ADC GOES TO COLLEGE

Each year the Center for Automatic Identification and AIM USA co-sponsor the Automatic Data Collection Technical Institute, held at Ohio University (Akron, OH). The Institute is run under the direction of Dr. James F. Fales, CMfgE, Ohio University, Russ College of Engineering and Technology.

According to Fales, 185 students attended classes covering ADC in 1987. By 1992, that figure was 5,019. In 1995, 1,529 students attended ADC classes.

Students Taking ADC Classes

<table>
<thead>
<tr>
<th>Year</th>
<th>Count</th>
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</thead>
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</tr>
<tr>
<td>1989</td>
<td>2,283</td>
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<td>1992</td>
<td>5,019</td>
</tr>
<tr>
<td>1995</td>
<td>1,529</td>
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"It appears," said Fales, "that an AIM-sponsored institute is an effective way to get auto ID subject matter into colleges and universities. Professors from a variety of disciplines have included auto ID subject matter in 34 different classes at 22 different universities and colleges."

For information on the upcoming institute contact: Dr. James Fales, CMfgE, Akron, OH, PH (614) 593-1455, FX (614) 593-9382, E-mail: jfales 1@ohiou.edu

ID Expo 96: In Perspective

by George Goldberg

We came away from ID Expo 96 (Rosemont, IL; May 14-16) reinforced in our feelings that the ADC industry is in good health with many opportunities still available for innovators in technology and marketing.

Even those companies that chose not to exhibit — they were expressing their displeasure at two shows being held each year in the same city (SCAN/DCR 5/24/96) — could not stay away. PSC hosted an elaborate hotel reception for 250 customers and friends; Sato demonstrated two new printers in a suite at the Hyatt Regency; Datamax executives booked back-to-back appointments with important customers, resellers and reporters at their hotel suite; and Zebra — headquartered in the Chicago area — took the opportunity to run a users conference at their facility.

We interviewed corporate executives and sales/marketing personnel from dozens of companies and found them to be upbeat about the future. A general consensus exists on three basic principles: resellers are the best way to move products into the hands of users; foreign markets will offer outstanding sales opportunities for at least the next five years; and the automatic data collection industry has moved well beyond just capturing data for fast and accurate input to a computer.

The new challenges will be to develop hardware, software and systems to capture, interpret, manipulate and communicate information — in real time. Batch data systems — which accumulate information for later transmission to a host computer — have become relics of the past. Whether it is needed or not, customers want their records to reflect information and status up-to-the-second.

"Horizontal" trade shows like ID Expo — which cover all applications of one technology — provide a perspective that is not available elsewhere. These events focus attention on both customers and competitors, and provide essential information for planning next moves.
ID Expo 96: 2-D Symbologies
Regain Momentum

Two-dimensional symbologies have gotten their second wind.

From an overabundance of hype and hyperbole about the importance and potential of stacked and matrix symbologies, we seem to have moved into a more reasonable atmosphere of reality and results.

The inflated claims of the early 1990s — i.e., 2-D sales will represent 50% of the bar code scanning market by the year 2000; or 2-D symbologies will largely replace linear bar codes in most applications — have largely been abandoned. Instead, we now find innovative technology developments and the exploitation of solid, sizeable niche markets that are particularly suited to 2-D.

The two demonstrations that most impressed us at ID Expo both involved 2-D systems. In our last issue, we selected the Metanetics IR-2000 Handheld Image Reader as the "best-in-show" (SCAN/DCR 5/24/96). That CCD-array reader/camera — which combines linear and 2-D scanning with the ability to capture photographs, signatures and other graphic elements — opens up new application opportunities in many areas.

In the second instance, Dennis Priddy, president of ID Matrix, dramatically demonstrated 2-D systems that are already at work:

• Using the Data Matrix 2-D symbology, Hewlett Packard is encoding its replacement printer cartridges with unique serial numbers printed "invisibly" with UV ink. As the cartridge comes off the production line, the code is read and then duplicated on the package using on-line ink-jet printers. Relying on this system, HP can now reject fraudulent claims where an old cartridge is placed in a new box and returned as "defective."

