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The substantially unrealized potential....

....for significant growth of Radio Frequency Identification (RF/ID) applications has been discussed for a number of years.

In one of the early references to RF/ID, in the May 1986 issue of *Bar Code News*, John Chilton (Escort Memory Systems) speculated: "After a slow start as a technology looking for an application, the sector of automatic identification known generally as RF Identification has in the past year expanded with new capabilities." In the July/August 1988 issue of *Identification Journal*, Ron Ames (a consultant to the RF/ID industry) wrote: "With...advances in technology...the RF/ID industry seems to be well-positioned for rapid growth."

At ID Expo this year, Texas Instruments (Attleboro, MA), which was exhibiting for the first time, was promoting its TIRIS (Texas Instrument Registration and Identification System) RF technology. TI, which entered the RF/ID market in 1991 with a $50 million start-up investment from its parent company, presented a very impressive list of successful TIRIS installations, including ski resort lift tickets, cargo loading and storage, ostrich and bison identification, garbage collection, marathon runners and many others.

But TI's greatest enthusiasm was reserved for its Intelligent Vehicle Highway Systems (IVHS), developed as part of a cooperative agreement with MFS Network Technologies (Omaha, NE). This RF/ID system -- which includes a new TIRIS transponder and reader -- has been designed to recognize a minimum of 2,500 vehicles per lane per hour, four times faster than any current coin-operated express lane. Overhead readers, mounted at the toll booths, communicate with uniquely coded RF/ID tags (or transponders) placed on the vehicle dashboards. Each transponder will carry a prepaid toll balance from which tolls will be directly and automatically deducted.

MFS announced that the first large-scale installation of IVHS, scheduled for December 1995, will occur on State Route 91 in California, the first private and all-automation tollway to be built in America.

There is little question that the array of projects suitable for RF/ID is very large and growing. But two major inhibiting factors have stymied the realization of its full potential over the past seven years.

The first barrier has been the high cost of the transponders. We discussed this issue, last year, with Don Small, VP Marketing at Hughes ID. At that

time, he told *SCAN*: "RF/ID has not yet developed into a major technology because it has been promoted, primarily, by smaller, technology-oriented companies which could not take advantage of the efficiencies resulting from large production quantities and corporate size....These smaller firms are not funded or equipped to mass produce transponders to sell as low as the Hughes-projected price of $.25 each." The active entry of giant Texas Instruments should help validate Small's position and possibly help to eliminate this pricing problem.

The second barrier, which is possibly the more important one, is the lack of national RF/ID standards. There is never a discussion of the RF/ID market without someone pointing to this missing link.

One organization that has taken an active role in pushing for RF/ID standards is the Automotive Industry Action Group, which recently published its own standard for RF/ID devices in automotive applications. An AIAG announcement on April 27, 1993 opened with the comment: "If national standards are adopted...RF/ID could start US industry on its way toward saving hundreds of millions of dollars annually. Savings in the billions will become possible when RF/ID goes to work in international commerce, government and other areas."

The AIAG statement continued: "Although many RF/ID applications already exist, most are 'closed systems' because they use proprietary frequencies and protocols. (An RF/ID protocol is a set of software, data and communication rules.) As a result, there is little or no interchangeability between systems or components....Making RF/ID technology usable on a mass scale requires a standard protocol....From a current level of $500 million, RF/ID sales volume could triple in five years...following adoption of a standard RF/ID protocol."

As a first step toward standardization (and as a move that emulates the examples set years ago by inventors of bar code symbologies), four equipment vendors -- Allen Bradley (Milwaukee, WI), Hughes Systems Group (Fullerton, CA), Microguard (Rochester, MI) and Micron Communications (Boise, ID) -- have placed their proprietary RF/ID protocols in the public domain, thereby making them available to others. According to an AIAG statement, other vendors are being encouraged to take similar steps in other application areas; in addition, RF/ID protocol standards are now being promulgated by ANSI.

The aggressive leadership taken by the AIAG is a natural, since the auto manufacturers can visualize hundreds of applications throughout their production and distribution sectors. They foresee that the standards, and the resulting price reductions, will prove to be of great benefit to them.

This welcome move, to adopt RF/ID standards, is another example of the need for a powerful organization, industry or government agency to apply the pressure necessary to break the logjam and overcome the restrictions that naturally arise among competitive vendors. This same type of action has repeatedly worked in the automatic data capture industry and is long overdue for RF/ID.

In a significant change....

....of philosophy, AccuSort is embarking on a new marketing effort. And to plan and implement this strategy, Al Wurz, founder/owner/president of the company, has hired Jack Ashcom as his new VP Marketing. Most recently, Ashcom was a consultant with Pittsburgh-based Green Associates; before that, he held

various positions in the material handling industry.

