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The important claims of accuracy....

....that have been a major, underlying *raison d'etre* for bar code scanning, have never really been supported by reliable scientific evidence. Believe it or not, there has never been a precise, controlled study published in the almost 20 years since the introduction of UPC.

We can now rest easier. The special AIM-sponsored Symbology Study, undertaken by Ohio University's Center for Automatic Identification (*SCAN* May 91) -- under the direction of Professor James Fales -- is completed, and the results fully support the claims of accuracy that have been made all these years.

Although this study was originally conceived only as a test of Codes 49 and 16K (both are two-dimensional symbols planned for use in the health industry), Codes 39, 128 and UPC-A were added. The results are as follows:

Symbology	No. of Data Characters Scanned	Observed Errors	Maximum Error Rates*	Minimum Error Rates*
16K	16M	0	1/5.4 M	1/315 M
Code 49	16M	0	1/5.3 M	1/309 M
Code 39	12M	1	1/2.5 M	1/34 M
Code 128	13M	1	1/2.8 M	1/37 M
UPC-A	12M	21	1/394 K	1/800 K

* Error rates are based on statistical analysis to show the minimum and maximum possible errors. Also note that Code 39 and UPC-A included a check digit.

(M = millions; K = thousands)

A few additional interesting sidelights:

1. When the US Department of Defense adopted Code 39 for its LOGMARS program in the early 1980's, their lengthy study included an estimate of the Code 39 error rate as one in 3 million. No one closely questioned their methodology to arrive at that number, but the government's result was right on the money.

2. Although the UPC-A error rate is much greater than any of the other symbologies -- as was expected -- it should be noted that this may

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not be that significant in practical field applications. In practice, the number of UPC-A errors is greatly reduced by the limited database in retail stores. In other words, although an 11-digit code number provides 100 billion numeric choices, there are only a tiny fraction of those numbers in the retail store computer, and a misread will rarely register a match to the database.

The full OU report, with complete descriptions of the test structure and results, will be published shortly. The study is very well documented and everyone we have discussed this with feels very comfortable with the results -- unlike the strong disagreements (including ours) that erupted with the 1987 AIM-sponsored Stony Brook study (*SCAN* Oct 87, Nov 87, May 88).

In a sudden and unexpected....

....move, it was announced on November 14 that Bill Hakanson had "resigned" as Executive Director of AIM/USA, the automatic identification industry's trade association. Hakanson will remain with the organization through December 16, assisting in the transition to a new Executive Director.

Hakanson joined AIM in 1975 when it was a division of the Material Handling Institute with a membership roster of 16 companies. He leaves behind AIM International, a worldwide association with over 700 members -- about 160 companies are in the US -- which he shepherded almost every step of the way.

Hakanson did not attend AIM's annual meeting in Florida on December 3-5. Earlier in November, there was no hint of this change during SCAN-TECH in Dallas. As we go to press, neither AIM nor Hakanson will say anything for the record as to the reason for this precipitous move. We are fairly certain, however, that we will have more to report about this story next month.

In his widely read ....

....*Wall Street Journal* column "Heard on the Street" (11/29/91), John Dorfman drew some pointed comparisons between Symbol Technologies and Telxon which left much room for question.

Dorfman, and the financial analysts he quoted, generally came down on the side of Telxon as a better investment in this current market. Dorfman wrote: "[Symbol] has grown expensive...it sells for 31 times the past four quarters' earnings. Some insiders have been selling. And competition is intensifying, particularly in the new 'wireless' systems."

Mitch Kuflik of Brahman Securities -- a close follower of the auto ID industry -- was described in the article as currently buying Telxon and selling Symbol "short" (i.e. betting that Symbol's price will go down). Kuflik characterized Telxon, whose stock closed for the month of November on an upward beat, at 24 1/4 (about 23 times earnings), as having built "a consistent 10-year track record of growth and high returns as a leader in wireless systems."

This comparison of wireless communications systems became the major foundation for the article's conclusions about the future prospects of the two companies. For instance, Mark Cohodes, a financial analyst at Rocker Partners, was quoted as saying: "Telxon, LXE and closely-held Norand all have better wireless

technology than Symbol does." (However, Cohodes may not be an entirely detached observer since Rocker also holds a short position on Symbol and recently purchased a large block of Telxon shares, increasing its ownership to 7.7% of that company.)

Columnist Dorfman also seemed to have become lost in the technology. He quoted a Symbol spokesman as saying that Symbol is now the leader in the new spread spectrum wireless systems and that "narrow band will be an obsolete technology within about two years." Dorfman then added that "Telxon, LXE and Norand generally use 'narrow band' radio systems." [Neither of these statements are entirely correct -- see below.]

