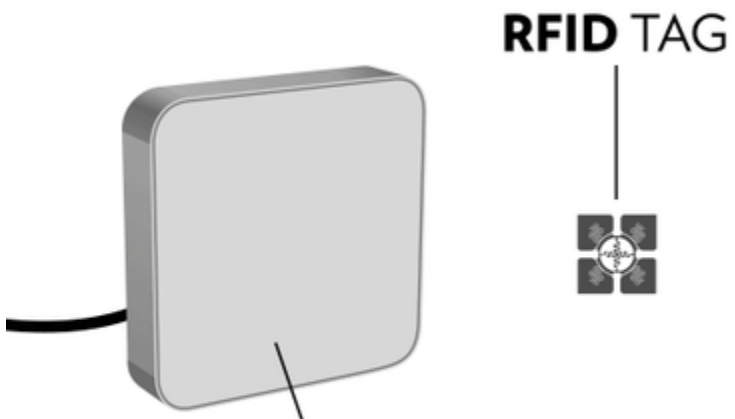
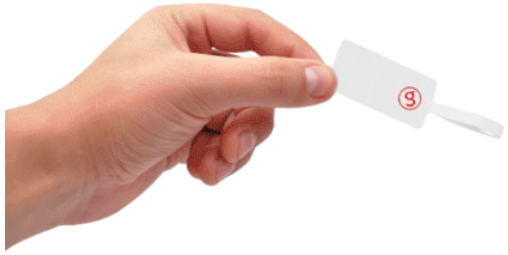
BAR, QR, AND RFID CODES – OH MY !!





UHF RFID Tag

Tagged on Jewelry items

RFID Scanner

COMPILED BY HOWIE BAUM

PRODUCT IDENTIFICATION METHODS

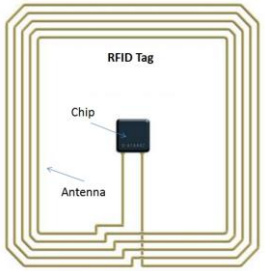
Barcodes, QR codes and RFID (radio frequency identification) are all systems for conveying large amounts of data in a small format.

They offer speed, labor savings and cost savings, among other benefits. But there are distinct differences between all 3 — and differences in the purposes they are best suited for.

BARCODES

Barcodes have been around for decades, are versatile, and have a lot of uses — especially in retail, grocery stores, manufacturing settings, and in transportation of products.

QR CODES are well suited for marketing purposes, use on business cards, on a coffee mug, on a banner at a sales event and on all types of food and grocery products to provide a good explanation about the product, by using a QR code app on a Smart phone.



RFID involves applying RFID tags to items or boxes or pallets. Tags vary greatly in size, shape and capabilities. The tag with its small antenna emits a radio frequency signal that is picked up and read by a special wireless RFID reader, conveying information from the tag about the item it is affixed to.

It is especially useful in situations where vast quantities of goods must be moved or tracked, or where tracking of item-specific information is necessary.

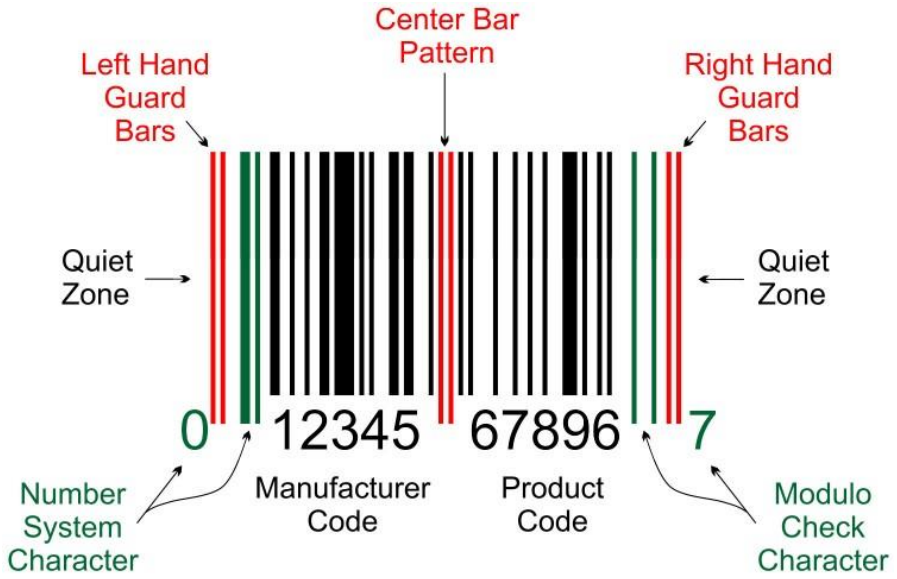
PRODUCT IDENTIFICATION CODES AND THE INTERNET OF THINGS (IoT)

Simply put, the IoT is a concept where (a) there is information stored on every object (either through a bar code, a QR code, a chip, or a larger embedded system), and (b) there is some way of connecting this information to the Web (generally by using a computer, tablet or smartphone as the gateway).

There are several technologies fueling the IoT – chips or codes that store information; near-field communication (NFC), Zigbee, radio frequency (RF) or some such method for the object to communicate with a tablet, smartphone or computer that can connect to the Web; and applications that make smart use of the information embedded in the object.

1D (1 Dimensional) VS 2D (2 Dimensional) BARCODES

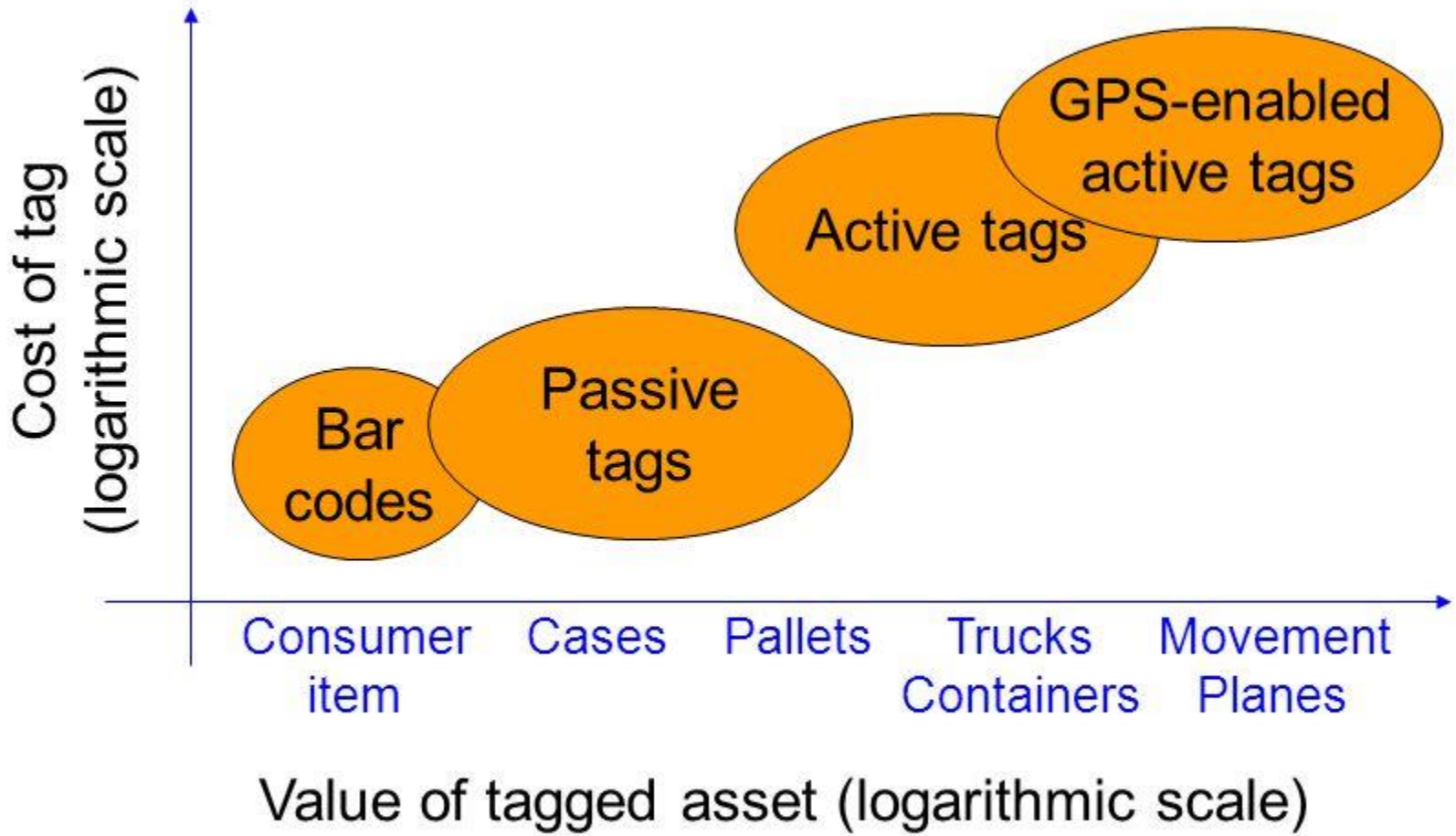
- There are two types of barcodes: linear – or 1D, and 2D.
- The most visually recognizable, the UPC (Universal Product Code) is a linear (multiple vertical lines) 1D barcode made up of two parts: the barcode and the 12-digit UPC number.
- The first six numbers of the barcode is the manufacturer's identification number. The next five digits represent the item's product code.
- The last number is called a check digit which enables the scanner to determine if the barcode was scanned correctly.



UPC-A Barcode Components

The first design for the Bar Code was a set of concentric rings but was later changed to the vertical lines that we know today.

Different types of tags for different uses



A **barcode** (also **bar code**) is an optical, machine-readable representation of data; the data usually describes something about the object that carries the barcode. **The abbreviation UPC stands for Universal Product Code**

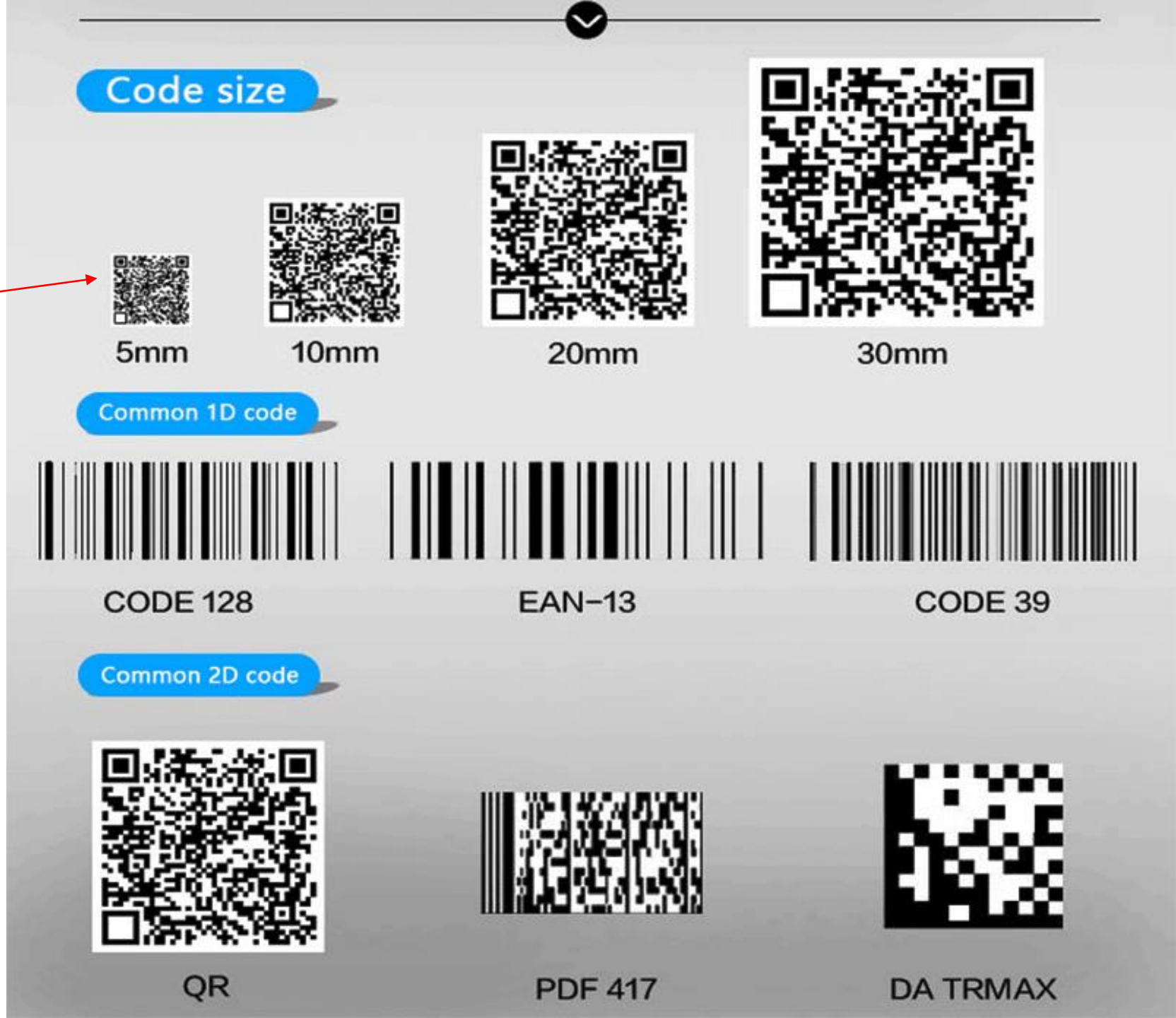
Traditional barcodes systematically represent data by varying the widths and spacings of parallel lines, and may be referred to as linear or one-dimensional (1D).

Later, two-dimensional (2D) variants were developed, using rectangles, dots, hexagons and other geometric patterns, called QR, *matrix codes* or *2D barcodes*, although they do not use bars as such.

Initially, barcodes were only scanned by special optical scanners called barcode readers.

Later application software became available for devices that could read images, such as smartphones with cameras.

The different types of 1D and 2D codes (below) and showing the different sizes of QR codes



ONE-DIMENSIONAL (1D) BARCODE TYPES

One-dimensional (or 1D) barcodes systematically represent data by varying the widths and spacings of the parallel lines. These include some of the most traditional and well-recognized barcode types, such as the **UPC (Universal Product Code)** and **EAN (European Article Numbering)** codes.

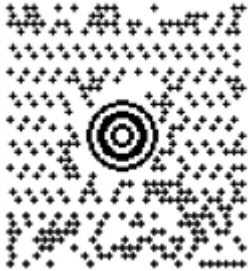
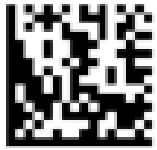
UPC barcodes are used to label and scan consumer goods at points of sale around the world—mainly in the United States, but also in the United Kingdom, Australia, New Zealand and other countries. **The UPC-A variation encodes 12 numerical digits, while UPC-E is a smaller variation that encodes only 6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

The barcode identifies the manufacturer and specific product so point-of-sale cash register systems can automatically look up the price. **The UPC-A and EAN-13 codes are valid worldwide, so products marked with a UPC-A code can be sold outside the USA.**

UPC – A

UPC-E

1D BARCODE FONT		DETAILS
	Uniform Product Code (UPC)	Retail stores for sales checkout; inventory, etc.
	Code 39 (Code 3 of 9)	Identification, inventory, and tracking shipments
	US Intelligent Mail barcode	Encoding zip codes on U.S. mail
	Bookland	Based on ISBN numbers and used on book covers
	Code 128	Used in preference to Code 39 because it is more compact
	Interleaved 2 of 5	Used in the shipping and warehouse industries
	Codabar	Used by Federal Express, in libraries, & blood banks

2D BARCODE FONT		DETAILS
	PDF417	Large amounts of text and data can be stored because it can be compressed. Used to print postage accepted by the USPS. It is also used by airlines on boarding passes.
	Maxicode	MaxiCode symbols can encode two messages; a primary and a secondary message. Used by the United Parcel Service.
	Data Matrix	Ideal for marking small items due to it’s ability to encode 50 characters in an extremely small size. Popular in healthcare and electronic components industry.
	QR Code	Common in advertising because it provides a way to access a brand’s website quickly. Easily read by smartphones. QR codes can hold as much as 7,000 digits or 4,000 characters of text.