• To insure correct packaging of pharmaceuticals, a small Data Matrix symbol — about one-quarter-inch square — is printed on the bottle or vial and its label and package. This unobtrusive symbol insures that the right medication is labelled and packaged with absolute accuracy, conforming to FDA regulations.

• Semiconductor chips — a most valuable commodity in an active black market — are now being individually identified for tracking purposes with either printed or dot-etched Data Matrix symbols.

Priddy revealed that ID Matrix has sold approximately 2,000 Data Matrix readers, at prices ranging from $2,000 to $15,000, depending on options.

Venture Development Corporation’s most recent study of the 2-D global market estimates that 1995 sales of 2-D products and services totalled $14.9 million. VDC forecasts that this market will grow to $200 million in the year 2000. According
to VDC, transportation (led by UPS and Roadway Package Systems) was the leading 2-D application in 1995. Over the next four years, VDC foresees that demand will be sparked by healthcare, auto manufacturing and wholesaling — each with an annual growth rate exceeding 100%.

For more information: ID Matrix, Nashua, NH, PH (603)577-8300, FX (603)577-8301.

ID Expo 96: Corporate News

Our favorite pastime at ADC trade shows is meeting with corporate executives to learn more about their past mishaps, recent accomplishments and future plans.

Not everyone has a story that is newsworthy or ready for public disclosure. Take, for example, the owner of a successful, old-line ADC firm (not-to-be-named) who told SCAN/DCR that he recognizes his company’s need for an infusion of capital to expand R&D and new product development. He has resisted going public, however, because he realizes that he does not have the executive infrastructure to successfully manage a public company. He is quietly looking for a merger partner or a larger company with the resources to acquire him.

The problem was quite different at Datamax. Rob Strandberg had been president/CEO since 1991, following a management buyout from GTECH Corporation. Datamax’s primary products then were thermal printers for airline automated tickets and boarding passes (ATB). In March 1993, Datamax acquired the bar code printer products division of Fargo Electronics and Tom Turner was appointed president of the bar code division.

From remarks made by Strandberg during the past three years, it was clear that Datamax was positioning itself to go public. Such a move would accomplish three things: pay off the $39 million debt to the investment partner that helped with the management buyout; bring in some fresh working capital; and, not so incidentally, enrich the current stockholders. Last year, Datamax divested itself of its less-profitable ATB line of printers and concentrated on bar code units only. Then, in November 1995, the company filed documents with the SEC in preparation for its initial public offering.

The IPO (initial product offering) was quietly withdrawn early this year, presumably because the company’s 1995 financial results were disappointing. On April 26, Strandberg suddenly resigned from the company to “pursue other interests.”

Although Datamax was not an exhibitor at ID Expo 96, Marvin Davis (its new president/CEO) and Tom Turner visited the show. Davis had been a Datamax board member and consultant to the company for the past two years. Explaining Strandberg’s unexpected departure, Davis told SCAN/DCR: “Strandberg was an entrepreneur who brought the company a long way. Datamax now needed someone to bring it to the next level of sales and profitability.”

Datamax sales are now $80 million a year. Davis revealed, however, that 1995 revenues and earnings were erratic and that his goal is to “solidify the company’s position, increase sales and increase profitability.” And, of course, take the company public as quickly as possible.

If there was any remaining doubt that the ADC industry was almost totally committed to marketing through resellers — whether they are called VARs, distributors, dealers or strategic partners — it was dispelled by the new posture of Intermec.

Ten years ago, when Intermec was still an independent public company (before it was bought by Litton Industries) it acquired all of its North American distributors and created a dedicated, direct, in-house sales force. Now, in a complete policy reversal, Mike Ohanian, who succeeded Tim Koogle as president of Intermec a year ago, told SCAN/DCR at ID Expo: “We are aggressively seeking VARs and resellers to supplement our sales force. We recently created the new position of VP of Indirect Sales — and appointed Ed Etzel to fill that role — and this will be a major objective of the company.”

According to Ohanian, Intermec is now “very profitable, with annual sales exceeding $300 million.” Ohanian also expressed satisfaction with the progress of Intermec’s five-year, $250 million, US government contract, which, he said, "is right on schedule at $50 million this year."

