Electronic Commerce in Apparel Production and Distribution

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ELECTRONIC COMMERCE IN APPAREL PRODUCTION AND DISTRIBUTION





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Electronic Data Interchange Program (EDIP)

Electronic Commerce in Apparel Production and Distribution

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Abstract

The use of interorganizational electronic systems in the textile, apparel, and retail trading community has given rise to electronic commerce. EDI, data bases, EFT, credit card authorization, home shopping, and other services are increasingly supporting the transactions for apparel. This report examines this phenomenon. INPUT estimates market sizes for select services, profiles the vendors of these services, and discusses the trends and opportunities available to the users and vendors of these services.

The report is 46 pages and contains 17 exhibits. An index of companies is included.



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Table of Contents

Ι	Introduction	I- 1
	 A. Communication Technology as an Efficiency Driver B. Electronic Commerce: Definition and Background C. Report Methodology D. Related INPUT Reports E. Overview of Report Findings 	I-2 I-3 I-5 I-6 I-7
II	The Apparel Production and Distribution Trading Community	II-1
	A. Basic Overview: Players Are Consolidating; Output Is Expanding	II-1
	B . Textiles and Accessories	II-2
	C. Apparel Manufacturers	II-3
	D. Retailers	II-4
	E. Transportation and Financial Intermediaries	II-5
	F. Information Technology Trends in Retail and Apparel Manufacturing	II-6
III	Actual and Potential Electronic Commerce	III-1
	A. Electronic Data Interchange	111-3
	1. EDI/EFT Payments and Factoring	III-7
	2. Case Studies	III-7
	B. Interorganizational Electronic Mail	III-10
	C. Electronic Marketing	III-10
	D. Credit Card Processing	III-11
	E. Electronic Home Shopping	III-13

i

Table of Contents (Continued)

IV	Electronic Commerce Service Providers	IV-1
	A. ACS Network Systems/PremenosB. Ernst & Young	IV-1 IV-2
	C. GE Information Services	IV-2
	D. International Business Machines Information Network	1V-4
	E. Microdynamics/Kurt Salmon	1V-5
	G. The Sabre Group	IV-0 IV-7
V	Conclusions	V-1
	A. Impacts on and Opportunities for Electronic Commerce Users	V-1
	1. Customer Service and Operational Efficiency	V-1
	2. Industry Consolidation and Restructuring	V-2
	B. Impacts on and Opportunities for Electronic Commerce Vendors	V-2
	1. Increased Penetration of EDI	V-2
	2. UPC Data Base Services	V-2
	 Model Stock Inventory Software for Automatic Replenishment 	V-3
	4. Product Movement and Market Share Data Services	V-3
Appendixes	A. EDI Transaction Sets for the Apparel-Retail	A-1
L	Trading Community	
	B. Index to Companies	R-1

Exhibits

I - 1	 Human-to-Human Transaction Prototype Electronic Commerce Definition Trading Community Definition 	I-3 I-4 I-5
—]	The Apparel Manufacturing and Distribution Trading Community	II-2
- 4	2 Textile Industry Consolidation	II-3
	Apparel Industry Consolidation	II-4
- 4	Retail Industry Consolidation	II-5
_ 4	Transport Expenditures by the Apparel Community Members	II-5
- (Transportation Industry Players and Trade Flows	II-6
- 7	Information Technologies in Retail	II-7
III - 1	Electronic Commerce Services in the Apparel Manufacture and Distribution Community	III-2
-	The VICS Three-Point Strategy	III-3
~ ~	Typical EDI Linkages in Apparel-Retail	III-5
~ (Apparel-Retail EDI Software and Services Market	III-6
- 4	5 EDI Software and Services Market in the Apparel-Retail Value Chain, 1992-1997	III-6
- (6 Credit and Debit Card Processing Service Companies	III-12
	Home Shopping Networks	III-13

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Introduction





Introduction



Suppose it takes 25 weeks from the time a textile mill buys a bale of cotton to the time a consumer buys a cotton shirt at a department store. Probably for 98% of those 25 weeks, the materiel, at whatever stage of production/distribution, sits idle—in a warehouse, in a production queue, or in a store's backroom storage area. Only for 2% of the time is transformative, value-adding effort applied.

A number of transactions (handoffs) take place in those 25 weeks and a number of parties will own—and, therefore, will allocate financial capital to—the materiel during its course through the value chain.

These transactions and allocations of capital incur costs to the various entrepreneurs along the chain. Better coordination minimizes these costs by minimizing:

- The number of transactions
- The per-transaction costs of the transactions
- The time that inventories of materiel have to be held idle
- A combination of the above

Although manufacturing and transportation technologies are minimizing costs for specific tasks of the apparel value chain, coordination technologies are minimizing the costs across the entire chain.

Basically, coordination technology facilitates the matching of producer supply to consumer demand.

The apparel value chain should not be thought of as simply producers on one side, final consumers on the other, and the retail point-of-sale cash register demarcating the interface between the two groups. Rather, a whole series of producers and consumers form a line—like a bucket brigade that fights a fire—from raw resource supplier to consumer.

To make the apparel value chain efficient, coordination technology must make intermediary transactions efficient.

EDTAP

Communication technologies are allowing the chain to be more efficient. This report discusses transcorporate coordination technologies in the manufacture and distribution of apparel.

Nevertheless, efficiency inexorably improves as participants in the distribution chain work smarter. Working smarter is a matter of coordination: coordinating manufacturing processes; coordinating distribution processes; coordinating the satisfaction of consumer concerns; and coordinating the available tools, persons, supplier sources, and marketing channels to meet customer concerns.

Communication Technology as an Efficiency Driver

Today, communication and information technologies are bringing new degrees of efficiency to manufacturing and distribution. Rather than impacting material transformation processes *per se*, these technologies make human communication and management more productive.

Specifically, these technologies bring greater effectiveness in human-tohuman transactions within and among organizations.

More-effective transactions means customer satisfaction because of the nature of all human-to-human transactions.

All work or market-related transactions are composed of:

- A buyer (a requestor/customer) and a seller (a fulfiller/supplier)
- Basic conversational moves: request, offer, promise to fulfill, report that the promise has been fulfilled, report that the fulfillment of the promise was satisfactory or not, etc.

Exhibit I-1 illustrates the basic conversational parties and moves that constitute a human transaction.

Electronic communication systems are bringing great efficiency to human transactions. The result is better resource management and customer satisfaction.

Whether data bases on consumer purchases, EDI between apparel manufacturers and retailers, credit card authorization, EFT settlements among buyers and sellers, advertising and government regulation made more effective through electronics—these systems allow the providers of apparel and the consumers of apparel to coordinate actions and satisfy each other through commercial exchange.