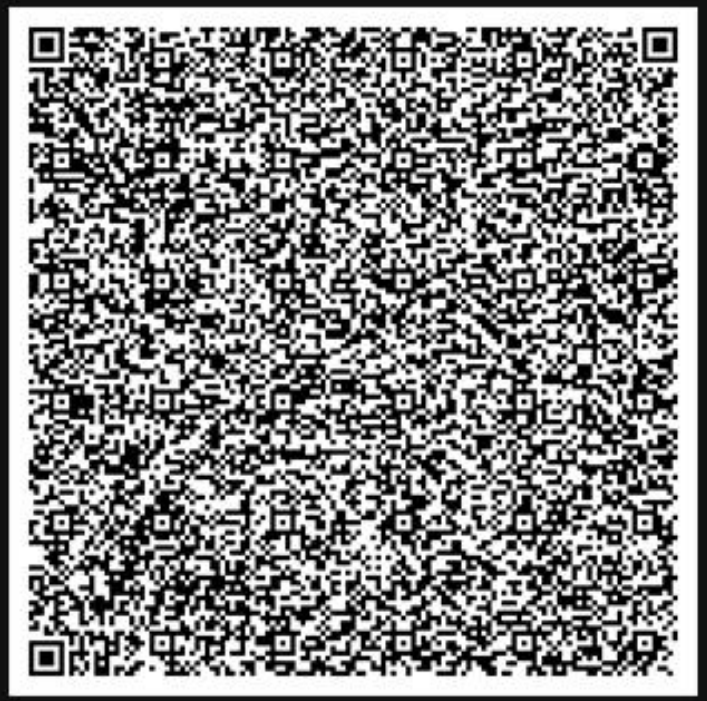
Applications of Barcode

- **HOSPITALS:** Barcodes can allow for the organization of large amounts of data. They are widely used in the healthcare and hospital settings, ranging from patient identification (to access patient data, including medical history, drug allergies, etc.) to medication management.
- **RETAIL:** Speeding up checkouts and ordering.
- **OFFICE:** Recording transactions.
- **HEALTH:** Ensuring correct dosage and treatment.
- **TRAVEL**: Making ticketing more efficient, ensuring safety and speedier check in.
- **LIBRARIES:** Logging borrowers and books

1D and 2D Barcode Facts

1D Barcode can store 85 Characters,
2D Can store over 7,000

A 1D barcode can store about 1/2 a tweet, while a 2D barcode can store the entire Gettysburg Address.

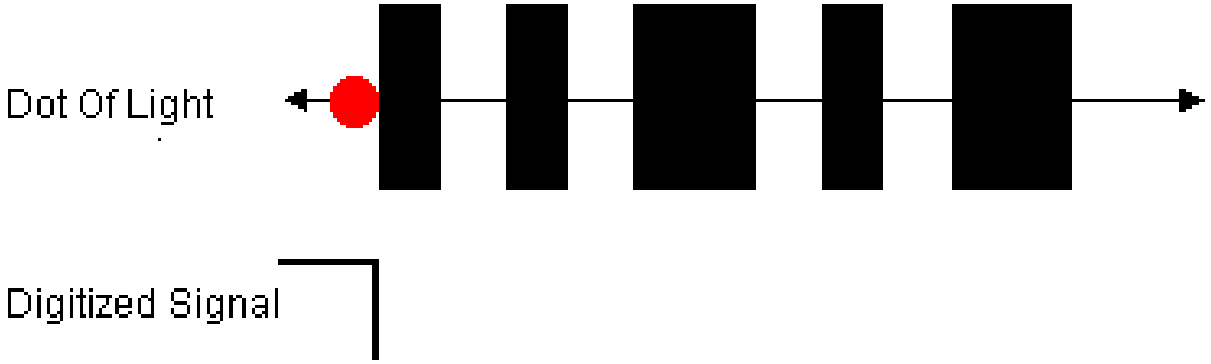


Scan this

BAR CODES

HOW DOES A BARCODE WORK?

Each character is represented by a pattern of wide and narrow bars. A barcode scanner uses a photosensor to convert the barcode into electrical signals as it moves across it. The scanner then measures the relative widths of the bars and spaces, translates the different patterns back into regular characters, and sends them on to a computer or portable terminal.



Every barcode begins with a special start character and ends with a special stop character. These codes help the reader detect the barcode and figure out whether it is being scanned forward or backward.

There are different barcode symbologies, each with its own particular pattern of bars.

The UPC code used on retail products is an all-numeric code; so is the Interleaved 2 of 5 Code. Code 39 includes upper case letters, digits, and a few symbols. Code 128 includes every printable and unprintable computer character code which is why it is used a lot.

EAN 13 & EAN 8

Linear Barcode

European Article Numbering international retail product code

EAN-13 or **EAN-8** are two different versions of EAN bar codes, which can encode 13 and 8 digit numbers.

The **EAN-8** code was introduced for use on small packages where an EAN-13 barcode would be too large.

All other countries aside from the United States utilize the EAN bar code for identification on retail goods.

USA use the UPC code for the same purposes, but this is only 12 digits long.

EAN-13

EAN-8

Code 39

Linear Barcode

A General purpose code in very wide use world-wide.

The **Code39** character set includes the digits 0-9, the letters A-Z (upper case only), and the following symbols: space, minus (-), plus (+), period (.), dollar sign ($), slash (/), and percent (%).

A special start/stop character is placed at the beginning and end of each barcode.

(also known as "USS Code 39", "Code 3/9", "Code 3 of 9", "USD-3", "Alpha39", "Type 39", "Code 93")

The code itself does not carry a check digit like the the Code 128 barcode and can often be identified by an asterix at the start and end of the eye readable.

The barcode may be of any length, although more than 25 characters really begins to push the bounds.

It has a lower character density than the Code128 making it rather a wide code in comparison.

This code is steadily being replaced in many of it uses by the Code 128 barcode which has better capabilities and a higher character density.

Code 128

Linear Barcode

Code 128

Very capable code, excellent density, high reliability; in very wide use world-wide

The **Code128** provides excellent density for all-numeric data and good density for alphanumeric data. It is often selected over Code 39 in new applications because of its symbology density and because it offers a much larger selection of characters.

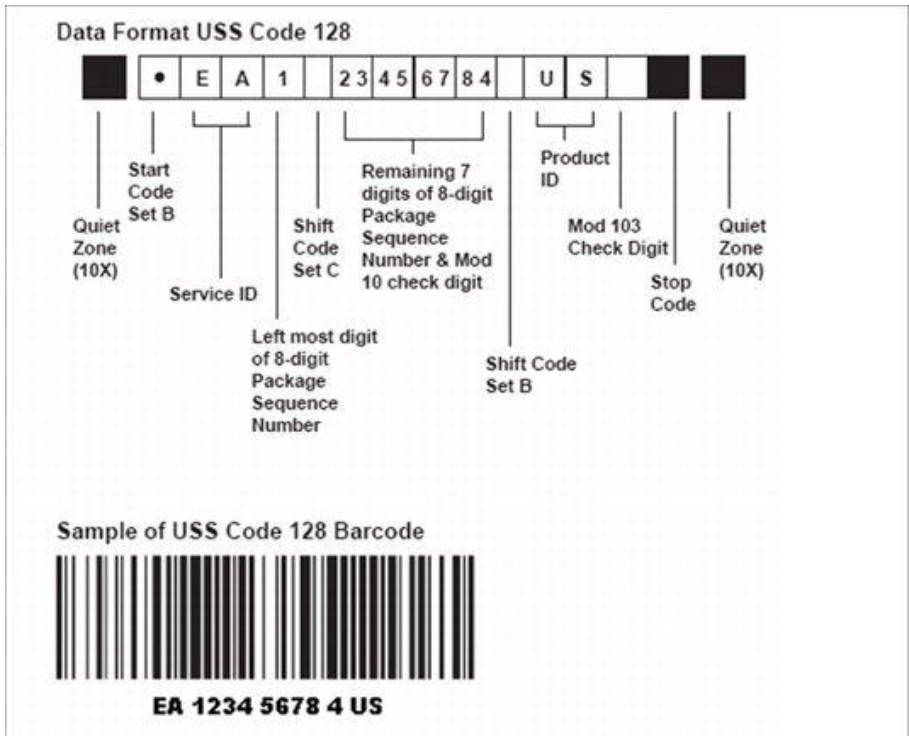
The Code 128 character set includes the digits 0-9, the letters A-Z (upper and lower case), and all standard ASCII symbols and control codes. The codes are divided into three subsets A, B, and C. There are three separate start codes to indicate which subset will be used; in addition, each subset includes control characters to switch to another subset in the middle of a barcode. Subset A includes the standard ASCII symbols, digits, upper case letters, and control codes. Subset B includes standard ASCII symbols, digits, upper and lower case letters. Subset C compresses two numeric digits into each character, providing excellent density.

A Code 128 barcode will have six sections:

Quiet Zone - Start Character - Encoded Data - Check Character - Stop Character - Quiet Zone

It has a medium to high character density making it widely used within the NHS, Records Management, and Asset tracking markets.

This code is the most commonly used by AC Labels and is used by many of our customers that once used Code39 barcodes.



NHS – (National Health Service)

This is a typical bar code label for First class mail, sent in the United States. It is based on the format for a Code 128 linear bar code which is one of the most popular types used because so much information can be put on it.

U.S. POST OFFICE BARCODES - The barcode that you might see at the <u>bottom of an envelope or on a mailing label</u> is the **Intelligent Mail Barcode** (**IM barcode**) and is a 65-bar barcode for use on mail in the United States.

The term "Intelligent Mail" refers to services offered by the United States Postal Service for domestic mail delivery and **represents ZIP Codes, ZIP+4 codes, and delivery addresses.**

The Postal Service uses automated equipment that reads the barcode to process and sort mail and tells them where to deliver your mail.

There are different kinds of barcodes for different aspects of the mail, such as the purchase of extra services (like USPS Tracking or Registered Mail).

U.S. Post Office mail sack labels also have barcodes on them.

All of these barcodes have different functions and must meet certain specifications so that the Postal Service can read them correctly.

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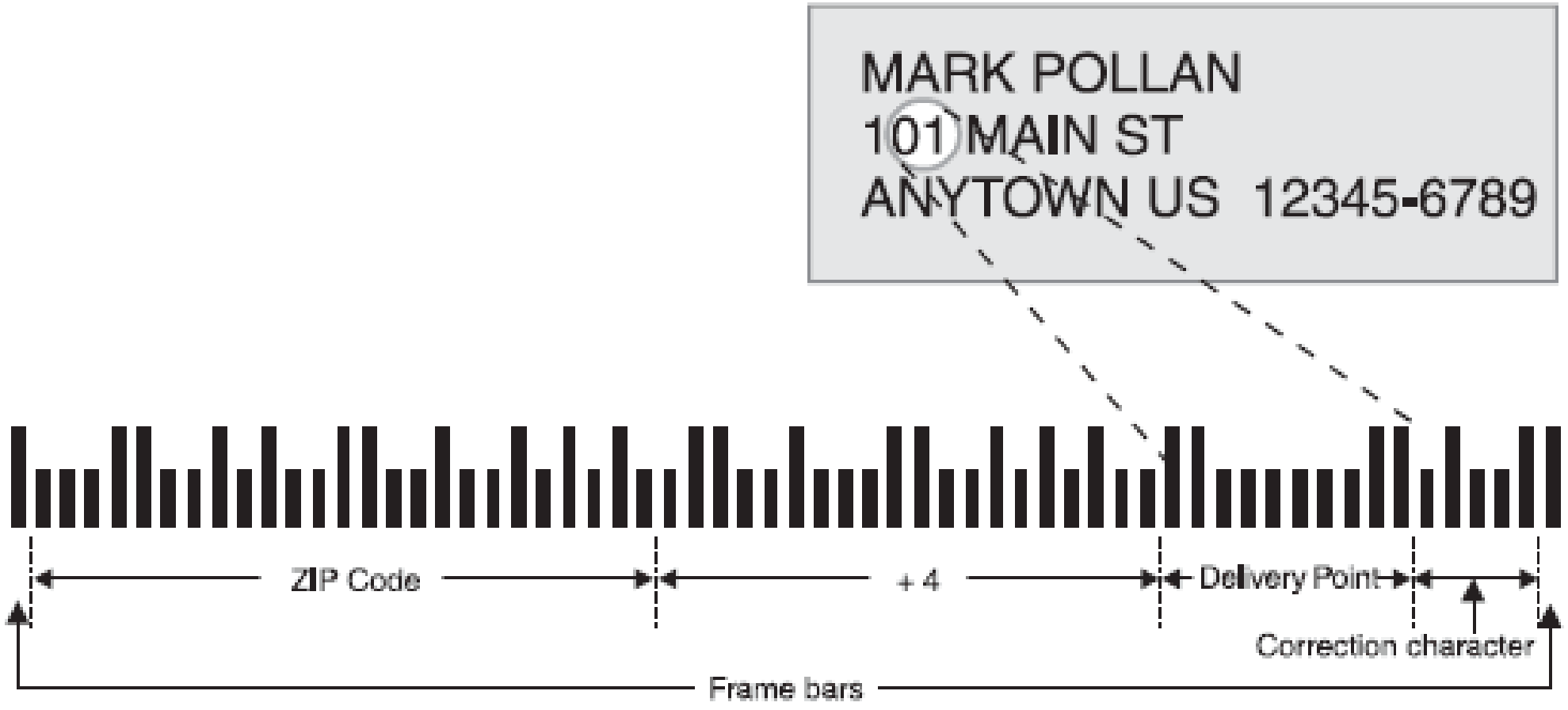
This diagram shows how the **Intelligent mail barcode (IMB)** is laid out with the zip code and the extra 4 digits afterwards.



UNDERSTANDING FIM (FACING IDENTIFICATION MARKS) ON ENVELOPES

The Facing Identification Mark (or FIM), small bar code that you usually see at the top right of an envelope, with only 5 – 6 vertical bars on it is used by the US Postal Service (USPS) to assist in the processing of letter mail.

This small pattern of vertical bars plays an important role in speeding your envelope mail through the USPS system.

The FIM Is for Envelopes - *Not* Shipping Labels and should only be applied to letter and postcard mail.

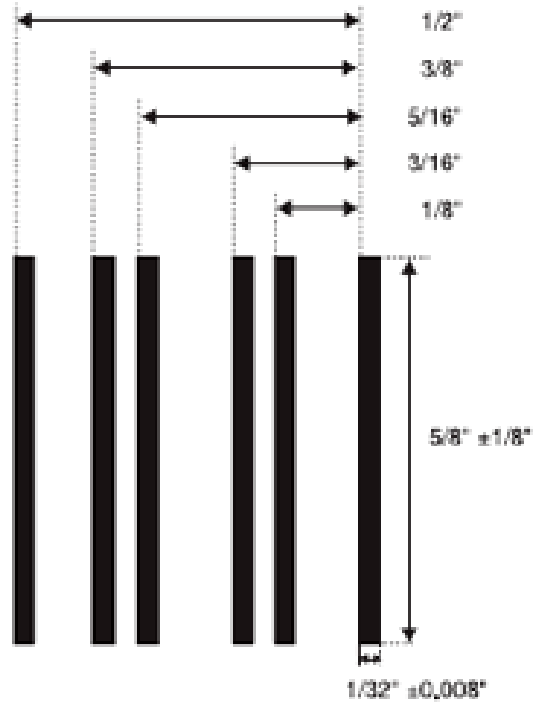
The USPS equipment that processes flats and packages does ***not*** look for or use a FIM.

What Does the FIM Tells USPS Mail Processing Equipment?

The FIM tells a key USPS processing machine two things about the envelope.

1 It alerts the machine as to what type of postage is (or should be) affixed to the piece.

2) It tells the machine if the mail piece already has a Intelligent Mail barcode representation of the delivery ZIP+4.



