoded. However, when a barcode is scanned computers sometimes automatically pull up other information that has been linked to the barcode number. This means that while a barcode may just have a number encoded, when that number is scanned into the system it can trigger other information to appear. This is what occurs in stores when the product information appears as a result of the barcode being scanned.

What are Barcodes used for?

Barcodes are used in a variety of different settings (some of these are described below). In each case barcodes help to optimise efficiency and eliminate room for human error.

Retail Stores

Barcodes are most commonly seen in use at the check-out counter of almost any retail store. Retailers use barcodes in this way to quickly retrieve the name and price of a product. This helps them to calculate a running total and generate an itemised receipt for all items purchased. If products did not have barcodes the check-out operator would have to key in every item individually leading to a laborious process and inevitable human error.

Barcodes are also sometimes used by stores for keeping track of inventory. This means that each variation of a product (e.g. each size and colour) may need its own barcode. This can help a store owner to know when a particular product variation is running out & needs to be reordered.

Libraries

Libraries use barcodes to keep track of which books are being lent out and when they are due to be returned. Every time a book is checked out the barcode is scanned into the system as an outgoing book, and whenever the book is checked back the barcode is scanned again back into the system. The system is updated each time a scan occurs so that librarians can search for a book and see how many are available and how many have been checked out.

Driver's Licenses

Many countries require that driver's licenses have barcodes on them so that they can be scanned by police in order to easily retrieve any relevant information on the driver.

Couriers

Couriers scan barcodes at each stage of delivery. This enables the courier company (and the sender) to track the parcel and see which stage of delivery it is up to.

Hospitals

Hospitals sometimes have barcoded wristbands for patients. This means that when the band is scanned, it pulls up the patient's information on the computer.

Businesses

Business use barcodes to track their assets and keep track of stock. For example, supermarkets use barcodes to keep track of backroom stock for reordering information, and other businesses may use barcodes to keep track of their electrical equipment.

Types of Barcodes

Retail Barcodes

EAN-13 Retail Barcodes



International Article Numbers (originally European Article Numbers - hence the acronym “EAN”) are by far the most common type of barcode used on retail products. These are 13-digit numbers which consist of 12 numbers followed by a calculated check-sum digit. EAN-13 numbers are used across the entire world on all products except books and magazines. EAN-13 barcodes are the most common retail barcode everywhere in the world with the exception of the USA (where UPC-A barcodes are more common).

The EAN-13 Number is encoded into an EAN-13 format barcode image. When the EAN-13 barcode image is scanned into store systems, product information (price and reordering information) can then be recorded. This means that a different EAN-13 number is required for each unique product.

Sometimes EAN-13 Numbers can have additional digits added to the end of the number. Two-digit supplements can be added to the end of a barcode to indicate the issue number of a magazine or journal. If a magazine for example has 12 issues per year, the supplements could be 01,02,03,04,05,06,07,08,09,10,11,12. These 15 digits are then encoded into an EAN-13+2 format image and incorporate into the packaging of each issue. Alternatively a 5-digit code can also be added to the end of an EAN-13 number and encoded in an EAN-13+5 format. These 5 supplement digits are often used to indicate the recommended retail price of books, or for weighted products that vary in price.

EAN-13 with 2 digits added:



EAN-13 with 5 digits added:



UPC Retail Barcodes

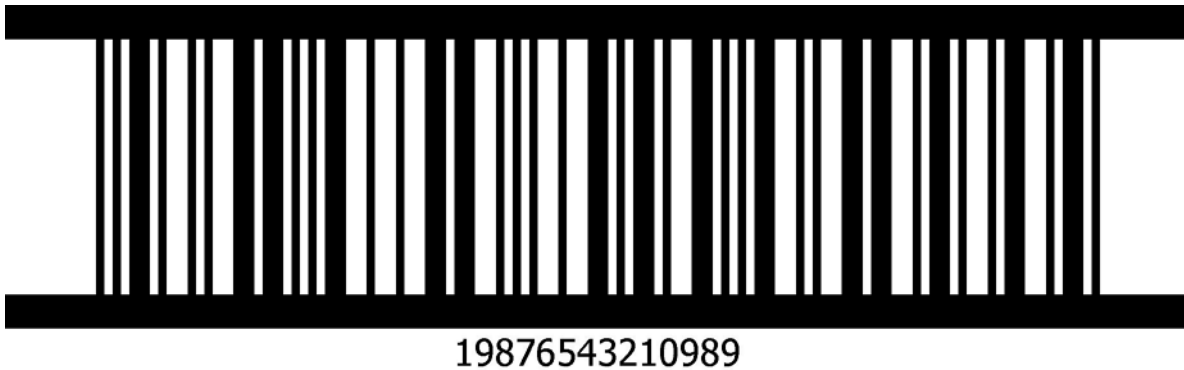


UPC Barcodes (Universal Product Codes) are 12-digit barcode numbers used predominantly in the USA on all retail products, again with the exception of books and magazines. UPC numbers consist of 11 numbers followed by a check-sum digit. These are used in the same way as EAN-13 barcodes. The UPC-A format image is incorporated into product packaging and product information is recorded in the stores system at the initial scan (or sometimes merged into the system via an electronic price-list). A separate UPC barcode number is required for each unique product.

A UPC Barcode can be changed into an EAN-13 Barcode by adding a '0' to the front of it. This will change the number of digits and the human readable section of the barcode (i.e. the numbers below the barcode image); however it will not change the bars of the barcode image at all. This is because a leading '0' has no effect on how the following numbers and is not represented in the bars. In an EAN-13, the leading digit indicates how the following 6 digits should be encoded. A '0' indicates that the following 6 numbers should be encoded in exactly the same way as a UPC-A code. More information on this can be found in the 'Barcode Encoding' section.

Carton and Pallet Barcodes

ITF-14 Carton Codes



ITF-14 Carton Codes are created from EAN-13 barcodes, and they are used on cartons or boxes containing a specific quantity of the item that the EAN-13 barcode represents. Many larger retailers require that packaging boxes have ITF-14 codes on them because they are used for keeping track of stock and reordering requirements.

It is important to note that ITF-14 barcodes should only be used within internal warehouses in stores – they should *not* be used for any products that are for sale at the retail level. For example, if a product (e.g. Pepsi) is being sold at the retail level both individually (e.g. a single can of Pepsi) *and* in a pack containing more than one of the item (i.e. a 6 pack of Pepsi), both the individual item & the pack need retail barcodes on them (EAN-13 or UPC-A codes).

ITF-14 carton codes are created by adding an additional number onto the beginning of an EAN-13 number and recalculating the check-digit. This creates a 14 digit number which is then encoded as a barcode in ITF-14 format.

An example of this is below:

EAN-13: 9876543210982

In this example the final digit of the EAN-13 (the check-digit) is a '2'. This '2' would be removed to create the following number.

