Birth of the Barcode

DIGIMARC

DIGIMARC DISCOVER®
digimarc.com/app

SCAN IMAGE
from 4"-7" away

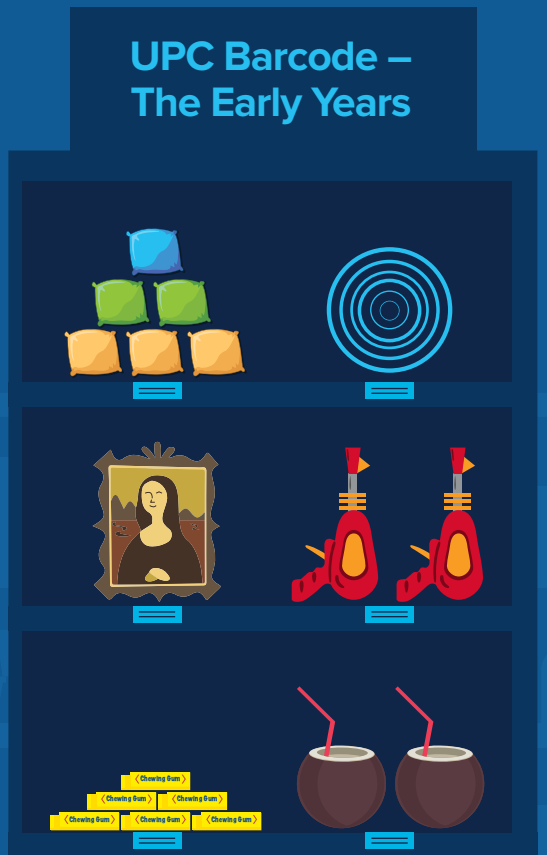
A Story of Imagination

The Universal Product Code (UPC) barcode might not be as universally recognizable as the Mona Lisa, but millions across the globe know it instantly.

The birth of the barcode is a story of imagination, persistence and ingenuity. The story has it all: lasers, Morse code and inspiration on the beach. And if that wasn't enough, don't forget bull's eyes, bean bags and a surprise appearance by Big Blue.

The birth of the barcode reminds us the history of retail is really the history of the relationship between technology and retailers.

Since the earliest days, grocers and retail executives have not only embraced technological innovation at every turn, but actually demanded the innovation community create the tools they needed.



A Need for Innovation is Born

There are many challenges today for grocers and retailers, but they pale in terms of what early generations dealt with.

In 1948, one frustrated supermarket manager went to the Drexel Institute of Technology in Philadelphia for help. He felt there had to be a way of getting shoppers through stores more quickly, and technology might help.

The dean listened, but offered no help. Yet two men associated with the university, Bernard “Bob” Silver and Joe Woodland, soon became interested and began working on an invention.

Hard Times in the Pre-Tech Era

- *Before the invention of barcodes and scanners, retailers had to close the store to take inventory by hand. Even more challenging: there was no way of tracking purchases.*