FIM B

There are 3 types of FIM bar codes.

The **FIM A** is used to designate an envelope which has a Intelligent Mail barcode and should contain a conventional stamp or a red postage meter ink mark.

Conventional stamps contain an invisible phosphorescent ink and red postage meter ink contains a red fluorescent trace. Both materials - when excited with a short wave light source - emit a green or red signal which can be detected by a USPS machine called a Facer Canceller.

The pre-addressed envelope you receive from your water company or credit card company typically will have a small FIM A bar code on it.

This type of envelope is called a **courtesy reply envelope** - they have provided a preaddressed envelope as a courtesy to you.

You are expected to place your payment in that envelope, affix a stamp or postage meter mark, and drop it in the mailbox. The billing company wins big time on this because their pre-addressed and **Intelligent Mail encoded** envelope gets to them quickly so they get your money that much sooner!

A good comparison of a standard orange colored Canadian stamp at the left, as compared to the same stamp under Ultraviolet light, at the top, showing the redder color.

A **FIM C** is used for Business Reply mail as depicted in the figure below.

This tells the USPS facer canceller the mail piece contains a Intelligent Mail barcode but also indicates that there will be no fluorescent ink to detect.

The postage is paid by the recipient of the mail, using a permit billing system.

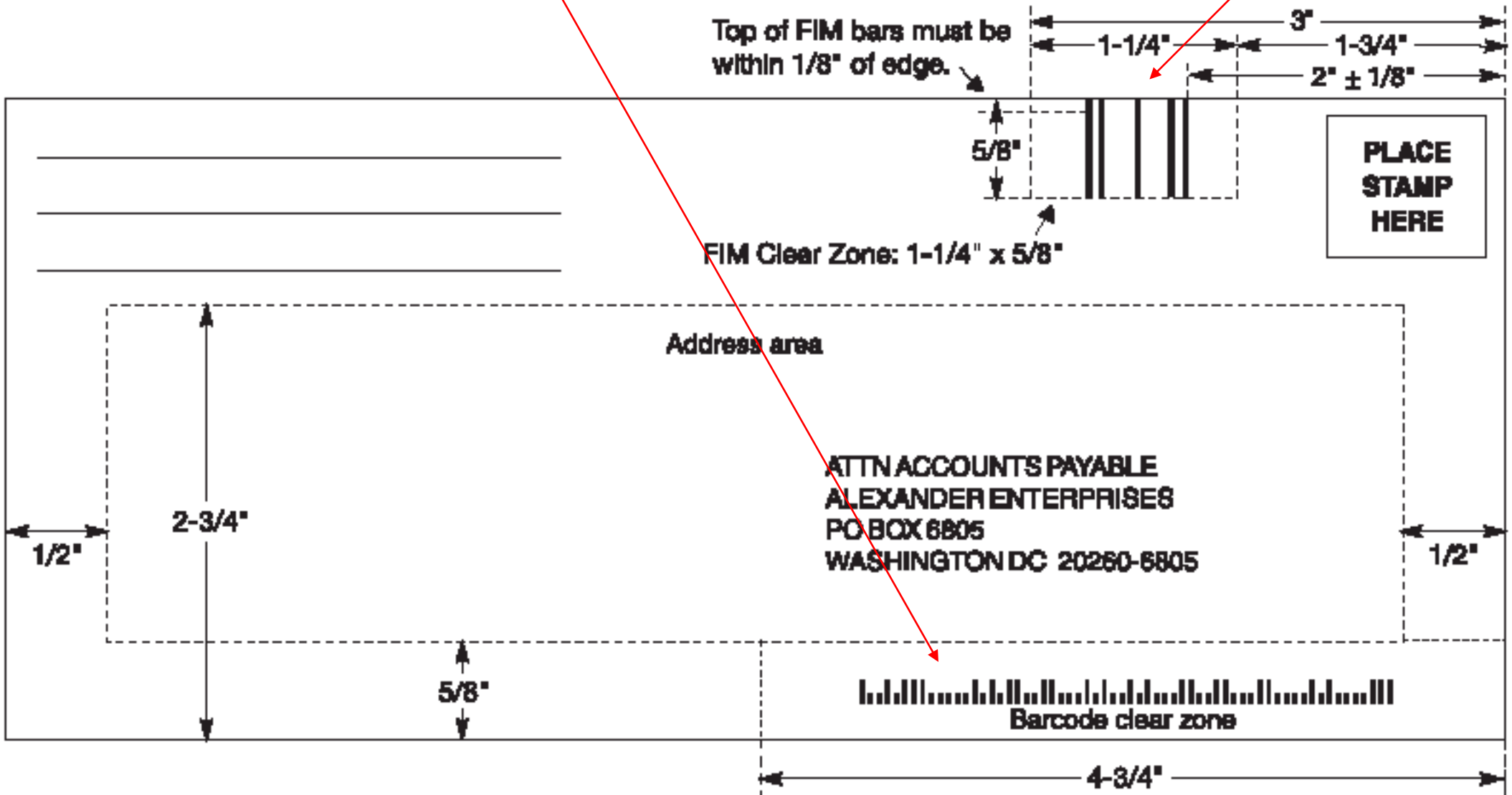
They are only billed for the post cards sent back to them.

You can see dozens of Business Reply postcards in any magazine you pick up.

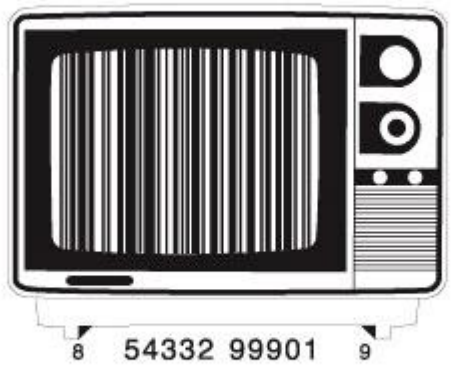
A **FIM B** is used for Business Reply mail which doesn't have an Intelligent Mail barcode.

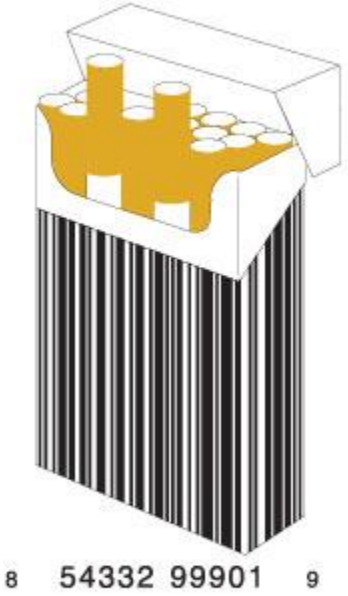
You will seldom see this because the USPS charges much more to the permit holder to process non-Intelligent Mail encoded reply mail.

This is the required layout of a #10 envelope, showing the locations for the small FIM bar code at the top right and the Intelligent Mail Barcode (IMB) at the lower right.



FUN WITH BARCODES !!



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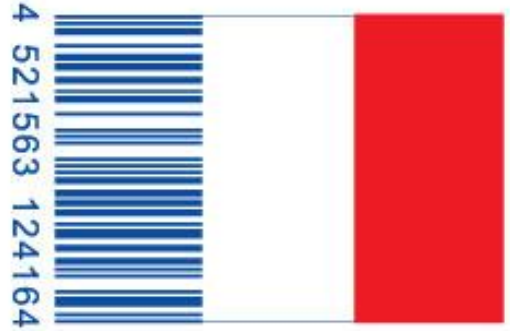
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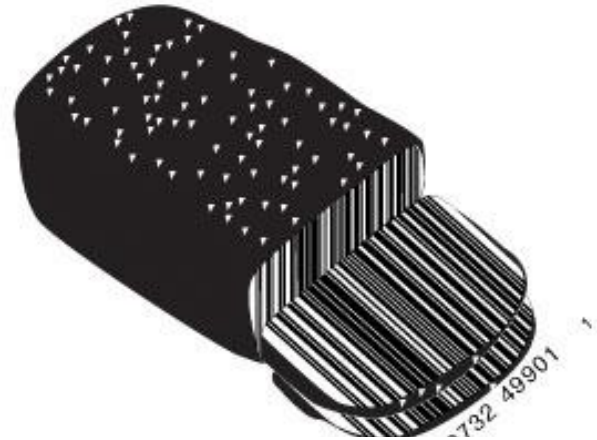
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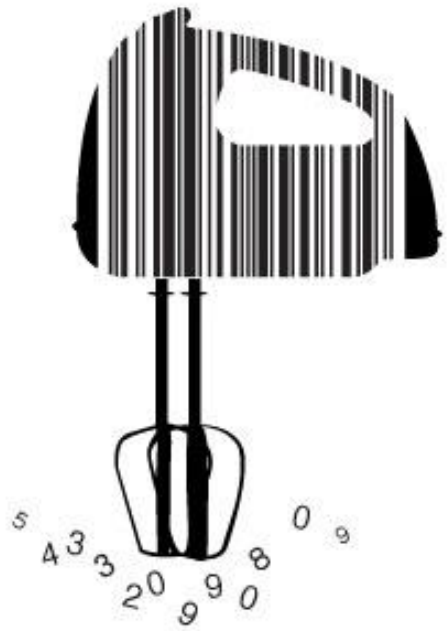
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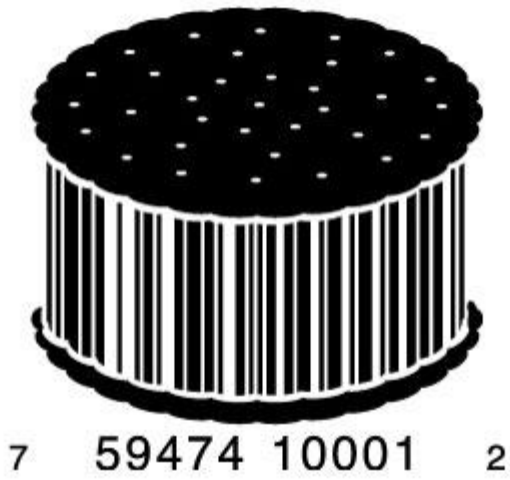
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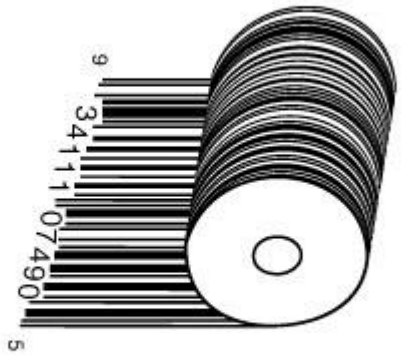
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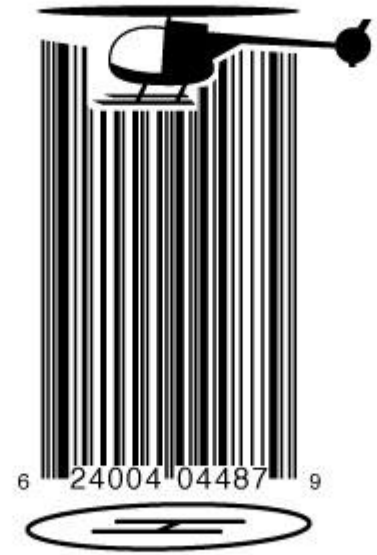
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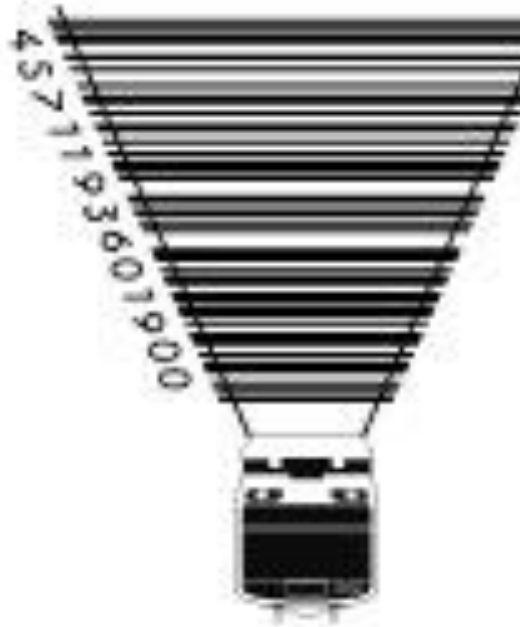
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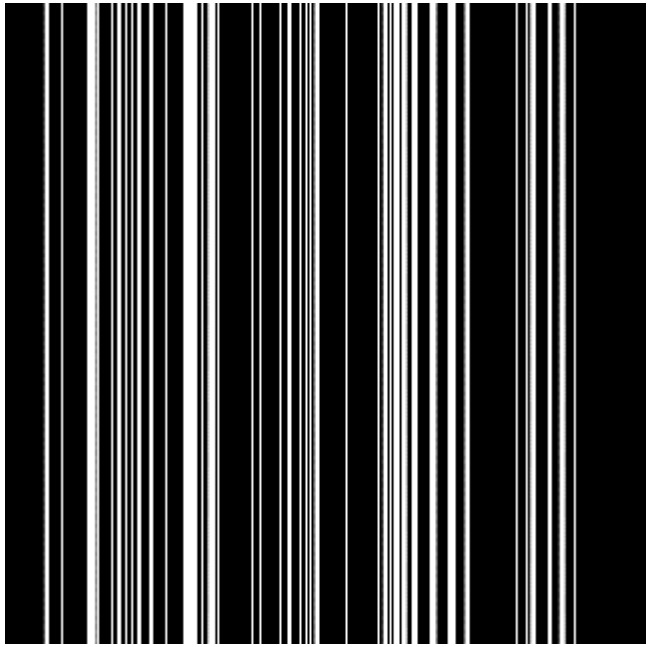

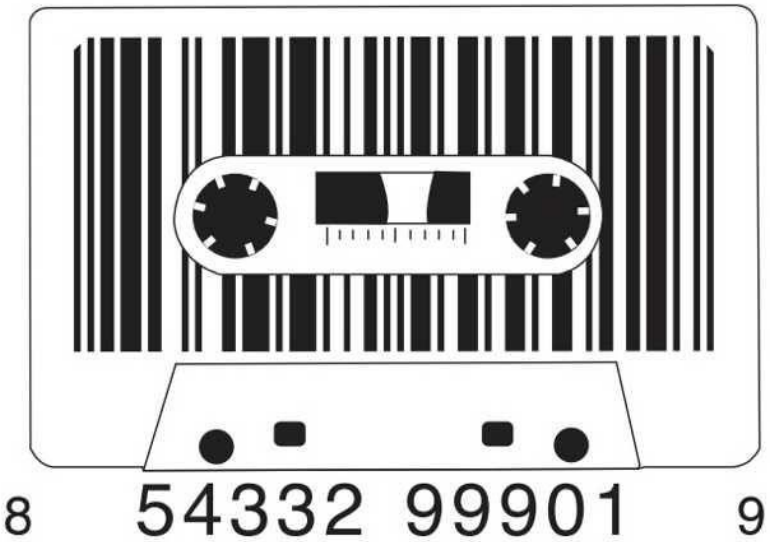
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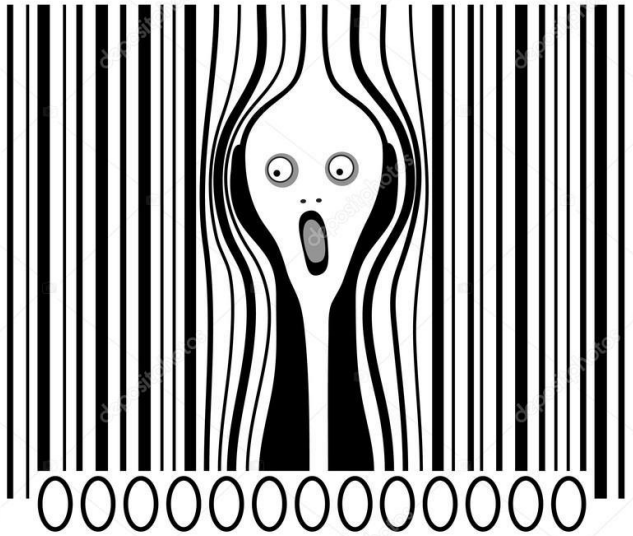
83911 52870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0123456789


