SCAN newsletter Ltd.

The management Newsletter for all industries involved with bar-code scanning and related technologies.

SCANNING, CODING & AUTOMATION NEWSLETTER • 11 Middle Neck Road • Great Neck, N.Y. 11021 • (516) 487-6370

Volume XIII Number 3 November 1989

After everything -- and everyone -- had settled down....

....late Tuesday night, October 17, the decision was made to let the conference and exposition proceed as planned. This judgment was based on the fact that there was little damage to the Convention Center and that all utilities were restored to reasonable normalcy.

What the managers of SCAN-TECH 89 in San Jose did not fully anticipate was that the awesome earthquake would persuade many of the visitors who were already at the show to turn around and go home as quickly as possible -- and that it would discourage a large number of those who planned to arrive Wednesday or Thursday from ever leaving home. (Even two of the smaller exhibitors packed up their booths and took off for home on Wednesday morning.)

Whatever financial disappointment there may have been, it pales in comparison to the disaster that was avoided. San Jose, much closer to the epicenter than San Francisco, miraculously escaped any serious damage. When one contemplates the number of people from the automatic identification industry who were clustered inside a few acres at 5:04 P.M. on that day, we can all be thankful that we can look forward to SCAN-TECH 90 and beyond.

The AIM organization is currently analyzing the impact of what happened in San Jose and exploring options as to what can be done to make up for any lost opportunities.

Which is not to suggest....

....that SCAN-TECH 89 was a complete bust. The seminars remained well-attended, with only spotty audience drop-offs on Wednesday and Thursday (when you've prepaid the fees for an entire seminar series, not even a 7.1 quake will send you home). The keynote speech on Tuesday morning by Louis Rukeyser was considered the best ever. And although the aisles in the convention hall were somewhat sparse on Wednesday and Thursday, those who remained will remember "SCAN-QUAKE 89" for more than the powerful and cantankerous San Andreas Fault.

The comment we heard most often from the experienced observers we interviewed was: "This was a printers' show." They were referring to the quality, speed

ISSN 0273-3080

INCLUDING THE INTERNATIONAL EDITION

and performance of the available bar code printers whose efficiencies have increased enormously over the past two years -- while the prices continue to drop. (Thermal transfer, in particular, seems to have stolen the spotlight from every other method.) As bar code scanning expands into application areas requiring large quantities of on-demand labels -- e.g. UPC on apparel, Code 39 on factory tools -- the importance and need for high-speed, quality printers has increased.

A good example of this improvement in printing-performance was demonstrated by Atech (Irvine, CA), which introduced what they refer to as: "The world's fastest, most powerful, and very affordable thermal transfer printer." Atech's Model 196 produces 203 dots per inch on a 4-inch web at speeds of up to 8 inches per second. According to VP-Sales, Chuck Mara, at the heart of the improved speed and performance is the latest National Semiconductor 32-bit processors which drive their new unit. The price is $3,700. (Competitive to the Atech unit is Zebra's Model 90, which uses a 16-bit processor, prints at 6 inches per second on a 3 inch web, and is priced at $3,950.)

Markem's Model LP 385 combines both thermal transfer and foil hot stamping technologies to produce a multi-color decorated label. At the first station, the thermal transfer process produces the variable information and graphics, including a bar code (at 203 dots per inch). The web proceeds to two hot stamping stations and then on to laminating and die cutting. At $45,000 per copy, the machine will produce 50 labels per minute.

Moving away from printing to bar code scanning, the emphasis was mostly on product improvement, but there wasn't too much that was dramatic. Symbol Technologies demonstrated that standard black and white bar codes (with a .050 inch "X" dimension) can be read from a distance of 15 feet with their new LS 8500 XL Visible Laser Diode Scanner. The company sees a market for these units in large open environments where merchandise and containers may be stacked or stored on high shelves.

No one came away from SCAN-TECH 89 overwhelmed by the innovations in hardware. Said one old-timer, who has been involved in bar coding since its infancy: "It was so mature, it was almost boring." The remark was made with more pride than sarcasm, but it should also be noted that hardware may not be the best route to future industry growth.

What may very well be the coming wave of the future....