987654321098

A new digit would be added to the beginning of the number (in this example we have added a '1').

1987654321098

The check-digit would then be recalculated (in this example the recalculated check-digit is a '9'). This produces the final ITF-14 number:

19876543210989

Any digit from 0-9 can be added to the beginning of an EAN-13 number to create an ITF-14 number. This means that up to 10 different ITF-14 numbers can be created for every EAN-13 number. Therefore, if a particular product was packaged in two different sizes boxes (a smaller box & a bigger box, each containing a different quantity of the product); two ITF-14 Numbers can be created.

SSCC Pallet Barcodes



(00)398765432109800010

Some retailers also require SSCC (Serial Shipping Container Code) Pallet Barcodes for the pallets going into their stores. SSCC Codes are 18-digit barcodes which are encoded in Code-128 format (or symbology). A unique code is required per pallet.

SSCC Barcodes are encoded as follows:

An initial application identifier number is used to establish the type of barcode that it is. In the case of SSCC codes this application identifier is a '(00)'. This is followed by an extension digit which can be chosen by whoever constructs the code. For this example we will use a '3'. This number is then followed by the company prefix which could be anywhere between 7 and 12 digits. The remaining digits, except for the last one, are a serial number assigned by the company having the SSCC codes created. This changes with each SSCC code created. Finally as with most barcode numbers, a final check-digit is calculated and added onto the end.

For our sample EAN-13 Barcode: 9876543210982, the SSCC code may look like this:

(00)398765432109800010

Book and Magazine Barcodes

ISBN Book Barcodes



International Standard Book Numbers (ISBN numbers) are the numbers used for the barcodes on all books (both e-books and hard copy books require these). While ISBN numbers were originally 10 digits long, since 2007 these numbers have been 13 digits. ISBN numbers are encoded using the EAN-13 symbology. In this format they can easily be incorporated into retail store systems.

ISBN numbers are distributed by designated organisations in each country. These organisations can be easily found here <http://www.isbn-international.org/agency>.

ISBN numbers can also sometimes be obtained through independent publishing agencies that help self-publishing authors publish their books for a reasonable price. Please see www.ipubnet.co.uk for UK ISBN Numbers and www.epubbud.com for USA ISBN Numbers.

There are 5 different elements in the structure of an ISBN Number.

1. Prefix element – either a '978' or a '979' at the start of an ISBN means that the item is a book.
2. Registration Group Element – This consists of between 1 and 5 digits and is used to identify the country, geographical region or language area of the ISBN Number. English speaking countries have either a '0' or a '1' for this element; whereas less common countries or languages tend to have longer registration group elements (i.e. the Caribbean has '976').
3. Registrant Element – This is similar to GS1 company prefixes in that a publisher may be assigned a block of numbers to distribute. The size of the block of numbers will affect the length of the registrant element. This can range from 1-7 digits.
4. Publication Element – This number identifies a specific book or edition of a book from the publisher. This is comprised of the remaining digits excluding the check-digit.
5. Check Digit – this is added onto the end of the barcode to help ensure that the barcode is not accidentally typed into the system incorrectly.

So, an ISBN structure may look something like this:

978-1-2345-6789-7

In this example the publication element (“6789”) has 4 digits and therefore allows 10,000 variations. You will notice that if the registrant element (“2345”) was longer there may be only 1000, 100 or 10 variations in the publication element (the longer the registrant element, the less variations are possible for the publication element).

http://www.caricom.org/jsp/projects/isbn/isbn_user_manual_caribbean_7ed.pdf

ISBN Numbers sometimes have 5 digit supplement price codes added onto the end. This is done as follows:

The first number represents the currency

0 = GBP (UK pounds)

5 = USD (US Dollars)

6 = CAD (Canadian Dollars)

The following 4 digits are the price in dollars and cents – the maximum price is \$99.99.

So an ISBN Number with a 5-digit supplement of 50895 would be \$8.95 USD:



ISSN Magazine Barcodes

An International Standard Serial Number (ISSN) is a unique 8-digit number used to identify periodical publications such as magazines and journals. The structure of this is a 7 digits unique number followed by the check-digit.

Similar to ISBN numbers, these are converted into a 13-digit format and created as images in the EAN-13 symbology. This means that they can also be easily used alongside other products in retail stores.

Unlike ISBN numbers, ISSN numbers are not divided into different sections - each ISSN number is part of an overall 7 digit series. This means that all ISSN numbers are essentially the same and no information can be gleaned about them based on how they start.

ISSN numbers are free of charge and they can be applied for here: <http://www.issn.org/2-22652-Requesting-an-ISSN.php>. ISSN numbers should only be applied for if your publication meets the following criteria:

- Serials (journals, newspapers, magazines, monographic series etc)
- Ongoing integrating resources (websites, databases etc)

For more information on how to obtain an ISSN number please see: http://www.issn.org/files/issn/demandeur_issn/ISSNguidelinesENG.pdf

ISSN to EAN-13 Barcode Conversion

An ISSN number is converted to an EAN 13-digit number as follows (using the example ISSN number of 1234-5679):

1. the check-digit is taken off = 1234-567
2. the hyphen is removed = 1234567
3. 977 is added to the front = 9771234567
4. 2 digits (usually '00') are added to the end = 977123456700
5. the check-digit is recalculated = 9771234567003

This number can then be created as an image using EAN-13 symbology.

There are 3 main formats that ISSN numbers can come in; therefore publishers can choose which format they prefer for their particular publication:

The first format (below) is a standard 13 digit ISSN number encoded with EAN-13 Symbology. In this case the same number would be printed on every issue of the magazine.



The second format (below) is created by changing the numbers added to the end of the ISSN number when turning it into a 13 digit number – these numbers are usually ‘00’ however can be anything from 00-99. If these numbers are changed, a separate barcode image could be created for each issue.



The third format (below) is created by adding a 2-digit supplement to the end of the EAN-13 barcode (EAN-13+2 format). The supplement can be changed from issue to issue. For example, the supplement number can be changed to represent the month of the issue (i.e. 01-12) or the week of the issue (01-52).



There doesn't seem to be any specific policies regarding which format should be used for Australia and New Zealand, however the 13-digit formats (the first and second format) are the most common for these countries. In the UK the 15-digit supplement format (the third format) is the most common.

If you are unsure which format would be best for you it is a good idea to have a look at different magazines of the same type in the retailers you plan to supply. This way you can get an idea of what format is most common.

2D Barcodes (or Matrix Codes)

What are 2D Barcodes?

The barcode types previously discussed in this document are all considered 1D barcodes – this means that they are read by a scanner that reads a single line of bars horizontally. The information encoded in 1D barcodes can only be in the form of differing gaps and thicknesses of bars. This limits the amount of information that can be encoded. These barcodes can be scanned easily by conventional scanners and are very useful for when only a small amount of information is encoded.

