IBM Token-Ring Local Area Network Products

In this report:

Token-ring occupies a unique position among network hardware schemes as the method chosen by IBM of connecting its systems—of all sizes—on an enterprise-wide scale.

Strengths

• Connectivity to entire IBM product line.

• Deterministic nature of token-ring performance.

• High level of fault tolerance.

Limitations

• Expensive.

• 8-bit data bus.

• Shielded twisted pair.

Competition

In token-ring networking, IBM's chief competition comes from Proteon and Madge, but token-ring network products also face competition from other network hardware, chiefly Ethernet. Ethernet network hardware is offered by dozens of vendors.

Vendor
IBM
Old Orchard Road
Armonk, NY 10504
Contact your local IBM representative.
In Canada:
IBM Canada Ltd., Markham
3500 Steeles Avenue E.
Markham, ON L3R 2Z1
(416) 474-2111

Price
IBM Token-Ring adapter cards start at $395 for the PC Adapter II or the Adapter II/A. The 32-bit 16/4 Busmaster Server Adapter is IBM's highest-priced adapter card at $1,030. **GSA Schedule:** Yes.

—By John Krick
Associate Editor

650-I048-**102**

Products • I

IBM
Token-Ring
Local Area Network
Products

Datapro Reports on
PC & LAN Communications

Product Analysis

IBM has finally announced support for 16M bps token-ring networking on unshielded twisted-pair wiring (UTP). Working with unshielded twisted-pair Ethernet pioneer SynOptics, IBM claims it has developed a new technology for regenerating network signals to defeat "jitter," a signal distortion problem that arises at high speeds. Details of the new technology were not available at press time, but several token-ring manufacturers such as Proteon and Madge have been offering 16M bps token-ring networking on unshielded twisted pair for quite some time. Whether the IBM/SynOptics UTP scheme will interoperate with those other vendors' equipment was also unclear, and no specific products have been announced by either firm.

IBM also announced a new version of the Token-Ring 16/4 Adapter/A for Micro Channel-based computers. IBM's PS/2 Models 50 and above use the 32-bit Micro Channel Architecture, as do Models 1 and 2 of the 3172 Interconnect Controller. The new version of the Token-Ring 16/4 Adapter/A fits in a half-size MCA slot including those in the PS/2 Model P70 portable. The new adapter offers enhanced I/O and instruction processing features, and replaces the earlier product of the same name.

IBM Token-Ring is a local area network hardware design based on a token-passing access scheme—a special data structure called the token is passed from one workstation to the next and possession of the token is required in order for a workstation to transmit on the network. Token-ring workstations are attached to a hub device called a Multistation Access Unit (MAU) in a physical star topology, but the passing of the token, and the associated access rights, from one station to the next gives the star the logical appearance of a ring. Larger networks with multiple MAUs take on the large-scale physical appearance of a ring because the MAUs are connected, one to another, in a ring.

Token-passing networks provide network planners with a distinct advantage over Carrier Detect Multiple Access networks (e.g., Ethernet/802.3) in that they allow precise mathematical predictions of the effect on network performance of adding workstations. For this reason token-passing networks are referred to as deterministic networks. Adding workstations also results in a slow and incremental degradation of token-ring performance. Ethernet/802.3 networks can exhibit a sharp drop-off in performance if one workstation too many is added. Token-ring has been standardized under the IEEE 802.5 specification.

Target Applications

Token-ring networks can support all of the popular high-end network operating systems—Novell NetWare, IBM LAN Server and Microsoft LAN Manager, and Banyan VINES. Since token-ring delivers consistent and predictable performance, it could be the logical choice for large companies interested in implementing large-scale client/server access to corporate databases and other server-based applications. Not the least of the advantages of token-ring is its capability to seamlessly connect to IBM mainframe-based applications such as PROFS and DB2. The new LANRES product that connects Novell servers to the parallel channel could make this the hardware's most attractive feature for corporate MIS managers.

Strengths

* Connectivity to entire IBM product line. Beyond the PC adapter cards described here, IBM also offers cards for the AS/400 and System/36 midrange computers, as well as for the 3172 Interconnnect Controller and the 3745 Communications Controller that attach to IBM mainframe systems.

* Deterministic nature of token-ring performance. Token-ring networks exhibit "graceful" performance degradation under load, and the effect of adding additional workstations to a token-ring network can be determined ahead of time with a great degree of certainty.

* High level of fault tolerance. Token-ring MAUs will disable "jabbering" network nodes and reconnect them automatically when the problem is resolved. In a large, multiple-MAU ring, a cable break will cause MAUs on either side of the break to "wrap" internally so that the integrity of the ring is preserved.

Limitations

* Expensive. Though IBM has cut prices, those price cuts mainly affected 4M bps adapter cards. Smaller cuts were made to 16/4 adapter card prices. Alternative network hardware schemes, including 10BASE-T Ethernet, offer great price incentives to network builders who do not need token-ring's high performance or connectivity to large-scale IBM computing.

* 8-bit data bus. IBM's cards for the PC/XT/AT (ISA) bus have only an 8-bit data path. Other vendors have embraced the 16-bit nature of the ISA bus—one reason most offer higher throughput and performance than

Overview

Models	IBM Token-Ring Network
Product Type	Local area network hardware.
Country of Manufacture	U.S.
Date Announced	October 1985.
Date Installed	October 1985.
No. Installed in 1990	IBM shipped nearly 1.5 million Token-Ring adapter cards in 1990.
Target Market	All LAN users—small businesses to *Fortune* 500 corporations.

Datapro Reports on
PC & LAN Communications

IBM
Token-Ring
Local Area Network
Products

650-I048-**103**
Products • I

Decision Points

Model	Requirements	Comments
IBM Token-Ring Network		
	Access control method must provide all nodes with transparent, collision-free access to LAN media.	Token-Ring's token passing access scheme provides predictable performance and negligible degradation under load.
	High speed/throughput	4M bps token-ring networks can display performance as good as or better than 10M bps Ethernet/802.3 networks because of contention/collision nature of Ethernet's access method. 16M bps token-ring networks outperform Ethernet/802.3 networks by wide margins.
	Fault tolerance	Token-ring networks exhibit excellent fault tolerance characteristics based on the capability of a MAU to disable individual node connections that are faulty, and in multiple-MAU rings, to respond to a cable break between MAUs by "wrapping" internally to preserve the integrity of the ring. While 10BASE-T Ethernet hubs can disable malfuctioning nodes, coaxial bus-based Ethernets are completely disabled by a cable break.
	Easy reconfiguration	New token-ring nodes can be attached at any time without affecting the operation of the rest of the network. Other hub-based networks, like 10BASE-T Ethernet, share this attribute, but older, bus-based, Ethernet networks must be taken down completely for reconfiguration of any kind.

IBM. For the Micro Channel Architecture (MCA) machines, most IBM cards provide only 16-bit connection to the MCA bus. Only the expensive Busmaster Server card uses the full 32-bit-wide data path of the MCA bus.

• Shielded twisted pair. While IBM has recently announced 16M bps unshielded twisted-pair development with SynOptics, products are not yet available. Shielded twisted pair is expensive and difficult to pull through walls.

Vendor Analysis

In the 1990s, IBM finds itself in a world of shifting user needs and priorities and shrinking revenues and is responding in ways not characteristic of the old Big Blue. Where once, as recently as two years ago, the mainframe giant was still acting as if it could dictate market realities, IBM has begun the 1990s by making dramatic moves to conform to them. The codevelopment of the OS/2 operating system and OS/2 LAN Server/LAN Manager with Microsoft were instances of the former attitude. Everyone knows how badly both have turned out. Many in the industry regard both OS/2 and LAN Server/LAN Manager as dead issues, and IBM and Microsoft have only recently

taken a breather from flinging mud at each other. Perhaps the best example of the latter approach is the new alliance between IBM and Novell.