SALE SALE


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CY-BIO-001
5 292705 000064


6 93461 31000 1


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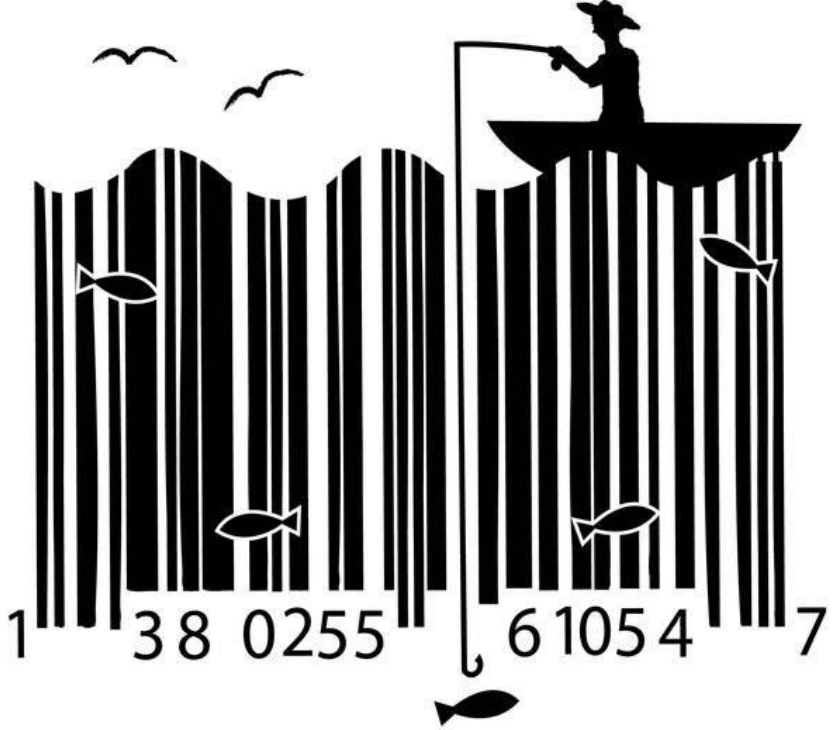
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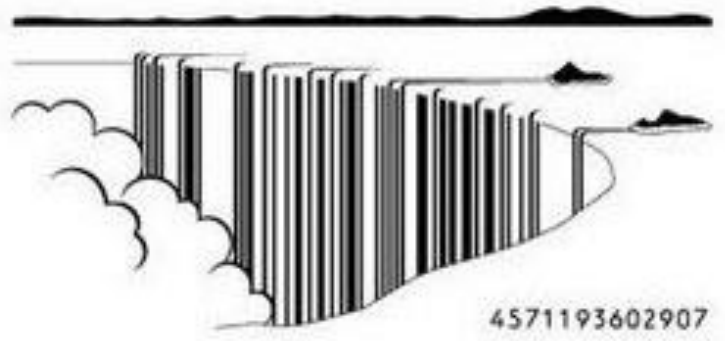
0123456789


POPSOCKETS.com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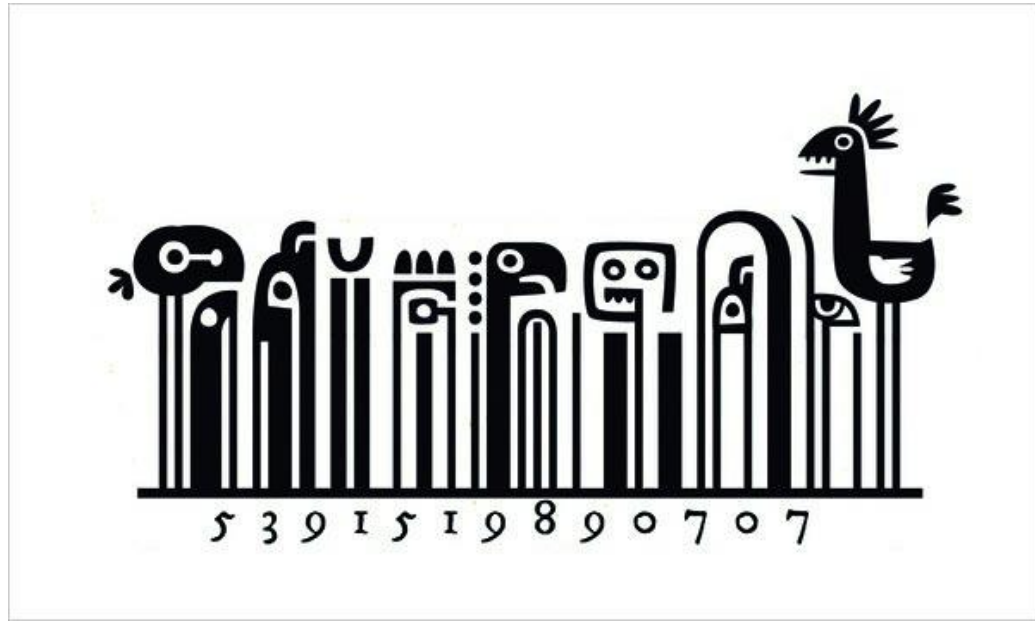

5391519890707


BEARDCODE


9 781553 170730


4 571193 601078


BarCode


Made in Italy


1564832970
PI-SLICES

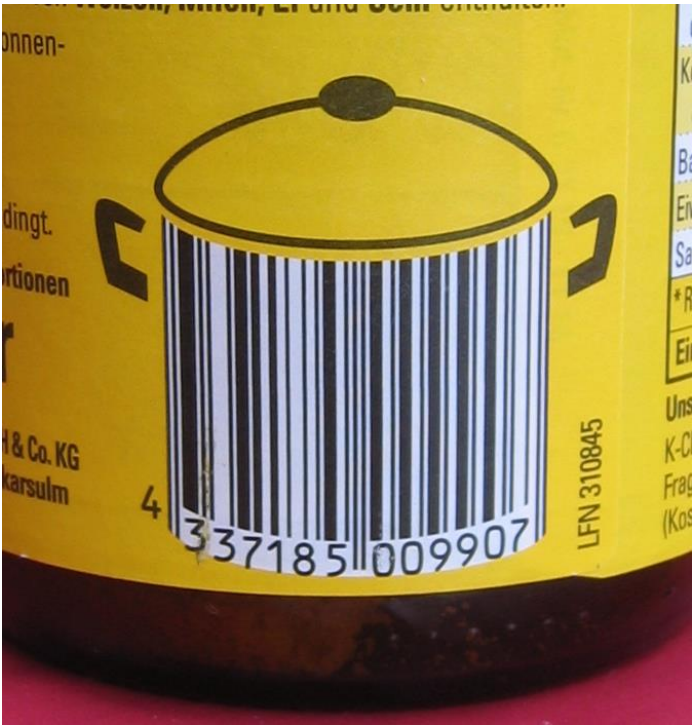

reedom isn't free.


5 0 6240 7890


Büffelgrashalms
Von der
4 034100 221771


RICA
PE
6 63194 00039 5
OLDER SULFITTER. BEVAT SULFIETEN. CONTAINS SULPHITES


8 54332 99901 9


4 337185 009907
LFN 310845

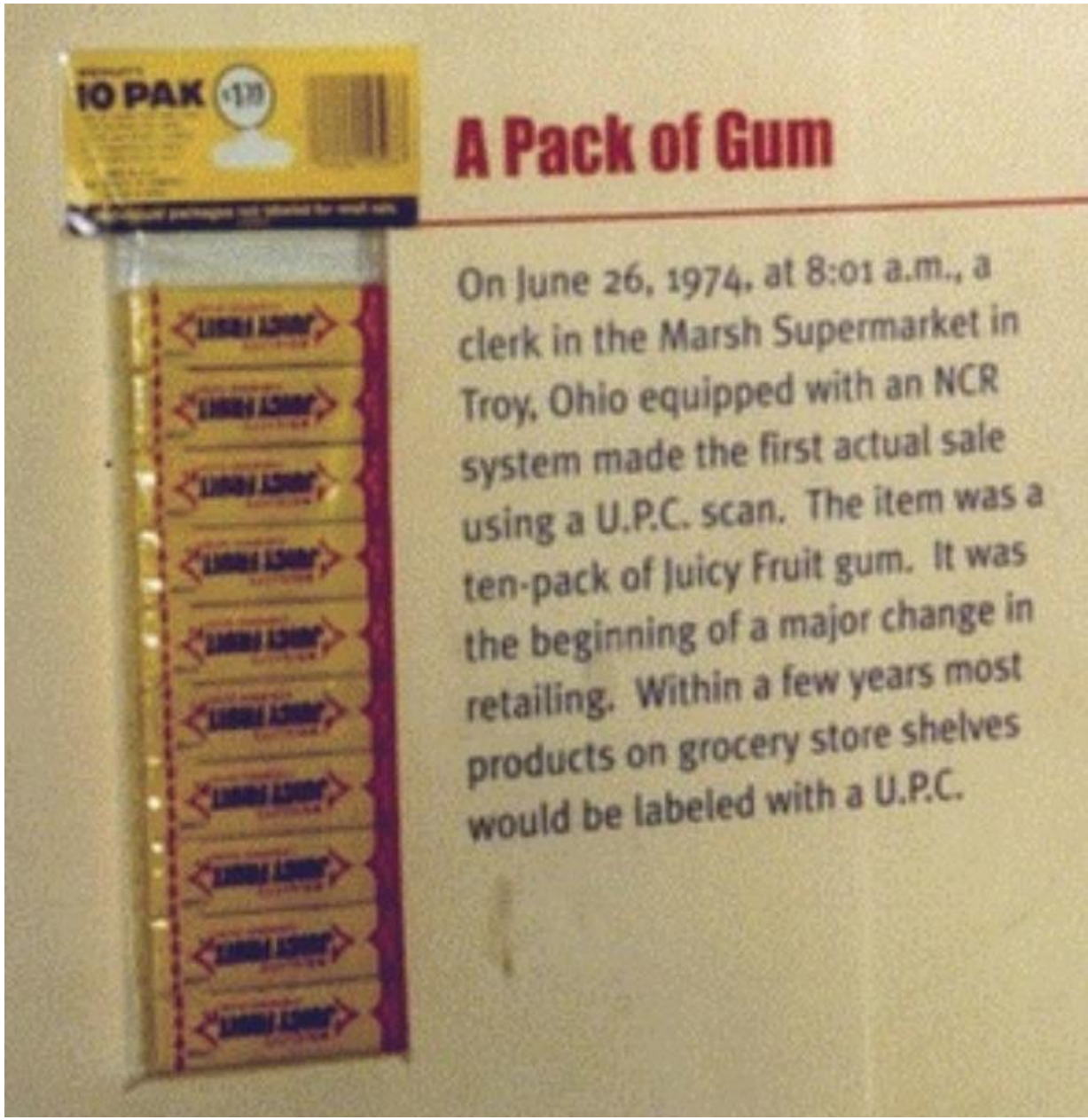

640509 040147

The first UPC marked item ever scanned at a retail checkout was at the Marsh supermarket in Troy, Ohio at 8:01 a.m. on June 26, 1974, and was a 10-pack (50 sticks) of Wrigley's Juicy Fruit chewing gum.

The shopper was Clyde Dawson and cashier Sharon Buchanan made the first UPC scan.

The NCR cash register rang up 67 cents. The entire shopping cart also had barcoded items in it, but the gum was the first one picked up.

This item is on display at the Smithsonian Institution's National Museum of American History in Washington, D.C.



And if you choose to celebrate it, June 26th is Barcode Day !!

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. 2D barcodes include some newer barcode types, such as the QR Code and PDF417.

QR CODE (Quick Response)

QR codes are most often used in tracking and marketing initiatives, such as advertisements, magazines and business cards. They are flexible in size, offer 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. They are public domain and free to use.

2D Barcode / Data Matrix

2Dimensional Barcode

Dot-Matrix / Data Matrix

Can hold large amounts of data, especially suited for making very small codes

The **2D Barcode / Data Matrix** is a two-dimensional barcode which can store from 1 to about 2,000 characters. The symbol is square and can range from 0.001 inch per side up to 14 inches per side.

Uses: Data Matrix is being used to encode product and serial number information on electrical rating plates; to mark surgical instruments in Japan; to identify lenses, circuit boards, and other items during manufacturing. The main sectors for use are for track and trace, anti-counterfeit, and banking solutions

Dot Matrix symbols require a 2-D scanner; they cannot be read using an ordinary linear barcode scanner. A number of scanners are on the market using both laser and CCD (Charge Coupled Device) camera technologies.

QR Barcode

2Dimensional Barcode

(abbreviated from Quick Response Code) is the trademark for a type of matrix barcode first designed for the automotive industry in Japan.

Can hold large amounts of data, especially suited for making very small codes

Recently, the QR Code system has become popular outside the automotive industry due to its fast readability and greater storage capacity compared to standard linear codes.

The code consists of black modules (square dots) arranged in a square grid on a white background.

Uses: Particularly used in promotional marketing and website linkages.

In June 2011, the Royal Dutch Mint issued the world's first official coin with a QR code to celebrate the centennial of its current building and premises. The coin was able to be scanned by a smartphone and link to a special website with contents about the historical event and design of the coin.

This was the first time a QR code was used on currency.

DATAMATRIX CODE

Datamatrix codes are usually used to label small items, goods and documents.

Their tiny footprint makes them ideal for small products in logistics and operations. In fact, the U.S. 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.

Industry: Electronics, Retail and Government

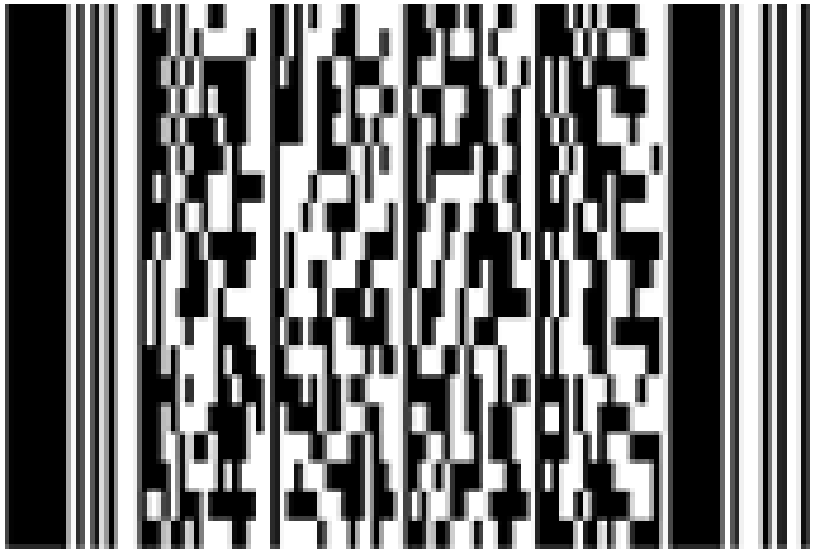
PDF417

PDF417 codes are used for applications that require the storage of huge amounts of data, such as photographs, fingerprints and signatures.

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.

Industry: Logistics and Government



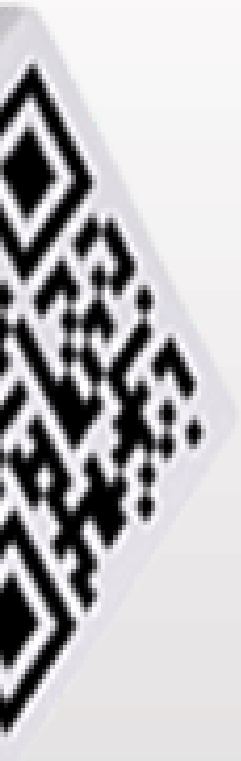
AZTEC

Aztec codes are commonly used by the transportation industry, particularly for tickets and airline boarding passes.