In the case of 2D barcodes, the scanner scans both horizontally (as with the 1D) and vertically. This creates a grid type barcode which can encode much more information than a 1D barcode. However, these cannot be scanned with conventional barcode scanners. Instead they are usually read by cell phone scanners (which use the camera of the cell phone to read the entire code). 2D barcodes can function in a wide variety of ways. For example, depending on the information encoded into the 2D Code, when the code is scanned the cell phone could transfer the user to a website with information on it, or prompt the user to input contact details automatically.

QR Codes

A QR Code (Quick Response Code) is the most common type of 2D (Matrix) Barcode. These can be seen commonly on anything from the sides of buildings to the backs of business cards. While these codes were first used in the automotive industry for recording information about various machine parts, they are now used for a variety of other purposes. QR Codes are popular because they can store relatively large amounts of information compared with other barcode symbologies.

Some common uses of QR Codes are:

Websites (URLs) – so that when the code is scanned the user is directly transferred to the website URL that was encoded in the QR code. This means that there is no need for the user to remember and type in long and complicated URL's. Please see the example below.



Business Cards (VCards) – the information is encoded into the QR Code in a special format which means that when scanned the cell phone will allow the user to easily add this person to their contact list (Name, Phone, Email, Position, Company etc). Please see the example below.



Events (VCalendar) – similar to VCards in this case the special format means that when the QR Code is scanned and option to ‘add event to calendar’ is offered. This makes it both quick and fun to add an event to a cell phone calendar.

Make a Phone Call – when the code is scanned the cell phone will automatically make a phone call to a designated number.

Send an Email – when the code is scanned, an email (to the designated email address) will be created.

Other Functions – Send a text, Links to Facebook or LinkedIn profiles, twitter profiles or simply a message can all be easily encoded into QR Codes

Size:

As with all barcodes, the greater the quantity of data encoded into the QR Code, the larger it will have to be to scan effectively and easily. For a URL link, 3 or 4 cm square is sufficient (this can easily fit on the back of a business card), however for several lines of text a slightly bigger code may be required.

The size of the QR Code will also depend on where it will go. Sometime QR Codes will be printed onto the sides of buildings. In these cases the QR Code will have to be big enough so that it can be scanned from a distance (i.e. 1 m square).

Cell Phone Apps:

QR Code app scanners both (a) scan the QR Code and (b) recognise when a business card or other information has been encoded, so that the cell phone can automatically prompt the user to add contact information. There are various QR Code cell phone apps available including QR Barcode Scanner.

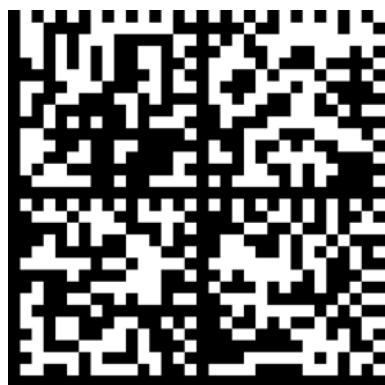
Other Types of 2D Codes

PDF417



These 2D barcodes are used by the United States Postal Service as well as on airport boarding passes. This barcode format is commonly used on driver's licenses internationally. Letters and numerals as well as other characters can be encoded into this type of barcode.

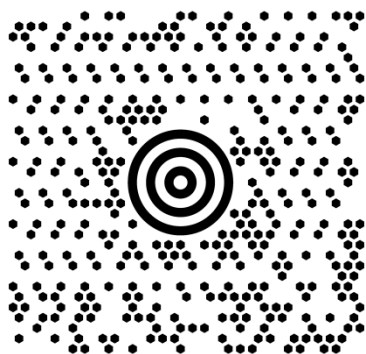
Data Matrix



Data Matrix codes are similar to QR Codes in that the type of information that can be encoded includes both text and numeric. Data Matrix codes are much less common than QR Codes; however they can be used in a variety of ways. They are used for aeroplane parts to ensure that the parts are usable and not counterfeit (in this case the Data Matrix code is encoded with the manufacturer ID and the part number or serial number). They are also used for marking personalised weapons in the US military.

The size of Data Matrix codes range from 300 micrometres (to be etched with a laser onto a silicon component) to 1 metre square (on the roof of a boxcar).

Maxi Code



Maxi Codes (such as the one above) are used by some postal services to track parcels. They can encode up to 93 characters and can be linked together for more data encoding. The bull's eye in the middle means that the code can be scanned even when the parcel is moving rapidly.

Aztec Code



Named for the similarity of the central finder pattern to Aztec Pyramids, these codes are primarily used by transport providers (e.g. Eurostar). These are often found on tickets which can be emailed to the customer to be printed or displayed on the screen of their smart phone for tracking. The Aztec Code can use less space than other 2D Barcodes as it does not need a quiet zone surrounding it.

Asset Tracking Barcodes

Code-39 Asset Tracking Barcodes:



39123439

Code 39 barcodes are used for asset tracking, membership cards (gyms etc) and in libraries for lending out books. They can encode alpha-numeric characters (letters and numbers).

For use with asset tracking a sequence of these numbers is produced. These numbers are essentially made up and printed onto adhesive labels to be applied to each individual item that needs tracking. When an item goes out, the barcode on it can be scanned so that the system knows that that item is out.

Because it can encode letters and numbers, code-39 barcodes use a relatively high number of black and white sections to encode one symbol (if it were just numbers then only 10 variations are required). This means that if a lot of information is encoded into the barcode and the barcode is printed small, scanners may have difficulty differentiating between so many different lines and segments (especially if it is printed badly). Therefore code-39 barcodes should be used when only a small amount of information needs to be encoded or there is space on the 'asset' to have a reasonably big barcode.

Code-128 Asset Tracking Barcodes:

Code 128 Barcodes are used in the same way as Code-39 barcode. They are used as sequential barcodes for asset tracking and can be used in libraries, gyms (membership cards) and large businesses for asset tracking.

Code-128 Barcodes can only encode numeric data (numbers). This means that while they are limited in that they cannot encode letters, they can encode more data in a smaller amount of space than a code-39 barcode while still maintaining a good level of scanability. This means that if you want to use small barcodes, or you need to encode a reasonably large amount of information, code-128 may be the best option.

The Difference between Code 128 & Code 39:

Code 128 barcode:



39123439

Code 39 barcode:



39123439

As you can see above, Code 39 has a low data density and Code 128 has a very high data density, therefore very small goods should be labeled with a Code 128 barcode (not a Code 39 barcode).

Most barcode scanners can read both Code 128 & Code 39 barcode images easily; especially if the barcodes only contain numeric digits (some scanners may struggle to read barcodes that contain alphabetic letters as well).

