After a very complex....

....series of events involving joint ventures, leveraged buy-outs and letters of intent, Dataproducts is about to take over all of the ink-jet printing technology and products which were developed by Exxon Printing Systems.

As we learned from Robert Spencer, Director of Industrial Marking Marketing for Dataproducts, ink-jet printing falls into two groups: solid ink (sometimes referred to as Phase Change) and liquid ink. Each method requires different print heads -- or nozzles -- and each has its own application advantages: solid inks, which dry in milliseconds, can be used for non-absorbent surface printing and for high resolution bar codes (the "X" value can be held to 6 mils); liquid inks are used for the printing of more conventional materials and substrates.

Dataproducts and Exxon had set up a 50-50 joint venture a few years ago to develop the solid ink technology. At that time, Exxon retained the liquid ink method and continued to develop printers using this approach within its Exxon Printing Systems subsidiary. After a few false starts, which produced less than adequate results, Exxon finally introduced the ink-jet printer last October at SCAN TECH 86 in San Francisco (SCAN Nov 86).

This apparently was not a comfortable product area for the giant oil company. When Reliance Electric was spun off from Exxon -- via a leveraged buy-out by Reliance employees about a year ago -- the liquid ink products and technology went with the deal. Reliance then formed a separate subsidiary company called Imaging Solutions Incorporated (ISI) -- and the Exxon/Dataproducts joint venture, which was working on the solid ink application, was also folded into ISI. On April 13, 1987, Dataproducts issued its letter of intent whereby it plans to buy ISI from Reliance and thus acquire the assets, products, technology and customers for the liquid ink-jet and solid ink-jet printers.

Dataproducts is one of the world's leading independent computer printer manufacturers with over $350 million in annual sales. According to Spencer, his company's interest in ink-jet printers and in bar code applications has been growing based on inquiries it has received and market research it has completed. Dataproducts now offers dot matrix, laser and thermal printers, and expects ink-jet devices to complement their product mix. The ISI deal has not yet been finalized, but indications are that it will go through in about 60 days.

Taking advantage of....

....its recent excellent sales and earnings performance, and the good
reception it has been receiving in an active stock market, Symbol Technologies
has registered a new stock offering with the SEC. The company plans to sell two
million shares of its common stock, which should yield about $40-50 million at
its current NASDAQ price level ($23 on 4/30/87).

"It's a good and prudent move on our part to raise additional capital in this
market," Chairman/CEO Jerry Swartz told us. "It will permit the company to
broaden its base of shareholders and increase institutional support." The
company plans to use the funds to increase its working capital and for general
corporate purposes. The firm will also be positioned to take advantage of
acquisition opportunities, although Swartz hastens to say that "there are no
negotiations currently pending for any such acquisitions."

(As part of this same offering, it should be noted that about 48,000
additional shares are being sold by a group of shareholders -- none of whom are
either officers or directors. The key stockholders are thus not bailing out,
even at these heady stock prices. They are remaining for what they apparently
see as a positive future.)

Symbol Technologies goes into this offering with a strong balance sheet: it
is sitting with over $17 million in cash and almost no long-term debt. Because
of the healthy price of the company's stock within the last 12 months, S/T was
able to force conversion of almost all outstanding notes and warrants to its
common stock. (A two-year $3.2 million loan was recently taken down from the
banks to finance the purchase of a new headquarters building and manufacturing
facility, which the company expects to occupy by mid-summer.)

From S/T's latest financial report (for the 9 months ended March 31, 1987),
revenues were $31.1 million, almost double last year's $15.9 million; net income
for this same period was $5.5 million ($.83 per share) compared to $1.4 million
($.27 per share) last year. With more than 400 employees now on the payroll,
and with management striving to keep up with its additional recruitment and
training needs, the company's mood is very upbeat. Symbol Technologies is
presently the outstanding performer of all companies in this industry which are
solely devoted to bar code scanning.

As a way of introducing....

....the next three articles, we selected some words of wisdom from Chapter 41 of
the draft of a book on bar code scanning applicatons in industry being written
by Harry Burke (now an independent writer/consultant).

   "How big is the bar code market? How fast is it growing? How
   big will it become?

   "How big do you want it to be? Its outlines are fuzzy; its definitions
   obscure. It can be sized in many different ways. It all depends on
   what you call a bar code product: What components are used to
   formulate a total? For instance, certain products clearly fall within
   any bar code definition: scanners, labels, film masters, wedges and
   verifiers. Of these there can be no argument. They only find use in
   bar code applications.

"But what about the engineering effort required for
systems integration? And what about software?"

Burke goes on for many pages to answer those questions and to describe how
a study of the bar code scanning market might include some components and
specifically exclude others. In order to prepare such a research report, the
author must make similar decisions about how to define the market and how to
select those players he considers important customers, vendors and qualified
sources of information. He must then quantify current sales and predict what
will happen 5 years hence. Anyone who has ever prepared 12-month budget
forecasts, even within his own company, can appreciate the monumental
challenge this represents.