....are mega-density symbologies. This breakthrough technology was explored in two private, by-invitation-only, showings at SCAN-TECH 89. Each of these presentations took a totally different approach in its attempt to achieve the same goal -- i.e. how to pack the maximum amount of machine-readable information into the smallest possible area.

> One of the underlying principles (and latest catchwords) that has stimulated interest in this corner of the technology is the concept of the "portable database." As more and more information can be crammed into less and less space, the machine-readable code is no longer restricted to its function as a "license plate" or identifier that merely serves as a pointer to a host computer database. Rather, the symbol will become a stand-alone database in and of itself. The implication is that, beyond a certain threshold (not as yet clearly defined), enough data can be encoded

directly onto a document or product, and then automatically retrieved, to provide all of the necessary identification information, including its description, source, location and destination.

At one of the special presentations in San Jose, Symbol Technologies distributed a theoretical paper on this subject, titled "Fundamentals of Bar Code Information Theory." The authors were Jerome Swartz (Symbol's Chairman), Ynjiun Wang (Staff Scientist) and Theo Pavlidis (Professor at the State University of New York at Stony Brook and consultant to Symbol).

The paper's abstract states in part: "We propose a method for maximizing the density for a given readability level...[by] the use of error detecting and error correcting techniques." In the Introduction to the monograph, the challenge is expressed in the following terms: "The basic problem is that of encoding information on some medium using printing technology. Any such encoding has the following conflicting requirements: (a) we want the code to have high density information; (b) we want to be able to read the code reliably with the available scanning technology; (c) we want to minimize the cost of the printing process; (d) we want to minimize the cost of the reading equipment."

Although this paper is presented as a preliminary treatise which explores the fundamentals of bar code theory, informal discussions revealed that the authors believe their analysis has important future implications. Based on these theories, they predict that two-dimensional bar codes can be developed which will reside in an area of under 2 square inches and be five to ten times more dense than Codes 49 or 16K. The authors also anticipate that this bar code will be fully compatible with other standard symbologies (UPC, 39, 128, etc.) so that the same scanners can interchangeably autodiscriminate and read them all in a mixed environment.

Symbol is not discussing, for publication, any of the planned application areas or a timetable for implementation. However, Swartz has clearly stated that any further developments will be immediately placed in the public domain, regardless whether these developments become patentable. His paper has been accepted by the *IEEE Journal* for peer review, which is presently under way.

Much further along in the realization of a mega-density symbol is Datacode International. Although his product is reportedly ready for the market, with special hardware expected to be available for shipment by the end of this year, company President Dennis Priddy decided to show it privately in a hotel suite rather than take a booth at SCAN-TECH.

Priddy describes his "data code," which has been under development for several years, as a "two dimensional, dynamically variable, machine readable binary symbol (patent pending)." He goes on to explain the data code's unique features as follows:

- "User-selected physical size -- from .001 inch square to 14.000 inches square, regardless of how much data you encode.
- "The ability to encode from a single character to 500 characters within the same user-selected physical size.
- "The full ASCII character set is available in English and full ISO character sets are available in over 15 international languages.

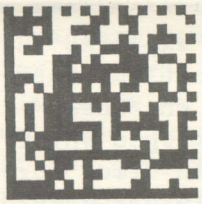
- "The data code symbol is extremely robust -- scratches, smudges, and staple holes will not render it unreadable.

- "Data codes of differing physical sizes and differing amounts of information can be read interspersed, at any angle or rotation, by the same reader.

- "Both 'public' and 'private' information can be encoded within the same data code thereby allowing one group of users full access to all of the encoded information while, at the same time, granting other groups of users access to only part of the information.

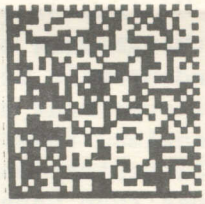
- "Data codes can be printed on any surface or substrate using standard office printers (dot matrix, ink jet, or laser), label makers, or other computer-controlled devices such as laser beams and etching devices. The data code can also be photo-reduced and placed on a microdot."