Α

EXHIBIT I-1



B

Electronic Commerce: Definition and Background

Although applications software and systems allow for better coordination of human transactions within organizations, electronic commerce consists of systems that interconnect organizations and facilitate transactions among organizations.

Exhibit I-2 states the definition of electronic commerce.

Electronic Commerce Definition

Electronic commerce is the facilitation and recording of commercial transactions among organizations by interorganizational computer-based systems.

Although computer applications that operate solely inside the boundaries of a single organization interface with electronic commerce systems, INPUT considers such applications outside of the definition of electronic commerce systems.

Also, electronic commerce applications require, to some degree, the ability of transactions or portions of transactions to be symbolically coded so that they can be processed to some extent by machines.

In other words, a telephone (although it is an interorganizational electronic system that facilitates commercial transactions) is not an electronic commerce application. Yet, an interactive voice response system (that allows customers to use phone keypads to place an order at a supplier, obtain an update on product availability, or inquire about shipment status) is.

Facsimile transmissions are also electronic commerce systems in that they can be processed by machines over and above basic transmission processing. For example, bar codes can be embedded in a fax transmission to allow for machine identification of the transmission. Character recognition, fax server, and imaging technologies allow for the processing of the content (not just the image) of the facsimile document.

The requirement for machine processability of coded transactions is important because it obviates anyone from manually rerecording the transaction. The ability to have the transaction (or component thereof) recorded once and only once, so that subsequent business references can be done automatically, is paramount.

Implicit in electronic commerce is the concept of a trading community. A trading community is more than a vertical market. It is all the organizations involved in delivering a certain consumer product or service.

Exhibit I-3 states the definition of a trading community.

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Trading Community Definition

A company, its trading partners, and the trading partners of its trading partners.

Whole groups of companies—trading communities—are integrating in transcorporate, technically complex electronic infrastructures.

These agglomerations are not only presenting technical challenges (with a concomitant confusing array of vendors that offer a variety of solutions), they are also generating unprecedented commercial phenomena that users and vendors barely understand.

Examples of these phenomena are alliances/partnerships between vendors and customers and, sometimes, among competitors; the elimination of intermediaries; users becoming vendors; economies of scale; proprietary versus open systems; and implementing standards and open systems across an industry.

The scope of what can be considered electronic commerce systems and who the users and vendors are is necessarily wide. The scope is wide because the efficiency engendered by electronics is causing an implosion of industries and organizations. This implosion is pulling in many disparate groups.

Electronic software-based systems allow for the reduction of tasks within and among organizations. The elimination of redundant work is the essence of information systems.

Because of this collapsing of workflow, one must look at many technologies and many categories of vendors and users to comprehend the full scope and potential impact of electronic commerce.

C Report Methodology

INPUT drew on several sources for the data in this report.

• Interviews (by phone or in person) of 12 apparel-retail managers that represent 2 department store chains, 4 apparel manufacturers, 2 textile mills, 1 trade association (UCC), and 3 vendors of network and software services

- Results from two EDI surveys INPUT conducted during 1991
- Ongoing interviews with vendors of electronic commerce services and products
- Extensive trade press and independent research sources
- In-house data bases on companies and product literature
- Other INPUT studies

Many of the issues and topics in this report are written about in greater detail in the companion report, *Electronic Commerce in Grocery Produc*tion and Distribution.

Related INPUT Reports

D

This report is part of a series of reports on specific communities that use networked systems. This well-received series (in terms of reports sold) was established because INPUT recognized the important trend taking place in the economy: the integration of trading communities in transcorporate, technically complex, electronic infrastructures.

The rationale for these studies is to look at the larger commercial phenomena in light of the information systems that play such a crucial role in integrating trading communities.

Titles of related research are:

Electronic Commerce: The New Foundation for Trade Electronic Commerce in Health Care Electronic Commerce and Transportation Electronic Commerce in Government Electronic Commerce in Grocery Production and Distribution The Electronic Data Interchange Market: 1991-1996 The Electronic Data Interchange Market: Europe The Electronic Data Interchange Market: Japan Trends in Electronic Corporate Trade Payments

E Overview of Report Findings

There is no question that information systems and electronic commerce make apparel makers and retailers more competitive. Despite the retail industry shakeout and the recession, apparel makers and retailers are moving forward by buying EDI and other electronic commerce systems.

The apparel-retail trading community is simultaneously going through a streamlining period with the adoption of information systems and a consolidation of players, particularly at the retail level. The two movements feed each other as the larger, dominant players realize expanding economies of scale with trading partners that use electronic commerce systems.

From the standpoint of a systems and services vendor, this is a doubleedged sword. On one hand, the sale of services will be easy to successful and growing companies because large volumes of business will easily justify purchases of systems. On the other hand, the vendor will have to pick user organizations that will prevail in the industry shakeout.

The fastest growing electronic commerce service is EDI. At \$30 million now in terms of service and software expenditures by the apparel-retail community, INPUT expects this spending level to rise to \$100 million by 1997 at a compound annual growth rate of 27%.

Although other electronic commerce services (such as a credit card authorization) are larger markets, EDI is inherently the backbone technology by which other services can be supported.

Product movement data services, model stock inventory modeling (and automatic replenishment), and market share data services are services that are now possible through the use of the electronically captured data at retailer point-of-sale stations and/or EDI purchasing applications.

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The Apparel Production and Distribution Trading Community



The Apparel Production and Distribution Trading Community

This chapter introduces the different players in the production and distribution of apparel. Trade flows between the players, how many players there are, and the business trends of the community affect and are affected by the community's capacity for electronic commerce.

Large transaction volumes warrant the use of electronic systems. Conversely, electronic systems often give a competitive advantage to a user company that results in the company's capturing a greater share of the specific market or transactions. Consolidated industries and market niches characterized by few vendors, each with large volumes, are the areas where electronic commerce systems can be found.

Thus, electronic commerce and industry organization go hand in hand. In this chapter, INPUT examines the industry organization as it is today in order to discern areas where electronic commerce systems are or will be most effectively deployed.

Important variables highlighted in this industry overview are consolidation and transaction volumes.

[Note: This report does not look at the retail sectors of consumer electronic, drugs, home improvement, or other specialty retailers that carry nonapparel items (such as toys, auto parts, food and drink, etc.).]

A

Basic Overview: Players Are Consolidating; Output Is Expanding

Exhibit II-1 shows the basic players in the apparel value chain. Raw materials are provided by primarily the chemical and agricultural sectors. These materials are converted into basic working materiel by the textile sector. From textiles, the materiel receives its greatest increase in value at the apparel manufacturers. Finally the product passes into the hands of the retailer, which makes the final handoff to the consumer.

EXHIBIT II-1



During the 1980s, consolidation occurred in all three main sectors (textiles, apparel manufacturing, and retail). In each area (except the subsector of apparel stores), the number of companies decreased while total sector sales (value of shipments) increased.