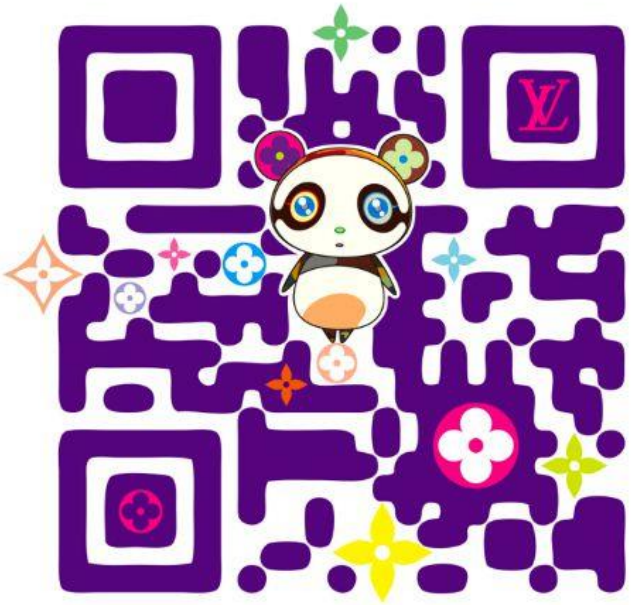
The barcodes can still be decoded even if they have bad resolution, making them useful when tickets are printed poorly or presented on a phone.

They can also take up less space because they don’t require a surrounding blank “quiet zone,” unlike some other 2D barcode types.

Industry: Transportation

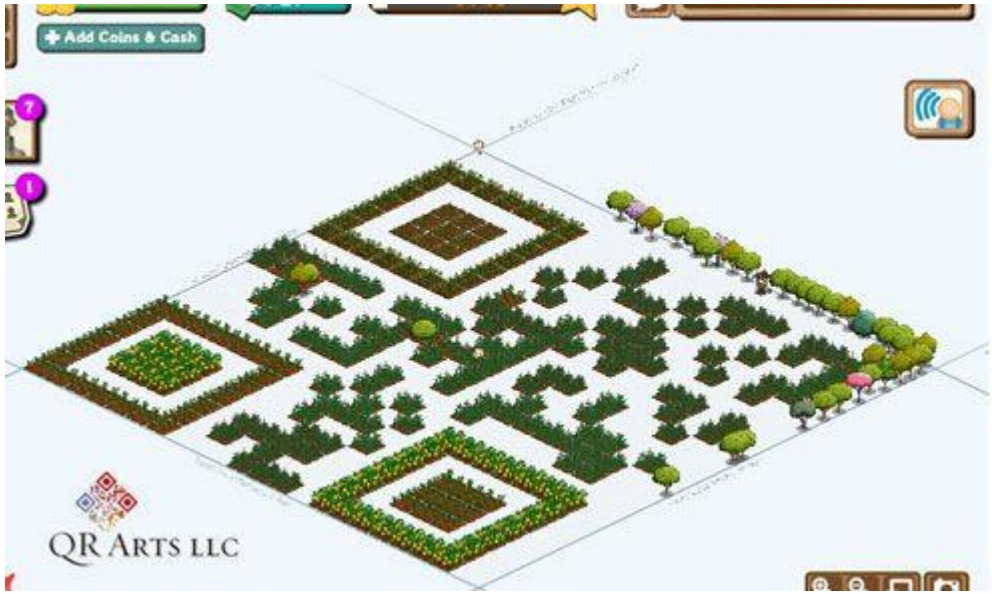


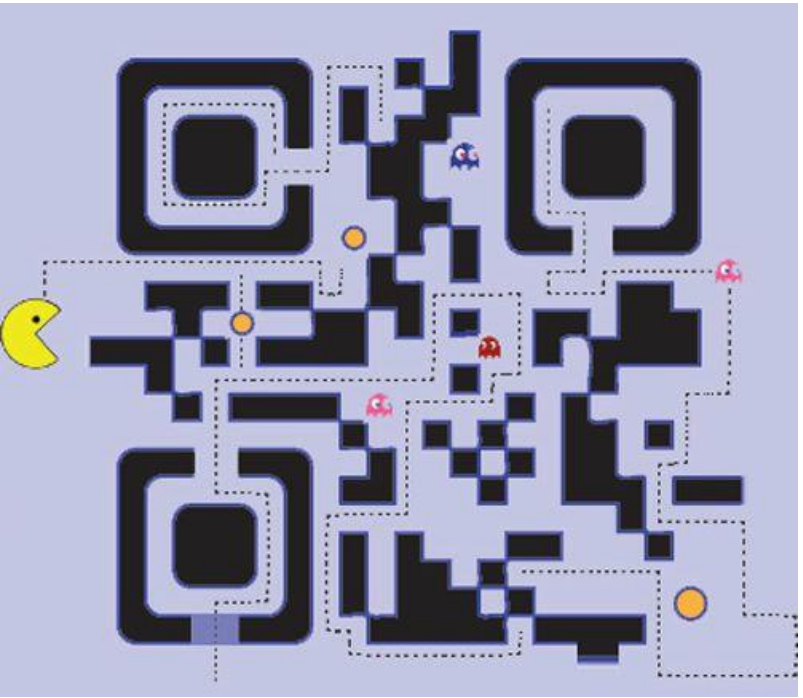
QR Codes for Fun?




あげちゃう。
あげちゃう。
あげちゃう。
Disney
Disney
Disney

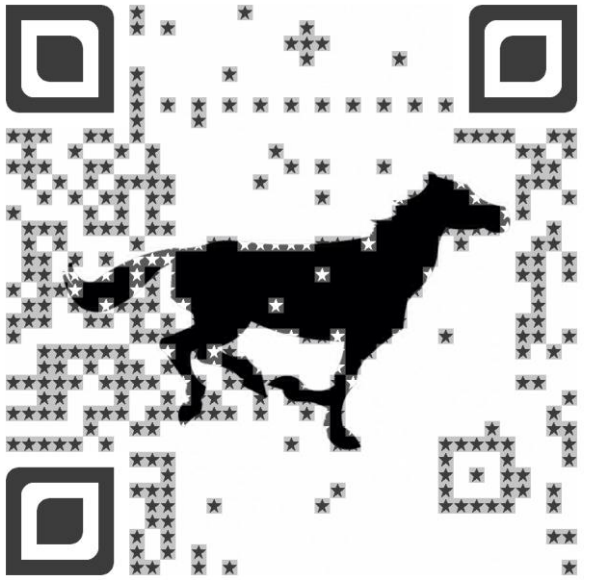

QR ARTS


Add Coins & Cash
QR ARTS LLC




QR Arts


THE
SOCIAL
MEDIA
CAFE




VALUE HOT 值选


IVY ELITE

RFID (RADIO-FREQUENCY IDENTICATION) TAKES MANY FORMS…

RFID IS THE METHOD USED TO IDENTIFY ALL KINDS OF PRODUCTS, VEHICLES, AND MORE, BY READING THEM WITH A RFID READING DEVICE OR SCANNER.

An RFID (Radio Frequency Identification) system is made up of electromagnetically responsive tags that can be picked up by specialized readers. Each tag can be embedded with unique information and attached to objects in order to track their presence and movement.

APPLICATIONS:

1) **Logistics industry** - RFID tags have traditionally been attached to shipping containers, so as trucks carrying containers enter or exit the port the RFID readers at the gate would track their arrival or departure.

2) **Manufacturing sector** tags may be attached to components, such as car parts in an automotive plant, which can then be tracked as they move along the production line.

3) People have also been carrying access cards embedded with RFID chips to pass through **turnstiles on public transport systems** in many cities for sometime.

4) Pet and person tagging with very small RFID chips, that are put under the skin.

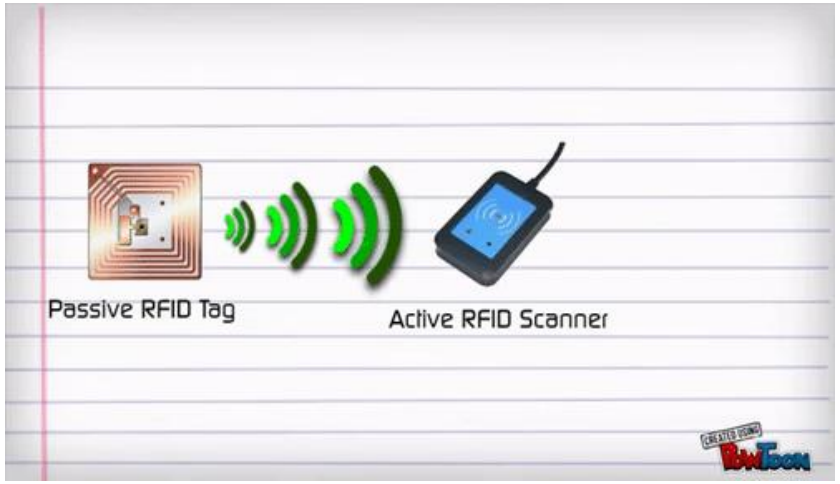
WHAT ARE RFID TAGS? - RFID technology relies on radio waves to send and receive information between a tag and a reader.

At its simplest level, an RFID reader sends a signal out to an RFID tag and the tag sends back an information-carrying signal. Unique information —such as a GS1 Electronic Product Code™ (EPC)— can be programmed into each individual RFID tag, which are then affixed to products, boxes, pallets or even high-value equipment depending on the application.

Similar to barcodes, RFID tags are commonly used to quickly retrieve product- or pallet-level information.

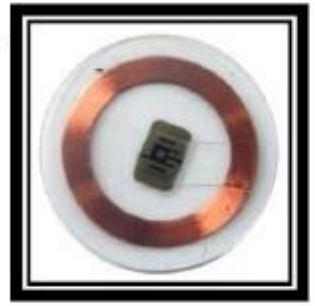
Because RFID tags use radio wave technology, they don't require direct line-of-sight in order to be read — meaning entire pallets or truckloads of products can be read as quickly as 700 products per second.

This gives RFID tags a clear advantage when it comes to driving visibility and efficiency at the supply chain level (called smart label tracking).



© RFIDTrakker

© Sokymat



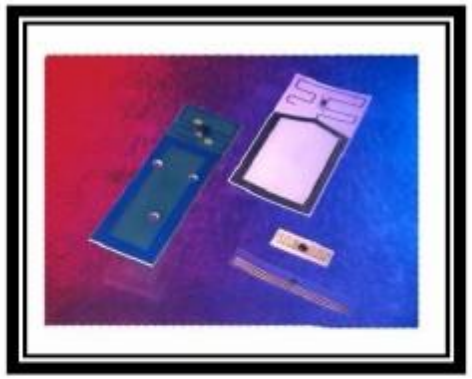
LF

(Low Frequency)

© Tagsys

HF

(High Fréquency)

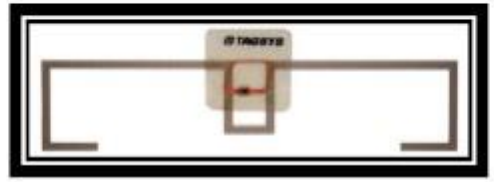


© Alien

© Rafsec

© Intermec

© Tagsys



© Rafsec

UHF

(ultra High Frequency)

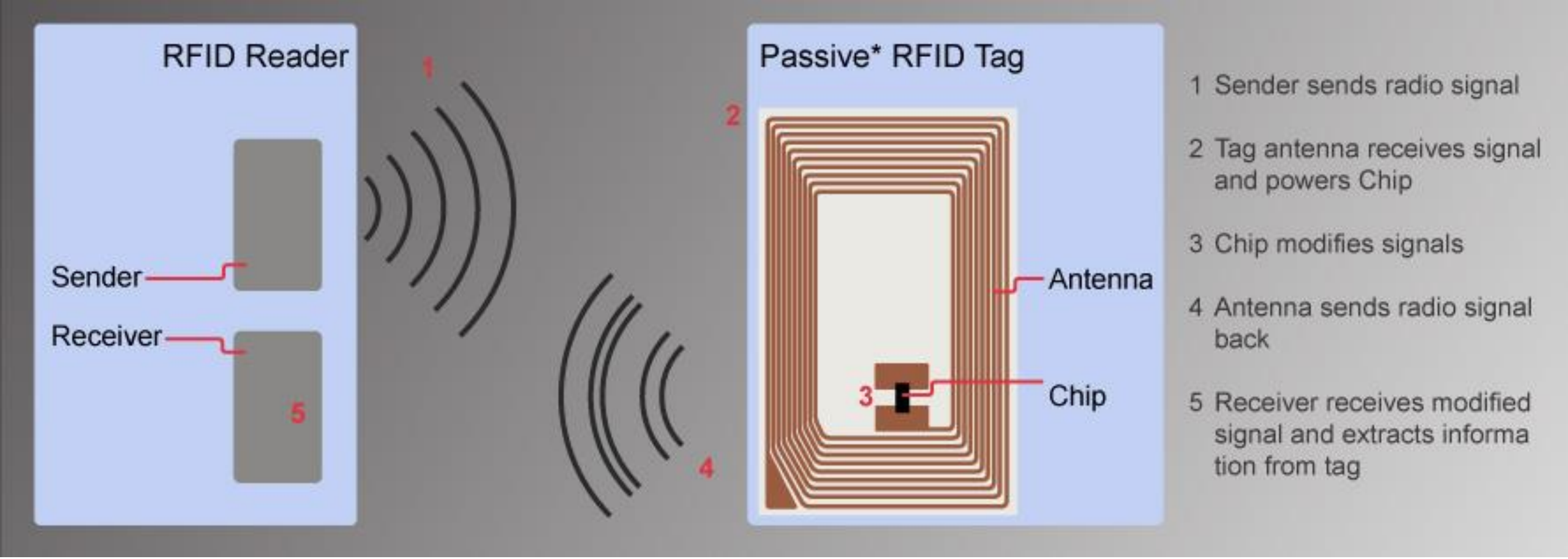
COMPARING RFID TAG TYPES: UHF VS. HF VS. NFC VS. LF RFID

There are a variety of RFID tags on the market today, differentiated by frequency range (low, high and ultra-high).

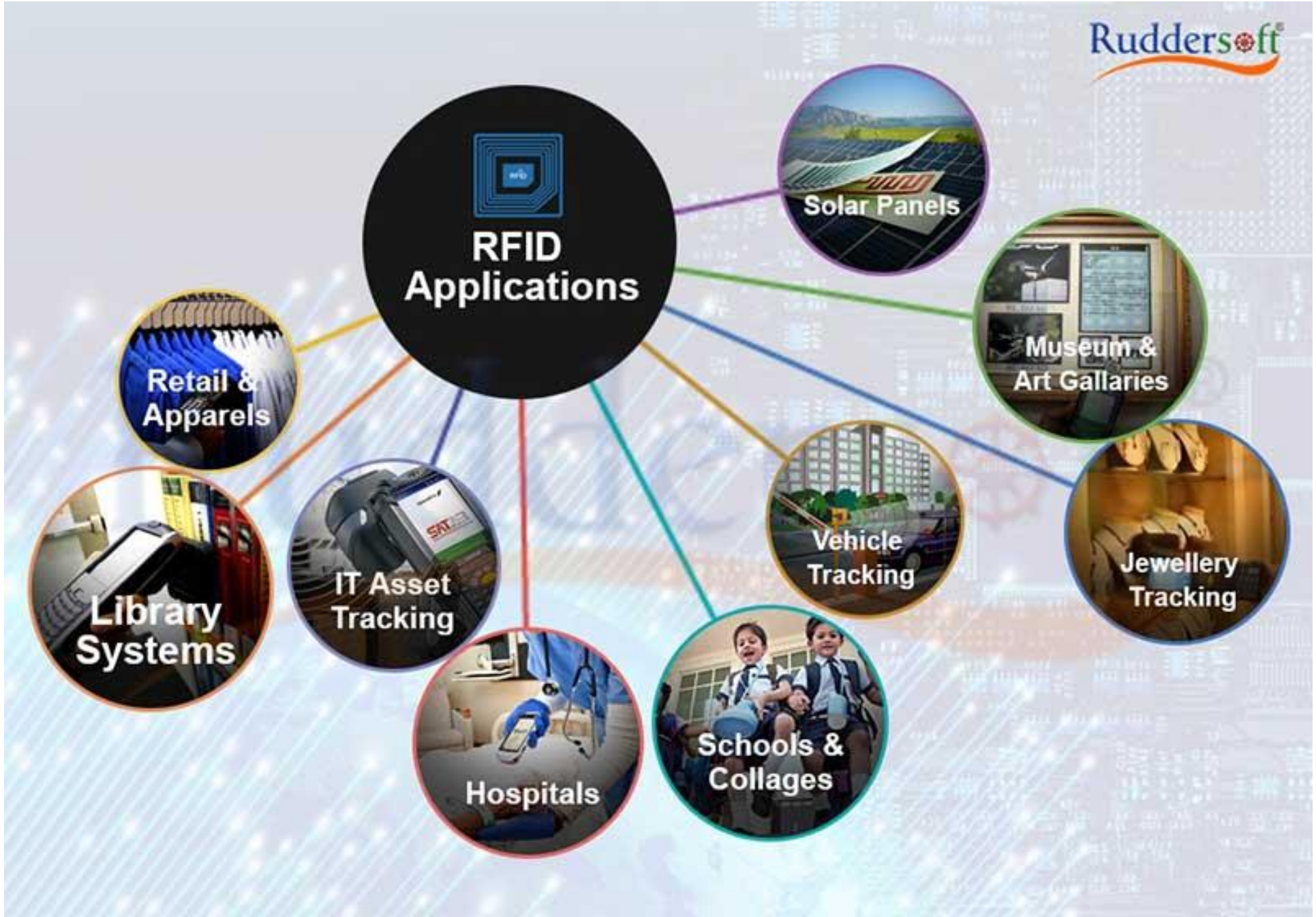
Each RFID type can be either active (powered), passive (un-powered) or semi-passive (battery-assisted).