In a final stab to explain how the respective technology positions will affect each company's future, Dorfman again quoted Kuflik of Brahman Securities as suggesting that "if CCD scanners became widely used, it would imperil Symbol's royalty revenue stream" from its patented hand-held laser gun. Dorfman noted the other side of that forecast by quoting Symbol's VP Marketing, Richard Bravman, who "scoff[ed] at the idea that CCD could pose a threat." Bravman described what he believes are the superior flexibility and versatility features of lasers compared to CCDs (without mentioning, incidentally, the commanding positions that CCDs maintain in markets outside North America).

This analysis of the two companies was further complicated by the news that both Symbol and Telxon "insiders" were reportedly taking personal advantage of the higher prices of their respective stocks (Symbol executives sold 372,000 shares and are registered to sell an additional 275,000 shares; Telxon insiders sold about 300,000 shares). Dorfman went into great detail about the amounts and names of the Symbol individuals who are selling, although he did not mention any of the Telxon traders.

COMMENT

Bravo to Telxon for sustaining their strong turnaround during the past 18 months -- and building support for the company in the financial markets -- after their very difficult time in fiscal year 1990. As for Symbol, we believe that their recent impressive increases in sales and earnings warrant a more careful analysis than was demonstrated by the WSJ column.

It was particularly bothersome that the writer concentrated on pitting Symbol against Telxon without recognizing that, in the expanding auto ID market, both could very well emerge as winners. In preparing his article, Dorfman seems to have spoken only to those financial types who supported Telxon, even though other respected observers take the opposite pro-Symbol position. The fact that two of Symbol's major critics had "short" positions in the stock suggests that they may have had a vested interest in their published opinions.

More importantly, the analysis of the technology itself was not totally correct, which may have given those readers who are unfamiliar with automatic data capture an inaccurate view of this industry. For instance, the initial market response to spread spectrum RF technology has been positive. However, although Symbol introduced spread spectrum about two years ago and has made about a dozen sales -- most significantly to K mart -- it is generally agreed that it will take some time to evaluate the performance of these systems.

*It should also be noted that, in spite of their earlier negative comments
about spread spectrum, Telxon, LXE and Norand have all introduced this
same RF approach -- which they prominently featured at SCAN-TECH last
month. It is certainly doubtful that any financial analysts are in a
position to judge the comparative merits of all of these systems at this
early date.*

*Finally, it has been conceded by many industry experts that even if spread
spectrum were to be successful -- regardless of which companies prevail --
it will not completely replace narrow band RF, which will continue to be
the technology of choice for many applications.*

*[On the Friday that the WSJ article appeared, Symbols shares dropped 2 5/8
-- about 11% of the stock's value.]*

The rapid progress of....

....the automatic identification industry has been due, in large part, to the
basic compatibility of different bar code languages and systems.

Although various symbologies have been developed -- each with its own special
advantages -- the early advent of autodiscrimination avoided any "babel"
syndrome. Even the much lamented incompatibility among computer systems has
been overcome by simple decoder interfaces which have made bar code scanning
input universally accepted. All of the important successful symbologies
have been placed in the public domain and uniform standards have been adopted
internationally.

Why, then, are we now forced to grapple with the Application Identifier versus
Data Identifier conflict that threatens to delay systems implementation and
waste thousands of man-hours in so-called "harmonization" efforts? Part of the
reason, we believe, is simply a "failure to communicate."

[Both Data Identifiers and Application Identifiers are prefix codes
intended to identify the numbers that follow them. DI's are alphanumeric
and the AI's are all-numeric. There are other significant differences in
the structure of the code numbers they represent (*SCAN* June 91).]

Data Identifiers were introduced by the Automotive Industry Action Group, about
eight years ago, to distinguish from among the various decoded data strings on
the AIAG multiple bar-coded shipping labels. Administration of DI's was taken
over by FACT in 1988 and, since then, the concept has been widely adopted by
many manufacturing and distribution industries in the US and Europe.

But not by the retailers. And there's the rub. Although UCC and EAN
executives maintain that they have been working on their system of Application
Identifiers for many years, their efforts did not surface until last year.
By the time representatives from the UCC, FACT and ANSI (which was working on
a related standard) got around to discussing the major differences in coding
structures, their respective positions seemed to have been etched in concrete.

When we began the hue and cry over the lack of coordination between the FACT
approach and the UCC approach (*SCAN Jan 91; June 91*) we had the distinct
feeling we were hollering down a well. All we heard back was our echo.