Throughout the clothing-making process, fewer companies are in charge of increasing numbers of transactions.

B

Textiles and Accessories

The value of shipments from the U.S. textile industry in 1990 came to \$66 billion. Eleven billion dollars went to the carpet industry, and \$4 billion went abroad in the form of exports. The remaining \$51 billion went to U.S. apparel manufacturers.

The textile industry may consolidate rapidly during the 1990s because of global competition. U.S. output actually contracted from 1989 to 1990, although it had expanded in earlier years. Total employment by textile companies continues to decline at a rate of approximately 1% per year. Exhibit II-2 contains Department of Commerce (Census of Manufacturers) data that show the consolidation in number of textile establishments from 1982 to 1987. Although the number of textile mills declined, the total output increased. Thus, fewer companies share a larger pie.

EXHIBIT II-2

Textile Industry Consolidation

Number of Establishments/Sales (\$ Billio	ns)
---	-----

1982
6,630/\$47

6,412/\$63

1987

Source: Department of Commerce

С

Apparel Manufacturers

Apparel manufacturing faces consolidation as the internationalization of the market forces makers to be more efficient. U.S. employment is falling in this sector.

Two opposing economic forces bear on the organization of apparel manufacturers.

- Apparel is highly labor intensive (84% of the apparel industry workforce is in production jobs, as compared to 68% for all manufacturing). This percentage makes the apparel industry highly susceptible to labor prices—production centers move to regions where wages are low.
- Fast turnaround in moving the product to the consumer in the face of changing fashion styles and consumer tastes makes the proximity of manufacturer to retailer an important factor.

How these two forces resolve themselves may depend on the cost-effectiveness of international transportation vendors. Already, most U.S. manufacturers acquire much of their product line abroad and use air courier services for a portion of transport needs.

As in textiles, the apparel manufacturing sector is also consolidating fewer companies share an expanded market income, as Exhibit II-3 depicts.



D____

Retailers

This sector consists of department stores (including mass merchandise stores) and specialty apparel stores.

The consolidation of this sector began in the late 1980s and, according to most players in the industry, will continue throughout the 1990s.

Wal-Mart president David Glass predicts that by the year 2000, 50% of the retailers in business in 1991 will be gone. Stanley Marcus, head of Neiman Marcus, predicts that the attrition rate will be 75%.

Despite great turmoil (the Campeau Corp. and Ames Department Stores bankruptcies; the sales of Saks, Marshall Field, and other properties by British American Tobacco), department stores are expected to remain a viable, growing segment of the general merchandise group in the 1990s and beyond.

Nevertheless, the department store sector continues to consolidate; the result is larger but fewer companies. Former regional companies, such as Dillard's and Wal-Mart, have become more national.

Between 1982 and 1987, the number of department store outlets with 25 or more employees increased from 10,163 to 11,069. Of the total, 2,425 were identified as conventional, 5,798 as discount or mass merchandising, and 1,818 as national chain stores.

The number of apparel establishments increased from 141,000 to 148,000 between 1982 and 1987. The number of stores increased in all segments of the industry, with the exception of men's and boys' clothing. Men's and boys' clothing stores declined from 18,600 in 1982 to 16,500 in 1987. The number of men's shoe stores also declined during the same period, from 4,400 to 3,900.

Consolidation occurred and will continue to occur in the retail sector, as Exhibit II-4 shows.

EXHIBIT II-4

Retail Industry Consolidation			
	Number of Establishments/ Sales (\$ Billions)		
	1982	1987	
General Merchandise Stores	36,000/\$124	35,000/\$181	
Apparel & Accessory Stores	141,000/\$54	149,000/\$77	
Source: Department of Commerce			

E

Transportation and Financial Intermediaries

Transportation and financial companies are key trading partners with textile, apparel, and retail organizations.

Exhibit II-5 lists the dollar amounts paid by various players to the transportation sector.

	(\$ Millions)
Agriculture	7
Textile	66
Apparel Manufacturer	137
Retailer	5,400

The number of transportation companies appears in Exhibit II-6.

EXHIBIT II-6

Transportation Industry Players and Trade Flows

Mode	Number of Establishments	Sales (\$ Billions)	Number of Key Establishments
Trucking	43,000	70	2,500 *
Railroads	500	25	13 ** -
Steamships	æ	11	-
Air Couriers	67	9	10
* Number of trucking companies with over \$1 million/year in revenues ** Number of railroads with over \$93 million/year in revenues			

Source: Department of Commerce

Banks play an important role in that they help apparel manufacturers collect monies owed by retailers. A factor bank will collect almost 20% of a typical retailer's accounts payable. Factor banks that are active in retail and use EDI are Heller Financial (Chicago, IL) and C&S/Sovran Bank (Atlanta, GA).

Commercial transactions among apparel makers and retailers, banks, and transportation companies are being increasingly supported by interorganizational electronic systems. This report measures the use of these transaction-oriented systems.

F

Information Technology Trends in Retail and Apparel Manufacturing

The larger information systems context in which electronic commerce systems are being implemented in the apparel-retail community consists of the general trends in Exhibit II-7.

The principal Quick Response players are textile mills, apparel manufacturers, and retailers.





Scanning stations are being installed by retailers at the point of sale. There was a very rapid deployment of scanning stations in the late 1980s, somewhat mirroring the situation of grocery retailers in the late 1970s.

All players in the value chain are downsizing.

Outsourcing is taking place most dramatically at the retail site as retailers look for more ways to cut costs. IBM's Integrated Systems Solution Center (formed in 1991 as an outsourcing contractor) took on Zales, a jewelry retailer, as one of its first customers. Macy's of California outsourced its entire data operations—including store floor applications to The Sabre Group, a wholly owned subsidiary of the Federated/Allied group of stores.

With these other IS considerations, apparel-retail players are building interorganizational systems to allow better coordination with trading partners. The next chapter examines the applications.

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Actual and Potential Electronic Commerce





Actual and Potential Electronic Commerce

Electronic commerce is commercial transactions that are supported by interorganizational information systems.

Either electronic commerce systems connect a buying organization with a selling organization, or they involve a third party acting between the buyer and seller (as in the case of credit card authorization service providers).

Exhibit III-1 lists selected electronic commerce services in the apparelretail community.

Electronic commerce in the apparel-retail community is composed more singularly and purely of EDI applications than in other industries such as health care or grocery, where data base services, various networking services, and other non-EDI systems are a significant part of the total electronic commerce activity.