The IBM and Novell axis was formed when IBM began offering Novell NetWare in blue boxes to its own customers. It was strengthened considerably by IBM's recent announcement of the LAN Resource Extension and Services product. LANRES, as it is called, offers NetWare users the ability to use IBM mainframe resources, including up to 64G bytes on a single disk volume of the mainframe's direct access storage devices (DASDs). Perhaps most interesting of all is that a Micro Channel-based PS/2 can now be directly attached to the IBM mainframe's parallel channel.

The LANRES products support both token-ring and Ethernet, and that is another indication of IBM's changing direction. Two years ago IBM offered only a single Ethernet-capable product—the 8232 LAN Channel station. Now the AS/400 midrange systems as well as the 3172 Interconnect Controller can support Ethernet attachment, and the 8209 LAN Bridge product supports token-ring-to-Ethernet bridging.

Product Strategy

In a sense, the IBM Token-Ring hardware is an example of the old, "Big Blue Through and Through" attitude. While token-passing networks in general and IBM/IEEE 802.5 networks in particular can be shown to have distinct technical advantages over contention/collision-detection-based networks, there is a sense in which IBM adopted token-ring because IBM is IBM.

IBM
Token-Ring
Local Area Network
Products

Datapro Reports on
PC & LAN Communications

Target Markets

IBM is now aiming token-ring at all network users—small businesses as well as the traditional IBM base of *Fortune* 1000 companies. In June 1991, IBM slashed prices of most token-ring adapter cards in half, bringing them somewhat closer into line with Ethernet products and, more significantly, undercutting most other token-ring vendors by wide margins.

Competitive Analysis

While early analysis of the future of token-ring predicted relatively quick gains for the IBM network hardware, and in fact, sales of token-ring equipment are very strong, development of 10BASE-T Ethernet at the low end, and Fiber Distributed Data Interface (FDDI) at the high end, could soon begin squeezing token-ring. Many companies and institutions have already installed 16M bps token-ring backbones on fiber optic cabling as a stopgap until FDDI became available.

In recent months, however, IBM has been exhibiting a real desire to cover all the bases in the connectivity arena. At the low end, IBM itself has pledged to make 10BASE-T chips available on the motherboard of upcoming machines. The IBM/SynOptics announcement regarding 16M bps token-ring on UTP is also clearly aimed at boosting low end token-ring sales. In the FDDI area, IBM has endorsed the FDDI on shielded twisted-pair proposal of the so-called "Gang of Five"—Advanced Micro Devices, Chipcom, Digital Equipment, Motorola, and SynOptics.

Ironically, IBM could find itself impaled on the two horns of an FDDI dilemma—token-ring could quickly be obsoleted by FDDI running on two kinds of media. The only users who have a large wiring plant of shielded twisted pair installed are the current users of IBM token-ring. The company or companies that can offer these users an economical upgrade path to 100M bps FDDI on shielded twisted pair stand to make deep inroads in this market. For high-end users who might be considering IBM Token-Ring, pulling in new shielded twisted-pair wiring becomes a less attractive proposition as the price of fiber, and FDDI hardware, drops. At the low end, token-ring networks of any sort are still quite expensive compared to any of the various Ethernet alternatives.

Market Position

IBM controls nearly 80% of the token-ring hardware market according to recent studies, with Proteon coming in a distant second with only 7%, and Madge third with about 4.5%.

In spite of those figures, IBM has no corner on quality or innovation in any aspect of token-ring hardware. Many firms are marketing token-ring adapter cards that perform better and offer more options than the IBM offerings. A recent National Software Testing Laboratories (NSTL) report rated IBM's cards last in performance, behind those of Andrew, Madge, Olicom, Thomas-Conrad, and Racore.

Arcnet and 10BASE-T power Standard Microsystems Corp. have recently moved into token-ring, partly through the purchase of Western Digital's adapter card business. Intel is the newest entrant in the token-ring card market, OEMing Olicom cards.

Major Competitors

In one sense, IBM's major competition for its token-ring network comes in two forms—from other token-ring hardware vendors like Proteon, Madge, and Thomas-Conrad;

and in competition from other types of networks like 10BASE-T Ethernet and FDDI.

There is another sense in which IBM has almost no competition—as a single source for all networking needs. Since 3Com refocused its efforts into LAN adapter cards and internetworking equipment, abandoning its network operating system, server, and diskless workstation lines, and Novell sold off all of its former hardware offerings, there has been no full-range supplier among LAN-oriented companies. Whatever competition IBM has had in the PC network business that has come from the other traditional mainframe and midrange vendors—Digital Equipment, Hewlett-Packard, AT&T/NCR, Unisys—has been negligible at best.

Sales and Distribution Strategy

Sales

IBM says that since 1986 it has shipped over 3 million token-ring cards. In 1990, as noted above, IBM captured nearly 80% of the 1.8 million token-ring adapter card sales. The firm took over 90% of the 16/4M bps adapter card business, partly as a result of being one of the first companies to ship such cards. Among the vendors of 4M bps cards, IBM is also the clear leader, although here the company only had 58% of the market. IBM shipped 743,000 4M bps adapters in 1990.

Distribution

IBM has recently taken steps to move token-ring hardware sales into a wider distribution channel. Products such as adapter cards will now be available through distributors and dealer organizations to resellers that are not part of the "IBM Authorized" inner circle. IBM is hoping to reach small business users who might not necessarily use the traditional IBM channel of large VARs and reseller chains.

Support

Competitors' Programs

None of IBM's competitors in token-ring networking have the resources to match the service coverage that IBM offers. Both Proteon and Madge rely on distributors and resellers to provide installation and service. Proteon provides telephone support for distributors and end users available from 8 a.m. to 8 p.m. Eastern time, Monday through Friday. Proteon's lifetime warranty for its 4/16M bps token-ring cards covers repair or replacement for the original user throughout the life cycle of the adapter. Madge offers free technical support on a toll-free telephone line and provides a five-year warranty covering parts, labor, and return shipment.

Policies and Programs

Warranty

IBM warrants all of its hardware products for one year from the time of purchase.

Datapro Reports on
PC & LAN Communications

**IBM
Token-Ring
Local Area Network
Products**

650-I048-**105**
Products • I

Support Services

IBM End User Support (EUS) provides a toll-free telephone technical support line for questions on installation and operation of IBM hardware and software, and assistance in problem determination and analysis.

Service Provider

IBM offers several varieties of hardware service. IBM Maintenance Services covers IBM products only. IBM Multiple Vendor Services, which should be of particular interest to network planners, covers non-IBM equipment in multiple-vendor environments. Both services can provide 24-hour/7-day service coverage, 24-hour access to IBM parts inventory, and an IBM Customer Engineer assigned to the site.

Also of interest to network planners is IBM's Connectivity Services under which IBM will undertake a wide range of installation services divided into three categories—Consulting Services, Design Services, and Installation Support Services.

Service Location

IBM maintains over 300 service locations in all parts of the world, staffed by more than 17,000 service personnel. IBM's service force is also one of the most technically advanced—IBM Customer Engineers (CEs) are linked to dispatch centers, online databases, and a national parts availability and ordering system by handheld digital terminals connected to the IBM Digital Communications System. CEs are dispatched within two minutes of call receipt, and the Digital Communications System also allows them to access customer assistance groups, hardware and software technical support, and remote diagnostic support.