In a recent interview with *SCAN*, Ashcom characterized AccuSort as having been an "engineering-driven" company up to now. "My job," Ashcom explained, "will be to turn Al's company into a new type of company with new marketing efforts."

Specifically, Ashcom's "strategic plan" calls for a reorganization into three separate businesses:

1. The manufacture and consolidation of custom-built, hardware-driven scanning systems will remain at the core of AccuSort's business, as it has been since its inception. At the heart of this section are the omni-directional, high-speed, high-performance laser scanners that have been the hallmark of the company. The most successful achievement of this product group was the multi-year $70 million contract to supply scanning systems to the US Postal Service (*SCAN* Oct 91, Nov 91). [Ashcom revealed that the company also had recently sold 700 scanners to Siemens for installation by the German postal system.]

2. A new line of commercial, off-the-shelf components has been introduced, led by the Model 20 (a small, inexpensive, self-contained, single line, moving beam laser scanner), and the Quad X/Double X (a more sophisticated omni-directional unit). Ashcom will be expanding AccuSort's VAR network to market these products for use in warehouse/distribution, manufacturing, health and document processing applications.

3. An expanded effort will be undertaken to market complete real-time systems, which will be centered around AccuSort scanners and will include everything from the host computers to the material handling equipment. Ashcom feels that the company can build these total systems -- similar in concept to the USPS systems -- and can sell them through the company's direct sales force.

AccuSort currently generates nearly $40 million a year in sales (not including the USPS contract, which will be winding down by next year). The new VP Marketing hopes to increase revenues, in part by taking many of the company's successful special applications and expanding them into broader market bases.

   [As an example of the need for this followup effort, Ashcom cites the bar code reader that AccuSort developed for Michelin several years ago. That reader completed a 360-degree scan to find a label inside a tire. Although this application was successful, there was little effort made to market the system to other tire manufacturers. According to Ashcom, it was only after other companies heard of the Michelin success that Goodyear, Goodrich and others installed similar AccuSort systems at a later date.]

Ashcom predicts that the health industry may be the next major market that opens up for the auto ID industry. He also foresees an erosion in the prices of the so-called "high technology units" -- such as the larger AccuSort omni-directional scanners. He visualizes that the substantial revenues and profits realized from these devices will be replaced by sales of off-the-shelf products and complete systems.

Ashcom also reviewed other in-house projects that AccuSort has pending:

- There have not been any new developments on the "invisible" bar code that made such a splash about two years ago (*SCAN* Feb 91). AccuSort is still waiting for researchers at Batelle Institute -- the inventors of this UV-based printing system -- to come up with an ink that has a shelf life of more than a few months in the bottle and more than a few hours after printing.

- The pending lawsuits and countersuits between AccuSort and LazerData are about to be settled. The companies were involved in a hassle over AccuSort's claim that LazerData's Time Slice Decoding products were infringing on AccuSort's patented DRX (Data Reconstruction) decoding technology (*SCAN* Jan 93).

  The presiding judge directed the parties to sit down and try to resolve the issues before going through a lengthy, costly trial. Although Ashcom could not reveal all of the details, he told *SCAN* that the companies have reached the following settlement:

  (1) LazerData has admitted to infringement of the AccuSort patents;
  (2) There will be payments (totalling in the "high 7 figures") made in various forms (including up-front cash and royalties) over an undisclosed period of time;
  (3) LazerData will continue to sell their own product, but will have to label that product with the AccuSort patent information;
  (4) All litigation between the two companies has been terminated.

- Although AccuSort's major contracts with the US Postal Service (for bulk handling systems) will be completed next year, the USPS is currently developing other large automation projects. In March, ElectroCom Automation (Dallas, TX) was awarded a $290 million contract to produce (within 18 months) 1,044 bar code sorters, each capable of handling 40,000 letters an hour. According to Ashcom, AccuSort expects to supply many of the bar code scanners for this project.

Some odds and ends....

....in the news this past month:

- Taking a leaf from a successful trend in discount marketing -- e.g., Price Club and Sam's Warehouse -- we now have the Bar Code Discount Warehouse (Strongsville, OH). This new company offers CCD, pen and laser scanners, printers, wedge decoders, mag stripe readers and printing software with major brand names, including Opticon, Spectra Physics, Symbol Technologies, Fargo and Strandware. According to a company statement: "BCDW is ideal for experienced bar code users who know what they want and want it for the lowest cost possible."