EXHIBIT III-1

Electronic Commerce Services in the Apparel Manufacture and Distribution Community

Retail Stores

- EDI POs, invoices, ship notices, and other transactions with apparel suppliers and transport companies
- UPC price sales catalog
- Direct debit POS
- Credit card authorization
- Electronic marketing/frequent buyer programs
- Sales data/product movement data services
- Third-party UPC ticketing services
- E-mail with vendors
- Interactive home shopping services
- Shared VSAT networks
- Interactive voice response
- EDI factoring with banks
- EDI/EFT tax payments

Apparel Makers

- EDI with customers
- EDI with suppliers (incl. graphics file to contractors)
- UPC price sales catalog
- EDI factoring with banks
- EDI/EFT tax payments
- **Textile Makers**
- EDI with apparel makers, suppliers, and retailers

A Electronic Data Interchange

The apparel-retail community is very focused and organized in its implementation of EDI. The Voluntary Interindustry Communication Standard (VICS) committee was created in the late 1980s and continues to be operated by very aggressive representatives from the community. The committee is responsible for the creation of EDI standards used by the community. VICS is under the immediate auspices of the Uniform Code Council (Dayton, OH), which also administers bar codes (UPC codes) for merchandise and grocery retailers. The EDI standards that the VICS committee creates use ANSI X12 syntax and standards.

The VICS committee has outlined a three-pronged program for streamlining the logistics between apparel vendor and retailer. The program is shown in Exhibit III-2.





The UPC—Uniform Product Code—is a bar code typically placed on merchandise by vendors. The UPC is the basis for automating all functions regarding the movement of merchandise. Shipping-and-receiving functions, inventory functions, and point-of-sale functions can be expedited by scanning these codes.

The Uniform Code Council (UCC) (Dayton, OH) issues vendor UPC codes to companies. The first six digits (assigned by the UCC) identify the company; the remaining five digits (assigned by the company) identify the merchandise.

There are approximately 500 apparel vendors in the UCC that mark their merchandise with bar codes. For unmarked items, many larger retailers will attach markings themselves so that they can scan the merchandise at the POS.

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A National Retail Federation survey found that not only do all large retailers scan products at the point of sale, but smaller retailers are getting into the act as well. Two-thirds of the respondents who indicated they were scanning at the POS had sales under \$50 million.

SCM—Shipping container marking—helps retailers quickly receive merchandise shipments at distribution centers. The unique carton number appears on the merchandise container in a bar code format called 128. The SCM identifies the case and case contents. The retailer typically uses the SCM to receive shipments and match the received merchandise with purchase orders and invoices. The SCM refers to an advanced ship notice that the vendor sent prior to the retailer's receiving the shipments.

Shipping container marking ideally allows the retailer to receive shipments without opening the cartons and counting each item.

EDI—With the individual merchandise UPC coded and the shipping containers coded with 128 codes, EDI communications are able to specify and track the movement of goods and payments between retailer and vendor.

Exhibit III-3 shows the kinds of EDI transactions and the respective applications to which the transactions interface. The appendix contains a listing of transaction descriptions.

INPUT estimates that there are 7,000 EDI users in the apparel value chain (including textile mills, apparel manufacturers, and retailers). This number doesn't include the transportation companies that serve these groups.

Most of these users are primarily PO-only users. Ship notices and invoices are still rarely used.
EXHIBIT III-3



Exhibit III-4 shows the total apparel-retail market for EDI software and services—including leading vendor revenues.

Apparel-Retail EDI Software and Services Market

Vendor	Revenue (\$ Millions)	Market Share (Percent)
IBM (incl. PRJ&'s EDI revenue)	7.2	24
GE Information Services	5.2	17
Sterling Software	3.5	11
BT North America	2.0	6
Sears	2.0	6
Other	10.0	33
Total	30.0	100

Exhibit III-5 shows the anticipated growth of the EDI software and services market through 1997.



EXHIBIT III-4

1. EDI/EFT Payments and Factoring

Payments are happening but only in a few test cases (e.g., Levi Strauss & Co., Sears, KG Retail). Sears has approximately 3,000 suppliers on EDI. It pays approximately 25% of the dollar value of its payables electronically. However, these payments account for only 3% of all payments (the majority of payments are for small amounts). One hundred seventy of Sears' suppliers receive electronic payments.

C&S Sovran Bank (Atlanta, GA) and Heller Financial (Chicago, IL) are two bank organizations that provide factoring services to retailers and manufacturers. Factoring is the collection of payments owed by the retailer to the supplier. These two banks seek to use EDI to allow apparel makers to send accounts-receivable information (invoices) to the bank so the bank will know how much to collect from the retailer. These services are just getting under way and the success of these EDI factoring programs is unknown.

2. Case Studies

The 500 Fashion Group (Northampton, PA) is a \$50-million-per-year maker of men's suits and pants. The company has three manufacturing locations in Pennsylvania. It conducts EDI with one customer: J.C. Penney. With Penney's it conducts a full range of VICS/X12 transaction sets: POs, invoices, ship notices, free text (864), and order status.

The Fashion Group may or may not bring on new EDI trading partners in 1992. Its MIS group will switch the current CPU from a combination IBM 4331 and System 36 to a single AS/400. Concomitant with this switch, the Fashion Group will switch its EDI software from a standalone translation brand (ACS/Premenos) to a fully integrated apparel CAD/CAM system that has EDI translation functions built in (Online Data Systems). EDI is a low priority until this switch is completed.

The Fashion Group puts electronically readable optical characters on the merchandise it ships to Penney's.

Amory Garment Company (Amory, MS) manufactures men's pants. Amory conducts EDI with one trading partner, Sears Roebuck & Co. Amory plans to bring up three or four more EDI customers in 1992 and uses ACS/Premenos translation software that runs on an AS/400. Amory uses the Sears network but expects to employ GEIS when Amory adds new trading partners.

American Textile Co. (Pittsburgh, PA) is an \$8-million-per-year maker of mattress and pillow covers. It conducts EDI with 10 retailers so that approximately 50% of business is via EDI. American Textile uses GEIS, IBM, and Sears networks. Although American Textile marks all products

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with UPC codes, it does not use a UPC catalog service. American Textile built all its EDI software. American Textile spends approximately \$10,000 per year in EDI-related expenses—primarily network service related. This \$10,000 does not count in-house development costs.

Haggar Apparel Co. has hundreds of EDI trading partners, primarily retail customers and textile mill suppliers. Transportation companies and trim vendors (buttons, zippers, etc.) are targeted for 1992.

Haggar places UPC codes on all merchandise. Haggar uses both the GEIS and IBM/QRS UPC catalog services. Haggar uses the two identical services because customers are on one or the other. Haggar uses GEIS and IBM networks as well to send and receive EDI messages. Haggar runs its EDI*Central translation software (from GEIS) on an IBM 3090.

With some of its customers, Haggar will automatically replenish stocks without the customer's explicitly making an order. Haggar has just begun to implement the VICS transaction sets that allow such replenishment. Specifically, Haggar is using the 852 product activity data format (which the retailer uses to send sales and inventory data to Haggar) and the 855 purchase order acknowledgment (which Haggar sends to the retailer to explain the quantities of merchandise that Haggar is automatically sending).