Representative data codes indicating varying densities on a 1" square:



0123456789
ABCDEFGHIJKLMN
OPQRSTUVWXYZ

0123456789ABCD
EFGHIJKLMNOPQ
RSTUVWXYZabcd
efghijklmnopqrstuv
wxyz



0123456789ABCD
EFGHIJKLMNOPQ
RSTUVWXYZabcd
efghijklmnopqrstuv
wxyzk@#$%^&*()_
+{}:"<>?~',./;'[]-=

Priddy asserts that the architecture of the data code provides capabilities, flexibility, and ease of use that simply are not possible with magnetic stripe, OCR characters, one-dimensional bar codes, or even the new ultra high density Code 49 and Code 16K for two-dimensional bar codes.

He describes the data code readers as using two-dimensional, charge-coupled device (CCD) technology. The reader takes an electronic "snapshot" of a visual area containing the data code and transfers the captured image into a Datacode Controller for processing. The data code is recognizable regardless of its location within the field of view and regardless of its angle of rotation to the reader. The family of standard readers will accommodate hand-held, fixed-station, and high speed conveyor/transport applications. Although the current controller is designed to read data codes at a rate of two to five per second, systems can be configured to read at 10 to 20 per second.

COMMENT

The impressive advances, made in just the past 2 years, in designing machine-readable symbols of higher and higher densities, suggest totally new markets and applications that have not even been recognized or described as yet. The treatise presented by Symbol Technologies, and the Datacode system which is about to enter the market, provide a glimpse into the future. The potential impact of the portable database on the automatic identification industry could be enormous.

After being relatively dormant....

....in the bar code scanning business for about five years, Skan-A-Matic is making a bid to come on strong once more. The company has been a leader in the field of optical sensing for over 20 years and produced some of the first bar code scanners and decoders on the market.

In 1986, Skan-A-Matic realized it needed more capital to expand and actively sought a corporate buyer. In October, 1987 the Electro Company, a Florida-based manufacturer of motion, presence and position scanners, bought the company. Their initial plan was to reinvigorate Skan-A-Matic -- particularly the bar code scanning product line. A promise was also made to retain the company's upstate New York location. But not much happened until January, 1989, when Bill Goble came aboard as the new President of Electro and began to make some changes.

One of his first moves was to merge the photo-electric portion of Skan-A-Matic with a new acquisition -- OptoSwitch -- located in Texas. Then the bar coding operation, which had been moseying along on its existing product line with little active promotional activity, was moved to Sarasota. A research and development program was also launched to add new products.

On October 16, 1989, Electro announced that it was acquiring another company, LazerData (formerly InstaRead, before a management leveraged buyout and name change in 1988 -- *SCAN* Jan 89). LazerData is the Orlando, Florida-based manufacturer of high performance laser bar code scanning equipment, including omnidirectional scanners and fixed-mount line scanners. Electro's plan is to consolidate LazerData with the bar coding portion of Skan-A-Matic and to locate the entire merged operation in Orlando.

The new company will eventually drop the Skan-A-Matic name and be known only as LazerData. The original LazerData officers -- Mike Reid, President; Jack Cochran, VP Sales; and Ishwar Singh, VP Engineering -- will continue in their current positions. In discussing the future of LazerData/Skan-A-Matic, Electro's Goble told *SCAN*: "By the end of 1990, our newly merged company will have sales in the $11-13 million range and we expect to lead the world in industrial bar code laser products. Our plan is to reinvest our profits -- and both the LazerData and Skan-A-Matic operations are currently profitable -- into R&D to expand our product line."

The company will concentrate on factory automation, including shop floor control, distribution and warehousing. Goble predicts: "We will have the best bar code team in the world with full systems integration capabilities by mid-1990." The stepped-up R&D efforts, according to Goble, will result in new products as soon as July, 1990.

As if to signal the emergence of its new image, Skan-A-Matic announced a new miniature moving beam laser scanner (Skan 9000) at SCAN-TECH 89. This new model, with adjustable speeds from 100 to 500 scans per second, measures 2.5" high x 2.5" wide x 3.5" long. The current price ranges from $1,550 to $3,300 depending on options.

Both Skan-A-Matic and LazerData have gone through a number of reformations and iterations during the past five years. The current management's optimism suggests that the recently reorganized company may have settled into its new life with sufficient committed resources to realize its potential.