Specifications

Enhancements

Enhancements	Date	Description
Token-Ring 16/4M bps Adapter/A	October 1991	A new, smaller version of the former product of the same name, this half-size Micro Channel Architecture (MCA) card fits the expansion slots of the PS/2 Model P70 portable as well as desktop PS/2s.
Token-Ring 16/4M bps Busmaster Server Adapter/A	March 1991	Designed for use in PS/2 file servers, this card provides maximum throughput by using the "busmastering" I/O technique that allows the card to take charge of data transfers to and from system memory over the system bus. It uses the full 32-bit data path provided by the MCA bus.

Features/Functions

Model	Token-Ring Network Adapter II	16/4M bps Adapter	Trace and Performance PC Adapter II
Transmission Features			
LANs Supported	IBM Token-Ring, IEEE 802.5	IBM Token-Ring, IEEE 802.5	IBM Token-Ring, IEEE 802.5
Media Supported	STP	STP	STP
Connectors Provided	15-pin D connector	15-pin D connector	15-pin D connector
Maximum Data Rate	4M bps	16M bps	4M bps
Operating Systems Supported	IBM LAN Server, Novell NetWare, Microsoft LAN Manager, Banyan VINES	IBM LAN Server, Novell NetWare, Microsoft LAN Manager, Banyan VINES	IBM LAN Server, Novell NetWare, Microsoft LAN Manager, Banyan VINES
Microcomputer Bus Supported	PC AT	PC AT	PC AT
Bus Size	8 bit	8 bit	8 bit
Card Size	Full slot	Full slot	Full slot

650-I048-**106**

Products • I

IBM
Token-Ring
Local Area Network
Products

Datapro Reports on
PC & LAN Communications

Features/Functions (Continued)

Model	Token-Ring Network Adapter II/A	16/4M bps Adapter/A	Trace and Performance PC Adapter II/A
Transmission Features			
LANs Supported	IBM Token-Ring, IEEE 802.5	IBM Token-Ring, IEEE 802.5	IBM Token-Ring, IEEE 802.5
Media Supported	STP	STP	STP
Connectors Provided	15-pin D connector	15-pin D connector	15-pin D connector
Maximum Data Rate	4M bps	16M bps	4M bps
Operating Systems Supported	IBM LAN Server, Novell NetWare, Microsoft LAN Manager, Banyan VINES	IBM LAN Server, Novell NetWare, Microsoft LAN Manager, Banyan VINES	IBM LAN Server, Novell NetWare, Microsoft LAN Manager, Banyan VINES
Microcomputer Bus Supported	Micro Channel	Micro Channel	Micro Channel
Bus Size	16-bit	16-bit	16-bit
Card Size	Full slot	Half slot	Full slot

Model	Token-Ring 16/4 Busmaster Server Adapter/A
Transmission Features	
LANs Supported	IBM Token-Ring, IEEE 802.5
Media Supported	STP
Connectors Provided	15-pin D connector
Maximum Data Rate	16M bps
Operating Systems Supported	IBM LAN Server, Novell NetWare, Microsoft LAN Manager, Banyan VINES
Microcomputer Bus Supported	Micro Channel
Bus Size	32 bit
Card Size	Full slot

Model	8228 Multistation Access Unit (MAU)	8230 Controlled Access Unit (CAU)
Transmission Features		
LANs Supported	IBM Token-Ring, IEEE 802.5	IBM Token-Ring, IEEE 802.5
Media Supported	STP	STP, UTP
Connectors Provided	IBM Cabling System connector	IBM Cabling System connector, RJ-45
Maximum Data Rate	16M bps	16M bps
Operating Systems Supported	IBM LAN Server, Novell NetWare, Microsoft LAN Manager	IBM LAN Server, Novell NetWare, Microsoft LAN Manager
Maximum Number of Node Attachments	8	80

Options

Option: Configuration Dependent	Description
8230 Optical Fiber Converter Module	Allows 8230 CAUs to be connected to a fiber backbone ring. Ring In (RI) and Ring Out (RO) modules for IBM Cabling System connectors are replaced with Optical Fiber Converter Modules.
8230 4M bps Media Filter	Allows 8230 CAU Base Unit to work with unshielded twisted-pair cabling and RJ-45 Lobe Attachment Module

Compatibility

Support	Description
Standards Supported	IEEE 802.5, 802.2
Protocols Supported	NETBIOS, NDIS

Datapro Reports on
PC & LAN Communications

IBM
Token-Ring
Local Area Network
Products

650-I048-**107**
Products • I

Pricing

		Purchase Price ($)
IBM Token-Ring Personal Computer Attachment Products		
9858	Token-Ring Network PC Adapter II	395
4790	Token-Ring Network Adapter II/A	395
7839	Token-Ring Network Adapter Remote Initial Program Load (RIPL) (for Token-Ring Network Adapter II)	99
8881	Token-Ring Network Adapter Remote Initial Program Load (RIPL) (for 4790 Adapter II/A, 7367 16/4 Adapter, and 1133 16/4 Adapter/A)	99
7367	Token-Ring Network 16/4 Adapter	895
1133	Token-Ring Network 16/4 Adapter/A	895
4041	Token-Ring 16/4 Busmaster Server Adapter/A	1,030
5121	Token-Ring 16/4 Trace and Performance Adapter	1,220
5130	Token-Ring 16/4 Trace and Performance Adapter/A	1,220
8218	Token-Ring Network Copper Repeater	1,985
8219	Token-Ring Network Optical Fiber Repeater	2,695
8220	Token-Ring Network Optical Fiber Converter	3,370
8228	Multistation Access Unit	630
1078	Component Housing (for use with 8228 MAU)	103
8230	Controlled Access Unit (CAU)	3,150
5501	Lobe Attachment Module (LAM) for IBM Cabling System	2,150
5502	Lobe Attachment Module (LAM) for RJ-45 connectors	2,150
5503	Optical Fiber Converter Module for 8230 CAU	1,310
5551	4M bps Media Filter for 8230 CAU	57

IBM
PC-to-Host Products

In this report:

Product Summary

Editor's Note
This report provides a look at IBM's line of 3270- and 5250-based PC-to-host communications products. IBM's offerings in this market have remained basically unchanged since our last report.

Description
These IBM products allow a PC to communicate with mainframes and minicomputers via 5250 and 3270 emulation.

Strengths
IBM compatibility is often a major concern for PC-to-host product users. Obviously, IBM enjoys an advantage in this area, with the ability to offer full standards compatibility.

Limitations
IBM has not been a leader in the development of the PC-to-host marketplace, usually lagging behind market leaders in the development and introduction of new products and the upgrading of old ones.

Competition
Digital Communications Associates (DCA), Attachmate Corp., and Novell Communications Division.

Vendor
International Business Machines Corp. (IBM)
Old Orchard Road
Armonk, NY 10504
Contact your local IBM representative.
In Canada:
IBM Canada Ltd., Markham
3500 Steeles Avenue E.
Markham, ON L3R 2Z1
(416) 474-2111

Price
Prices range from $145 for FTTERM to $10,375 for the high-end version of AS/400 PC Support.

GSA Schedule
Information not available.

—*By Dave Hickey*
Staff Writer

650-I048-**302**

Products • I

IBM
PC-to-Host Products

Datapro Reports on
PC & LAN Communications

Analysis

Product Strategy

Though IBM may dominate many areas of the computer industry, it has not been a leader in the PC-to-host communications market. The company offers a complete line of 5250 and 3270 emulation products, but these products have not fared as well as devices offered by market leaders such as Digital Communications Associates (DCA) and Attachmate. IBM entered the market late, after companies such as DCA and AST Research had already established themselves.