Izod-Lacoste (NY, NY) has three divisions doing EDI—approximately 30 retailers. The divisions don't use EDI with suppliers yet, except for Soabar, which prints merchandise tickets for Izod. Izod uses the IBM/QRS and GEIS UPC catalog services. Izod spends approximately \$20,000 to \$25,000 per year on network services, including the catalog services. Izod uses ACS/Premenos EDI translation software that runs on an AS/400. Izod began its EDI program in 1988. It plans to initiate electronic mail with customers so that Izod sellers can talk with retail buyers in this mode. Izod expects that by late 1992 it will start implementing invoicing and electronic payments with some key customers. Izod's MIS personnel are working to interface applications (such as sales, manufacturing, accounts receivable, etc.) with the EDI translation software.

One current application is the creation of UPC tickets for merchandise. Izod tickets all its merchandise, regardless of whether Izod communicates with the retailer in EDI. Izod uses the outside ticketing services of Soabar to print the tickets. When Izod receives a purchase order from a customer, its UPC generation application will send an EDI message to Soabar. The message contains the merchandise and UPC information for Soabar to print a ticket. Soabar delivers the tickets to Izod factories, distribution centers, or other locations for the tickets to be attached to the merchandise. Izod does automatic replenishment for some customers but is not yet using EDI sales data to drive the replenishment system.

J.C. Penney had 1,263 trading partners on EDI in October 1991. It was averaging 13 million EDI documents sent or received per month. The number of EDI purchase orders equalled 1 million in a single month. J.C. Penney is doing EDI with air and truck carrier companies in addition to vendors. J.C. Penney uses the UPC catalog services.

One large department store does EDI with only 80 trading vendors and 12 transportation companies. The vendors represent 20% of the chain's buying business. More than half of this EDI traffic is not purchase orders but is instead sales data (in the 867 product activity format) that drives stock automatic replenishment systems.

The store management's decision to outsource all IS functions put a damper on EDI plans. All DP applications—POS, accounts payable, MPS, etc.—are leased from a third-party outsourcing vendor. Transitioning to this new scenario has diverted management's attention from moving forward with the EDI program and obtaining new EDI trading partners.

The store uses GEIS' EDI*Central mainframe software and the GEIS network. The store does not use UPC catalog services.

Wal-Mart (Bentonville, AR) had 1,721 stores at the beginning of 1991. Wal-Mart made a deal with Foretell Corporation, an EDI PC translation software maker and subsidiary of TSI International. Wal-Mart is making available to its trading partners Foretell's software at 80% off. Normally the software would sell for \$2,875. Wal-Mart sells suppliers the software for \$600. The software comes largely preconfigured with the necessary transaction sets and communications procedures to connect to the Wal-Mart network.

Wal-Mart sends its suppliers retail store POS data, purchase orders, quick-response distribution center sales data, and E-mail.

The software works in conjunction with Microsoft's Windows product. Besides the graphical interface features, Windows also allows file transfer capabilities between applications. Wal-Mart and Foretell have purportedly helped Wal-Mart suppliers to link EDI transmissions to spreadsheet applications.

Interorganizational Electronic Mail

Retailers and apparel vendors are interconnecting with E-mail systems. Email sometimes plays the role that EDI would play otherwise.

Retailers can perform the basic order, order status querying, ship notices, and price catalog services via E-mail—albeit not in a production, high-volume, application-to-application mode that EDI allows.

Nordstrom (Seattle, WA) was later than other large retailers in setting up an EDI program. The personal-touch culture of the company made the adoption of UPC scanning and tracking a low priority. Nordstrom does not scan merchandise. Nordstrom does not use scannable ticketing (even though many of its vendors provide premarked merchandise). Nordstrom is converting to scanning and EDI systems in 1992.

Nordstrom initiated an E-mail network with its vendors. The network is intended to bring better communications between buyers and sellers, particularly where multiple Nordstrom buyers for a single product category deal with a single manufacturer (for example, in the case of shoes). Buyers do not place purchase orders over the network (POs are still sent on paper through the postal service). Yet the network ties into Nordstrom's purchasing and accounts-payable applications. Vendor representatives can check the status of orders and invoices.

Nordstrom deals with 14,000 active vendors, 150 of whom account for 50% of Nordstrom business. By mid-1992, Nordstrom expects to use EDI with key vendors. Approximately 300 Nordstrom vendors are on the E-mail system V.I.P. Express. Altogether the system maintains 3,000 mailbox addresses, most of which are Nordstrom buyers and other personnel.

In 1991, GE Information Services launched Retail*Talk, which is a fullfunction messaging service that includes EDI, E-mail, and other services in a single network offering (see the GEIS profile in Chapter IV).

С

B

Electronic Marketing

Large repositories of consumer POS data are allowing retailers to customize merchandising strategies at the store level.

Retailers such as Neiman Marcus are offering preferred-customer and frequent-shopper programs to build customer loyalty.

The programs can be direct-mail oriented—the retailer mails to targeted customers that have specific buying habits. Programs can include giving discounts to customers who purchase above a certain amount in a given time. Programs can also include real-time discounts to customers at the check-out line.

D

Credit Card Processing

INPUT estimates that the market for credit card processing services for all retail outlets (including nonapparel, grocery, and eating-and-drinking establishments) is \$2,240 million.

INPUT estimates the grocery and restaurant component to be \$540 million, leaving \$1,700 million for the rest.

Exhibit III-6 lists leading credit (and debit) card processing service providers.

Credit and Debit Card Processing Service Companies

Vendor	1990 Revenues (\$ Millions)
Electronic Data Systems	290
National Data Corporation	73
Deluxe Data Systems	3 5 *
Mid West Commerce Corp. (subsidiary of NBD Bancorp, Inc.)	N/A
NCR Data Services	150 **
First Data Resources Inc. (wholly owned subsidiary of American Express)	275 ***
Concord Computing Corporation	17
Affiliated Computer Systems, Inc.	N/A
First Financial Management Corp.	450
National Processing Co.	N/A
Telecredit Inc. (subsidiary of Equifax)	58
Total System Services, Inc.	74
Other	700
Total Card Processing	2,122
Card processing just for food stores and eating/drinking establishments	510
* 1988 Revenues	E- <u></u>

** 1987 Total division revenues

*** 1989 Revenues

E Electronic Home Shopping

Home shopping for apparel via electronic mail networks is still in its infancy.

Exhibit III-7 lists some of the leading networks that provide shopping services.



The 101 OnLine service was developed in part by the French Minitel organization. It uses a phone terminal with an eight-inch black-and-white screen. 101 OnLine is being tested in Omaha (NE), Houston (TX), and San Francisco (CA).