At first glance....

....it seems like a very reasonable difference of opinion between two branches of government. The Congress has come up with a new idea that it wants to implement very quickly, because the proponents believe the concept is innovative and potentially very effective. The Executive branch says, in effect: "Gee, the proposal may really be great, but wouldn't it be better if we were to study it some more, and explore other alternatives?"

We're referring to the Senate's plan to establish a task force of industry experts to study the feasibility of bar coding US paper currency ($20 bills and larger) in order to track major drug dealers (*SCAN* Oct 89). The recommendations of this task force were then to be submitted to the Secretary of the Treasury, who was directed to take action within 6 months.

By the middle of October, the bill, sponsored by Sen. John Kerry (D-MA), had been reported out of the Banking Committee and passed by the full Senate. (The measure was tacked on as an amendment to the omnibus drug enforcement bill, which slid through the Senate with little difficulty.) The legislation now awaits introduction into the House where there are reportedly several Congressmen ready to back the proposal, which has been gaining in popularity. After all, who could object to a relatively straightforward method to mark bills so as to improve the ability of law enforcement agencies to capture drug-dealing criminals? In addition, industry experts would be involved so that the government would be able to complete the task in the speediest, most efficacious way.

We asked William McKay, legislative liaison of the Treasury Department's Drug Enforcement Branch, and Ira Polikoff, currency expert of the Bureau of Engraving & Printing, what they thought of the pending legislation.

According to McKay: "A few years ago, the Treasury [under James Baker, while he was Secretary of the Treasury during the Reagan Administration] had developed a number of anti-counterfeiting revisions, including mono-filament threads in the paper and micro-engraving around the portrait. These modifications are now being implemented, and the introduction of additional changes at this time could cause production problems." In any event, McKay continued, his Department objects to the fact that there are no government representatives on the proposed task force to study the problem. He notes that the idea of industry outsiders telling the government how to print or manage currency "changes the mission of the Treasury and the Bureau of Engraving and Printing."

Polikoff was even more specific. He believes that the idea of being able to track drug money is a good one, but he feels that US currency is electronically traceable now and that there is no need to rush to introduce a new technology. The current production procedures -- employing hand-etched engravings, the intaglio method of printing, and high levels of quality control -- should not be changed, for fear of compromising the difficult and sensitive methods for printing and issuing currency.

> All US currency is printed by the Bureau of Engraving & Printing. Full sheets of bills are intaglio printed using special inks and unique presses. These sheets are then cut in half, rigidly inspected and put through an off-line printer to add the serial numbers to each bill.

The serial numbers are a special problem in themselves. They contain a one-character prefix designating the Federal Reserve Bank region issuing the notes (B = New York; G = Chicago; L = San Francisco, etc.), followed by an 8-digit serial number. The final alpha-character is an assigned letter for each new number series; i.e. as each 8-digit number group is used up, another series is started with the next letter progressing through the alphabet (A, B, C, etc.).

Most importantly, the entire numbering sequence starts over again with each year of issue. The last two years of issue, for example, were 1985 (when Jim Baker signed the bills) and 1988 (when Nicholas Brady signed). The point of all of this is that the serial numbers can duplicate one another. In order to absolutely identify a particular $50 bill, its serial number has to be scanned simultaneously with its denomination and its issue date.

Therefore, when the Treasury spokesmen contend that the technology exists which can optically scan the serial number, denomination and issue date of each bill, and that this can be done at the speed and accuracy necessary to install a practical working system, the Congressional representatives become skeptical of their motives. Jim Brenner, from Sen. Kerry's office, poses the question: "Which would be easier to accomplish -- to try to optically scan all the elements on the current bills using OCR equipment or to print bar codes which incorporate all of the information in one machine-readable symbol?"

When it was pointed out to Brenner that the technology to print consecutive, non-duplicating bar codes on sheet-fed presses may not currently exist, he replied that the Bureau of Engraving & Printing is already exploring the use of web-fed printing presses. In any case, he said: "Treasury has demonstrated a failure to understand how the technology works."