Now the battle has been joined by others. The pages of the October and December issues of *ID Systems* fairly bristled with negative comments about how two standards have been adopted to accomplish the same result. In October, Editor Mark David wrote: "...the groups are going to have to sit down together and work out a solution."

In December, Richard Meyers, a regular contributor to *ID Systems* and a very strong supporter of Data Identifiers, addressed this problem. "Consistently invited but conspicuously absent from every single meeting [of FACT]," Meyers wrote, "was the Uniform Code Council (UCC)....All of a sudden the UCC makes a bold new statement: 'AIs are the way to fly!' What is odd is that this effort has reportedly been going on silently since 1985. Why was there no response to the FACT invitation to participate in this broadly supported effort?"

COMMENT

Gentlemen, where were you last year when the problems first surfaced? The UCC/EAN announcement that 36 application identifiers had been adopted came on February 27, 1991. We had broken the news of this potential conflict, between the different approaches of FACT and the UCC, in September 1990, and stressed it again in our January and June 1991 issues.

The problem has spread well beyond the US borders -- and this challenge should not be ignored by any of the parties. The European Community standards groups have a strong vested interest in the resolution of these differences. We are aware of some European "harmonization" efforts under way to reconcile the AI/DI systems. There are strong indications that FACT and AIM International will become actively involved in these EC activities. Let's hope this time around the parties speak to one another.

Last month we reviewed....

....the major impressions we took away from SCAN-TECH 91 in Dallas (November 4-6), highlighting the noteworthy new products; corporate mergers, acquisitions and strategic alliances; and the continuing growth of the resellers.

Here are two additional items of interest from the show:

- The "Systems Display" was larger than last year and, as promised, this time it was located in the exhibit area, although off in a corner and out of the mainstream of visitor traffic. There was little excitement to these system displays, however, and, at the time we walked through, some of the personnel were "baby sitting" the exhibits and not familiar with the material. From our observations, we still get the feeling that this part of the show has not yet been given the serious attention it deserves by the AIM management.

  Since the AIM press releases after the show emphasized that 65% of all attendees were first-time visitors, it is apparent that a well-organized systems area would be a worthwhile feature. Here are a few suggestions for next year's Systems Display: 1. Treat this area as a major show attraction with a central location and heavy promotion. 2. Organize on-the-hour, scripted presentations which take the novice through all the exhibits using professional presenters to describe all of the system features. 3. Obtain the active commitments and

participation of as many exhibiting companies as possible. 4. Set up bins at one central point for all exhibitors who wish to distribute product literature.

- The keynote speaker in Dallas was probably the best ever booked for a SCAN-TECH show. <u>Dr. C. Jackson Grayson</u>, Chairman of the non-profit American Productivity and Quality Center, presented the concepts of Total Quality Management (TQM) and Benchmarking.

  TQM involves the total commitment of a manufacturing company -- from the executive suite right out to the shipping dock -- to the ultimate quality of its products. Benchmarking was described by Dr. Grayson as the "continuous process of measuring one's products, services and practices against the best anywhere in the world."

  An informed talk about productivity improvement, which is one of the major problems facing US manufacturers, was exactly what the SCAN-TECH audience should have been hearing. Dr. Grayson urgently warned his audience: Although the US may still be number one in productivity, at the current rate of change, other nations -- notably Germany and Japan -- will surpass the US by 1995.

  For information on TQM and Benchmarking, contact: American Productivity and Quality Center, 123 North Post Oak Lane, Houston, TX 77024-7797; 713/681-4020; FAX 713/681-8578.

If you are a supplier....

....to the automatic identification market and you contemplate doing business in the European Community (EC92) -- whether you are a European, North American or Far Eastern-based company -- you had best keep up-to-date with the activities of the official groups working to establish European standards.

The reasons are fairly straightforward:

1. When adopted by CEN TC225 (the European Standardization Organization for Automatic Identification), the resulting standards will automatically apply to 19 nations with 366 million people in a $5 trillion-a-year economy -- the largest unified industrial market in the world.

2. All procurements of auto ID products by those 19 governments will require bidders to adhere to those standards.

3. There is a greater proclivity among European companies -- particularly the Germans and French -- to adhere to published standards than among American companies. Be prepared to accept the standards or be frozen out of a portion of the EC market.

4. Currently participating (but not voting) in the CEN TC225 activities are representatives from the following European industries: chemicals, steel, autos, paper and medical devices. These industries expect to provide input to the work of the Committee and it is anticipated that most of them will accept the standards when adopted.