The products that IBM offers in the PC-to-host market are very similar to other major companies' product lines. IBM has two major families of products that provide 5250 and 3270 emulation. On the 5250 side are six products that provide connectivity between IBM PC/XT/AT and PS/2 computers and System/3X and AS/400 minicomputers. The 3270 line includes four software packages that allow PC/XT/AT and PS/2 computers to communicate with IBM mainframes. One package additionally provides asynchronous communications features and supports communications between a PC and ASCII hosts and Digital Equipment Corp. VAX minicomputers.

IBM's 5250 product line is diverse enough to meet a variety of traditional communications needs. The products provide local and remote terminal emulation and file transfer, encompassing coaxial, twinaxial, RS-232-C connections through a modem, and LAN connections. All of the products support at least two host sessions for simultaneous communications with two different host systems. Users can hot-key to DOS applications so that the computer is not tied up when file transfers or searches are in progress. The products support virtual disks on the host and a full array of printer emulation capabilities. ASCII and binary files can be sent at high data rates (usually the rate of the LAN). Users can also use IBM APIs to develop application programs to directly access the host

through the emulator. Other ease-of-use features include user-defined keyboard mapping, installation programs, menu- or command-driven packages, windowing functions (in some cases), and pop-up windows (in some cases). The products also support color displays and graphics displays.

Competitive Position

While IBM dominates many areas of the computer/communications industry, it is not the market leader in PC-to-host communications products. The company, however, does claim a top position, competing with companies such as Novell, DCA, and Attachmate. DCA remains the market leader, although other companies, particularly Attachmate, have begun to seriously challenge DCA's dominance.

IBM's position in the PC-to-host market is an interesting one. Companies such as DCA and AST Research had already established a presence in this market by the time IBM introduced its first micro-to-mainframe link. As a result of being slow to enter the market, IBM products have not been capable of drawing as large a following as DCA's IRMA line.

In addition, the development of PC-to-host connectivity products has not traditionally been a high-priority area for IBM. As a result, companies such as Attachmate and DCA have consistently led the way in product development and innovation and have been able to maintain their advantage over IBM in this market. The fact that most PC-to-host links are between IBM (or compatible) systems, however, would seem to secure IBM's presence in this marketplace.

Decision Points

User Interface
The 3270 and 5250 families of products are very similar in features, offering local, remote, and network gateway connections, using coaxial cable or RS-232-C and RS-422 interfaces. Each product provides terminal emulation and file transfer. Once a session is established, users can hot-key back to the DOS session. All products have installation programs and are command or menu driven. Some products also support pop-up windows and windowing functions. The PC 3270 Emulation ▶

Datapro Reports on
PC & LAN Communications

IBM
PC-to-Host Products

650-I048-**303**

Products • I

Company Profile
IBM Corp.

Corporate Headquarters
Old Orchard Road
Armonk, NY 10504

In Canada
IBM Canada Ltd.,
Markham
3500 Steeles Avenue E.
Markham, ON L3R 2Z1
(416) 474-2111

Offices located in other cities throughout Canada

Officers
Chairman/CEO: John Akers
Vice Chairman: Jack D. Kuehler
Sr. VP/Gen. Mgr.: Terry Lautenbach

Company Background
Year Founded: 1914
No. Employees: 400,000 worldwide
COPICS Installed Base: 1,500 worldwide COPICS customers, 450 U.S. customers (estimated).

IBM is one of the oldest manufacturers of computing equipment in the world. It started out in Poughkeepsie, NY as a small company manufacturing clocks for industrial use and later introduced punched card equipment for business accounting functions. According to *Business Week* and *Fortune*, IBM is among the top five industrial corporations by sales volume. It has dominated the mainframe market for over 30 years and has a strong hold on other industry sectors.

Business Overview
IBM designs, manufactures, markets, and services mainframe computer systems and associated peripherals; minicomputer systems and peripherals; microcomputer/personal computer systems; computer system software; data communication controllers and terminals; other communication products such as modems, voice response systems, and voice messaging systems; local area network communications products; and office typewriters. In addition, IBM provides specialized products and services such as communications carrier and limited time-sharing services; the IBM Information Network, a communications facility with remote storage and computing services; OEM manufacturing of terminals, disk drives, and other products; maintenance service and system supplies; and financial services through its IBM Credit Corp. subsidiary.

Since it introduced its PC line of microcomputers, IBM has had several earning periods where the growth of the company was much less than anticipated. This reflects the competitive nature of this small system market. To compete more effectively in this market, IBM has greatly expanded its software, as well as hardware, efforts and has entered into agreements with several independent software suppliers to provide tools for its entire line of computer products.

For the second time in its history, IBM has confirmed a reduction in its work force. According to a recent announcement, approximately 10,000 people will either take early retirement or accept termination incentives. It was also announced that IBM will take a fourth-quarter write-off of $2.3 billion as a restructuring charge.

Financial Profile
Operations results for 1989 showed that net profits fell 35 percent to $3.76 billion, or $6.47 per share. Revenues, however, increased 5.1 percent to $62.7 billion over 1988. Fourth-quarter earnings fell 75 percent to $591 million, or $1.04 per share, due to the $2.3 billion restructuring charge.

Management Statement
Moving more resources close to customers is a cornerstone of IBM's transformation in the computer industry. To that end, in 1988 IBM undertook the most significant restructuring of its business in more than 30 years, establishing seven lines of business and a new organization—IBM United States. This restructuring continued through 1989 and will continue to be dynamic in order to consistently meet the needs of its customers.

IBM notes that it is managing for the long term and, with the steps it has taken and continues to take, it remains confident about the future of its business.

To help its customers stay competitive, IBM announced its Computer-Integrated Manufacturing (CIM) Architecture. IBM claims its CIM Architecture gives customers a comprehensive strategy to help them integrate information in a consistent manner across the entire enterprise. It addresses the integration challenge in an environment characterized by a variety of computer system technologies, operating systems, and applications. The CIM Architecture focuses on the storage of shared information, its delivery throughout networks, and its presentation to a variety of devices and users. IBM says CIM functions will be implemented for its Systems Application Architecture operating environments and its Advanced Interactive Executive operating environments.

650-I048-**304**
Products • I

IBM
PC-to-Host Products

Datapro Reports on
PC & LAN Communications

▶ *(Analysis continued)*

Program (3.0) is the only multiuser product in the line, supporting up to 32 users on a LAN. While some 5250 products support token-ring connections, they are not multiuser gateway products. The 3270 emulation products also support virtual disks on the host. A variety of APIs are available for further development by the user. A unique product in the IBM line is FTTERM, introduced in mid-1988. The product not only acts as an asynchronous communications device (and is competitively priced) but also performs 3270 emulation through an asynchronous connection.

One of the problems with both the 5250 and 3270 product lines is that IBM has not developed a common user interface, which all the other top competitors in this market have done. This means that PC users who have one IBM PC-to-host product installed on their network will have to learn an entirely new user interface if they switch to another IBM PC-to-host communications product. IBM indicates that it plans to address this problem through SAA. Many of the IBM products also lack any form of on-line help.

Overall, IBM's products have many of the desirable features of PC-to-host products when considered on an individual basis. As a product family, however, the lack of a common user interface and on-line help makes the products less desirable than other product lines on the market.