  General Manager Pete Huber told *SCAN*: "Our prices are 40% to 50% below retail, even for a one-off purchase. We are operating on a very small margin in order to build volume to increase our buying power." Huber says his company will concentrate on POS customers (such as video rental stores) and will be supplying the bar code portions only. "We are not a VAR," he explains. "We will be selling new equipment with the manufacturer's warranty at good prices."

Huber comes from Timekeeping Systems, a Cleveland-based manufacturer of bar code readers. He will not reveal the names of the owners of BCDW who, he says, prefer to remain as "silent partners."

We cannot attest to whether the prices at BCDW are any less expensive than those offered by other aggressive dealers, but we thought the marketing approach was worth noting.

BCDW, 14761 Pearl Road, No. 257, Strongsville, OH 44136; 216/273-4746.

- The final attendance figures at this year's ID Expo (May 11-13, 1993) were up an impressive 15% to 10,230 visitors (not including exhibitor personnel). There were 230 exhibiting companies, a show record. These figures were noteworthy, particularly in view of the current difficulties which have beset AIM's SCAN-TECH show.

- A *Business Week* cover story (June 14, 1993) titled "The Technology Payoff" included a few quotable quotes which could readily apply to the auto ID industry:

"Throughout the 1980s US businesses invested a staggering $1 trillion in information technology....Despite the huge investment, businesses saw little payoff. Profits were flat, and productivity growth was stagnant....Overall, national productivity rose at a puny 1% annual rate compared with nearly 5% in Japan, and the US standard of living stagnated. Now there are tantalizing hints that the big payoff may finally be at hand....According to [a] soon-to-be-published analysis...the return on investment on information systems averaged a stunning 54% for manufacturing, 68% for all business surveyed....

"Perhaps nowhere in the service sector has information technology had more impact than retailing. In the 1980s Wal-Mart stores leaped to number one in the US retail business by keeping its prices low, its stores better stocked and its inventory tight....By tracking every sale [through bar code scanning] to see what's selling and what's sitting, Wal-Mart avoids costly markdowns to inventory."

Business Week suggests that "sweeping changes in management and organization structure" are part of the "revolution that is sweeping America's offices and factories." We believe there are many indications that these changes bode well for bar coding, RF and other auto ID technologies.

- On two recent occasions on these pages, we have described the peculiar seasonal pattern of sales and earnings reported by Norand (*SCAN* July 92, May 93). In the past, the company's revenues were sharply tilted toward the fourth quarter -- with as much as 38% of the revenues and 98% of the profits concentrated in that 3-month period -- which made it difficult to predict annual results.

When the company went public last year, management indicated that efforts would be made to flatten this disparity in quarterly results. Indications from the first nine months of its current fiscal year suggest that Norand may have been successful -- in more ways than one.

Not only has the annual pattern evened out, but sales and earnings for the year have risen dramatically. For the nine months ended May 30, 1993, sales were $105.8 million, up 40% over last year's $75.5 million. Operating income was $6.2 million compared to $2.0 million last year; net income after (interest expense, provision for taxes and other extraordinary items) was $2.4 million ($.62/share) versus last year's loss of $3.0 million.

The company also announced in June that it had acquired Tandy Corporation's Micronic/Parcon organization in Europe. The Micronic line of hand-held computers is marketed primarily in Germany, Spain, Denmark, Sweden, United Kingdom, Finland and France.

<u>Our readers should be pleased</u>....

....to learn that the worldwide bar code equipment market "was recession-proof during the global economic downturn." So says the latest Frost & Sullivan Market Intelligence report, "World Barcode Equipment Markets," scheduled to be released this month (Report No. 925-10, 262 pages, $1,895).

Overall, this newest F&S/MIRC study is very optimistic; it characterizes the bar code equipment market as having been "very dynamic in the past four years." Because companies look for "ways to increase efficiency, control costs and optimize resource utilization [and because] bar code technology has a proven record in accomplishing these objectives," the report maintains that the world bar code market was "insulated from the adverse effects of the global economic recession."

The study covers scanners, verifiers, data terminals, printers and software, and includes these statistical highlights:

- In 1992, the total worldwide sales of bar code products was approximately $3.5 billion.

- The compound annual growth rate, for 1992 through 1999, is projected to be 17.3%, with sales in the final year of this century forecast at $10.5 billion.

- Somewhat surprisingly, the report predicts that over the next seven years the percentage breakdown of the total auto ID market, by product type, will remain approximately the same as it was in 1992 (last year's dollar sales shown in parenthesis):

    Scanners.........36.4% ($1.3 billion)
    Printers.........28.2% ($970 million)
    Data Terminals...25.8% ($890 million)
    Software......... 9.3% ($320 million)
    Verifiers....... 0.4% ($15 million)

- Similarly, the apportionment of worldwide regional sales is expected to remain static for the remainder of the decade: US - 50%; Europe - 28%; Pacific Rim - 17%; Rest-of-World - 5%.