Getting and using retail barcodes

Obtaining Barcodes for your retail products

Retail products generally use EAN-13 Barcodes. These are used on all products, with the exception of books and magazines, and they are used in all countries. In the USA, while EAN-13 Barcodes are accepted, UPC Barcodes are more common. Therefore if your product is going to sell in any country other than the USA then an EAN-13 Barcode will be most suitable. However if your product will sell in USA then you may wish to consider a UPC code. For the most part it should be safe to have a either type on your product, but EAN-13 is generally the better option.

A common misconception about retail barcode numbers is that the only way to obtain legal registered barcode numbers is through an organisation called GS1. GS1 has an entity in at least 105 countries. These entities charge both joining fees and membership fees to anyone wanting to obtain barcode numbers through them.

The joining fees range from around \$50 USD to over \$10,000 USD (sometimes up to \$120,000 USD for high earning companies in certain countries) however these joining fees tend to average a minimum of around \$270 USD. The joining fee depends on both how much your company earns and which GS1 member organisation you are applying to.

The annual membership fees range from about \$25 USD per year to again over 10,000 USD per year (sometimes up to 40,000 USD). The average annual membership fee for low earning companies is around \$200 USD.

Many people report that GS1 is simply too expensive to justify barcoding the products of their small business. They feel they are either restricted to selling in small stores that don't require barcode numbers (which obviously stunts their growth) or that they need to make a large financial commitment in order to expand the availability of their specialty product.

Thankfully, much of this financial risk can often be reduced by obtaining 'reseller barcodes' for products instead of going through GS1. These reseller numbers are sold for a one-off cost with no joining fees or membership fees. This means that in addition to an initial saving on the cost of the barcode numbers (compared with the cost of joining GS1) there are also long term savings associated with these barcode numbers (as a result of not having to pay annual membership fees).

One thing to be aware of when purchasing reseller barcodes is that not all barcodes sold on the internet are necessarily legitimate. Many offers pop up offering barcode numbers for 70 cents each or something similar. These barcode numbers may be illegal barcode numbers or may already be in use by another organisation. It is important to remember that an initial upfront saving may cost more in future if it transpires that the barcodes are not legitimate. It can be costly to print barcodes on products, the last thing anyone wants to do is reprint their products due to a barcode mishap.

A list of reputable barcode resellers in various countries can be found here <http://www.barcodeinfo.org/how-to-get-a-barcode> . These organisations can guide you on barcodes and advise if any of your retailers do not accept reseller barcode number (this is the case with few stores internationally).

How Can There Be Barcodes Outside of GS1's Control?

The easiest way to explain how reseller barcodes can legally exist and be sold is to go into the history of the GS1 Barcoding system.

In the 1990's GS1 was established in most parts of the world. They licensed their 13 digit barcode numbers to their members (and as discussed previously charged both membership fees and joining fees). However, there was a separate organisation in the USA – the Uniform Code Council (UCC) which sold 12 digit (UPC-A) barcode numbers to their members for a one-off cost (there were no ongoing license fees). The UCC was competing with GS1. Their 12 digits numbers are effectively a subset of the 13 digit system.

In the late 1990s, the UCC merged with GS1, becoming GS1-US. As part of this change, they decided to start charging annual license fees for all of their members, including those who had paid a one-off fee for barcode numbers in the 1990s. Of course, many of these members weren't happy with the new annual license fees, and so a group of them ended up in class action law suit with GS1. The members won in the courts in the early 2000s, resulting in a multi-million dollar settlement by GS1. A further consequence of this court case is the proof that the original numbers issued by the UCC in the 1990s are outside of GS1s control now, and hence no license fees are required. These numbers are bought by resellers and sold on an individual basis. They are 'new' numbers, in that they have never been used on a retail product, and are part of the GS1 system.

How to Implement Barcodes on Your Retail Products?

Once barcode numbers have been obtained, the challenge is then implementing them on your retail products. Hopefully, you have the barcode images (the actual bars themselves) for your barcode numbers. Most good barcode resellers send these with their barcode numbers, however if you have purchased your barcodes through GS1, or have not obtained the barcode images for your EAN-13 barcode for some other reason, then you can find a list of places that can help you with this here <http://www.barcodeinfo.org/how-to-get-a-barcode> . These places will normally send through the barcode images in the officially recommended size of 38x25mm but can send through the images in any size that you specify so that they will fit well with your product packaging.

Once the barcode images are on hand they can be simply incorporated into product packaging in an easily viable, flat location. This can be done by either incorporating the barcode into the packaging design for the product, or by printing sticky labels with the barcode image on them and manually sticking them onto your products.

When retailers receive your products for the first time they will either scan the barcodes and input the product information to their system, or they will upload an electronic pricelist to their system linking several barcode numbers with various products. This means that every time the barcode is scanned from that point onwards, the product information related to the barcode will appear.

EAN-13 Barcode Symbol Dimensions (at 100% magnification):

Please keep these in mind when deciding on the size of your barcode images. Depending on the retailer this could be an important factor to consider with your barcode sizing. Some retailers require that barcode images are at least 80% (the minimum officially accepted size). This means that if at all possible, you should keep your barcode image at least 30x20mm total (including the quiet zones). If there is space on your product then the standard size of around 38x25mm specified below is recommended.



Barcode Magnification Standards:

The recommended magnification range for an EAN-13 Bar Code Symbol being scanned at retail POS **80% – 200%** (X-dimension 0.26mm-0.66mm).

Note: To calculate the **total barcode width** (from the chart below) you need to include not only the “Bar Width” but also the “Left Quiet Zone” and the “Right Quiet Zone” dimensions. Therefore, an EAN-13 barcode at 80% magnification (the smallest recommended size) should be at least 29.83mm wide.

The following page has detailed specifications at each allowed size.

Magnification	X-dimension	Bar Width	Bar Height	Left Quiet Zone	Right Quiet Zone
80%	0.26	25.08	18.28	2.90	1.85
85%	0.28	26.65	19.42	3.09	1.96
90%	0.30	28.22	20.57	3.27	2.08
95%	0.31	29.78	21.71	3.45	2.19
100%	0.33	31.35	22.85	3.63	2.31
105%	0.35	32.92	23.99	3.81	2.43
110%	0.36	34.49	25.14	3.99	2.54
115%	0.38	36.05	26.28	4.17	2.66
120%	0.40	37.62	27.42	4.36	2.77
125%	0.41	39.19	28.56	4.54	2.89
130%	0.43	40.76	29.71	4.72	3.00
135%	0.45	42.32	30.85	4.90	3.12
140%	0.46	43.89	31.99	5.08	3.23
145%	0.48	45.46	33.13	5.26	3.35
150%	0.50	47.03	34.28	5.45	3.47
155%	0.51	48.59	35.42	5.63	3.58
160%	0.53	50.16	36.56	5.81	3.70
165%	0.54	51.73	37.70	5.99	3.81
170%	0.56	53.30	38.85	6.17	3.93
175%	0.58	54.86	39.99	6.35	4.04
180%	0.59	56.43	41.13	6.53	4.16
185%	0.61	58.00	42.27	6.72	4.27
190%	0.63	59.57	43.42	6.90	4.39
195%	0.64	61.13	44.56	7.08	4.50
200%	0.66	62.70	45.70	7.26	4.62

“Width” = the width of the bars only (does not include the width of the Quiet Zones).