IBM Compatibility
IBM continues to dominate the communications industry as a whole, and compatibility with IBM standards is a key issue in the PC-to-host connectivity marketplace. Companies such as Attachmate Corp. of Bellevue, WA have dedicated their entire product lines to achieving true IBM compatibility. Needless to say, IBM enjoys a tangible advantage over competitors in this area. IBM's products sell well because customers are ensured total compatibility. Though customers often have a love/hate relationship with IBM, the company as a whole is well known for its quality of support, especially in corporate accounts.

Product Development
The PC-to-host marketplace is, like any other, constantly evolving, with vendors introducing new

products and adding features to old ones. This has been an area that has traditionally kept IBM from achieving the kind of market share enjoyed by companies like DCA. As previously mentioned, IBM was slow in becoming involved in the PC-to-host marketplace and started out playing catch-up to companies that had already established themselves as market leaders. In addition, IBM has also lagged behind in the development and upgrading of its products. Since this market is not IBM's primary concern, users looking for more innovative products—such as the number of products currently available that offer Windows 3.0 compatibility—would be better served by vendors like Attachmate and DCA.

Characteristics

Models: AS/400 PC Support, Enhanced 5250 Display Station Emulation Adapter Kit, Enhanced 5250 Emulation Program, Enhanced 5250 Emulation Convenience Kit, System/36/38 Workstation Emulation Adapter, System/36 PC Support/36, 3270 Workstation Program, IBM PC 3270 Emulation Program, IBM PC 3270 Emulation Entry-Level Program, and FTTERM PC/Host File Transfer Program.

Date Announced: Information not available.

Date First Installed: Enhanced 5250 Display Station Emulation Adapter Kit, Enhanced 5250 Emulation Program, and Enhanced 5250 Emulation Convenience Kit—April 1985; IBM PC 3270 Emulation Program—January 1987; IBM PC 3270 Emulation Entry-Level Program—September 1987; 3270 Workstation Program and System/36/38 Workstation Emulation Adapter—December 1987; System/36 PC Support/36—June 1988; and AS/400 PC Support and FTTERM PC/Host File Transfer Program—July 1988.

Number Installed: Information not available.

Distribution: IBM distributes its products directly and through distributors, dealers, and retail stores. Most products are also available from Value-Added Resellers.

Datapro Reports on
PC & LAN Communications

IBM
PC-to-Host Products

650-I048-**305**
Products • I

Models

IBM's PC connectivity offerings include products that connect PCs with mainframes, minicomputers, other PCs, information services, or ASCII hosts supporting Digital emulation.

Though the products are designed for operation in different environments, they share several common features. Each software program is both command and menu driven. All products support emulation and ASCII and binary file transfer capabilities. Each product also supports file conversion. Other common features include color display support, function keys, and user-defined keyboard mapping. All products also support installation programs. With the exception of the IBM PC 3270 Emulation Program 3.0, which is a gateway supporting as many as 32 users, all products are designed for use by a single user. None of the software products are copy protected. Most of the emulation products work on IBM PC/XT/AT and PS/2 (both Micro Channel or non-Micro Channel Architecture) computers and compatibles. Except for FTTERM, all products support an installation program.

In this report, we categorize the IBM products as those providing 5250 emulation (for connection to an IBM minicomputer) or 3270 emulation (for connection to an IBM mainframe).

5250 Family of Products

This family includes six products that allow a PC to communicate with an IBM System/3X or AS/400 minicomputer. The products operate synchronously and support color, monochrome, and graphics displays. All products operate under systems running PC-DOS. Each 5250 family product supports the twinax protocol; AS/400 PC Support and System/36 PC Support/36 additionally support SNA and SDLC protocols. Detailed below are the individual products and the features that differentiate them. See Table 1 for further specifications.

AS/400 PC Support: This is a software product that allows PCs and PS/2s to communicate with IBM System/36 and AS/400 minicomputers. The package supports remote (SDLC), twinaxial (local and 5394 Remote Controller), and IBM Token-Ring LAN connections. A PC with AS/400 PC Support installed emulates AS/400 display workstations, printers, or graphics workstations. The PC can run up to five sessions, including any combination of host and printer sessions, concurrently. Users can transfer ASCII, binary, DOS, Basic, and DIF files. Users can also send and receive messages to and from display stations and PCs attached to an IBM AS/400 or on a LAN.

Other features of the product include support for up to three virtual printers, virtual disks on the host system, expanded memory, and shared folders. Users can run PC and AS/400 functions from the same menu, called Organizer. The user interface also includes pull-down and pop-up windows and cursor-sensitive help. Users have access to DOS while the host session is in progress. The program also supports automatic dialing and redialing.

The software product requires at least one disk drive and a diskette adapter. A minimum of 512K bytes

Table 1. 5250 Connectivity Products

Model	AS/400 PC Support	Enhanced 5250 Display Station Emulation Adapter Kit	Enhanced 5250 Emulation Program	Enhanced 5250 Emulation Convenience Kit	System/36/38 Workstation Emulation Adapter	System/36 PC Support/36
Microcomputers Supported	IBM PC/XT/AT, PS/2 (MCA and non-MCA), and compatible	IBM PC/XT/AT, PS/2 (non-MCA), and compatible	IBM PC/XT/AT, PS/2 (non-MCA), and compatible	IBM PC/XT/AT, PS/2 (non-MCA), and compatible	IBM PS/2 (MCA), and compatible	IBM PC/XT/AT, PS/2 (MCA and non-MCA), and compatible
Software Environment	IBM OS/400	IBM OS/400, System/36 SCP, System/38 CPF	IBM OS/400, System/36 SCP, System/38 CPF	IBM OS/400, System/36 SCP, System/38 CPF	IBM OS/400, System/36 SCP, System/38 CPF	IBM System/36 SSP
Host Protocols Supported	SNA/SDLC, T1P1 twinax	T1P1 twinax	T1P1 twinax	T1P1 twinax	T1P1 twinax	SNA/SDLC, T1P1 twinax
Transmission Rate (bps)	19.2K, 4M (LAN)	1M	1M	1M	1M	19.2K, 4M (LAN)
API Compatibility	LU6.2, proprietary	IBM API, LU6.2, proprietary	IBM API, proprietary	IBM API, LU6.2, proprietary	IBM API, LU6.2, proprietary	LU6.2, proprietary
Microcomputer Security	Single-level password, interface to host software, transmission encryption	Interface to host software	Interface to host software	Interface to host software	Interface to host software	Single-level password, interface to host software, transmission encryption

650-I048-**306**

Products • I

IBM
PC-to-Host Products

Datapro Reports on
PC & LAN Communications

of memory is required, but 640K is recommended. AS/ 400 PC Support software is installed both on the host and PC ends of a link.

Enhanced 5250 Display Station Emulation Adapter Kit: This product consists of a software/hardware combination that allows IBM PCs and PS/2s to communicate with IBM System/34, System/36, System/38, and AS/ 400 minicomputers. The product performs local 5250 terminal emulation via a twinaxial, twisted-pair, or ECL connection. Each PC that has the product installed supports two Physical Units (PUs); when communicating with an AS/400, the PC supports up to five Logical Units (LUs). The product also provides host printer emulation and allows users to access host-resident programs. While in a host session, users can hot-key to DOS. Other features include unattended execution and support for diagnostics.

The product consists of software for the PC and a five-inch card that fits into a PC's short or long card expansion slot. The 5250 Emulation Adapter Kit also requires a single diskette drive and a diskette adapter. A minimum memory of 256K bytes is required.