This is a sampling of some of the positive market trends that were predicted:

> "Vendors are making an effort to increase the size of the pie rather than battle over market share; Price erosion is resulting in unit shipments growing faster than revenues; The retail market is approaching saturation, but the manufacturing sector is beginning to adopt an increasing amount of bar code equipment; A stress on bar code quality...should aid sales of verifiers; Handheld laser scanners experienced faster growth because of their ability to read from distances; Wireless data communications [are] becoming popular with end users."

Major technology trends -- higher density symbologies, higher performance scanners, smaller printers, more aggressive software development -- are all cited in the report as evidence of an industry destined for continued profitable growth.

COMMENT

We feel constrained to point out that we have always been less than enthusiastic about studies that purport to predict the future.

Although there may be a great deal to be learned from this report about the current status of the industry and its 400 vendors, we are less comfortable with the attempts to forecast what the worldwide market may look like in seven years. Since there is much evidence that individual companies are having problems predicting their results for the next fiscal quarter, any prognostication beyond that should be viewed with some skepticism.

The first announcements....

....concerning SCAN-TECH/Europe and SCAN-TECH/UK since the sale of these events to Advanstar (*SCAN* March 93) have resolved their next dates and venues:

- SCAN-TECH Expo Europe '93 (note the slight change in name) will be held November 30-December 2, 1993 at Koln, Germany. This event is the tenth in the series (that started in Amsterdam) and the first time in that German city. According to the preliminary information, this first Advanstar-managed show will be very similar in format and presentation to those of the past few years. Also listed as sponsors are AIM/Europe and the European edition of *Automatic ID News Magazine* (owned by Advanstar). The new organizers have launched an extensive advertising and promotion program to attract exhibitors and attendees.

- SCAN-TECH/UK will now be known as ICAP Expo. The first show under Advanstar management will take place June 14-16, 1994 in Birmingham. ICAP is an acronym for Information Capture and Processing and comes from the UK organization of the same name. That group was formed late last year, with funding and support from AIM/UK, to bring together, under one organization umbrella, manufacturers, suppliers, consultants, systems integrators, academics and users of auto ID.

  [Advanstar had originally suggested that the expo be held in London in May 1994. Then Advanstar's management wisely decided to attend an AIM/UK meeting. Based on suggestions from the members, they settled

on the June 1994 date and continuation with the Birmingham location. Advanstar heeded the advice of those who pointed out that Birmingham was much more centrally located for the auto ID users they wanted to attract.]

Advanstar seems very enthusiastic about their two new shows. From all indications they have the backing and support of the European vendors of auto ID hardware, software and systems.

Musicians who are coping with....

....computers and automation will be interested in a new method for <u>scanning</u> <u>printed</u> <u>music</u> and converting it into computer language.

An article in the April 1993 issue of *Electronic Musician*, titled "Scanning the Horizon," explained that music, as a written language, is "far more complex than words" and that several organizations have been trying for many years to develop optical character recognition (OCR) suitable for use by musicians, composers and orchestrators. The article added: "There have been no products available -- until now."

According to the article: "Ever since personal computers became musically inclined, musicians have longed for the ability to scan a piece of sheet music and convert it into a MIDI sequence, or music notation file, for transposition and other modifications.

> [MIDI stands for Musical Instrument Digital Interface, which is the communication protocol for computers and synthesizers that was developed in 1983 through the collaboration of several major electronic instrument manufacturers.]

For the musically uninitiated, the challenge of scanning sheet music does seem quite daunting. "The important elements to recognize," the article continues, "are note pitches (including accidentals), note and rest durations, clefs, key and time signatures, and bar lines. The recognition algorithms identify all pertinent symbols staff by staff, taking about 5 minutes per page with up to 98% accuracy."

There are now two software packages that will scan graphic images of sheet music into standard MIDI files. They are sold by <u>Coda</u> <u>Music</u> <u>Technology</u> (Minneapolis, MN; 800/843-2066) and <u>Musitek</u> (Ojai, CA; 800/676-8055). Both systems will require standard, full-page OCR scanners which can generate a separate TIFF (Tagged Image File Format) file. Only printed -- not handwritten-- sheet music will be scannable.

Starting later this year, Coda Music will be scanning on an in-house service bureau basis only. By mid-1994, the company expects to be able to provide end-users with software to load into their own computers. Musitek is currently taking orders for their program ($379 each) for shipment in late July.

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