Studies about the bar code market are beginning to proliferate. They cannot
be properly evaluated unless the reader fully understands the basis upon which
the author has built his market estimates and forecasts. Read on....

The report published....

....by Frost & Sullivan is entitled Bar Code Data Collection for Retail and
Industrial Markets (Dec 1986). Due to copyright restrictions, we can only sum
up some of the features and conclusions:

1. The study's objectives were to provide a perspective of bar code systems
    in the industrial marketplace; to analyze the current market structure
    of bar code products and systems; to forecast future market structure;
    to examine the competitive environment; to identify opportunities and
    potential strategies; to determine user profiles; and to provide a
    constant dollar 5-year forecast of consumption by producer, by end-user
    and by application area.

2. The methodology used to prepare the report included a review of
    articles in trade journals and other publications; a mail survey to
    5,000 potential industrial bar code users (they received 232
    responses); telephone and personal interviews with users, industry
    leaders, manufacturers and consultants; and an evaluation of industry
    statistics from various sources.

3. Gross revenues for the bar code industry are estimated to have been
    $750 million in 1986 and projected to grow to $2.3 billion in 1990 --
    a compound growth rate of 30%.

COMMENT

*We have no factual basis for disputing the final Frost & Sullivan figures
(since we have conducted no surveys of our own). However, if any of the
results turn out to be accurate, we believe the similarity will be mostly
accidental. We just do not concur with either the methodology used or the
sampling techniques employed, as they were stated in this study.*

The study costs $1,925 from Frost & Sullivan, Dept. R-1, 106 Fulton Street,
New York, NY 10038; 212/233-1080.

Some previous reports....

....compiled and published by International Resource Development (IRD) have
met with mixed reviews on these pages (SCAN Dec 84, Oct 85, Mar 86). IRD has

addressed the bar code scanning marketplace from many vantage points and the results have been interesting, even though the market forecasts never seem to agree with each other. As to whether these reports are worthwhile (at over $1,600 for each), the decision must be a personal one for each buyer.

The most recent IRD study, dated February, 1987, is titled Bar Code Markets: Key Growth Areas in Service Industries. It covers very specific market applications and includes only selected industries within the US service sector, which it defines as follows:

"The service industries lack enduring material products; they employ primarily white collar, professional, clerical and serving workers, and they are highly labor intensive. The particular industries stressed in this report are health care, physical distribution and mail services, libraries, office bar coding in service-sector offices, scanning-based market research services, video rentals and so forth."

Although we may disagree with some of IRD's conclusions, we selected several items from the Executive Summary to provide the flavor of the report:

- Bar coding is not a terribly large industry. But it is a profitable one, and so far at least, has been innovative, lean and well-managed.

- Some of the major issues facing the bar code vendors as they address specific areas in the service industry will be the problem of overcoming alternative technologies; the problem of international competition, especially from Japan; the issue of systems integration versus component manufacturing; the whole area of prices and margins; and the looming possibility of FDA and/or industry regulation of laser products.

- A quantitative analysis was presented of annual gross sales (US) for each of the areas covered, including current and projected market size (all figures are in millions):

	1987	1989	1992
Health Care	$8.0	$16.0	$40.0
Libraries	5.5	N/A	9.8
Video Tape Rental	2.0	N/A	4.0
Physical Distribution	3.0	N/A	8.0
Finance, Insurance and Real Estate	4.0	8.0	20.0

The body of the report discusses each of these markets in greater depth, and profiles the important supplier companies.

IRD, 6 Prowitt St., Norwalk, CT 06855; 203/866-7800.

And to round out....

....our review of currently available market studies of the bar code scanning industry, here are two more:

- The Bar Code Business: A Strategic Analysis by Ross Associates, which purports to answer the questions: "Is there a bar code industry? If it isn't an industry, what is it? How big is whatever it is, and where is it heading?" (Those are real quotes!) This study estimates "the size of the total bar code business shipments at $511 million in 1986,

growing to $1.01 billion in 1990, an average yearly increase of a hefty 19%." The report goes on to say that readers should not pay too much attention to this figure, which it calls "amusing and really misleading for planning purposes." You can buy this gem from Edward A. Ross, Ross Associates, 32 Kearney Rd., Needham, MA 02194; 617/449-5123.

- <u>Market Study of the Automatic Identification Industry 1985-90</u> is published by <u>Inmark Corp.</u>. (We can only quote from a magazine write-up of this study which appeared in ID Systems. We called and left a message on the Inmark answering machine, but no one ever called back.) According to ID Systems, the report states that the market was $1.2 billion in 1985 and is expected to grow to $2.3 billion by 1990. The study costs $3,950 and is available from George Gilfoil, Inmark Corp., 16 Hozey Street, Watertown, MA 02172; 617/739-4548.