Enhanced 5250 Emulation Program: The Enhanced 5250 Emulation Program is a software package that is part of the IBM Enhanced 5250 Emulation Convenience Kit. The package allows IBM PCs and PS/2s to communicate with IBM System/36 and System/38 databases and AS/400 minicomputers. The product emulates IBM 5291, 5291-1, and 5291-2 display stations, as well as 5256 and 5219 printers. It supports local, remote (via the 5294 Remote Control Unit), and IBM Token-Ring LAN connections. Up to two host sessions can run concurrently in the background while a PC application is running in the foreground. Users can hot-key between the host sessions and DOS. The program also allows users to print files to local or host printers; host-resident applications can be accessed from the PC and sent to spool files for printing. Other features include diagnostics support, unattended execution, and dynamic addressing of terminals.

The emulation program requires a single diskette drive, a diskette adapter, and a minimum of 256K bytes of RAM for installation.

Enhanced 5250 Emulation Convenience Kit: This product allows IBM PCs and PS/2s to communicate with System/36, System/38, and AS/400 hosts. The kit consists of the IBM Enhanced 5250 Emulation Program, which is detailed above, and the Enhanced Display Station Emulation Adapter. The product provides local 5250 terminal emulation via a twinaxial, twisted-pair, or ECL connection; host printer emulation is also supported. The Convenience Kit allows users to access host-resident programs and run two sessions simultaneously. As with the Enhanced 5250 Emulation Program, diagnostics and unattended execution are supported.

The product requires a single diskette drive, a diskette adapter, and a full-size expansion slot. A minimum of 256K bytes of RAM is also required.

System 36/38 Workstation Emulation Adapter: This is a hardware product that allows an IBM PS/2 to communicate with System/36 and System/38 hosts, as well as the AS/400. The product provides local 5250 terminal emulation via a local twinaxial, twisted-pair, or ECL connection. Up to four PUs are supported; five PUs are supported when communicating with an AS/400. Users can access programs resident on the host. Other features supported include host printer emulation, diagnostics, and unattended execution. The product requires 384K bytes of RAM for operation.

System/36 PC Support/36: System/36 PC Support/36 consists of software for the PC and host. The product allows IBM PCs and PS/2s to communicate with IBM System/36 computers via 5250 emulation. The package supports local and remote connections to the PC, allowing up to five sessions to run concurrently. The five sessions can include one printer session and four host sessions. Users can hot-key between these sessions and DOS. Communications are established using twinaxial cable, a modem, or a Token-Ring LAN connection. Local connection requires that the PC is directly attached to an IBM 5364 System Unit.

Users can transfer ASCII, binary, DOS, Basic, and DIF files from the minicomputer to the PC. Files transferred to the minicomputer from the PC must replace existing System/36 files. Files are either transferred character-by-character or are sent fully and then translated from ASCII to EBCDIC. Application source code can also be transferred between minicomputer and the PC. Other features of the program include pop-up windows, on-line help, and support for graphics displays. The product also supports automatic dial and redial functions.

Installation requires a single diskette drive and an adapter in the PC. A minimum of 512K bytes of RAM is required, but 640K bytes is recommended.

3270 Family of Products
The IBM 3270 product line includes four software products that allow an IBM PC/XT/AT and compatibles, PS/2 MCA, and PS/2 non-MCA computers to communicate with various IBM mainframes. FTTERM additionally works in conjunction with Rolm CBXs. In addition to the general specifications shared by all the IBM products, all of the products additionally support PC-DOS and hot-keying to DOS during a communications session. All of the software products are designed for installation in a PC. Listed below are the products within the 3270 family and their specifications.

3270 Workstation Program: This product allows PCs and PS/2s to communicate with IBM 43XX/30XX mainframes via a local coaxial, IBM Token-Ring, or IBM PC Network connection. The product performs 327X/317X

DFT- and CUT-mode emulation. Up to six PC sessions and four host sessions can run concurrently. The software also supports virtual disks on the host, a mouse device, an on-line tutorial, pop-up windows, and a windowing function.

The software requires between 384K and 640K bytes of RAM for proper operation. It runs in IBM MVS/CICS, MVS/TSO, and VM/CMS environments. It is programmable and compatible with IBM's API, LU6.2, and HLLAPI applications programming interfaces. Microcomputer security is provided through an interface to the host software.

PC/Host File Transfer and Terminal Emulator Program: Known more commonly as FTTERM PC/Host File Transfer Program, this product differs from many 3270 emulation programs in that it is an asynchronous communications program that allows PC and PS/2 users to communicate with ASCII and IBM hosts; all transmissions are asynchronous. Connections are set up via IBM System/370 protocol converters (IBM Models 3174, 3708, 7171, and 9370), IBM's 9750 Business Communication System, or Rolm's CBX II.

Using the program, a PC can perform TTY, Digital VT100/VT220, IBM 3101 Model 10, and IBM 3270 CUT-mode terminal emulation to connect with IBM 43XX/30XX, Digital VAX, and any ASCII hosts supporting Digital VT100/VT220 or IBM 3101 emulation. The product supports full-screen 3270 terminal emulation and the following file transfer protocols: xmodem, xmodem CRC, ymodem, ymodem batch, ymodem batch short file, and line mode. IND$FILE transfers are also supported. Files are transferred between the host and the PC at rates between 300 and 19.2K bps. FTTERM also supports 3708 shared printer spooling. Users can concurrently print and run a host session over a single line. Only one host session is supported per program.

FTTERM's other features include help screens, a dialing directory, pop-up windows, modification of host colors from the PC side, and unattended receive on the PC side. The package also supports automatic dialing, redialing, and answering. FTTERM supports a 3270 status line when in a 3270 emulation session. The package comes with files that are preset to call ASCII databases, such as The Source, LEXIS/NEXIS, or Dow Jones. Security is provided through multilevel passwords and through host passwords.

The program includes an asynchronous version of IBM's High Level Language Application Program Interface (HLLAPI), called FTHLLAPI. The programming interface works with Pascal, C, Cobol, and Basic programs. Users can automate communications and perform other repetitive tasks through the programming language.

IBM PC 3270 Emulation Program: The IBM PC 3270 Emulation Program is a software package that allows a PC or PS/2 to emulate IBM 327X/317X DFT mode and 3X74 SDLC devices in order to establish a link with an IBM 43XX/30XX mainframe. The product supports coaxial, SDLC, IBM Token-Ring, and IBM PC Network

connections to a mainframe. The package can be used locally or remotely or function as a network gateway supporting 32 users. One PC session and two host sessions are supported concurrently. Files are transferred synchronously at speeds between 2400 and 19.2K bps (using the SNA/SDLC protocol), or at IBM Token-Ring and PC Network rates in a LAN configuration. The bisynchronous (BSC) protocol can be used if the product is linked to a 3X74 using BSC. Files can also be sent to virtual disks on the host.

Features of the program include support for a graphics display, host printer emulation, print to disk, and automatic answer. Users can hot-key to DOS while in a host session. The program supports an install program and diagnostics. Microcomputer security is provided by the interface to host control software.

A minimum of 256K bytes of RAM is required for proper operation. The package works in IBM VM/CMS, MVS/TSO, and MVS/CICS environments. It is compatible with IBM API and SRPI applications programming interfaces and supports Extended Connectivity Facility (ECF) applications.

IBM PC 3270 Emulation Entry-Level Program: This is the entry-level version of the former product. Unlike the previous program, this package supports only local terminal emulation (via a coaxial, CUT-mode connection) and one user. Emulation capabilities also differ; the Entry-Level Program performs 327X/317X CUT emulation only. The product operates in the same host environments as the PC 3270 Emulation Program. Transmission rates are determined by the speed of the coax connection. Users can hot-key to DOS while a host session is active. Files can be printed to a virtual disk on the host. Access to host-resident programs is also permitted. The product additionally supports ECF applications.