John Paxton has been making his mark at Monarch Marking since joining the company as president/CEO last November. In February, he introduced a new "worldwide corporate identity program" — replete with a redesigned corporate logo — and announced that his objective is to achieve a "14 percent compound annual growth rate over the next five years, which will almost double the company’s size [currently $300 million] by the year 2000."

This is no longer the 105-year-old, quiet, conservative Monarch Marking which established itself years ago as the key source for printers and supplies to the retail trade. “Half of our sales are still to retail-oriented businesses,” Paxton told SCAN/DCR, “but we see our major growth in non-retail areas such
as manufacturing, warehousing and transportation."

Paxton has budgeted $20 million per year for R&D — up from $3 million just a year ago. He wants to see a stream of new products and the rapid development of new markets. As an example of his no-nonsense, take-charge posture, he recruited Karen Longe away from Zebra to head Monarch's marketing efforts to the healthcare industry — the same job she was doing for Zebra.

Monarch had been quietly plugging along while it was wholly-owned by Pitney Bowes. That situation changed last July, when the company was bought by a consortium of Paxar Corporation (the leading manufacturer of apparel labels and tags), Odyssey Partners (a private investment firm) and key Monarch executives. Paxar and Odyssey each own 45% of Monarch; the executive group — which now includes Paxton — owns the remaining 10%.

Targeting the end of the decade to achieve substantial growth and profits is not a random choice. In 1999, in a complex corporate deal, Paxar and Odyssey will either spin off Monarch as a separate public company or Paxar will buy out Odyssey's share. Paxton thus has a substantial incentive to make Monarch a very successful company by then.

* * * * *

Mergers, acquisitions, public offerings, corporate make-overs — these are all signs of a dynamic industry whose continued rapid growth is fueling the entrepreneurial spirit. Stayed tuned!

**ID Expo 96: New Products**

ID Expo 96 will not be remembered for an abundance of notable new products or systems. However, besides the 2-D readers and applications described above, there were some items exhibited which should not go unnoticed:

**Metrologic** introduced and demonstrated both fixed position and hand-held versions of its omnidirectional, holographic scanners. Metrologic had invested heavily to develop holographic scanning devices and ultimately acquired Holoscan (in March 1996), the company that pioneered this technology. According to Metrologic, the new hand-held unit is "the first of its kind to bridge the gap between omnidirectional fixed projection and hand-held scanners."

Holographic scanners provide an unusually large depth of field — more than three feet — allowing for greater flexibility in positioning. Although omnidirectional scanners are particularly well-suited for retail point-of-sale, Metrologic has targeted new applications for the industrial/warehousing market.

For more information: Metrologic, Bellmawr, NJ, PH (609)228-8100; FX (609) 228-6673.

* Some companies would "kill" for the kind of publicity that was generated when Supertag was announced in January 1994 (SCAN Feb 94, April 94). When CSIR (South Africa) introduced its new RFID transponder tag and reader, its management claimed that they could produce a two-cent tag that was going to revolutionize the auto ID business — and even replace UPC/EAN bar codes. The sensational story was picked up by the major media in every industrialized country.

In March 1995, Samsys signed up as a Supertag licensee of CSIR — but Samsys now is not sure that it wants to continue to use the product's famous name. "Supertag was oversold and over-hyped," Samsys President Cliff Horwitz acknowledged, when we spoke with him at ID Expo, "and it is now difficult to market a product that resembles the one promised by CSIR. We feel it will be better to rename the product and move ahead with new development and new applications."

Samsys chose ID Expo 96 to debut its Fastrak RFID system — incorporating the Supertag technology — for materials handling, logistics management, warehousing and distribution. The company says that up to 50 assorted or identically coded items can be scanned, identified and counted in one second. Among the suggested applications: "An entire shelf of stock can be scanned without stopping and starting; the contents of a box or container can be accurately read without unpacking; or a pallet loaded with containers can be electronically inventoried as it moves through a doorway." Read-only or read/write tags will cost $2.00 to $3.00 each.

For more information: Samsys, Toronto, Ont. Canada, PH (416) 777-6755; FX (416) 777-6709.