Four TC225 Work Groups (WG), which were established at the inaugural meeting, include: WG1 on Symbologies; WG2 on Bar Code Quality; WG3 on Data Content; and WG4 on Applications. The work program is very ambitious. CEN TC225 has established procedures for eight standards to be released for public review later this year. They include a symbology format standard; five symbology standards (Codabar, Code 39, Code 128, EAN, Interleaved 2/5); symbology identifiers; and special steel industry labels.

COMMENT

This issue is not just of small regional concern. International input into the work of TC225 is already being provided by the UCC/EAN groups, AIM International and standards organizations such as ANSI and ISO.

We suggest that everyone be forewarned: Use CEN TC225 as a fast track towards international standardization or ignore it and risk technology divergence which will multiply your engineering and marketing problems.

A Washington Post article (12/2/91) said it very succinctly: "Across Europe, industry groups...are huddling to devise standards for products as diverse as toys, beer, computers and earthmovers. The deliberations will help determine who can and who cannot compete effectively in the huge, affluent European market....In the end it's not a technical problem....It's a problem of economics."

It is becoming more apparent....

....that on the date that the <u>European Community</u> becomes a reality -- scheduled for 12/31/92, about one year from today -- a curtain will not part to reveal everything functioning smoothly with all of the elements in place. On the contrary, this process will evolve gradually as organizers cope with the monumental task of reconciling the economic, political, cultural and social differences of 19 nations.

A major factor in the economic portion of that reconciliation -- or "harmonization" as everyone refers to it -- will take the form of standards and specifications agreed to by all the parties.

In order to keep all vendors of auto ID equipment, software, supplies and systems up to date on these European Community standards, AIM-Europe recently decided to publish an 8-page newsletter titled "*Aim Standard*: *The Newsletter of European Standardisation and Harmonisation.*"

The first issue -- due out in mid-December -- will be mailed free to all 900 AIM affiliate members worldwide. The cost of publishing *AIM Standard* will be borne by a special increase in membership dues levied on all AIM-Europe members. The annual subscription cost for all others will be $750 ($500 if you get your check in before December 31, 1991).

In addition to the newsletter, subscribers to *AIM Standard* will be entitled to the following services: reception of CEN papers and minutes; access to a "help desk" at AIM-Europe; participation in surveys; and the purchase of technical literature at a discount. AIM Europe, The Old Vicarage, Haley Hill, Halifax HX3 6DR England; 422-359-161; FAX 422-355-604

While we are on the subject....

....of new publications, there are two possible additions to your library that you should check out:

- o AIM/USA will publish *AIM Journal*, a newsletter focusing on technical developments and standards, but aimed primarily at newcomers to the auto ID user community. [The industry still lacks a publication, like the old *ScanJournal*, which provides a forum for substantive technical articles on automatic data capture (*SCAN* Mar 86; July 86).]

- o The Uniform Code Council has inaugurated a new quarterly, *UCC Interchange*. Based on the contents of the first issue, the *Interchange* will devote its 8 pages to non-controversial articles that supply basic information to its members. (The 2-page article on quality did include one slight overstatement, to wit: "The importance of the UPC symbol quality is approaching the importance of the quality of the product itself.")

The UCC article on quality also addressed the very timely issue of "repetitive strain injury" (RSI) in grocery stores. Studies have shown that the current first-pass scan rate in US retail stores is 85%, about the same as it was in 1980. According to *New York Newsday* (December 1, 1991) thousands of grocery cashiers across the country are now suffering from RSI -- which includes carpal tunnel syndrome -- one of the leading causes of workplace illness in this country since 1989. Among grocery workers -- presumably those who are scanning products at the check-out counters -- RSI has increased more than 600% from 1984 to 1989. There is every indication that poor quality UPC symbols contribute to this ongoing problem.

Our warmest congratulations....

....to Carl Helmers, founder and president of *ID Systems* magazine, on the 10th anniversary of his publication.

Started in December 1981 in an 8-page, typewritten-newsletter format -- christened *Bar Code News* -- its next issue hit the mails in March 1982 looking more like a magazine. In September of that year, the magazine began regular bimonthly editions. With the Jan/Feb 1987 issue, the name was changed to *ID Systems* and, under this new banner, monthly frequency began in March 1987.

ID Systems has grown with the industry, and today it is a successful, slick, 4-color publication chock-full of industry news and advertisements and distributed to 65,000 subscribers.

We wish Carl, Publisher Kevin Rushalko, and their fine staff up in Peterborough, NH, the best of luck for the next 10 years.

And to all our readers....

....*our best wishes for a most happy holiday season and a healthy, prosperous and peaceful New Year.*

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