The program requires a minimum of 128K bytes of RAM on the PC. The product supports the IBM Server-Request Programming Interface (SRPI) and IBM's HLLAPI. Security is provided by the host software.

Support

Support: Support is provided through local IBM branches.

Warranty: The hardware products are warranted for 1 year, while the software products are under a 90-day warranty.

Maintenance: Extended warranties and contracts are available.

Pricing

Listed are quantity one prices for the products. Volume discounts are available.

650-I048-**308**

Products • I

IBM
PC-to-Host Products

Datapro Reports on
PC & LAN Communications

Equipment Prices

		Purchase Price ($)
5728-PC1	AS/400 PC Support	1,495 to 14,980
2911	Enhanced 5250 Display Station Emulation Adapter Kit	641
2912	Enhanced 5250 Emulation Program	160
2910	Enhanced 5250 Emulation Convenience Kit	913
69X6-279	System/36/38 Workstation Emulation Adapter	620
5727-WS1	System/36 PC Support/36	439 to 1,885
75X1088	3270 Workstation Program	594
75X3-286	FTTERM PC/Host File Transfer Program	175
59X9969	IBM PC 3270 Emulation Program	495
75X1085	IBM PC 3270 Emulation Program, Entry Level (1.2)	325

■

ICOT

PC-to-Host and LAN Gateway Products

In this report:

Product Summary

Editor's Note
Since our last report, ICOT has reduced its connectivity product line, eliminating the pcPATh series entirely. As a result the company is now more focused on its line of OmniPATH gateway products.

Description
ICOT's terminal emulation products allow PC-to-mainframe communication. The product line includes local, remote, and gateway solutions.

Strengths
ICOT's Ksaver products, as well as the RAMiser feature of its OmniPATH products, offer users the most memory-efficient connectivity options available, requiring as little as 40K bytes of RAM for the workstation software.

Limitations
The user interface is not consistent across product lines, which results in the need to learn a new interface when migrating between product families.

Competition
Novell and Digital Communications Associates (DCA).

Vendor
ICOT Corp.
3801 Zanker Road
P.O. Box 5143
San Jose, CA 95150-5143
(408) 433-3300
In Canada:
Contact U.S. headquarters

Price
Ranges from $750 for Ksaver (single-user version) to $9,995 for OmniPATH SDLC Gateway (253-LU version).

GSA Schedule
Yes.

—By Dave Hickey
Staff Writer

650-I060-**102**

Products • I

ICOT
PC-to-Host
and LAN Gateway Products

Datapro Reports on
PC & LAN Communications

Analysis

All ICOT product lines offer a variety of configuration solutions. They support local and remote connections, single or multiple users, and gateway configurations. The products also allow users to connect to multiple mainframes in different locations simultaneously. All gateway products can be used on any NETBIOS-compatible LAN.

Product Strategy

ICOT entered the PC-to-host market in August 1986, with the acquisition of Integrated Network Systems of Mobile, AL. The company further expanded its offerings with the January 1988 acquisition of Pathway Design, Inc., of Natick, MA. The two companies now comprise ICOT. Each company came to ICOT with its own product lines and customer bases. The only overlap was in the remote SDLC communications area. Although merging the companies' development and sales efforts under one umbrella took longer than anticipated, ICOT is now poised to concentrate on product development.

ICOT's PC-connectivity products currently include emulation boards and software that allow IBM PC and PS/2 Micro Channel Architecture (MCA) computers to communicate with IBM hosts via SNA 3270 emulation. The products allow users to transfer data synchronously using Systems Network Architecture (SNA) or the X.25 packet-switching protocol. ICOT's product line spans local, remote, and gateway connections. The Ksaver family of single-user and gateway products is noted for its efficient use of random access memory (RAM). The OmniPATH product line, which was released in June 1989, comprises single-user and gateway SDLC products, as well as coaxially connected DFT products. In addition, OmniPATH products offer RAMiser, a memory management feature that significantly reduces the products' RAM requirements.

Today, ICOT focuses on two main areas of business: PC connectivity and OEM development. The OEM segment still contributes significant revenues to the company. The connectivity marketplace is also doing well, as gateways are coming into their own as a viable technology. ICOT anticipates substantial growth in this market over the next five years.

Competitive Position

Within the general 3270 PC-to-host product line, Digital Communications Associates (DCA) and Novell Communications are market leaders. ICOT also competes in this line but cannot claim such a sizable market share. Novell's product line is more modular in style than ICOT's. Users must pick an interface board and software from a large, somewhat intimidating product line. DCA's product line is more package oriented, as is ICOT's. Users purchase hardware/software combinations, most of which use the same boards. Both Novell and DCA have common user interfaces that bind their product lines. Novell and DCA also offer 5250 products, while ICOT no longer competes in that market.

ICOT's area of strength is the gateway market. Over the past few years, gateways have become one of the hottest technologies in the PC-to-host marketplace. Because Pathway Design had one of the first gateways on the market, ICOT managed to get a jump on the competition. Comparing ICOT's gateways with Novell's and DCA's will show that, except for the Ksaver feature, most of the products offer the same functionality and features.

Why, then, is ICOT on top in this market? The company attributes its success to several factors. First, ICOT has been able to attract technically competent VARs that understand both the PC and mainframe side of the communications link. At this point, much of selling gateways is just a matter of education, according to an ICOT spokesperson. Selling gateways, he said, is more difficult than selling emulation boards, since gateway technology is just gaining acceptance. An ICOT spokesperson said a company such as DCA is more attuned to selling its IRMA products. IRMA boards are not only an easier sale, due to customer acceptance, but as single-PC, single-user products they also generate more revenue. As for

Datapro Reports on
PC & LAN Communications

ICOT
PC-to-Host
and LAN Gateway Products

650-I060-**103**

Products • I

Company Profile
ICOT Corp.

	Fiscal 1987	Fiscal 1988	Fiscal 1989
Net Sales	$49.74 million	$33.99 million	$23.39 million
Net Income	$6.23 million	-$6.43 million	-$12.37 million
Net Income (per share)	$0.58	-$0.59	-$1.09

Corporate Headquarters
3801 Zanker Road
P.O. Box 5143
San Jose, CA95150-5143
(408) 433-3300
In Canada
Contact vendor's U.S.
headquarters.

Officers
Chairman: Arnold N. Silverman
President & CEO: Joel M. Becker
Senior Vice President: Bruce A. Kelley
Vice-Presidents: Kenn T. Dahl and Aamer Latif
Controller/Treasurer: John E. Arnold
Secretary: Ann B. O'Doherty

Company Background
Year Founded: 1968 (as Microform Data Systems)
No. Employees: 120

Although ICOT was formed over 20 years ago, the company was a relatively late entry to the PC-to-host market. The company was incorporated in 1968 as Microform Data Systems, Inc., based in Delaware. At the time, the company's main business was manufacturing microfiche systems for phone companies.

ICOT did not keep up with advances in digital technology, however, and almost went out of business.

In an effort to regroup, the company changed its speciality and began selling terminals and concentrators to airlines. In December 1980, it changed its name to ICOT Corp., and established a home office in California. Between 1984 and 1986, most of ICOT's revenues came from the airline industry, with American Airlines accounting for about 80 percent of those revenues.

In April 1987, ICOT suffered another crippling blow, when American Airlines notified the company that it would cease using many of the company's products. Revenues immediately plummeted, resulting in still another change of focus. This time the company shifted its emphasis to its line of PC-to-host and gateway products, which it had begun marketing in August 1986. ICOT is still in a recovery stage. After posting losses in fiscal 1988 and 1989, however,

the company seems to be reversing its fortunes with gains in each of the first three quarters of fiscal 1990.