A Bull's Eye at the Beach

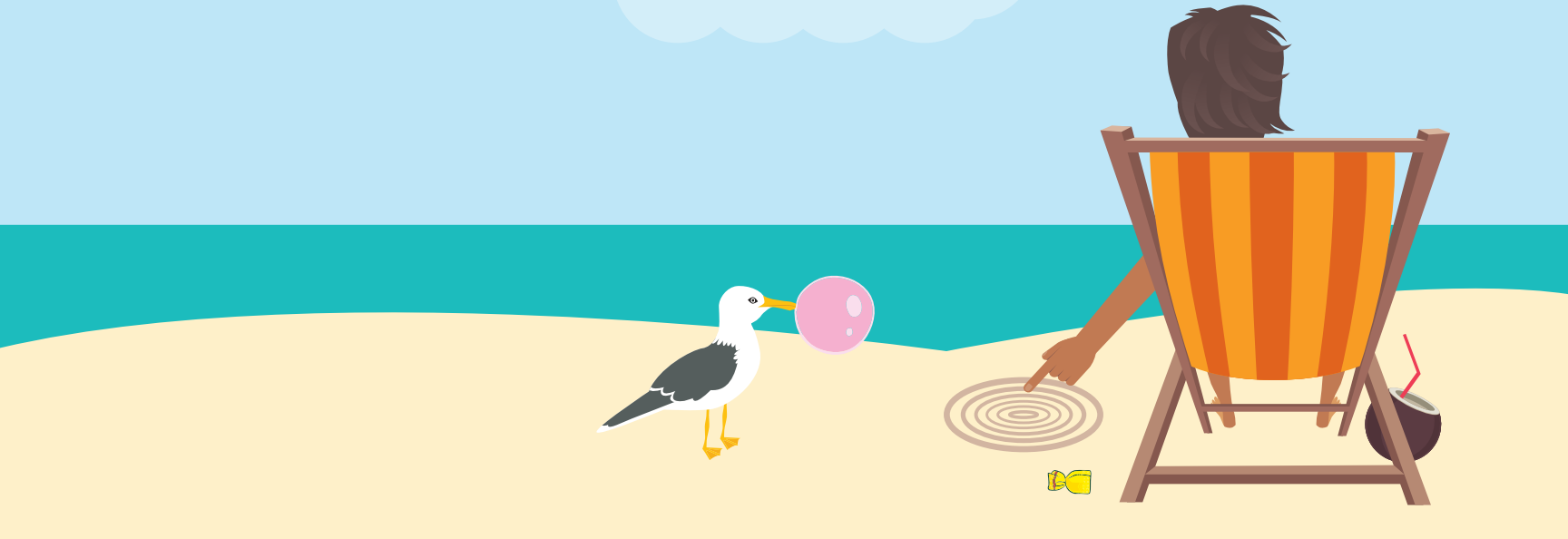
Woodland's eventual inspiration for the barcode came from an unlikely source—Morse code. In his mind, Woodland transformed dots and dashes into wide and narrow lines.

He got the idea while sitting at the beach. He dragged his four fingers across the sand, forming straight lines. Then, seconds later, he sunk his fingers into the sand again and made a circle. **The first barcode—the bull's-eye version—would be round.**

His proto-barcode scanner, however, didn't work. It was underdeveloped, bulky, unwieldy and couldn't be read because there wasn't a bright enough light to read the code.

The Cost of Being Pioneers

Woodland and Silver sold their patent to Philco in 1962 for $15,000 because their technology was ahead of its time.



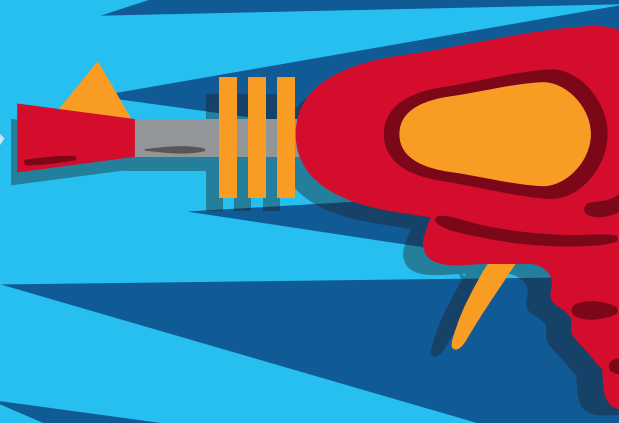
A Laser to the Rescue

While Silver and Woodland were struggling with their invention in the 1960s, there were concurrent technological developments that would eventually foster the birth of the barcode.

In 1960, Hughes Aircraft Company announced it had created an “atomic radio light brighter than the center of the sun.”

In other words, Hughes had created the first laser.

The laser solved the problem of the bulkiness of Woodland’s scanner, as well as mitigating the heat problems that resulted from its 500-watt lamp beaming onto the paper and the ink of the barcode.



Retail’s Sci-Fi Weapon

Nobody predicted the laser would revolutionize the retail industry. Lasers were still sci-fi. Headlines had titles like, “L.A. Man Discovers Science Fiction Death Ray.”

RCA Enters the Picture

By the 1970s, the technology Woodland dreamed up in the 1950s was feasible and close to commercial maturity.

This encouraged several other companies to examine the burgeoning technology, one of which was the Radio Corporation of America (RCA).

It's difficult to imagine today, but 50 years ago the RCA brand had the weight and power of an Apple or a Samsung. RCA was an iconic American company that had been involved with pioneering work in radio networks, radio receivers, phonographs and eventually television.

The entrance of such a major electronics pioneer was a clear signal to both the retail and technology community that the barcode was an innovation of great significance.