Types of RFID tags

	LOW-FREQUENCY (RFID)	HIGH-FREQUENCY (HF)	ULTRA-HIGH-FREQUENCY (UHF)
FREQUENCY RANGE	30 to 300 KHz	3 to 30 MHz	300 MHz to 3GHz
COMMON FREQUENCY	125 KHz or 134 KHz	13.56 MHz (NFC)	860 to 960 MHz (UHF Gen2)
RELATIVE COST	$$	$$ – $$$	$
READ RANGE	≤10 cm	≤30 cm	≤100 m
BENEFITS	More resistant to interference by liquids and metals.	Higher memory capabilities, NFC tags can function as both reader and tag.	Lower cost, with good read range and fast read rates.
COMMON APPLICATIONS	Animal tracking, automobile inventorying.	Promotional packaging and labels, contactless payment, library collections.	Inventory control, item-level tracking, supply chain visibility and efficiency.



You can buy an adhesive-backed label with 3 layers, that has a Passive RFID tag in a middle layer with a printed bar code on the top layer


Ruddersoft
RFID Applications
Solar Panels
Museum & Art Gallaries
Retail & Apparels
Vehicle Tracking
Jewellery Tracking
Library Systems
IT Asset Tracking
Hospitals
Schools & Collages

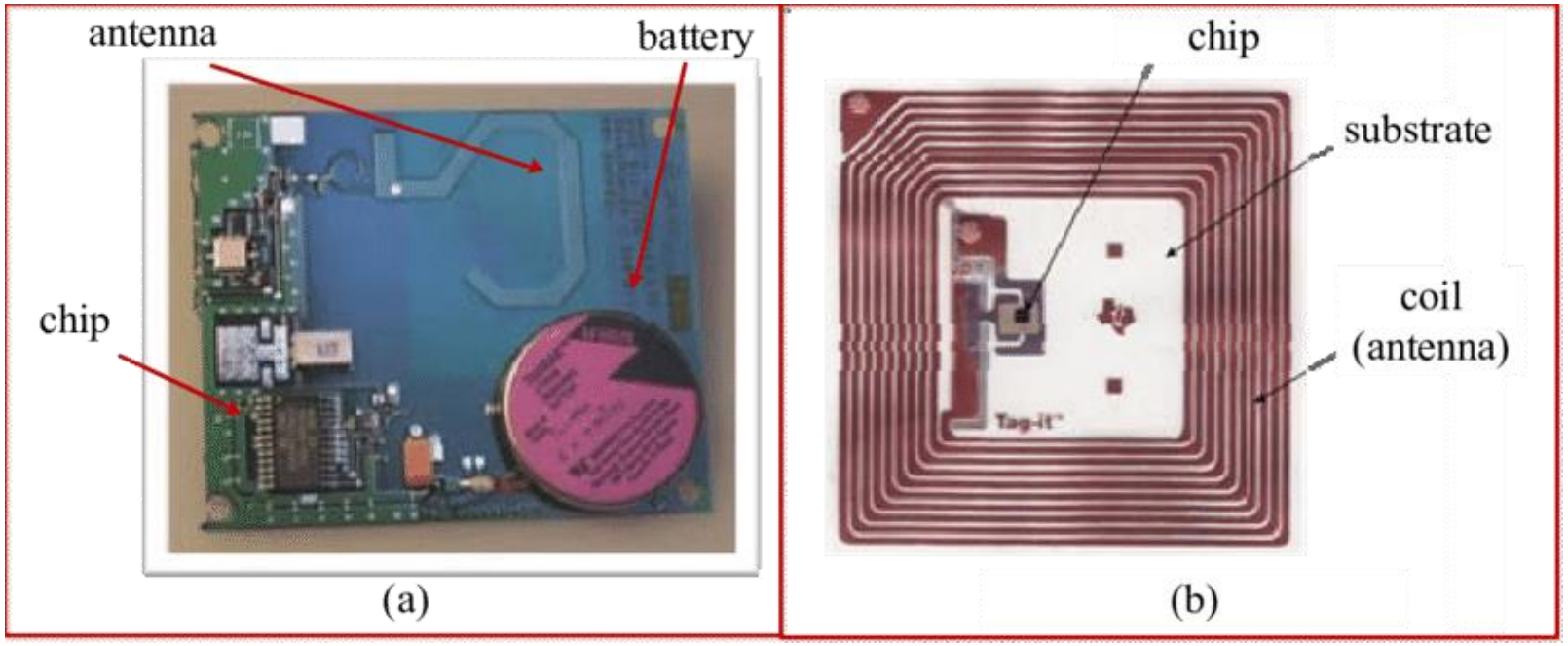
RFID Background

- Two types of RFID tags:
  - Passive tags and Active tags

Passive tags

Active tags

While the cost of basic IoT sensors has come down to a matter of dollars (smarter versions in the tens of dollars), a passive RFID tag only costs a few cents. These economics mean a fashion retailer can tag every piece of clothing in a store; a supermarket could tag all of their tens of thousands of products, and in a smart building context, they could tag pretty much everything.



a) Active and b) passive RFID tag

Semi-active tags: Although they have their own power source, it is used to energize the chip.

Reading operation is performed through Electromagnetic (EM) fields emitted from reader like passive tags. They do not broadcast like active tags.

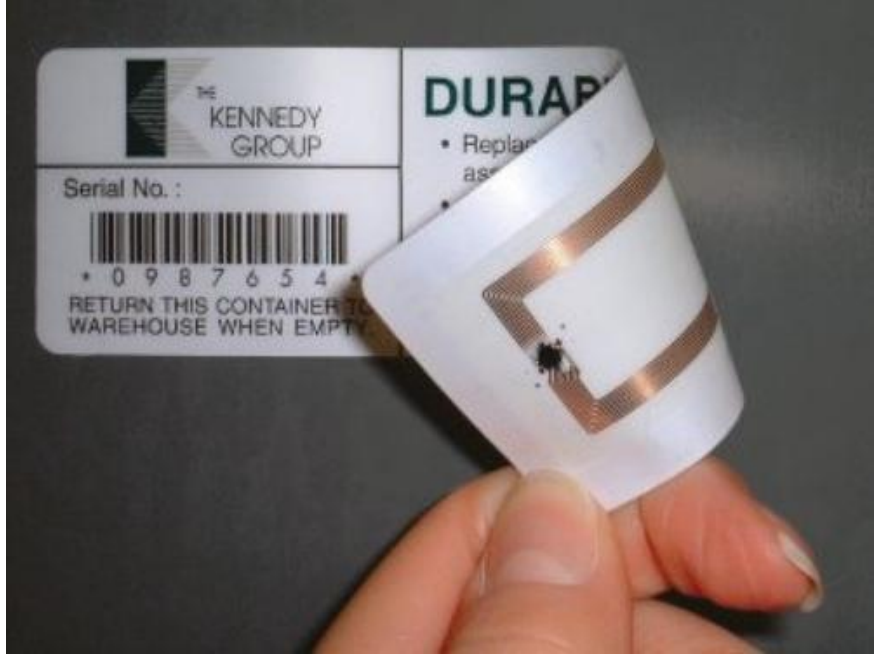
Types of RFID Systems - There are two types of RFID systems: passive or active. The tag power system defines which type of system it is.

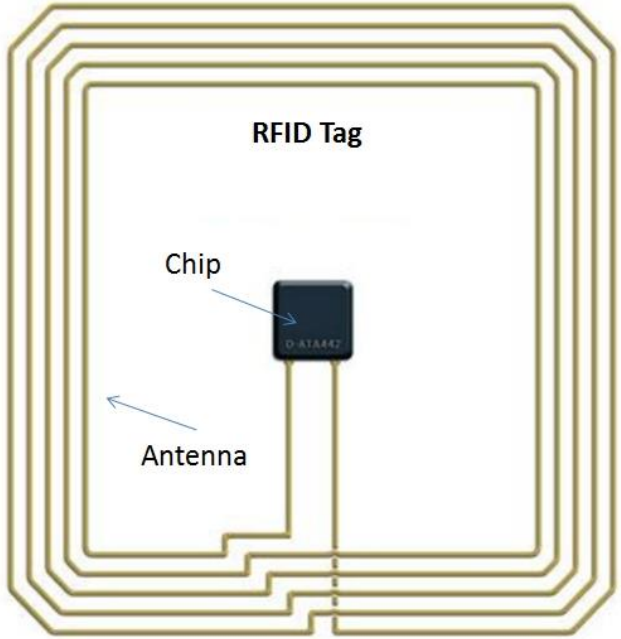
Passive

In a passive RFID system, the tags do not use a battery; instead, they receive their energy to run from the reader.

The reader emits an energy field of a few feet, providing the energy for any tag in the vicinity. The tag gathers the electromagnetic energy from the card reader, powers up, and responds with 'hello world' and its identification information.

Passive tags have the benefit of being able to be read at a fast rate (10 or more times a second). They are extremely thin (allowing them to be placed between layers of paper) and are extremely cheap (less than $0.05 in 10,000+pcs volumes).

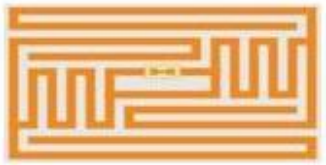

KENNEDY
GROUP
Serial No. :
RETURN THIS CONTAINER
WAREHOUSE WHEN EMPTY


RFID Tag
Chip
Antenna


ZEBRA
ZEBRA
ZEBRA

TYPES OF PASSIVE (NO BATTERY) RFID TAGS

Paper Tag



EPC Tag

Inlay Tag

Button Tag

Metal Tag

Glue Tag

Key Tag

Glass Tube Tag

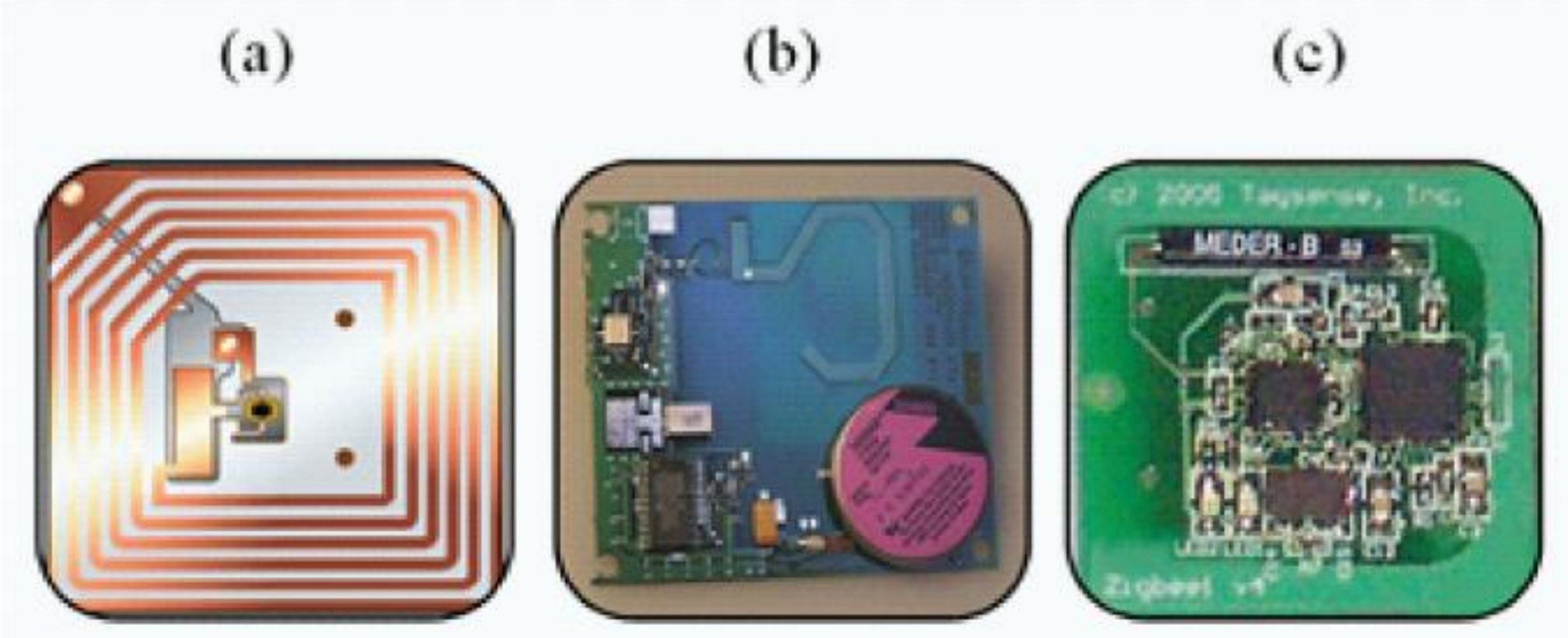
Ear Tag

Ceramic Tag

Disc Tag

Pocket Tag

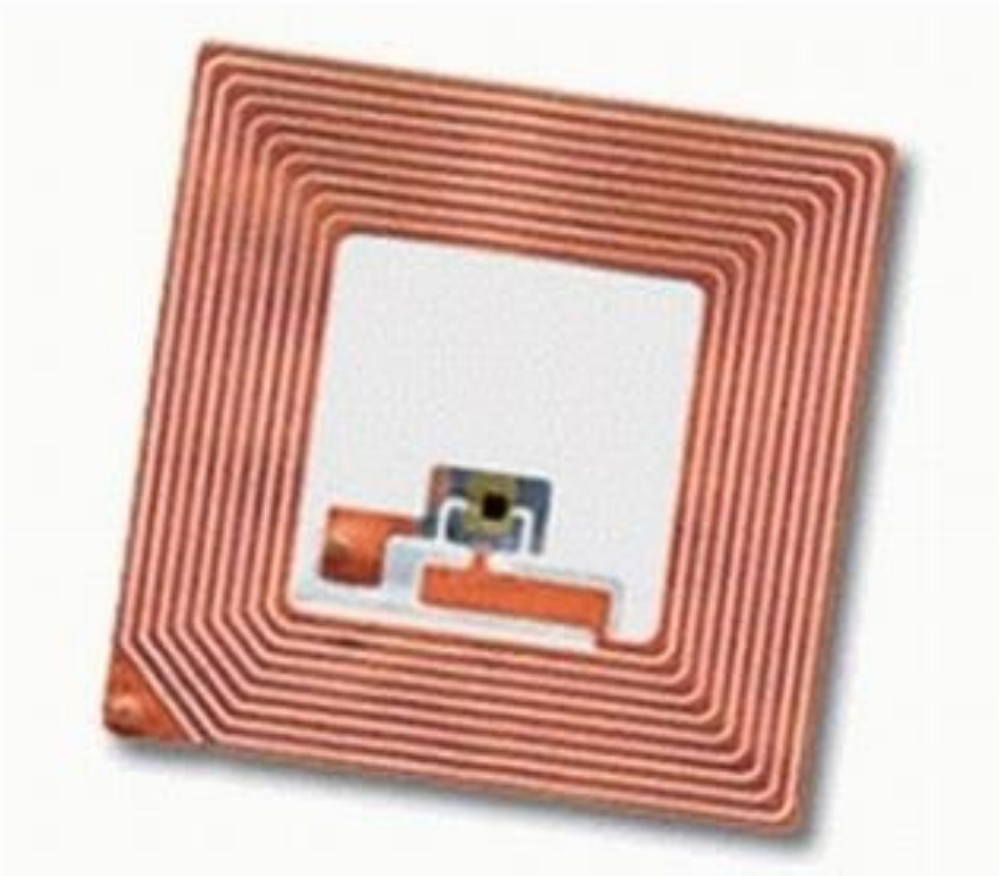
(a) PASSIVE, (b) ACTIVE, AND (c) SEMI-ACTIVE RFID TAGS



RFID Types

- Passive RFID
  - No batteries required
  - Weaker
  - Cheaper
- Active RFID
  - Battery powered
  - More complex
  - Expensive
- Three Main Types of Frequencies
  - Low
  - High
  - Ultra high

RFID Tag



Passive RFID Vs. Active RFID

Power

Passive RFID tags only give off a signal when an antenna distributes a radio signal that powers it.