Congress doesn't want the task force to be comprised solely of Treasury people, because it feels their natural inclination will be to kill the proposal. On the other hand, McKay, explaining the Treasury's position, says he does not necessarily discount the potential value of bar coding to law enforcement. But, he maintains: "How can you proceed with such a project without full representation by the involved agencies, including Treasury, Bureau of Engraving & Printing, Federal Reserve Bank, Secret Service and the US Mint?"

The proponents of using bar coded currency to deter drug trafficking are righteously aggressive and believe that technology is on their side. The keepers of the currency are understandably protective, insisting that any change in the complex chain of currency distribution must take every aspect into account. The outcome is far from clear at this point.

[One final note: In his just-released book, "Automating Management Information Systems, Volume I" (published by Van Nostrand Reinhold), author Harry Burke predicts that the bar coding of currency is inevitable. In an October 10 memorandum, Burke wrote to Sen. Kerry and Treasury Secretary Brady: "When currency is bar coded, as it most assuredly will be, the issue of high-speed machine verification of authenticity should be addressed as well as that of traceability...Once bills are bar coded, and processing machinery developed, the basic means of handling currency will be altered worldwide."]

A further demonstration....

....of the worldwide proliferation of automatic identification, without regard for national boundaries, political persuasion or economic orientation, will be evidenced by this year's SCAN Newsletter European Industry Achievement Award. On November 7, at SCAN-TECH Europe 89 in The Hague, the award will be presented to Dr. Peter Glattfelder of Hungary, in recognition of his pioneering efforts in promoting automatic identification technology in Eastern Europe.

Dr. Glattfelder has been dealing with uniform product identification, bar code techniques and auto ID technology since 1981. As head of the Research Institute at the Hungarian Board for Materials and Prices, he coordinates the government's implementation of products from different ministries relating to automatic identification. He initiated Hungary's membership into the International Article Number Association (EAN) and was the first Hungarian representative from the AIM/Europe Council. Dr. Glattfelder is also undertaking a market research study of the Comecon countries (SCAN Sep 89).

Previous recipients of this award have been: Albert Heijn - Ahold (1984); Paul Berge - Symbol Technologies (1985); Mark Marriott - Numeric Arts (1986); ODETTE - European Auto Industry (1987); Brent Jones - Hudson Bay Co. (1988).

Continuing its torrid pace of last year....

....Intermec's first-half profits increased 78% on sales that were up 40% (for the six-month period ended 9/30/89). All of a sudden, we are looking at a company with sales paced well in excess of $150 million per year, and stock sitting at over $34.00 -- more than double its low over the past 12 months.

INTERMEC	6 Months ended 9/30	
	1989	1988
Revenues ($000)	$78,230	$55,764
Net earnings ($000)	4,771	2,674
Net earnings/share	.65	.39

In discussing his company's achievements, President John Paxton states: "These outstanding results make Intermec's future look very promising, indeed." Paxton also outlined Intermec's increasing investment in research and development, which he anticipates will rise this fiscal year by 50%, to over $12 million. He noted that Intermec has completed the acquisition of its North American sales distributors (which is now 100% Intermec-owned) and pointed to the growth of the Intermec users group (which, in just two years, has grown to be the largest in the industry with over 2,500 members).

Two other factors have contributed to Intermec's success. One is the growth of their foreign sales, which now comprise about one-quarter of the company's revenues. The second is Intermec's contract with the Department of the Army for bar code systems in non-tactical applications, which amounted to $6 million in fiscal year 1989. The company's new headquarters and primary manufacturing facility, currently under construction in South Everett, WA, is expected to be ready for occupancy early next year.

SCAN NEWSLETTER LTD. • 11 Middle Neck Road, Great Neck, N.Y. 11021 • Phone: 516/487-6370 • FAX: 516/487-6449
PUBLISHER/EDITOR: George Goldberg • ASSOCIATE EDITOR: Jeff Goldberg • CIRCULATION DIRECTOR: Teddy Allen

INTERNATIONAL EDITOR: Paul Chartier • United Kingdom Office P.O. Box 7 • Cirencester GL7-1HY England
Phone: 44-285-3011 • Telex: 437269 SHARET G • FAX: 44-285-68859

Published monthly