GE Finishes What it Started

RCA was founded in 1919 by General Electric (GE), but was forced to divest its control in 1932. In 1986, GE repurchased the company and ultimately sold off its assets.

Kroger Dreams Retail's Future

But while the technological underpinnings of barcode scanning were coming together in the late 1960s, retailers of the era were still dealing with the same challenges of their counterparts in the 1940s.

In 1966, the Kroger Company, which ran one of the largest supermarket chains in North America, created a brochure that was essentially **a letter to the technology community**, ending with this aspiration:

> "Just dreaming a little . . . could an optical scanner read the price and total the sale... Faster service, more productive service is needed desperately. We solicit your help."

4 5 6 7 8

One Idea That Didn't Work

A system where customers picked out a punch card for a product, and then handed them to cashiers who retrieved it.

The Bull's Eye Misses the Mark

A small research team at RCA Corporation heard the call and got involved. They uncovered previous attempts at developing a barcode—learned from the mistakes—and plowed ahead.

In 1971, RCA bought the original Woodland/ Silver patent from Philco... **the barcode was about to come-of-age**.

RCA quickly identified printing the bull's-eye barcode as one of the biggest challenges, because any imperfections interfered with the barcode functioning. Yet despite the challenges, the bull's-eye barcode remained largely accurate and could be scanned from any angle, helping RCA to secure an 18-month barcode testing period with Kroger grocery stores.

Grocery Sales - Then and Now

In 1972, total food store sales in the U.S. were $100 million (this was an increase of 43% from 1967). Things have really changed: In 2016, total supermarket sales were $669 billion.***

**1972 Census of the Retail Trade, U.S. Dept. of Commerce*

***Progressive Grocer's 84th Annual Report of the Grocery Industry, April 2017*

Putting the ‘Universal’ in UPC

In 1972, the first automated checkout counters were installed at a Kroger in Cincinnati, Ohio. When the checkout counters with scanners were added to additional stores, Kroger began to see evidence of increased sales at these stores—**the bull’s-eye barcode had proved its worth**.

Yet one obstacle remained for the barcode to take off—universality.

To make the barcode universal, a consortium of grocery leaders created the Ad Hoc Committee of the Universal Product Identification Code.

Did You Know?

Today, the universality of barcodes is managed by the GS1 organization, which created global standard barcode definitions.
www.gs1.org

Resistance from the Status Quo

But before the ball could get rolling, the Ad Hoc Committee faced initial resistance.

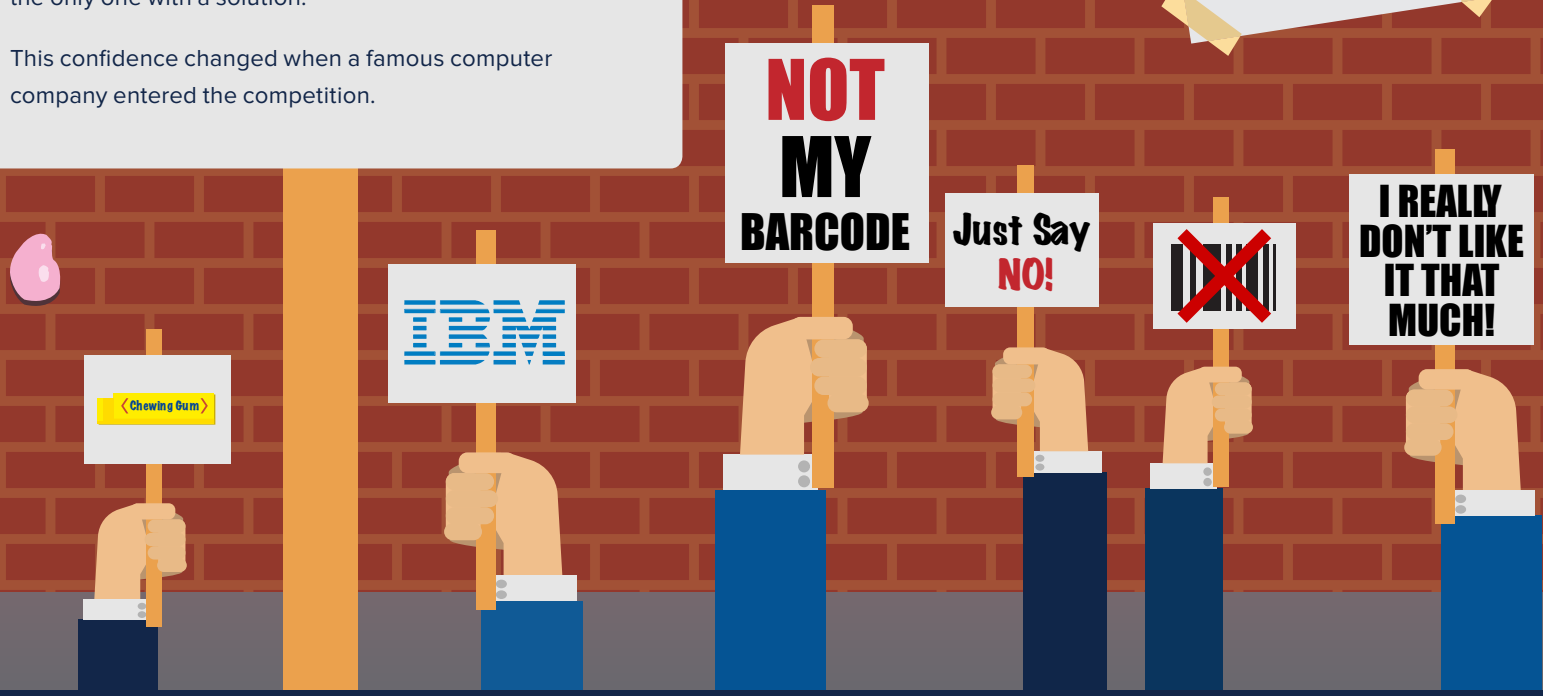
Brands and manufacturers had their own identification codes and were resistant to the idea of a new code.