<u>One of the limitations....</u>

....of the <u>UPC Shipping Container Symbol (SCS)</u> is that it does not encode packaging levels or quantities. Under the existing specification (Oct 1984), each different quantity pack of the same item has to carry a different product identification number. No provision was made to recognize the intermediate packages, pallets or other variations in packaging levels. The Uniform Code Council (UCC) is circulating a draft proposal which would remedy this omission. This new proposal retains the original "Assortment Indicator" concept, which assigned zero as the first digit of the code to indicate that the SCS product number and the UPC product number are different. This first digit has been renamed the "Packaging Indicator" (PI).

Now, however, instead of using only the digit "1" to show that the UPC and SCS product numbers are the same, PI numbers 1 through 7 are set aside to specify the packaging level. (This approach seems to emulate the Unit of Measure used by the Health Industry Bar Code). The PI does not represent the actual number of units, but establishes different code numbers for different packaging levels and quantities. Numbers 1 through 7 are reserved for fixed weight items; 9 is for random weight; and 8 has been set aside for future use.

From what we can see, this is the only change in the SCS draft proposal. It now goes to the UCC Board of Governors where approval is expected this month. If the UCC can only come up with a program to convince the retailers to install back-door scanning systems, this application could become a very significant new market opportunity for hardware and systems vendors.

<u>We were cautioned....</u>

....by just about everyone we questioned on the subject of <u>UPC random weight coding</u> "to please set the record straight -- let your readers have an accurate version of recent developments." The group charged with studying this problem and submitting recommendations is the <u>Perishable Foods Random Weight UPC Ad Hoc Committee</u> (which we will refer to as the "Committee").

The problem has been around for many years, and although many solutions have been attempted, they all proved inadequate to the total task. The most commonly used UPC code for random weight products (meat and produce) is described in UPC Guideline #11. The symbol is the standard UPC 12-digit Version A format with designated fields for a number system character 2, a single digit vendor code, a 4-digit item identification, a 4-digit price with its own check digit, and

the standard UPC check digit. Although many retailers have used this symbol, it soon became evident that the standard UPC format wasn't going to hack it.

After a great deal of study, the Committee finally decided to go with the Version D-3 symbol. From the 12-digit coded information, the code and symbol were expanded to 24 digits as follows: A 2-digit number system indicator (02); a full 5-digit manufacturer's number, so that the manufacturing source could be fully identified; an item field expanded to 5 digits (which is a ten-fold increase) to accommodate 100,000 products; a price field increased to 5 digits (that's really planning for inflation); and space for 3 check digits. In addition, 4 digits were set aside for future use.

No one expects implementation immediately, even though approval by the Uniform Code Council is anticipated this month. Expanded coding of meats is important to those retailers who want to track sales of this very large product group, but systems are expected to be one-on-one arrangements between the retailers and their vendors. What is significant about the guidelines is that they will establish working specifications for suppliers to design equipment and software that will scan and decode a 24-character symbol. Some industry spokesmen estimate real world usage is 5 to 10 years off.

For those who believe that the adoption of UPC Version D-3 opens the door to other commodity areas (apparel and coupons have been prominently mentioned), we know of no current support for such a move. The meat industry needed an expanded code and it worked out to be an "inside arrangement." Adoption of Version D-3 on an industry-wide basis for other products is most unlikely.

(For details of the UPC Version D symbols, consult Appendix D of the UPC Specification Manual.)

Where are the new markets....

....for bar coded products and systems? We are all aware of the general retailing, automotive, government and health industry applications. But what about the smaller, not-so-obvious niche markets which offer opportunities slightly out of the mainstream -- like video rentals?

We researched this area by first visiting the International Home Video Market at the Javits Center in New York in mid-April. After noting the significant number of companies which are offering operating systems (including scanners) to the retailers, we tried to determine the size of the market and whether the bar code implementation is under any control or guidance.

The answer to the second question is that there does not seem to be any organized attempt to set standards or specifications. By common consent, blank or prerecorded videocassettes offered for sale are using the UPC code and symbol, similar to other published media. For the video rental business, however, Code 39 has become the symbol of choice, mostly by default. The rental stores want to uniquely number each cassette and each member-borrower, sometimes using alpha-numerics.

Systems are basically a closed-loop affair, with the stores labeling their own merchandise, issuing their own membership cards and scanning internally. Since rental transactions normally involve only a few units at one time, most systems offer scanning wands as the least expensive alternative. Labels are ordered as needed in batch sequence.

As for the size of this market, no one had any definitive statistics. We con-
tacted the show's sponsor, Knowledge Industry Publications, Inc., and their best
guesstimates were: 28,000 rental locations, of which about 80% are devoted to
video only (as opposed to many supermarkets, convenience stores and others who
have rental departments); and 3,000-4,000 videocassettes carried at each location.

