SCAN The DATA CAPTURE Report

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July 31, 2009

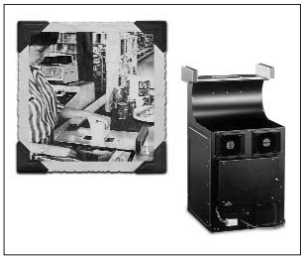
Special
SCAN: The DATA CAPTURE Report
Reprint

Bar Code Scanning—The Conception Of An Industry

The first bar code scanner used in a retail store is celebrating its 35th birthday this year. That scanner, born in 1974 at the **Spectra-Physics** company in Mountain View, California (now **Datalogic Scanning** of Eugene, OR) weighed 112 pounds and was 32 inches high. Many people know that the first scan of an item in a live retail checkout, anywhere in the world, was at a **Marsh Supermarket** in Ohio. But, like most births, most people don't know the true story surrounding the conception of the scanner.

A Bar Code and a Prayer

Bar code concept patents have been around since the 1940's, but in 1970 the **Super Market Institute** (soon to become **FMI**) contracted with the **Battelle Memorial Research Institute** to perform a feasibility study to look at using bar codes to improve front-end automation in retail stores. The Super Market Institute and the newly formed standards committee, the **Uniform Code Council** (**UCC**), began a drive to decide on a bar code standard in time to piggyback on a major change in packaging that was about to happen—mandated nutritional labeling. Several companies, including **IBM** and **RCA** (with their bull's-eye code) submitted bar code symbologies for consideration, but ultimately, at its annual convention in 1973, SMI announced the (10-digit) UPC symbology as the standard. Since the UPC symbology was close to the original proposal submitted by IBM, that decision put IBM ahead in the race and seriously threatened many of the other industry players' positions.



Prototype scanners were replaced several weeks later with Spectra-Physics production models called the Model-A.

Two Spectra-Physics employees were at that convention at the time of the announcement—product manager Ron Elcheson and engineer Dale Crane. They had actually gone to the convention to sell Helium-Neon laser tubes to point-of-sale (POS) and other OEM vendors on the assumption that they would be frantically scrambling to build bar code scanners. What they quickly learned was that, with the exception of IBM, very few of the potential players had the core engineering resources to build a full laser-based scanner. Elcheson and Crane knew they could.

Jon Tompkins and Al Hildebrand, senior managers

of the Laser Products Division of Spectra-Physics (the world's first commercial laser company founded in 1961), recall how Ron and Dale had drafted an internal development proposal on the flight from Dallas back to California. Both rushed back to headquarters as soon as the plane landed to present their proposal. In response, Spectra-Physics quickly formed a team of fourteen engineers to develop a complete bar code scanner.

However, they soon discovered that they did not have the software expertise necessary to write the complicated bar code decoding algorithms needed to translate the bars and spaces into numbers that could be used by the POS software to identify the items.

This lack of decoding expertise became a serious threat to the project, but then, fate intervened. Elcheson received news on a Friday morning that **Pitney-Bowes** was shutting down its scanner development group and would be displacing software engineers. By 2:00 p.m. that afternoon Spectra-Physics representatives were on a plane and in the Pitney-Bowes personnel offices before any of the lay-offs began. They hired three decoding engineers on the spot and had them working on the project in Mountain View, California by the following Monday morning. That saved the project.

FACTS ABOUT THE MAGELLAN MODEL A SCANNER

Width:	16 Inches
Depth:	20 Inches
Height:	32.25 Inches
Weight:	112 Pounds
Mirrors:	52
PC Boards:	8
Laser Life:	3,000 Hours
Operating Power:	375 Watts
Quantity Built:	28
Selling Price:	$12,500

When IBM demonstrated a bar code scanner at the **National Retail Merchants Association** (now **NRF**) show early in 1974, the AIDC industry was born. Later that same year, at the SMI trade show in May, Spectra-Physics' new Model-A scanner was displayed in over 10 other companies' booths and orders for 28 scanners were secured. The first was delivered to **Singer** with the remaining 27 scanners to be delivered to seven other customers. Seventeen of those scanners were destined for **NCR Corporation**. The NCR order included a "feasibility" model, which cost $55,000, six engineering prototypes at $10,000 each, and 10 production prototypes at $4,000 each.

The Real Visionaries

Clyde Dawson, research and development manager of Marsh Supermarkets and owner Ron Marsh may have been the truest visionaries. Marsh, who had installed one of the first NCR terminal-mainframe POS systems, the revolutionary 255-726, was shown the Spectra-Physics scanner prototype by NCR representatives. Both Dawson and Marsh recognized bar code scanning as the wave of the future and consented

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- Smart cards
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Vol. 32, No. 15

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SCAN/DCR is published 24 x per year, on the 2nd & 4th Fridays of the month, by:

RMG Enterprises, Inc.
4003 Wood St.
Erie, PA 16509

PH (814) 866-1146
Web Site http://www.scandcr.com

Subscriptions: $597 per year for electronic copies.

to do an installation in their store in Troy, Ohio.

Only true visionaries could have seen past the implementation hurdles and glimpsed the future possibilities. The hurdles they faced (and ultimately overcame) included the fact that, in 1974, most items didn't have UPC bar codes. Additionally, the scanner prototype was so large that new check stands had to be designed [*See sidebar with specs*]. There were no ready-made item scanning files. Those had to be built from scratch. Those first scanners required 375 watts of power per lane and the laser tubes had an estimated life of just 3,000 hours or about two years averaging just four hours of use per day. Constructed using 52 mirrors and eight printed circuit boards the scanners weighed 112 pounds each. The final hurdle was that each scanner cost $12,500 which in 2009 dollars is about $56,880.

The cost of scanning was even more daunting because, in those days, consumers expected each item to have a price sticker even if it had a bar code. Stopping this practice and going to shelf-edge price marking would have provided a better return-on-investment through reduced labor, but it was unacceptable to the general shopping public at the time.

Marsh had to pressure manufacturers to print bar code labels on items, something that the package printers were not sure they could even do. Marsh also had to create their own labels for many of the items in their store, which was a challenging process by itself.

Building the item file was yet another significant challenge that had to be overcome before that first scan happened. Each item had to have its own punch card created and loaded into the POS system, and prices had to be manually verified for each item.

Once the item file was created and the prototype scanners were installed in all six lanes, Spectra-Physics, NCR, and Marsh technicians had one week to test and verify the system prior to going live.

Many have heard that the first item scanned at Marsh's 8:00 a.m. opening that day in June, 1974 was a 10-pack of *Juicy Fruit* gum. The rest of the story is that the gum was marked at 69 cents, but, was scanned and rung-up as 67 cents. One can only imagine what the technicians and store management observing the event were feeling when that happened. Luckily, they soon realized that Marsh had always discounted this item two cents, so the POS scanning system was correct. Thus, that first scan was a success!

The End of the Beginning

The Marsh supermarket in Troy became a pilgrimage site for retailers and manufacturers around the world. The prototype scanners were replaced several weeks later with Spectra-Physics production models called the Model-A. NCR and Spectra-Physics signed a $10 million contract and the industry was off and running.

Only two of these original Spectra-Physics Model-A scanners are known to exist. One is in Datalogic Scanning headquarters in Eugene, Oregon and the other is in the **Smithsonian Museum** in Washington, D.C. Today that scanning "beep" is everywhere and is heard five billion times every day around the world. **SCAN**