Since active RFID tags are constantly generating a radio signal they need to have a power source.

Range

Having no direct power source means a weaker signal. These tags can be detected up to 10ft away.

The battery pack on an active RFID tag gives it a good range. These tags signals can travel 350ft

Cost

$

Passive RFID tags can range from $0.15 to $5

$$$$

Active RFID tags can range from $15 to $100

Industry

Passive RFID tags work best for tracking inventory in industries like manufacturing, distribution, and wholesale.

Active RFID tags are most effective in industries where people and large assets need to be tracked

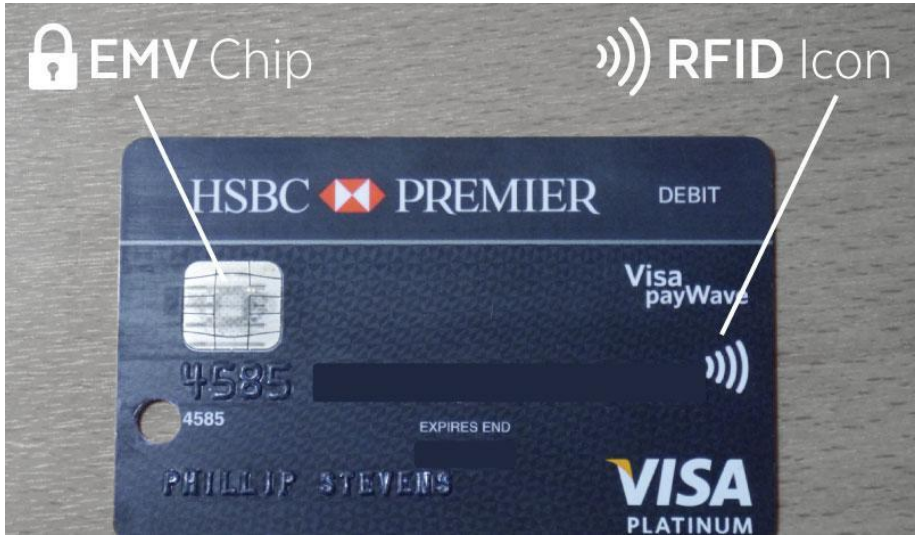
Active -Active RFID systems include tags that have their own internal power supply for increased range.

Active tags possess a battery and usually have larger SMD components.

After a preset amount of time the tag emits an RF '*chirp*'. A reader in the vicinity can listen and hear for this chirp.

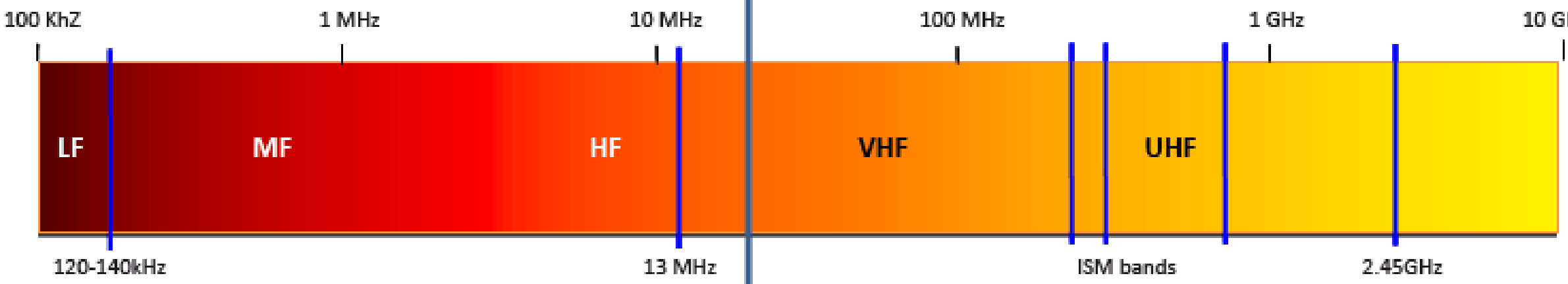
An active tag can be read over much larger distances than passive tags (tens of feet).

Downsides to active tags include greater bulk (because of the battery), limited life span (tag is dead when the battery is exhausted), increased cost per tag, and varying report rates.



EMV STANDS FOR EUROPAY, MASTER CHARGE, AND VISA. THE CARD USES NFC OR NEAR FIELD COMMUNICATION TO WORK, WHICH IS SIMILAR TO RFID.

RADIO FREQUENCY SPECTRUM



Low Frequency
ISO 11784/5
ISO 18000-2

High Frequency
ISO 15693
ISO 14443
ISO 18000-3
NFC

Passive RF

Sub 1 GHz
6LoWPAN
Proprietary
Dash7
ISO 18000-6
SimpliciTI

2.4 GHz
ZigBee
Bluetooth/BLE
ANT
WiFi
SimpliciTI
Proprietary

Active RF

BARCODE VS RFID

BARCODE SCANNER PLACED DIRECTLY IN FRONT OF EACH LABEL TO WORK PROPERLY.

BARCODE CAN ONLY BE READ, AND THE DATA CAN NEVER BE CHANGED.

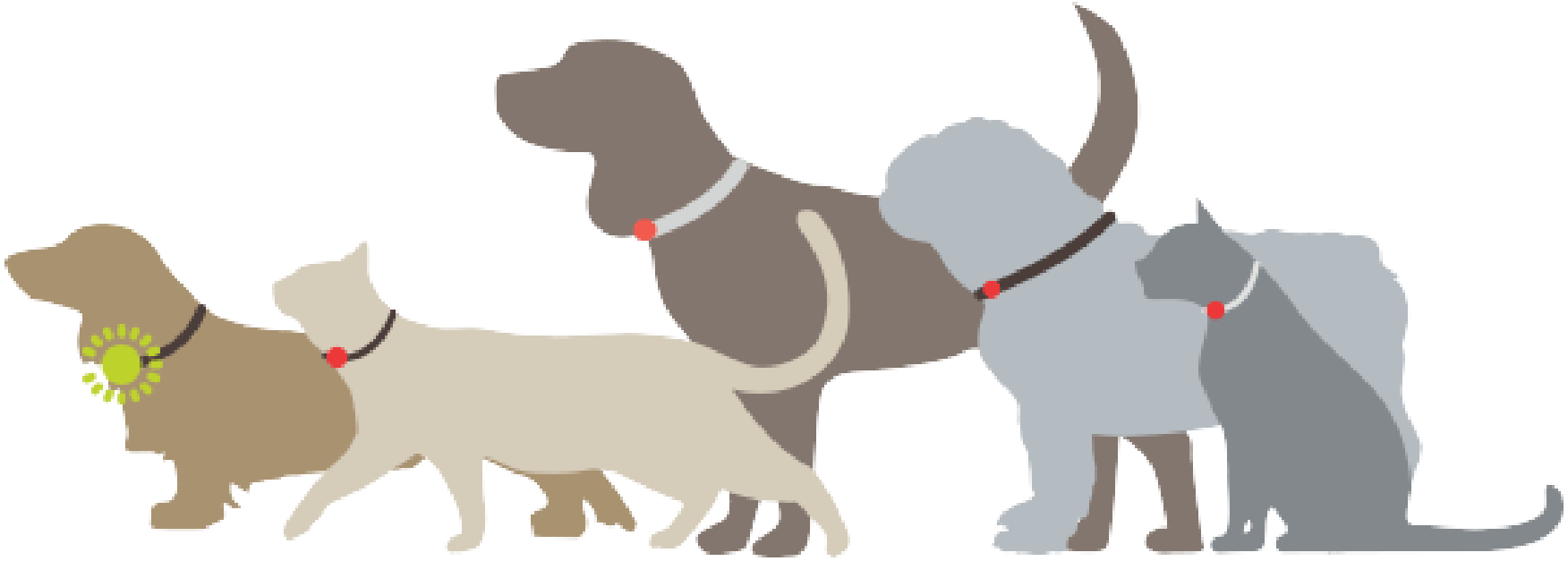
BARCODE ONLY TRACKS ITEM TYPE CAN'T DISTINGUISH BETWEEN INDIVIDUAL ITEM.

NO LINE OF SITE NEEDED SCAN IN ANY DIRECTION

RFID TAGS CAN BE READ, AND THE DATA ON THE TA CAN BE REWRITTEN OR MODIFIED AS NEEDED

RFID ALLOWS FOR EACH ITEM TO HAVE IT'S OWN UNIQUE IDENTIFICATION

Ruddersoft

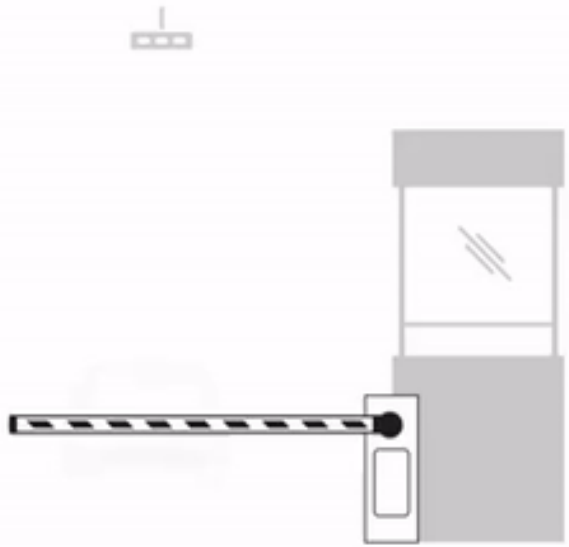


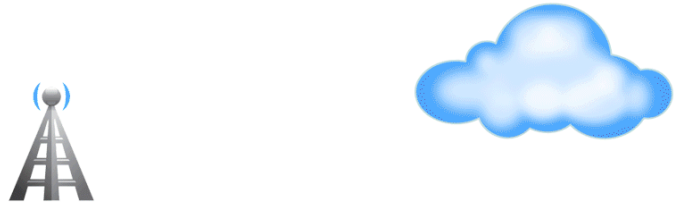
Scans your cats microchip BEFORE your cat gets to the door.

Cats Love It!™

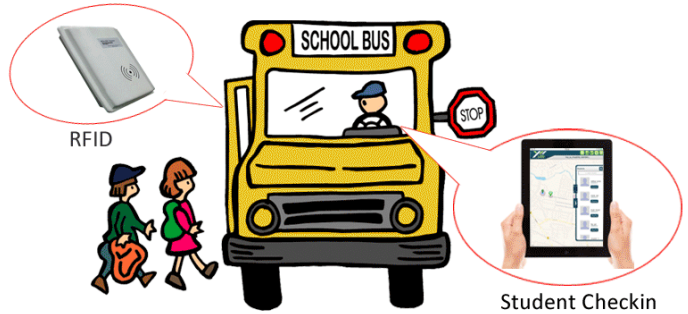

It opens when it recognises
your cat's microchip or
RFID collar tag


2.23L
約1.0K





School administer



RFID

Student Checkin

Parents

For people who go to Disney World, **MagicBands and cards** are secure all-in-one devices that allow you to effortlessly access the plans and vacation choices that you've made with "My Disney" Experience.

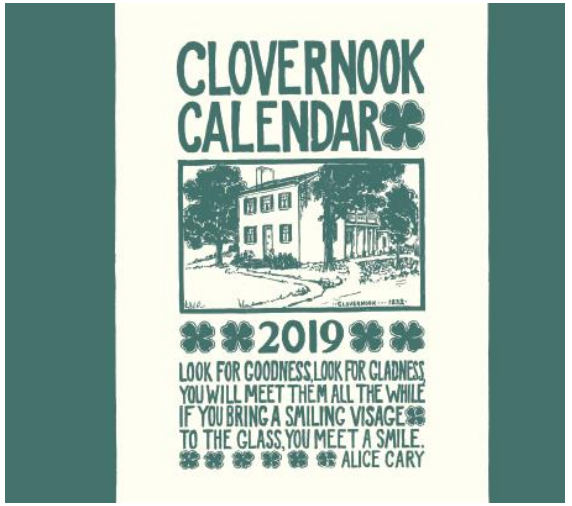
They are colorful, waterproof wristbands—resembling a watch or bracelet—that you can quickly and easily touch to a sensor called a touch point.

Cards work in a similar fashion, but physically resemble a plastic credit card or driver's license. Both MagicBands and cards allow you to travel lighter throughout your vacation.

They both work as RFID (Radio Frequency Identification) devices.

An interesting use of a QR code is to provide background information about a picture in a calendar, for persons who are Blind or Visually-Impaired.

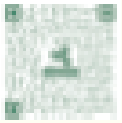
The Clovernook Center for the Blind printed their 2019 calendar in an antique format, using pictures made from wood blocks of scenes from many years ago, with poetry written by one of the women – Alice Cary, who with her sister, started Clovernook.

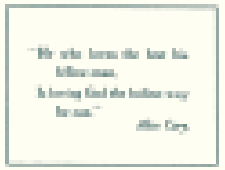


When a person scans the QR code at the lower left of the page, which is on each page, it describes something different for each of the months.

The scanned QR code connects to words that were professionally read, some with sound effects, and then saved to a "SoundCloud" website.