“Bar Height” = the height of the bars only. You need to allow extra space to include the barcode number (which must be printed below the bars).

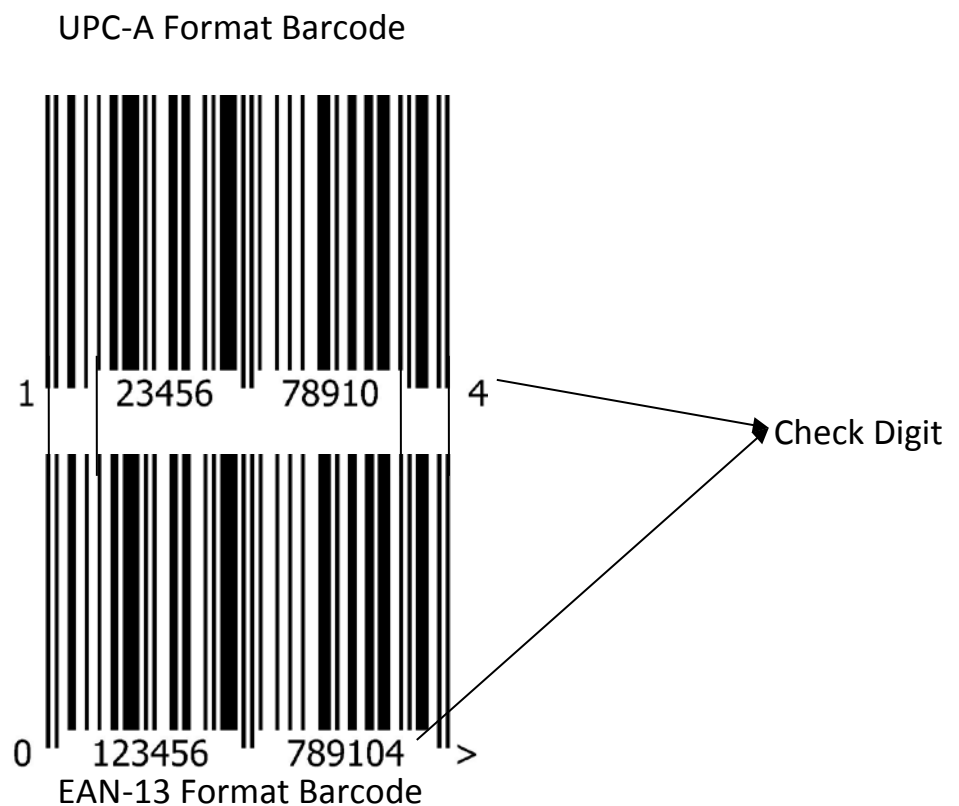
“Quiet Zone” = the blank space on either side of the barcode. These are compulsory (scanners need them in order to read the barcode bars). Many barcode images have a > on the right hand side after the numbers – this is optional, but is used to give a visual indication of the right side quiet zone that is needed.

An allowable minimum magnification of 75% (X-dimension 0.25mm) is applicable only to on demand (e.g. thermal) print processes. In this case, the bar height should never be truncated below the minimum required height for an 80% magnification barcode symbol.

Where an item may also be scanned in a General Distribution Scanning environment (automated scanning), the allowable magnification range is 150% to 200% (X-dimension 0.50mm – 0.66mm).

Differences Between UPC-A Codes and EAN-13 codes

EAN-13 and UPC-A Codes are essentially the same once they are encoded as images. This is because the leading digit of an EAN-13 indicates the way that the following 6 digits should be encoded, but is not encoded itself. A '0' on the front of an EAN-13 indicates that the number should be encoded in exactly the same way as a UPC-A code. This means that a UPC-A number can be encoded in EAN-13 symbology by simply adding a '0' on the front of it. In this case the bars of the EAN-13 image will be exactly the same as the bars of the UPC-A image. Please see the example below which compares a UPC-A format image with an EAN-13 image. You will notice that the numbers appear in different places below, and the EAN-13 image has 13 digits, the bars of both images are identical. This means that scanners read either code in exactly the same way.



UPC-A format barcodes have traditionally been used in the USA whereas EAN-13 format barcodes are used throughout the rest of the world. While the majority of stores throughout the entire world can accept barcode images in either format, and this is a requirement of new barcode systems, there may be some stores that will only accept UPC-A format barcodes or only accept EAN-13 barcodes. For this reason, a good general rule is that if your products are going into the USA you should use UPC-A format barcodes.

GS1 Country Codes

GS1 assigns prefixes to each GS1 member organisation. This means that based on the first 3 digits of a barcode number one can tell which GS1 member organisation the barcode came from or what specific purpose the barcode number has. While often this correlates with the country of manufacture of the product, this is not always the case. So while the country code indicates the country of origin of the barcode number, **it cannot** be considered an indicator of where the product is manufactured. All reseller barcode numbers come initially from the GS1-US system. This means that the country code of all reseller barcode numbers indicates that the barcode number itself is from the USA, but, despite this country code, this type of barcode is used in all countries on products manufactured anywhere.

A list of these country codes can be found here

http://en.wikipedia.org/wiki/List_of_GS1_country_codes

Company Prefixes

The following part of the barcode (after the 'country code') is sometimes considered to be the 'GS1 Company Prefix' of the barcode. For GS1 Barcode numbers, the amount of the remaining 9 digits (excluding the country code and check-digit) that make up the company prefix, depends on how many barcodes are assigned to the company. For example, if a company purchases 10 Barcode numbers then the company prefix would be 8 digits long. The final 9th digit allows for 10 combinations (0,1,2,3,4,5,6,7,8,9) or 10 item identifier numbers. As the length of the prefix decreases, the amount of variables allowed in the item identifier section increases. So, if a company requires 1000 barcodes, GS1 would assign them a 6 digit company prefix.

It is a common belief that all barcodes, for some reason or another, need to have a company prefix section separate from the item identifier number. However, this is not the case, barcode numbers can be used as stand alone numbers without a company prefix as such. In these cases the entire 9 numbers can be considered the company prefix only allowing for one variation which is the one product. It is shown that this is possible in all situations within the GS1 system as GS1 in some countries sell individual barcode numbers in this way. This shows that there is no need for a company prefix, and barcode numbers can be used as complete units without dividing them into various sections.