The committee eventually put out a Request for Proposals and seven U.S. companies submitted bids. RCA was one of them, and naturally assumed it would win because it was the only one with a solution.

This confidence changed when a famous computer company entered the competition.

The Barcode Parameters

The committee had very specific parameters: The barcode must be a maximum 1.5-square inches and there had to be fewer than 20,000 undetected errors.



Enter Big Blue

International Business Machines (IBM) made a surprise bid, and they did it with Joe Woodland, who now worked for IBM.

In the end, **George Laurer developed a rectangular code** because it could hold the necessary data, while being smaller than a bull's-eye and eliminating ink smearing. The Ad Hoc Committee was enthusiastic and decided to adopt the proposal in March 1973.

A Fast-Pitch Barcode

To disarm barcode skeptics at IBM, the inventors taped barcodes to the bottom of bean bags and pitched them across the scanners. Each one read correctly.

A Pioneering Pack of Gum

On June 26, 1974, the first product with a UPC barcode—a package of Wrigley gum—passed over an NCR scanner at Marsh Supermarkets in Troy, Ohio.

The Barcode Era Had Begun.

To be continued. Next in our series, the barcode comes-of-age.

DIGIMARC DISCOVER®
digimarc.com/app

SCAN IMAGE
from 4"-7" away

DIGIMARC

DIGIMARC CORPORATION
9405 SW Gemini Drive, Beaverton OR 97008
T +1 800 DIGIMARC (344 4627)
F +1 503 469 4777

digimarc.com | info@digimarc.com

ABOUT DIGIMARC CORPORATION

Digimarc Corporation (NASDAQ: DMRC) is a pioneer in the automatic identification of everyday objects such as product packaging and virtually any media, including print, images, and audio. Based on the Intuitive Computing Platform (ICP™), Digimarc provides innovative and comprehensive automatic recognition technologies to simplify search, and transform information discovery through unparalleled reliability, efficiency and security. Digimarc has a global patent portfolio, which includes over 1,100 granted and pending patents. These innovations include state-of-the-art identification technology, Digimarc Barcode, as well as Digimarc Discover® software for barcode scanning, and more. Digimarc is based in Beaverton, Oregon, with technologies deployed by major retailers and consumer brands, central banks, U.S. states, film companies and professional sports franchises, among others. Visit digimarc.com and follow us @digimarc to learn more about The Barcode of Everything™.

Sources:
"The History of the Bar Code" – Smithsonian.com, Sept. 2015
"It's a Wrap: GE, NBC Part Ways, Together They've Changed History" – GE.com, February 2013
"A Short History of the Modern Bar Code" – The Eye & 99% Invisible, April 2014