* Eighteen months ago, at SCANTECH 94, Sensis was awarded first prize in the New Product Showcase for its GEOscan, a double-ended, hand-held reader — with a laser at one end to illuminate the bar code and a CCD at the other end to scan it. But the GEOscan was just a prototype which had many problems to overcome.

Last year, at ID Expo 95, the GEOscan reemerged as the Bumpy Bar Code (BBC) reader. A pre-production model was shown that could read bar code patterns molded, etched, engraved or embossed in any material — "color" contrast was
achieved by the lights and darks created by the laser light.

This year, Sensis was featuring examples of actual working BBC installations. Goodyear Tire and Rubber, for example, is now molding a bar code into the side walls of its aircraft tires, which will be tracked by the airlines through their complete retreading and maintenance cycles. At Ford Motor Company, bar codes are etched or embossed on bare metal vehicle labels which can be read before or after painting.

Sensis is marketing their systems through VARs (Intermec is a major distributor). List price for BBC scanners is $5,000. The company now has 25 units out in test locations, targeting niche markets where printed bar codes are not appropriate or harsh environments are restrictive. Examples: Gas and electric utility companies which mark and scan assets located outdoors; items which require acid baths; fiberglass molds.

For more information: Sensis, Dewitt, NY, PH (315)445-0550, FX (315)445-9410.

Battle Over RF Wireless LAN Standards Continues

by Rick Morgan

The plot thickens as the debate over Radio Frequency (RF) wireless LAN (local area network) standards continues.

In the last issue of SCAN/DCR we uncovered a group of manufacturers who joined forces as the Wireless LAN Interoperability Forum (WLIF) to promote open architecture for wireless networks. In addition, the IEEE 802.11 committee continues to plug away at its version of an RF standard. Now a third group (Aironet Wireless Communications, a subsidiary of Telxon Corp. - Lucent Technologies, Network Systems Div. - and Digital Ocean) has surfaced to offer a standard for communication between RF access points, an integral part of the whole system but one that is not addressed by the WLIF or 802.11 proposals.

The industry is in a state of turmoil with regard to the whole interoperability issue. A great deal of attention is being focused on the emerging IEEE 802.11 specification which is currently under development. More than 100 representatives from various companies within the radio frequency industry are working on the 802.11 standard, including some who are members of the WLIF.

One major reason that the 802.11 standard has moved so slowly is that approval of all additions to the specification requires a 75% majority. One member of the committee who wished to remain anonymous stated: "The diversity of the membership base makes it difficult at times to get anything approved. The IEEE 802.11 membership is made up of representatives from many companies that produce a wide variety of products. It is easy to see that what may be good for one company, might not be good for another. But overall, members try to work for the common interest of the industry as a whole."

A WLIF press release stated that its goal is to offer "interim" interoperability until 802.11 becomes a "robust standard." Other companies such as Symbol Technologies, Aironet, Lucent Technologies and Digital Ocean are working within the guidelines of 802.11 and feel there is no need for an interim specification. To make it even more confusing, we have talked to software providers who claim that the whole debate is a moot point because complete interoperability can be obtained by using their products.

On May 23, Aironet, Lucent Technologies (the product of the restructure of AT&T into three separate companies), and Digital Ocean came forward to offer the industry a specification which defines how access points from different vendors communicate with each other. The standard has been dubbed, the Inter-Access Point Protocol (IAPP). Interestingly, each of these companies manufactures access points and at times compete with each other.

To better understand why these competitors would join forces and why another specification was needed, SCAN/DCR contacted the principals of the companies for their views. Speaking to us was Roger Murphy, president and CEO (Aironet/Telxon), Cees Links, general manager (Lucent Technologies), and Jeff Alholm, president (Digital Ocean).

Alholm: Companies that use multiple access points could have major problems running more than one network at a time. Remember, with radio frequency we must share the vehicle for transporting data and that vehicle is air. Without a standard for multiple access point interoperability, it is not only feasible but probable that one network would interfere with the operation of another. And even if a company was willing to run only one network at a time (which is poor time management), what about if the company next door is running a wireless network as well?