Leslie Grey, editor of the Home Video Publisher Newsletter, sees bar code
scanning becoming widely used in the industry, with current market penetration
estimated at less than 20%. The recent study completed by International
Resource Development (see above) estimates this market will grow to $4 million
by the year 1992.

In an aggressive move....

....to expand its presence in the market for hand-held data collection ter-
minals, Intermec has introduced its Trakker -- a portable transaction manager
-- which has been designed and will be manufactured in-house.

We reviewed the Trakker's major features with Intermec's Portables Product
Manager, Monica Holly. She emphasized the advantages of the new proprietary
programming language built into the unit's editor/compiler, which allows for
greater user flexibility and the inclusion of an unlimited number of files and
prompts. "The Interactive Reader Language (IRL) is designed for data collection
programs," she noted, "and its powerful data editing and record look-up
commands are optimized for portable bar coded reading and on-the-spot
verification."

Holly estimates the current market for portable devices of this kind to be
about $100 million per year, with a significant portion dedicated to retail
applications. Intermec is looking toward expansion into the industrial market,
particularly in automotive, where the company feels it has a great deal of
strength with its other products. Industrial applications include shipping,
receiving, and warehouse control; and document and asset tracking.

The Trakker supports the Intermec 1500 solid state moving beam laser scanner
and the 1260 series digital wands. The device can interface to various host
computers via its RS-232-C port and communications protocols. The price of
the Trakker is $1,295; add $1,195 for the laser scanner or $169 for a wand.

Intermec, Box 360602, Lynnwood, WA 98046-9702; 206/348-2600.

Following a somewhat....

....dormant period, Cardinal Computers (Lewisville, TX) is emerging with new
financing and new market opportunities. During the past two years, the company
had been discussing possible mergers with Imtec (SCAN Dec 86, Mar 87) and
another (unnamed) company. Both opportunities led nowhere. Because of these
corporate activities, as well as a shortage of cash, Cardinal has done almost no
advertising since 1985 and relied on "word of mouth recommendations" for sales
leads.

We recently covered these events in some detail with President and founder,
John Laninga, who called to advise us of new developments. He was particularly
enthused about the new financing made available to the company by two "silent"
investors who have put up substantial funds ("seven figures") in exchange for
80% of the company.

Currently 90% of all Cardinal's products are bar code related. The company started 5 years ago as an OEM distributor for Intermec and has been selling readers to Federal Express for a number of years. Recently the company was listed as an authorized supplier under a worldwide GSA contract for readers, printers and service. (Cardinal contracted with a large service company to handle the maintenance work.)

The current products which Cardinal manufactures include readers and wedges. The company also "remanufactures" dot matrix, thermal and impact printers to which it adds software, laminators and some peripherals.

Laninga optimistically projects that his company will do about $1 million in sales in fiscal year 1987 (ending Sept 30); for fiscal '88, he believes sales will increase three-fold to $3 million.

Cardinal Computer, 3207 Justin Road, Lewisville, TX 75028; 214/539-9650.

This year, there will be a change....

....in the AIM-UK third annual conference and exhibition program. The show has been relaunched as SCAN-TECH UK '87 and moves to a new, out-of-London venue at the National Exhibition Center, Birmingham. It will run from June 23-25 and will include seminars and vendor exhibitions. More details about SCAN-TECH UK from: AIM-UK, The Old Vicarage, Haley Hill, Halifax, West Yorkshire, HX3 6DL, ENGLAND; telephone (0422) 59161.

Three weeks earlier, AIM-France will be mounting its second National Conference of Automatic Identification. This show will be held at the Cite des Sciences et Techniques, Paris on June 3 & 4. Contact: Agence Benefice, 66 Rue Sebastien Mercier, 75015 Paris, FRANCE; telephone 33 1 45 78 61 31.

For the past 10 years....

....we have been trying to get the message across to our readers that the possibilities for employing bar codes are almost limitless. For example, there is a case of the municipal authorities in Camden, London, England who are attempting to solve the annoying problems related to malfunctioning parking meters. Some of the town's bureaucrats believe that these breakdowns may not be random occurrences, but rather the work of a few coin jammers and others bent on malicious mischief.

So they have installed a bar code monitoring and maintenance system for their parking meters. Service engineers check each unit for possible malfunctions and scan its bar coded identity label. If the meter is faulty, the engineer also enters the license plate number of the adjacent parked car, using a bar coded menu card. By analyzing details of vehicle registrations, the authorities feel they may be able to correlate certain vehicle owners with the occurrence of malicious damage and coin jamming.

The high resolution labels and menu cards have been supplied by Image Data Systems and the information is captured on MSI Datawands. We haven't heard of any arrests yet.