The ScanFone system looks like a regular phone with the addition of a 16character display screen, a light pen for scanning bar codes, and a slot for reading the magnetic strip on credit cards. ScanFone was developed by U.S. Order (Herndon, VA) and is being beta tested in San Francisco, CA. In San Francisco trials, both services have signed up Safeway supermarkets, Bank of the West, KPIX-Channel 5, and the *Bay Guardian* for local news; *USA Today* and the Associated Press are signed for world news.

U.S. Order is encouraging merchants to include bar codes in all advertising and catalogs. Consumers equipped with a ScanFone can then simply pass the light pen over the bar code and place the order instantly.

Both services cost \$9.95 per month and are billed through the telephone company.

Safeway will supply ScanFone subscribers with a catalog of more than 6,000 supermarket items, each marked with a bar code. Shoppers simply brush the light pen over the bar code for each item they want and push a button when the order is complete.

ScanFone then asks the customer to pass his or her credit card through the magnetic reader. The groceries are delivered later for a service fee of \$10.



Electronic Commerce Service Providers





Electronic Commerce Service Providers

This chapter offers condensed profiles of a representative selection of products and services vendors that allow apparel-retail companies to perform electronic commerce. This chapter is not a comprehensive list of companies. For such a list, please inquire about INPUT's Vendor Analysis Program at any INPUT office. For EDI vendors, INPUT's EDI Program vendor profiles also provide a source of company background.

ACS Network Systems/Premenos (Concord, CA)

ACS Network Systems is a division of Premenos, a holding company with no other divisions. Originally ACS Network Systems was a provider of apparel-manufacturing software. In 1990, ACS sold the apparel systems division—Apparel Computer Systems, Inc.—to Kurt Salmon Associates (Atlanta, GA) and Microdynamics Inc. (Dallas, TX). ACS has since focused exclusively on building software for IBM midrange systems—the System 3X and AS/400 series computers. This focus has served the apparel industry well because these are the most prevalent platforms in the apparel industry.

ACS/Premenos software includes EDI/ 36^{TM} , EDI/ 38^{TM} , and EDI/ $4XX^{TM}$. The price of EDI/36 is \$5,700; EDI/38 is \$9,000. Prices for EDI/4XX range from \$7,000 to \$18,000—depending on the AS/400 computer model. The Single Port Dialing and Communication Scheduler sells for \$4,500.

ACS/Premenos markets its products directly and through distribution agreements with selected third-party networks such as Ordernet, AT&T, GEIS, and other System/3X applications software houses—including J.D. Edwards, Inc. and Pansophic, Inc.

ACS/Premenos acts as OEM for IBM's midrange software products (expEDIte series).



ACS/Premenos has also developed other less mainstream software products for EDI: translation software for UNIX, a CASE-like programming language for developing custom application program interfaces to EDI translation software, and QMAIL, an E-mail facility for AS/400 computers.

ACS/Premenos has more than 1,000 customers in a variety of industries apparel, automotive, banking, electronics, government, medical, retailing, grocery, and telecommunications. Major customers include Samsonite Luggage, Izod, Schering Plough, Castrol, Sanyo, International Jensen, Champion Labs, British Petroleum, Waterford, L'Oreal, TDC, Nintendo, and Apple Computer.

Ernst & Young (New York, NY)

Ernst & Young (E&Y) provides professional and systems integration services to wholesale and retail distributors, banks, insurance firms, manufacturers, and firms in a number of other vertical markets. Professional services that E&Y supplies to retailers include consulting on systems and technology planning, hardware and software selection, and software development. Ernst & Young also provides systems integration services.

Consulting, particularly on application systems planning and the evaluation of software solutions, along with custom development, provided over 50% of E&Y's information services revenues in 1990 from retail distribution.

E&Y identified PC-based POS, multitasking accounting systems, and purchasing as important application areas.

The slowdown in the economy and the large number of retail establishments are factors having an impact on retail distribution today, according to E&Y. E&Y feels that there will be a consolidation of retail stores and a reduction in the total number of retail outlets, which will aid the industry.

С

B

GE Information Services (Rockville, MD)

GE Information Services (GEIS), along with IBM, is the leading EDI value-added network service provider in the apparel-retail industry. It has over 2,500 retailers and suppliers using the network for messaging, payments, UPC catalogs, and EDI services and software.

GEIS currently provides transaction and utility processing; inquiry/response, electronic data interchange, and value-added network services; systems integration; and software development and network management professional services to over 13,000 corporate and association clients worldwide.

GEIS services are generally categorized into the following application areas:

- Industry applications: banking and financial services; retail; trade and transportation; and petroleum
- EDI
- Business communications
- Managed network services
- Network and processing services
- On-line consumer information services

In the retail area, GEIS supports EDI, electronic payments, UPC catalogs/ bar code management, and communications between business partners.

- In July 1991, GEIS announced the commercial availability of the Retail*Talk Service, which combines electronic mail, specialized data bases, industry directories, electronic news services, and bulletin boards via a PC-based system to complement EDI transactions between retailers and suppliers.
- UPC*Express Catalog is a service that manages and distributes Universal Product Code (UPC) numbers and their description information for vendors and retailers. This data base is integrated with the EDI*Express System to electronically maintain and receive UPC catalog updates.

GEIS charges \$30 to each company involved in exchanging UPC codes (the vendor and the retailer) per month. Each side of the partnership can access and download the UPC data as many times per month as desired subject to only the standard transmission charges of the GEIS network. In other words, Levi Strauss may have 100 retailers that have contracted to access the Levi codes on the GEIS catalog. Levi pays \$3,000 per month (\$30 X 100); each retailer pays a \$30 charge per month for the Levi access plus \$30 times the number of other vendors whose codes the retailer has access to. • Credit*Pro, announced in 1989, is a fully integrated credit management system that automates and manages all the functions required for a retailer to offer credit to customers. Credit*Pro is available as a software package or on a service bureau basis.

GEIS' generic EDI offerings are:

The EDI*Express Service, introduced in 1985, provides the capabilities for sending, receiving, translating, and compliance checking EDI messages.

The EDI*PC System is a software package for IBM and compatible microcomputers that allows trading partners to exchange business data in public and private standard formats to and from the EDI*Express system.

The EDI*Central Software System is a mainframe translation-and-management system that supports centralized and decentralized corporate application environments on one or more computers.

The Design*Express System is a family of products that allows engineering/manufacturing design data to be processed and transmitted electronically in several types of document formats through a variety of protocol access methods.

GEIS also supports several private electronic commerce networks in the apparel industry—including Haggar Apparel Company's HOP (Haggar Order Processing) and LeviLink (Levi Strauss & Co.).