Links: Basically, our customers told us they wanted interoperability and did not want to be locked into a future commitment to our product. The IEEE 802.11 spec does not cover
interoperability between access points from different vendors. Nor does the committee want to make it a part of their charter in the future. So we (Aironet, Lucent and Digital Ocean) took it upon ourselves to develop the IAPP specification. People should understand we are not doing this because we are so altruistic that we want to have standards. There's a selfish purpose in coming out with an open protocol. We believe the market will grow faster and everybody will in turn take significantly more money out of it if we have clear standards on interoperability. We do not believe proprietary systems are good for our overall business.

**Murphy:** I'm not here to badmouth the WLIF. At Aironet, we support the IEEE 802.11 initiative and have chosen to work within its guidelines. Beyond that, we are breaking new ground by entering into an agreement with our competitors to promote true interoperability, even between multiple access points. Although Lucent Technologies and Digital Ocean are formidable competition, we feel that each of our companies' products have inherent qualities geared for specific vertical markets.

**Alholm:** The IAPP is our attempt to go one step beyond what 802.11 is doing. This standard is meant to be complimentary to and concurrent with 802.11. It basically says, these are the parameters we are going to pass between access points or in layman's terms, these are the guidelines for passing information between access points. The beauty of a standard is that once it is in place, you can begin to focus on other things that need to be done such as product improvement and technology upgrades.

**Murphy:** We all have representatives that sit on the IEEE 802.11 committee. As a matter of fact, Vic Hayes of Lucent chairs the committee. We believe that although progress on the final specification has been slow, 802.11 will ultimately be a robust standard that offers real interoperability in the radio frequency wireless LAN industry.

**Links:** I don't agree with the people who believe 802.11 is going to be a long time coming. I think you will see a formalized standard in the near future. A lot of time and effort has been spent on the development of 802.11 and a wealth of intellectual property is now available in draft form. The participants on the 802.11 committee have put together a great deal of information on power management, roaming, and other interoperability issues. Clearly, there is no reason for anybody to develop a new standard from scratch and those who would suggest otherwise are being unrealistic.

Those who are complaining about how long it has taken to develop a specification must understand that RF LAN interoperability poses a much more difficult problem than the Ethernet standard of the past. There are inherent complexities with working over the air that just aren't a problem with cabled solutions.

**Murphy:** Although we do not believe proprietary systems are good for the [RF LAN] industry, we do not agree with some of the WLIF members who are suggesting that end-users are prolonging their buying decisions because of a lack of interoperability. Some individual companies may not be doing as well, but growth figures clearly show that the overall industry is booming. The trend is toward open platforms. But we came from an industry based on proprietary systems. There has been substantial growth [in our industry] so I don't buy it when people tell me interoperability or the lack of it has kept buyers from making a purchasing decision.

**Links:** Buyers may not be holding back on purchase but proprietary systems do retard the growth of an industry. Look at how fast the IBM pc market has grown compared to Apple. Apple's system is proprietary. It has grown more slowly and holds a much smaller share of the market than IBM. Our protocol gives total freedom to the customer to choose what access point to buy. It also does not lock them into staying with the product they choose.

**Alholm:** We are in a $200 million a year industry. For it to become a $1 billion a year industry we must standardize and do away with proprietary systems. Digital Ocean is a technology provider, that is we license our technologies to other companies so you wouldn't expect me to say these kinds of things. But I truly believe that open standards are the key to success for industry in the future.

Almost everyone agrees that there is a need for standards in the RF LAN industry. And, any number of companies are willing to step forward with a solution. The major problem facing the prospect of universal industry standards is the propensity of companies to lean toward self-serving interests. If the industry can rise above this dilemma, true interoperability should be attainable.

**Editor's note:** In future issues we will discuss a software provider that believes no standards are needed to achieve interoperability.

For more information: **Aironet Wireless Communications, Inc.,** Akron, OH, PH (330) 665-7900, FX (330) 665-7922, E-mail: tsmit@aironet.com, **Lucent Technologies, Murray Hill, NJ, PH (908) 559-6405, FX (908) 559-1967, E-mail: mammen@attmail.com, **Digital Ocean, Inc.,** Lenexa, KS, PH (913) 888-3380, FX (913) 888-3342, E-mail: marketing@digocean.com.
Process Development Causes
PSC Earnings To Dip
by Rick Morgan

PSC's first quarter 1996 drop in sales (to $21.5 million from $22.3 million last year) and sharp decline in earnings ($0.04/share vs. $0.22/share) prompted us to call President/CEO Mike Hone for a more detailed explanation.