Barcode Registration

Many people seem to believe that some kind of registration must be necessary for each barcode number. While this is potentially a good idea, there is currently no international registrar for all barcode numbers. It is up to GS1 and Barcode Resellers to ensure that each number is only sold once. It is then for the business owners to allocate each barcode to each product on an individual basis to ensure there are no double-ups of barcode numbers on products. Product information about barcodes is drawn from the individual system of each store so it is not necessary that all barcode numbers be registered on the same international database.

There are some barcode registration websites which, while unnecessary, can be useful to people with barcode numbers. These registration websites are useful for the following reasons:

1. They can help with cell phone app scanners such as 'Red Laser' so that when the product barcode is scanned the product information will appear.
2. They can increase the internet profile of the product so that when the barcode is searched for on Google or another search engine the product information can appear.
3. If a barcode is registered on internet databases, it can dissuade people from using the barcode number illegally on sites like Amazon. If a quick internet search tells the person that that barcode number is in use they will be much more likely to pick another one. While people cannot legally use legitimately sold barcode numbers, if they are being used illegally it is an extra hassle for the legal owner of the barcode number to follow this up.

For these reasons some resellers offer an additional optional barcode registration service. While this is optional, many buyers opt for this option.

Barcode Encoding

The Check-Sum Digit

The Check-Digit is a digit on the end of most barcodes which is calculated based on the other digits in the barcode. This ensures that no single digit is manually typed into the system wrong, because, if this occurs then the check-digit would change. If multiple digits are typed in wrong then there is a 9/10 chance that the check-digit will be incorrect also. The check-digit for any check-digit barcode can be calculated as follows:

Using the EAN-13 Number (with no check-sum): 012345678910

1. All the numbers in even positions are added up
 $1+3+5+7+9+0 = 25$
2. The result is multiplied by 3
 $25 \times 3 = 75$
3. All numbers in odd positions are added up
 $0+2+4+6+8+1 = 21$
4. The total of steps 2 and 3 are added
 $75+21 = 96$
5. The number required to reach the next multiple of 10 is the check-digit
 $96+4 = 100$ therefore the check-digit = 4



How Barcodes are Encoded

UPC-A

UPC-A Barcodes are encoded by first splitting the 12 encoded numbers into two sections. Each of the numbers in these sections is encoded with 7 block segments. Each segment is either black or white and each combination of 7 segments represents 1 number only. When a scanner scans a segment it records it as a combination of 0's and 1's. Zeros are recorded for the white segments and 1's are recorded for the black segments. So the number 1 for example appears on the left side as 'white, white, black, black, white, white, black'. This is input to the computer as '0,0,1,1,0,0,1'. This combination of numbers is always a 1. The right hand 6 numbers are encoded in the same way, with 7 block segments, however the combinations of segments to make numbers are the exact opposite of the combinations on the left hand side. Where 1 on the left side is encoded as 'white, white, black, black, white, white, black' or '0,0,1,1,0,0,1', the 1 on the right hand side is encoded as 'black, black, white, white, black, black, white' or '1,1,0,0,1,1,0'. This ensures that if the barcode is scanned upside down for some reason, the correct number will still appear.

In addition to this encoding, there are three marker sections consisting of two bars equal in thickness and distance apart. These mark the beginning, middle (where each side of 6 numbers divides) and end of the barcode number. These can be seen on the example below at either side and dropping down further than the other bars in the middle of the barcode.



EAN-13:

EAN-13 Numbers are encoded in a similar way to UPC-A Codes. They use the left side odd parity and the right side parity in the same way as the UPC-A codes however also incorporate a left side even parity. This left side even parity is used to encode some but not all of the first 7 numbers. The number at the beginning of the barcode decides which of the following 6 numbers should be encoded using each parity. So while the first digit is not encoded as a number, the combination of odd and even parities used for the following 6 numbers is dependent on the first number. Each parity use combination is unique to the leading number so that when the barcode is scanned the leading digit is picked up based on the parities used across the following 6 digits. If the leading digit is a '0' then the parity used for the following 6 digits is the left side odd parity. For this reason EAN-13 Barcodes with a '0' on the front of them, appear in exactly the same way as UPC-A Barcodes.

Barcodes for Specific Product Categories

Some types of products can require different barcoding. This occurs often when there are lots of variations on a type of item such as issues of a magazine or different greeting cards produced by the same company.

Greeting Card and Postcard Barcodes

There are 3 ways to do barcodes for greeting cards, and for postcards. If you look in a store with a wide range of cards, you will probably see all 3 options being used, and be able to see which ones are most common.

1. You can put a unique 13 digit barcode on every card (most expensive option). This means buying different EAN-13 numbers for every single variation. This may be ok if you only have a few different greeting cards or postcard, however, many companies produce hundreds or thousands of different cards. At these quantities it becomes impractical to have a different EAN-13 barcode on each card.
2. You can put the same 13 digit barcode on a range of cards – they need to be the same price, and the reordering of the cards needs to be done manually (as they can't track individual card sales in their computer system). This is the cheapest option, however may be a hassle for large stores who rely on barcodes for reordering information. If the stores you are planning on selling your cards in have this on some of the cards that they stock then it would seem that this could be a suitable, cheap option for cards going into this store.
3. You can put a 13 digit barcode with 2 digit supplement on the cards. The 13 digit code is unique, and needs to be purchased. The 2 digit supplement ranges from 00 to 99, so you can use these on 100 different cards (usually in a common series). The 13 digit number gives the pricing etc. The 2 digit supplement can be used by some software systems to track sales of individual cards, & hence be used for stock tracking. This is the medium cost option and could work well depending on how the stores systems are set up.

Barcodes for Books

Books use ISBN Numbers (International Standard Book Numbers). These are 13 digit numbers which are encoded into book barcodes using EAN-13 symbology. ISBN numbers are distributed by designated organisations in each country. The organisations in each country can be easily found here <http://www.isbn-international.org/agency>.

ISBN numbers can also sometimes be obtained through independent publishing agencies that help self-publishing authors publish their books cheaply. Please see www.ipubnet.co.uk for UK ISBN Numbers and www.epubbud.com for USA ISBN Numbers.

For more information on ISBN Numbers please see 'ISBN Book Barcodes' under 'Book and Magazine Barcodes'.

Barcodes for Magazines

ISSN Numbers (or International Standard Serial Numbers) are 8 digit numbers which are converted into a 13 digit number in order to be encoded using the EAN-13 symbology. These 13 digit ISSN Barcodes are the used on magazines and other periodic publications.

ISSN numbers are free of charge and they can be applied for here: <http://www.issn.org/2-22652-Requesting-an-ISSN.php>. ISSN numbers should only be applied for if your publication meets the following criteria:

- Serials (journals, newspapers, magazines, monographic series etc)
- Ongoing integrating resources (websites, databases etc)

For more information on how to obtain an ISSN number please see:

http://www.issn.org/files/issn/demander_issn/ISSNguidelinesENG.pdf

More information on ISSN Numbers is provided in this document in the section 'ISSN Magazine Barcodes' under 'Book and Magazine Barcodes'.