INPUT estimates that EDI-related products and services contributed \$30 million to GEIS' 1990 worldwide revenues and \$45 million to 1991 revenues. INPUT estimates that in the U.S. apparel-retail trading community alone, GEIS's revenues were \$6 million in 1991.

D

International Business Machines Information Network (Tampa, FL)

Main apparel-retail electronic commerce offerings:

- IBM Integrated Systems Solutions Corp. Formed in 1991, this IBM group offers outsourcing services to all industries, but has a special focus (and had its first customers) in the retail segment.
- IBM Information Network (with access to QRS's UPC catalog service; see QRS profile)

The IBM Information Network, IBM's international value-added network, offers inter- and intra-enterprise networking services that allow companies to interconnect people and systems (IBM and non-IBM) around the globe.

Value-added services that address specific business communications needs include electronic mail, electronic data interchange (EDI), access to commercial data bases and information services, and remote-computing services.

IBM Information Network (IBM IN) operates an international network with leased-line and dial access available from hundreds of cities in more than 83 countries. Customers can use the network to outsource network implementation or to extend the reach of the existing network. IBM IN supports SNA- and non-SNA-based systems.

IBM IN has offered EDI services since the commercial debut of the network in the early 1980s, but it wasn't until 1990 that IBM IN entered the EDI market with a vengeance. In that year, IBM IN rolled out a full line of EDI translation software, the IBM expEDIter DataInterchange Series, and began aggressively signing hub (or, as IBM calls them, "sponsor") companies in a focused marketing program. IBM IN also created an IBM Solution Center.

IBM's expEDIte DataInterchange Series of translation software includes packages that run on MVS, AS/400, System 3X, OS/2, and AIX operating systems. Through its QuickEDI service programs, whereby IBM IN helps a hub company bring up all trading partners on EDI, IBM IN offers a PC (MS-DOS) translation package.

The translation software supports the ANSI X12, UN/EDIFACT, UN/TDI, and UCS EDI data standards.

IBM IN is interconnected with the following other EDI network services: ARI Network Services, Inc.; AT&T; BT North America; CompuServe; Harbinger Computer Services; GE Information Services; Kleinschmidt, Inc.; Sears Communication Company; Sterling Software ORDERNET; Telecom Canada; and TranSettlements, Inc.

Microdynamics/Kurt Salmon (Dallas, TX/Atlanta, GA)

Microdynamics was founded in 1979 to develop CAD/CAM systems that run on the IBM personal computer for the sewn-goods industries. The founder, Ron Martell, pioneered CAD/CAM software for apparel in the 1970s with the founding of another company, Camsco, Inc. Microdynamics' first product was Footwear Design System, a CAD system for the footwear industry. It sells as a turnkey system, the buyer receiving software and hardware. The next product was an apparel design system that allows users to design, make patterns, grade, make markers, and cut.

In 1987, Microdynamics formed a relationship with ACS Network Systems, another apparel CAD software maker. In March 1989, Microdynamics—along with Kurt Salmon Associates (Atlanta, GA), a professional services firm specializing in the apparel-manufacturing area—jointly purchased ACS Network Systems (Atlanta, GA) and simultaneously sold the EDI group of ACS, which subsequently became ACS/ Premenos (see above profile).

Microdynamics and Kurt Salmon are 50% owners of ACS.

Quick Response Services, Inc. (Richmond, CA)

Quick Response Services, Inc. (QRS) is a subsidiary of PRJ&, a provider of software and professional services to the retail industry. PRJ& is a privately held corporation; IBM holds an estimated 40% equity stake. INPUT estimates PRJ&'s 1991 revenue to be \$30 million.

PRJ& is a supplier of software, computer systems, and related services to the retail industry worldwide. With three offices in the U.S. (and one each in the U.K., Australia, and Japan), PRJ& licenses and markets its retail information systems modules—including financial, merchandising, and credit management systems.

In addition to its retail systems modules, PRJ& offers the services of QRS, a retail industry EDI network and UPC catalog service. The catalog allows apparel vendors and retailers to store and retrieve vendor-product information at the UPC level with associated item or SKU data, which ensures the accuracy of item data for vendor and retailer. The QRS catalog is a composite of individual catalogs of vendor product and UPC information.

To access the catalog, the retailer or vendor must use the IBM Information Network. There is no other connection path.

Although the QRS data base and the IBM network are the same, a prospective client may elect to have QRS and IBM bill individually or to have QRS take care of everything. If all billing is handled by QRS, clients receive a 5% discount on network charges over normal IBM IN charges. INPUT estimates that the QRS operation contributed \$4 million in annual revenue for 1991. At the close of 1991, QRS reported 70 retailer and 1,500 apparel manufacturer customers and is adding 60-80 customers per month.

QRS charges its clients a flat monthly fee and an access fee (each \$141). An access fee applies when a client accesses an apparel vendor's UPC listings. The charge is for the first time each new set of listings appears in a monthly (single billing) period. For example, J.C. Penney will incur only one access fee even if Penney looks at Levi Strauss' UPC file set many times in a given month. But Penney will incur another access fee to look at Haggar's files. Penney will be charged another access fee if in the next month it looks again at Levi Strauss' files. The apparel vendors pay the same access fee the first time in a billing period that a retailer accesses the retailer's files. QRS collects fees from sender and receiver. QRS charges no storage fees.

The Sabre Group (Atlanta, GA)

The Sabre Group is a subsidiary of the Federated/Allied group of stores. Sabre was formed by Federated (prior to the merger with Allied) to consolidate all data processing applications under a single organization. Federated management saw economies of scale in having all stores work from a common base of applications: payroll, personnel, merchandise applications, credit authorization, point-of-sale, logistics, and accounting.

In 1991, the organization commercialized its services and has become an outsourcing vendor to mass merchandise retailers. The first customer was Macy's. Sabre converted the Macy's east group of stores in six months. Sabre will do the same with the Macy's west group in the first half of 1992.

So far, hardware conversions have not been an issue because all Sabrecontracted stores have IBM (usually based on the MVS operating system) hardware.



Conclusions





Conclusions

Electronic commerce in the apparel-retail value chain—principally EDI brings a host of business opportunities to users (apparel makers and retailers) and vendors (information services companies). In this chapter INPUT examines the principal impacts on and opportunities for these two groups.

Impacts on and Opportunities for Electronic Commerce Users

1. Customer Service and Operational Efficiency

Electronic commerce in the apparel-retail chain (otherwise known as Quick Response or QR) brings the retailer better customer service and lower operating costs.

Customer service is improved because merchandise is in stock when the customer wants to buy it. According to Andersen Consulting, Quick Response leaders are improving in-stock positions in basic/seasonal merchandise from 70%-80% to more than 95%.

Sales: Shortened lead times for ordering increase the sales of merchandise by as much as 28%. By tracking sales at the item level, retailers can react quickly to actual customer demand.