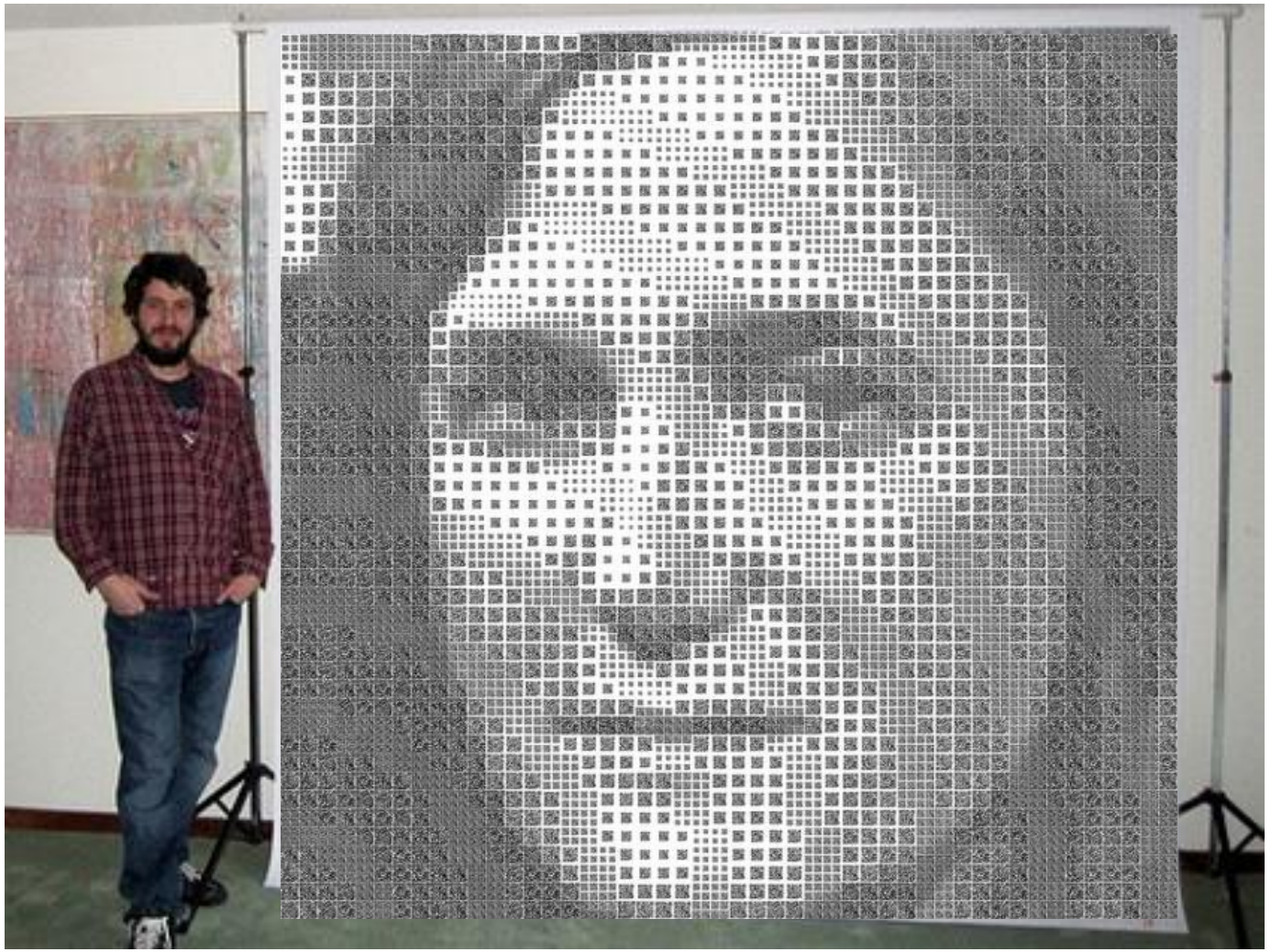
This is what the person hears for the month of May, which shows an image of a woman making a wool blanket while she sits at a wood loom. (the reading is actually for June)
https://soundcloud.com/clovernookcenterfortheblindandvisuallyimpaired/june-1





Amy Goodman

For this portrait by the artist Scott Blake, a total of 2,304 QR codes were used, and each one links to all of the parts of 9 years of videos from the online program – “Democracy Now” that is hosted by Amy Goodman.



https://vimeo.com/24889746

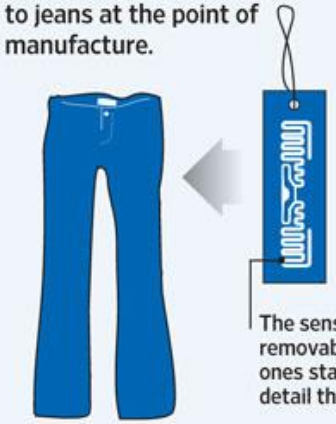
AUTONOMOUS SUITCASE THAT FOLLOWS YOU, BY HAVING A WRIST BAND ON, WITH RFID CONNECTIONS.

https://youtu.be/5-yevDAY-7U

Garment Tracker

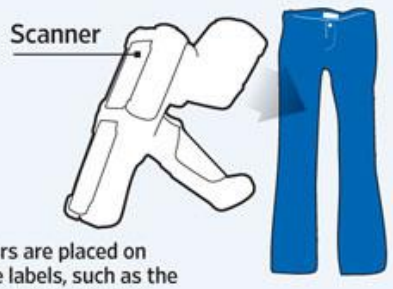
How Wal-Mart's 'electronic product code' system works

1 Suppliers add RFID (radio-frequency ID) sensors to jeans at the point of manufacture.

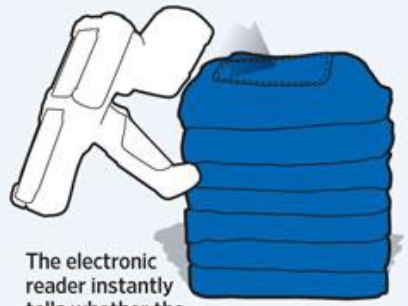


The sensors are placed on removable labels, such as the ones stapled on jeans that detail their size and fit.

2 Workers scan the garment with electronic readers and build a database detailing all the sizes and custom fits available.



3 Workers scan the stacks of jeans to discover which sizes have sold out and need to be replenished.

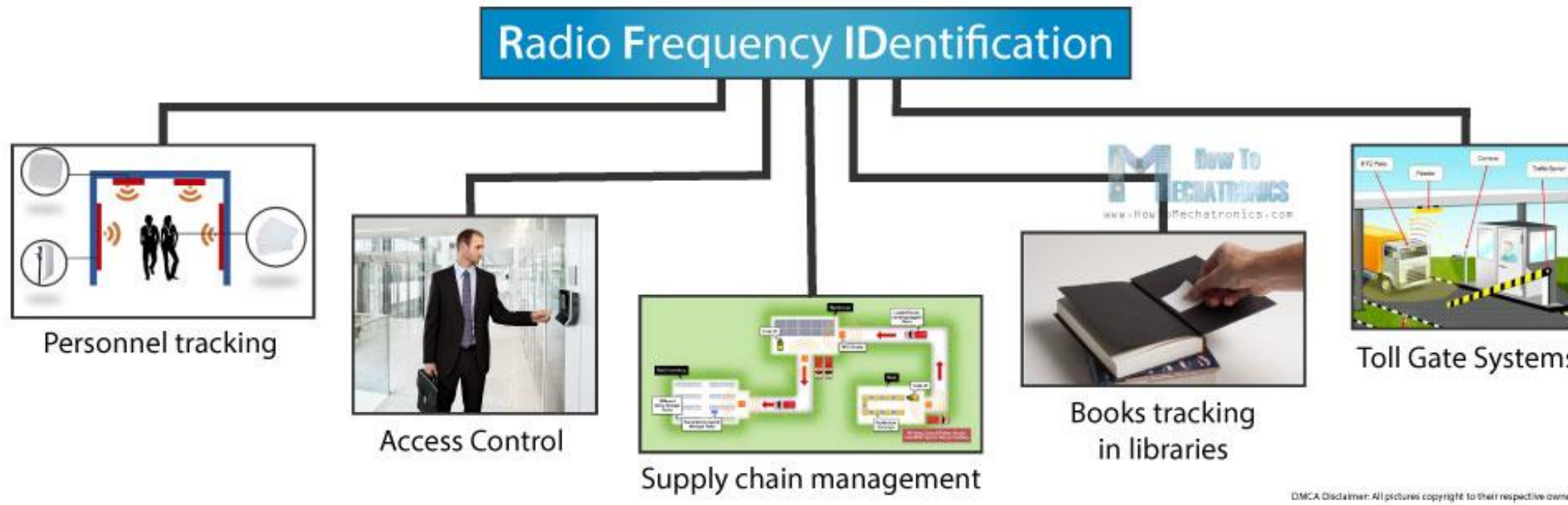


The electronic reader instantly tells whether the sizes are still available in the back of the store, and where they sit.

4 Customers who purchase the jeans take the sensors home when they leave the store, but throw them in the trash along with other packaging before wearing them.

Privacy advocates worry this tags exposes consumers to the possibility that criminals or unscrupulous marketers will scan their garbage to learn their purchasing behavior.

Source: the company



A company called PillDrill launched an RFID-enabled pill-dispensing system designed to help patients manage their medications and monitor their well-being.

The solution, also known as PillDrill, is based around a device called a Hub, which contains a built-in RFID reader.

Users can attach passive RFID tags to pill bottles, pill packs and other types of medicine containers. The company also offers an RFID-enabled weekly pill organizer consisting of seven removable pill containers (pods), each with its own RFID tag attached to its base.

Once a person's medication schedule is programmed into the PillDrill website, the Hub flashes a light and emits a tone whenever it is time for a user to take his or her pills, and its large LCD screen displays precise dosage information. To indicate that the dosage has been taken, the patient waves the appropriate pill container over the Hub.

Savi ST-656-030 Active RFID tag

The Savi ST-656 is an **active RFID tag** for shipping containers that enables shippers, carriers and logistics service providers to monitor their shipments in real time as they move through the global supply chain.

The ST-656's unique C-clamp door-mount design places the sensitive RFID components inside the shipping container. Only the low profile, external antenna casing is on the outside, which significantly reduces the risk of tag damage during the loading, unloading and transportation of shipping containers.

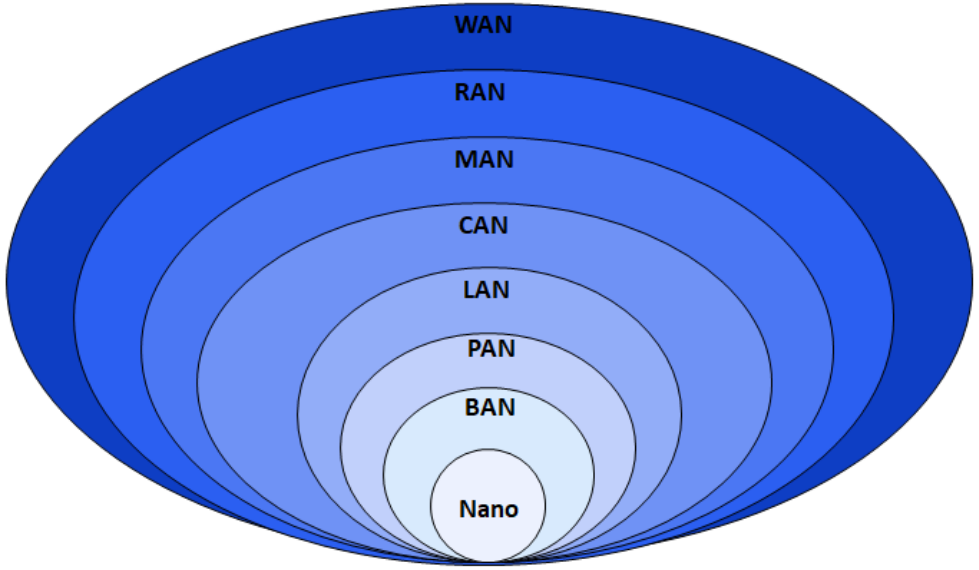
It supports 400 feet (122 m) of RFID communications range, and delivers real-time asset information to guide supply chain operations.

Near-field communication (**NFC**) is a set of communication methods that enable two electronic devices, one of which is usually a portable device such as a smartphone, to establish communication, usually for making a financial transaction, by bringing them within 4 cm (1.6 in) of each other.

NFC devices are used in contactless payment systems, similar to those used in credit cards and electronic ticket smartcards and allow mobile payment to replace or supplement these systems.

NFC is also used for social networking, for sharing contacts, photos, videos or files.

NFC-enabled devices can act as electronic identity documents and keycards and offers a low-speed connection with simple setup that can be used to bootstrap more capable wireless connections.



These are the different types of communication Networks: (the letters AN stand for Area Network)

Nanoscale
Near-field (NFC)
Body (BAN)
Personal (PAN)
Near-me (NAN)
Local (LAN)
Home (HAN)
Storage (SAN)
Wireless (WLAN)
Campus (CAN)
Backbone
Metropolitan (MAN)
Wide (WAN)
Cloud (IAN)
Internet

RFID and NFC (Near Field Communication), the third rapidly rising trend we are seeing in the future of barcodes, is the incorporation of radio tags, like RFID or increasingly NFC tags, being incorporated into more and more items.

These types of tags enable non-connected objects, like boxes or clothing, to become an active part of the "Internet of Things," transmitting their location in the warehouse or triggering your smartphone to show you a product video when you walk by.

NEW CONCEPTS IN PROTECTIVE PACKAGING

Photo recognition is becoming a large scale reality has a fantastic potential application in replacing the way we traditionally think about barcodes, because the entire object becomes scan-able by itself.

As scanner technology continues to evolve, there will be less need and demand for 1D barcodes.

THE SMARTLABEL SYSTEM - With consumer needs in mind, the Grocery Manufacturers Association (GMA) in 2015 announced plans for an unprecedented initiative that brings more transparency into and more information about what's on store shelves.

This U.S. initiative, ultimately named SmartLabel, uses QR code as well as online technology to provide extensive product details for any item in the food, beverage or consumer goods space in an easy and uniform way.

The Coca-Cola Company became an early adopter of the GMA program. "The purpose behind everything we are doing with SmartLabel is to provide full transparency and promote clear facts for all of our products, to make sure shoppers have access to every possible piece of information to help them make informed decisions," said Tim Goudie, Director of Social Commitment at Coca-Cola.

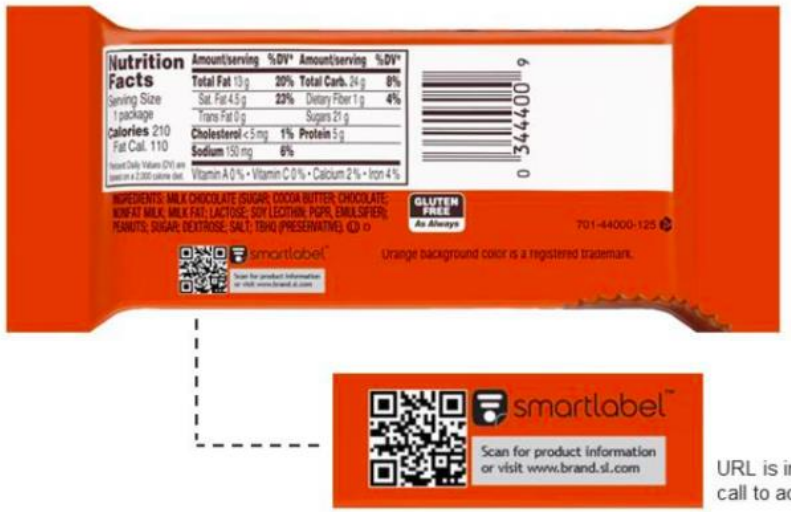
https://www.youtube.com/watch?v=jdpIBK7BsSo

These 5 images give examples of information found when scanning a “SmartLabel” QR code, with your Smart phone.

Nutrition, Ingredients, Allergy information, Other Information, and info about the Company and Brand.

Provisioned for: **food & bev, non-food, pet food, OTC/medical devices, vitamins & supplements**

Nutrition | Ingredients | Allergies | Other Information | Company/Brand



REESE'S PEANUT BUTTER CUPS WITH ITS "SMARTLABEL" MESSAGE AND CODE

Major brands have been busy developing their SmartLabel programs, and recent updates from USDA regarding GMO/BioEngineered food marking have provided brands that were waiting with a clear path forward.

Detailed product information from more than 36,000 products from over 826 brands are already online with more being added every day. To compete, companies in the CPG space need to include SmartLabel!

WHAT IS A SMART PRODUCT SMART PACKAGING

QLIKTAG
www.qliktag.com

Insignia Technologies (www.insigniatechnologies.com) has launched a new smart label aimed at improving customer confidence in the quality of their food while cutting down on unnecessary waste.

Easily incorporated into any film lid, the label is activated when a packet is opened and triggers a timer that changes color as the food within loses freshness – meaning hungry fridge-raiders can tell straight away if their snack is out of date or not.


THE
END