Barcode Scanning & Apps

Barcode Scanning Apps

There are many free Barcode scanning apps for both Android and Iphone available. Most of these allow you to scan the barcode where upon, if they have the product in their database, the product information will appear. If the product information is not in their database, they will sometimes give an option to search the internet for this barcode number.

1D Barcode Scanning Apps

Android:

Red Laser
Barcode Scanner
ScanLife

Iphone:

Red Laser
Kinoni Barcode Reader
Anobii Scan
Rediff Shopping

2D Barcode Scanning Apps (QR Code)

Android:

Scan - QR Code Barcode Scanner
QR Barcode Scanner
QR Droid
ScanLife
Red Laser

Iphone:

QR Utilities
Super QR
QRCoder
Kinoni Barcode Reader
Red Laser

Barcode Scanners and Systems

Purchasing Barcode Scanners

Barcode Scanners can be bought from a wide variety of places internationally.

<http://mrscanman.com.au/> offers some good options in Australia.

<http://www.barcodeproducts.co.nz/> seems to offer a good selection in NZ.

In the UK <http://www.thebarcodewarehouse.co.uk> may be able to help you out. These places should be able to advise you on how to implement a barcoding system as well.

FAQ's

Where Did the Barcode System Come From?

The UPC numbering system and bar symbols were designed in the early 1970's by George J. Laurer on behalf of IBM. He presented them to the food industries as a universal way to keep track of inventories, prices and manufacturers. It was chosen ahead of many other options, and has since been accepted and adopted worldwide as a unified product tracking method.

Do I Need a Barcode?

While using barcodes is voluntary, many retailers require that barcodes be on products going into their stores. This is because barcodes save a lot of time at the check-out and make things much more straight forward. So, if you are planning on selling your product through retailers then yes, you probably need a barcode. If you are selling your product through your own store only, then you may not need a barcode.

How Many Barcodes Do I Need?

Barcodes are used to pull up product information when they are scanned at the checkout and in larger stores to track stock. This means that a barcode can only represent one product at one price in a store. So, a separate barcode number is needed per unique product.

If you have a product that varies slightly, but keeps the same price regardless of this (i.e. various different colours of one product), then depending on the types of stores you are getting your products into, you may be able to get away with printing the same barcode on all product variations. This will restrict stores ability to use the barcode for stock tracking as they won't be able to differentiate how many of each product have been sold. Therefore, stores that rely heavily on barcodes for keeping track of stock may not accept such a system, however, stores that only use barcodes for pulling up price and product information at the checkout should be happy to accept barcodes like this.

Will My Barcode Work for Any Retail Product?

Yes, with the exception of books and magazines, all product types use the same EAN-13 barcode numbers. There are some restrictions on reseller barcode numbers. This information can be seen here <http://worldbarcodes.com/barcode-acceptance/>.

Will My Barcode Work Internationally?

Yes, all barcodes are designed for international use. EAN-13 Barcodes are the most common used throughout the world and are accepted in all countries. The only country where another type of barcode is more common is the USA where they tend more towards UPC-A Barcodes.

What Information is Contained in a Barcode?

A barcode is purely a unique number with no product information encoded into it. The barcode number has no meaning until the details have been recorded in the stores system linking the barcode to the product. The scanning of the barcode acts as a trigger for the information in the computer to appear.

Can the Barcode be Printed in Colour?

Yes, while black on white provides the best amount of contrast, barcodes can be printed using other colours that contrast well. Barcodes should not be printed in colours with minimal contrast i.e. yellow on white. If you are planning on printing your barcode in colour, it is a good idea to do various test scans on the barcode to ensure that it scans easily.

What Numbers are Required for Books and Magazines?

International Standard Book Numbers (ISBN's) are required for books. International standard serial numbers (ISSN's) are the numbers used on magazines. For more information on requesting an ISSN Number please see

http://www.issn.org/files/issn/demander_issn/ISSNguidelinesENG.pdf. If you require an ISBN Number, information on obtaining these in various countries can be found here <http://www.isbn-international.org/agency>.

How Can Individual Barcode Numbers be Sold?

In the 1990's GS1 was established in most parts of the world. They licensed their 13 digit barcode numbers to their members (and as discussed previously charged both membership fees and joining fees). However, there was a separate organisation in the USA – the Uniform Code Council (UCC) which sold 12 digit barcode numbers to their members for a one-off cost (there were no ongoing license fees). The UCC was effectively competing with GS1. Their 12 digits numbers are effectively a subset of the 13 digit system.

In the late 1990s, the UCC merged with GS1, becoming GS1-US. As part of this change, they decided to start charging annual license fees for all of their members, including those who had paid a one-off fee for barcode numbers in the 1990s. Of course, many of these members weren't happy with the new annual license fees, and so a group of them ended up in class action law suit with GS1. The members won in the courts in the early 2000s, resulting in a multi-million dollar settlement by GS1. A further consequence of this court case is the proof that the original numbers issued by the UCC in the 1990s are outside of GS1s control now, and hence no license fees are required. These are the numbers are bought by resellers and sold. They are 'new' numbers, in that they have never been used on a retail product, and are part of the GS1 system.

These numbers are sold on an individual basis largely to small companies who have only one or two products and cannot afford high joining and membership fees.

Glossary of Terms:

2D Barcodes - Also called Matrix Barcodes - Refers to barcodes that encode information both vertically and horizontally as opposed to traditional 1D barcodes. These are capable of encoding much more information than normal barcodes. QR Codes are the most common type of 2D Barcodes.

Asset Tracking Barcodes - These are sequential numbers usually encoded in Code-39 or Code-128 format barcodes. Labels with a different barcode number on each are stuck onto assets of a business to keep track of what goes in and out. These formats of barcodes are used in this way in libraries for lending out books as well.

Aztec Code - A type of 2D Barcode with an Aztec pyramid like centre finder pattern (A pattern in the centre of the code used by the scanner to establish a centre point). These are used primarily for tickets of transport providers such as eurostar.

Bar Height - The height of the shortest bars in a barcode. This refers to the bars only and does not include the number at the bottom.

Bar Width - For barcode specifications. Refers to the total width of all of the bars. This excludes the quiet zones on either side of the bars.

Barcode - An Image used to contain a small amount of information to be easily read by a barcode scanner or cell phone app.

Barcode Package - Refers to a purchase option that some resellers offer where by both the Barcode number and the Barcode images can be purchased at the same time. This sometimes also includes a guarantee certificate and sometimes barcode registration.