For the past five years, PSC's sales have grown at the average annual rate of 39% and earnings — $0.54/share in 1995 — have steadily increased. The price of the company's stock has risen accordingly. The less-than-stellar results for the first quarter, however, has pushed the stock down from a 52-week high of $15 to the current $8 to $9 range.

"The first quarter has been a little softer for almost everybody in the industry," Hone explained. "In addition, we're involved in a major product transition from our non-direct illumination to our direct illumination scanner engines. Process problems associated with this transition contributed to a drop in our earnings. However, we feel this is temporary and expect things to normalize in the second half of the year."

We asked how technology transitions affect production. "The DI-1000 Minuet scanning engine is our newest product," Hone replied. "It integrates a number of technologies into one very small package. In the development of the product, we encountered engineering and manufacturing process problems which is normal for any new product.

"For example, we use a CAD system which has 3-D modeling capabilities to design our parts. But what comes out of the mold does not always match what's on the CAD screen. Adjustments must be made. We've been going through these adjustments to our manufacturing processes for the past six months. The fact that we have solved the problems and improved the design is a positive but it kept us from getting the product into the market as quickly as we anticipated."

PSC is not a mass production company but more a "mass customization house" according to Hone. Ninety-five percent of PSC's product go out the door with another company's name on them or incorporated into someone else's product — similar to an Intel processor in an NEC computer.

"The DI-1000 Minuet platform will allow us to do a lot of customization to meet our individual customer's specs and applications," said Hone.
Telxon took the long view and put its customers first by responding to this issue and undertaking an expensive, last-minute debugging and refinement program to insure the timely delivery of complete, reliable products worthy of reorder.

Second, Telxon’s fourth quarter earnings were increased $0.11 per share as a result of the amortization of software development costs that the company had always treated as an expense in the past. Software development cost amortization is a legally acceptable accounting procedure often employed by software developers and systems integrators engaging in significant software development activities, but it was a change in policy by Telxon. In the view of some analysts, amortizing current software development costs against future revenues will negatively impact future results.

Third, Telxon’s fourth quarter profits were enhanced $0.11 per share by the reduction of “manufacturing and customer service inventory reserves.” Reducing inventory frees capital for a number of projects and could be potentially beneficial to the customers as well as shareholders. However, if the inventory reduction cannot support Telxon’s future business, the company may incur additional costs as a result of: (1) the need to rapidly increase inventory; (2) the inability to meet short-turnaround orders, and/or (3) the cost of contracting for the increased inventory necessary to meet future business.

(Comment)
During the past three years, Telxon realized healthy revenue and profitability gains by taking the long view: i.e., investing in technology and market development, productivity improvement and putting customers first. Will these accounting decisions that seem to have been made to enhance short-term earnings, put Telxon’s momentum at risk?

These changes have already had a negative impact on the momentum of Telxon stock. The general consensus among investment analysts we have contacted was a high degree of dissatisfaction with the quality of Telxon’s FY 1996 earnings. The investment community regards the $0.22 / share increase in earnings realized from software amortization and inventory reduction to be ‘phantom earnings’ making it difficult to make comparisons in its previous years’ performance.

As long as these accounting “gimmicks” are not meant to hide any underlying weakness of the company — and we see no evidence of that — the temporary hammering of the stock should pose no long-range corporate problems.

The skepticism that arises is whether these questionable actions are consistent with the statement of Chairman/CEO Bob Meyerson in his remarks accompanying the announcement of the FY96 results. “We have been consistent in that pursuit [producing long-term profitable growth], sacrificing near-term gain for longer-term sustainable gains which produce more lasting values.”

[On June 5, 1996, Telxon’s shares closed at $17-7/8, near its 52-week low.]

(Christopher Rezendes is director of Bar Code Industry Planning at Venture Development Corp)