Markdowns: QR allows retailers to stock what customers want, not what they don't want. Markdowns can decrease prices by as much as 30% in basic merchandise and 40% in fashion, according to Andersen Consulting.

Merchandising Expenses: Automatic replenishment systems and EDI reduce the time required to create, communicate, and track purchase orders by as much as 80%.

Store merchandise counts are effectively eliminated as sales data, at the SKU level, is captured at the point of sale.

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Administrative Expenses: Most invoices are manually reconciled with purchase orders and entered into the accounts-payable system. Using EDI to transmit this data and automatically reconcile invoices saves clerical costs. It also reduces errors.

Interest on Inventory: Quick response replenishment strategies are speeding up inventory turns by 25% to 45%. This translates into savings on inventory carrying costs for retailers.

2. Industry Consolidation and Restructuring

Further consolidation of the textile-apparel-retail supply chain will continue through the 1990s. Not only will the number of companies in these three sectors decrease, but the relationships will, too.

Intermediaries—brokers and manufacturer sales representatives—are being removed from the value chain by large retailers with clout.

In an effort to speed up product delivery cycles and reduce the amount of inventory that retailers must hold, retailers are streamlining the steps in the delivery of merchandise from vendors to retailers' distribution centers. Wal-Mart, in late 1991, announced that it wants to buy directly from vendors and not through third parties. By eliminating the broker, Wal-Mart expects to get faster turnaround and therefore lower prices.

Impacts on and Opportunities for Electronic Commerce Vendors

1. Increased Penetration of EDI

The use of EDI by apparel makers and retailers is principally for the transmission of purchase orders. More transaction set message types have yet to be employed. More players can potentially adopt EDI than the current 7,000.

2. UPC Data Base Services

These services are growing as GE and QRS both reported rapid growth in customers. The central role UPCs play in Quick Response strategies and the adoption of Quick Response by apparel-retail players will make all services supporting UPC codes important. Beside UPC data bases, these services include the registration of UPCs by the Uniform Code Council, the printing of UPC tickets by such firms as Avery Dennison Soabar, and services/efforts that integrate these codes with worldwide coding schemes and merchandise.

3. Model Stock Inventory Software for Automatic Replenishment

These systems will be deployed as retailers and vendors integrate more tightly.

4. Product Movement and Market Share Data Services

Services now provide apparel makers and retailers with reports on what kinds of products are selling and what makers/retailers are capturing the market for specific items. The grocery industry has had these services (for example, Information Resources Inc., Neilsen) since the late 1970s. Scanned POS data and/or EDI data between retailer and apparel maker can help determine best-selling merchandise and leading manufacturers. Transaction data bases, such as Sterling Software ORDERNET's Market Quest service, are a possibility.

Appendixes





EDI Transaction Sets for the Apparel-Retail Trading Community

(American National Standards Institute X12 syntax and approved by the Voluntary Interindustry Communication Standard (VICS) committee)

ANSI # Description

(VICS approved and published)

- 810 invoice
- 820 payment order/remittance advice
- 830 planning schedule with release capacity
- 832 price sales catalog
- 840 request for quotation
- 843 response to request for quotation
- 846 inventory inquiry/advise
- 850 purchase order
- 852 product activity data
- 855 purchase order acknowledgment
- 856 ship notice/manifest
- 860 purchase order change
- 864 text
- 867 product transfer and resale report
- 869 order status inquiry
- 870 order status report
- 997 functional acknowledgment

(approved for future publication)

- 204 motor carrier shipping information
- 210 motor carrier freight details and invoice
- 214 motor carrier shipment status message
- 812 credit/debit adjustment
- 818 commission sales report

Index of Companies

Symbols

101 OnLine, Inc. III-13 500 Fashion Group III-7

A

ACS Network Systems/Premenos III-7, IV-1 Affiliated Computer Systems, Inc. III-12 America Online III-13 American Textile Co. III-7 Ames Department Stores II-4 Amory Garment Company III-7 Andersen Consulting V-1 Apple Computer IV-2 ARI Network Services, Inc. IV-5 AT&T IV-1, IV-5 Avery Dennison Soabar III-8, V-2

B

Bank of America III-13 Bank of the West III-14 British American Tobacco II-4 British Petroleum IV-2 BT North America III-6, IV-5

С

C&S Sovran Bank II-6, III-7 Campeau Corp. II-4 Castrol IV-2 Champion Labs IV-2 CompuServe III-13, IV-5 Concord Computing Corporation III-12 CUC III-13

D

Deluxe Data Systems III-12 Department of Commerce II-2 Dillard's II-4 Dow-Jones III-13

E

Electronic Data Systems III-12 Ernst & Young IV-2

F

Federated/Allied II-7, IV-7 First Data Resources Inc. III-12 First Financial Management Corp. III-12 Foretell Corporation III-9

G

GE Information Services III-6, III-7, III-10, III-13, IV-1, IV-2, IV-5 General Videotex III-13

H

Haggar Apparel Co. III-8, IV-4 Harbinger Computer Services IV-5 Heller Financial II-6, III-7

I

IBM III-6, III-7 IBM Information Network IV-4, IV-6 IBM's Integrated Systems Solution Center II-7 Information Resources Inc. V-3 International Jensen IV-2 Izod-Lacoste III-8, IV-2

J

J.C. Penney III-7, III-9 J.D. Edwards IV-1

K

KG Retail III-7 Kleinschmidt, Inc. IV-5 Kurt Salmon Associates IV-1

L

Levi Strauss & Co. III-7, IV-3 L'Oreal IV-2

M

Macy's II-7, IV-7 Microdynamics Inc. IV-1, IV-5 Microsoft III-9 Mid West Commerce Corp. III-12

N

National Data Corporation III-12 National Processing Co. III-12 National Retail Federation III-4 NCR Data Services III-12 Neilsen V-3 Neiman Marcus II-4, III-10 Nintendo IV-2 Nordstrom III-10

0

Ordernet (see Sterling Software)

P

Pansophic, Inc. IV-1 PRJ& IV-6 Prodigy III-13

Q

Quick Response Services, Inc. IV-6

S

Safeway III-13, III-14 Samsonite Luggage IV-2 Sanyo IV-2 ScanFone III-13 Schering Plough IV-2 Sears Communication Company IV-5 Sears Roebuck & Co. III-6, III-7 Sterling Software III-6, IV-1, IV-5, V-3

T

TDC IV-2 Telecom Canada IV-5 Telecredit Inc. III-12 Telecue Systems III-13 The Sabre Group IV-7 Total System Services, Inc. III-12 TranSettlements, Inc IV-5 TSI International III-9

U

Uniform Code Council (UCC) I-5, III-3

W

W.E.L.L. III-13 Wal-Mart II-4, III-9, V-2 Waterford IV-2

Z

Zales II-7

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