Barcode Registration - An optional service offered by some barcode resellers to increase the internet profile of barcodes and ensure that the product information appears when the barcode is scanned by cell phone apps. There is no mandatory registration database for barcode numbers.

Check Digit - An additional digit that is calculated using a special algorithm and added onto the end of a barcode. This helps ensure the barcode is not accidentally keyed in wrong as if one digit is incorrect the check-digit will change. Also called check-sum digit.

Code-128 - A barcode symbology used mostly for asset tracking. Can only encode numeric data. Has a high data density so very small items should be labels with this instead of code-39 as code-128 should scan more easily.

Code-39 - A barcode symbology used mostly for asset tracking. Can encode alpha-numeric data (letters and numbers). Code-39 has a low data density so small goods should not be labelled with this because small barcodes of this type may be difficult for a scanner to pick up.

Company Prefix - Refers the section of a barcode numbers following the initial 3 digits. The Company prefix is the section following that doesn't change across an entire company's barcode selection. The length of this is determined by how many individual barcode numbers the company owns (i.e. if the own 10,000 barcode numbers then the company prefix needs to be shorter to fit with the 13 digit threshold).

Country Code - Refers to the first three digits of a retail barcode number which indicate which GS1 member organisation the barcode came from. A common misconception is that this shows the country of origin of the product when in reality it only shows the country of origin of the barcode itself.

Data Matrix - A type of 2D Barcode used in engineering and manufacturing industries. Used to locate individual components during the manufacturing process.

EAN-13 - European Article Number - The 13 digit standard retail barcode used almost ubiquitously throughout the world. Only in the USA they use UPC-A Barcodes more commonly, although stores still accept EAN-13 Barcodes. EAN-13 can refer to the barcode number or the barcode format .

Encoding - The encoding is the information that is the barcode is generated from. In the case of an EAN-13 Barcode this would refer to the 13 digit number.

Format - Can refer to the type of image file that the barcode image is in, the symbology of the barcode, or how the barcode is broken up into sections.

GLN Numbers - Global Location Numbers are 13 digit numbers required by some stores as a prerequisite for trading. These unique numbers are used as location identifiers. These can be obtained through GS1 and some resellers.

GS1 - GS1, or Global Standards One, are the international company that implements and enforces barcode standards. Barcodes can be purchased through them, though generally an initial joining fee needs to be paid as well as annual memberships fees.

GTIN Barcode - GTIN's are Global Trade Identification Numbers. These refer to any barcode numbers used in retail as part of the GS1 system. These could be GTIN-13's (or EAN-13's), GTIN-12's (UPC-A) or GTIN-14 (ITF-14).

ISBN Barcode - International Standard Book Number Barcodes are the barcodes used on books. These start with 978 or 979 and are produced as barcodes using EAN-13 symbology usually with text above.

ISBN Number - International Standard Book Numbers are 13 digit numbers beginning with a 978 or 979 that are used on books.

ISSN Barcode - International Standard Serial Number Barcodes are 13 digit barcode that have been converted from an 8 digit ISSN Number. This 13 digit code is encoded using EAN-13 symbology in a barcode that is used on magazines and other periodicals.

ISSN Number - An International Standard Serial Number is an 8 digit number supplied to creators of magazines and periodicals which can be converted into a 13 digit magazine barcode.

ITF-14 - ITF-14's or Interleaved Two of Five's are barcodes created from an EAN-13 number (by adding an additional leading digit) to be used on the cartons of the EAN-13 barcode's product. These are large barcodes printed on boxes of 6 or 12 of an item to be used only for stock tracking purposes and not for retail selling.

Matrix Barcode - Also called 2D Barcodes - Refers to barcodes that encode information both vertically and horizontally as opposed to traditional 1D barcodes. These are capable of encoding much more information than normal barcodes. QR Codes are the most common type.

Maxi Code - A dotted 2D Barcode used by some postage services. While it can only encode small amounts of information, a central bulls eye allows it to be scanned even when a parcel is moving quickly.

Parity - A way that a set of numbers (0-9) can be encoded to be read by a barcode scanner. Each number in the parity must be represented by a different combination of black and white spaces in barcodes and each parity used in the encoding of one barcode number must be entirely different from all other parities used in the barcode symbology.

PDF417 - A type of 2D Barcode used for identification cards and e-tickets. These are often used by transport providers.

QR Code - Quick Response codes are the most common kind of 2D Barcode. First developed for Toyota, these codes are now used world wide to encode a large variety of other information. They are primarily used to automatically link smart phones to URL addresses when scanned.

Quiet Zones - Quiet Zones are part of the barcode specifications that refer to the white spaces on either side of the bars. These are required to be a certain size for the barcode to scan correctly and for it to fit within the officially accepted specifications. Sometimes a '>' is used to indicate how big the quiet zone should be.

Specifications - Specifications refer to the dimensions that the barcode is required to be on a product in order to be officially accepted. Stores have different levels of tolerance for barcodes that don't fit these specifications. Smaller stores don't tend to mind so much.

SSCC Barcode - Serial Shipping Container Codes are 18 digit barcodes (with an additional 2 digit application identifier) used on pallets going into large retail stores. Each pallet requires a different SSCC code.

Symbology - Symbology is the type of Barcode or way that the barcode is encoded. This word is sometimes interchanged with format. The symbology is a combination of the parities used on in what order these are used.

UPC-A - Universal Product Code - A type of retail barcode used predominantly in the USA (although theoretically accepted worldwide). These 12 digit numbers are encoded in UPC-A Symbology. These are effectively a subset of EAN-13 numbers.

Vcalendar - A text format used to encode calendar events into a QR Code so that when it is scanned the phone will automatically add the event into the cell phone's calendar.

Vcards - A text format used to encode contact information into a QR code so that when it is scanned the phone will automatically add the contact information into the cell phone's contacts.

Verification - An additional service offered by GS1 and some barcode resellers consisting of a test scan of the barcode as it will be printed on the product to see how it is likely to scan in different environments. Usually this is not necessary however some larger retailers require this. The barcode must strictly adhere to barcode specification to have any chance of passing.

Useful Links:

Barcode Information:

<http://www.barcodeinfo.org/>

<http://worldbarcodes.com/barcode-acceptance/>

ISBN Numbers:

<http://www.isbn-international.org/agency>

www.ipubnet.co.uk

www.epubbud.com

ISSN Numbers:

<http://www.issn.org/2-22652-Requesting-an-ISSN.php>

http://www.issn.org/files/issn/demander_issn/ISSNguidelinesENG.pdf

Country Codes:

http://en.wikipedia.org/wiki/List_of_GS1_country_codes

Barcode Scanners & Systems:

<http://mrscanman.com.au/>

<http://www.barcodeproducts.co.nz/>

<http://www.thebarcodewarehouse.co.uk>

Barcode Encoding:

http://www.cut-the-knot.org/do_you_know/BarcodeEncoding.shtml