Management Statement
"Fiscal year 1989 sales were $23,397,000, a decline of 31 percent from $33,996,000 for the previous fiscal year. For the year, ICOT incurred a net loss of $12,375,000, or $1.09 per share, which included $3,737,000 for accelerated amortization of the purchase price in excess of net assets acquired pertaining to the acquisition of Pathway Designs, Inc. (Pathway) in January 1988. Also included in the loss are the fourth-quarter costs of reorganizing the company subsequent to the sale of its Electronic Funds Transfer Point of Sale (EFTPOS) business to VeriFone, Inc. in June 1989. Revenues were lower due to the continued decline in airline product sales and the absence of fourth-quarter EFTPOS sales. Sales to the PC-Connectivity market were essentially flat

as the growth in SNA and X.25 gateway and adapter products offset the decline in 8100 adapter products. Sales to the company's major OEM customer were higher.

"Fiscal 1989 was an important year for the company. Though a sizable loss was incurred, a major portion of this loss was a result of the company's investment in the future. As a result, significant progress was made in advancing the market position of the company's EFTPOS, PC-Connectivity, and OEM businesses.
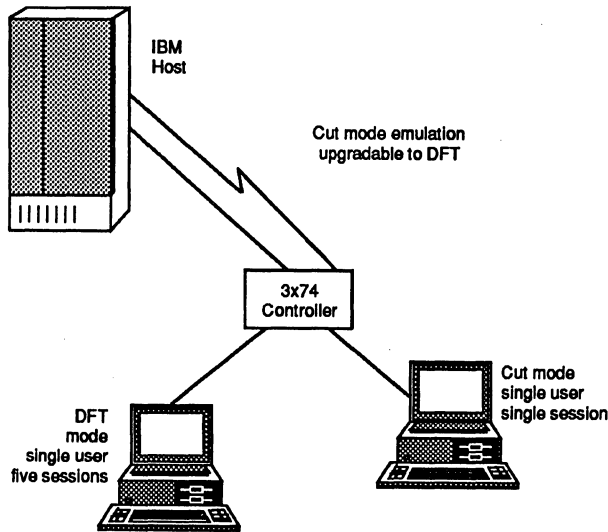
"While the future continues to present significant challenges, we are confident that our employees are willing and capable of meeting those challenges. We thank our stockholders for their patience and continued loyal support." challenges, we are confident that our employees are willing and capable of meeting those challenges. We thank our stockholders for their patience and continued loyal support."

Novell, its primary business is selling LAN operating systems and adapter boards, whereas gateways are ICOT's primary focus.

Another major source of gateway revenues is ICOT's OEM market. The gateways' modular architecture is very attractive to OEM customers who want to develop their own drivers for the ICOT SNA software. ICOT is using its marketing channels well. The company's gateways also stand up to competing gateways in ease of use, flexibility, and price.

Figure 1.
ShortCUT II Connectivity

ICOT's ShortCUT II is available in versions supporting both CUT and DFT connections to an IBM host system.

Decision Points

Memory Management
One problem often encountered in implementing a PC-to-host link is the amount of RAM required by the software, which is often high enough to cause difficulties in loading other applications. ICOT has effectively removed this potential problem, offering products that require as little as 40K bytes of memory without any significant sacrifice in functionality. ICOT's products make more memory available for hot keying to memory-hungry PC-based applications, such as spreadsheets and databases.

The company's Ksaver products, for example, are very memory efficient, requiring as little as 56K to 75K bytes of memory. In fact, the company also offers an XL version of Ksaver, which reduces RAM requirements to 40K bytes but supports fewer sessions. In addition, ICOT offers the proprietary RAMiser feature for use with its OmniPATH products. RAMiser reduces RAM requirements to between 29K and 51K bytes without sacrificing sessions or features. The product uses memory swapping to conserve user RAM and is offered as a standard feature on all OmniPATH products.

User Interface
The products are all menu driven, featuring help screens and hot keying to DOS. Each product sup-

ports the use of an application programming interface (API) that will allow programmers to customize applications and automate repetitive tasks. ICOT products support IBM's EEHLLAPI method, as well as proprietary APIs. All products use IBM's IND$FILE file transfer method, which allows the exchange of binary and text files between the PC and the host system. The products also provide support for a variety of proprietary file transfer methods.

One problem facing potential users is that user interfaces are not consistent throughout the product line. While each product family has a consistent user interface, such as OmniPATH's or Ksaver's, all of the products do not have the same interface. A user purchasing an OmniPATH product will need to learn a different interface if he or she wants to use a Ksaver product. The inconsistent user interface resulted from the merger of INS' and Pathway Design's product lines. Within their own product lines, however, user interfaces are similar.

Modularity
ICOT's products are modular in nature, allowing upgrades within product families via simple software, from single-user solutions to gateway configurations. In some cases, the workstation software is essentially the same; the difference lies in the way the products tie into the host. Such modularity can provide a significant cost savings to users wanting to expand their networks; they need only add components instead of replacing entire products. Modularity also helps ensure greater product longevity, as products can be more easily and inexpensively upgraded.

Characteristics

Models: ShortCUT II, Ksaver, OmniPATH/SDLC, and OmniPATH/DFT.

Date Announced: ShortCUT—August 1988, Ksaver—August 1986, OmniPATH/SDLC—June 1989, and OmniPATH/DFT—June 1989.
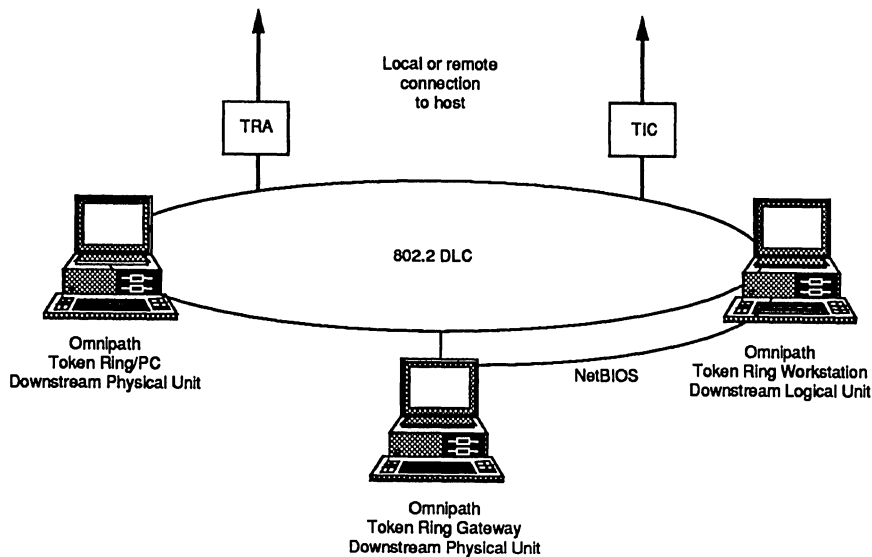
Datapro Reports on
PC & LAN Communications

ICOT
PC-to-Host
and LAN Gateway Products

650-I060-**105**
Products • I

Figure 2.
Token-Ring Connectivity
Options

The OmniPATH Token-Ring PC and OmniPATH Token-Ring Gateway products allow networked PCs to establish a TRA or TIC connection to an IBM host.

Date First Installed: ShortCUT—September 1988, Ksaver—October 1986, OmniPATH/SDLC—February 1989, and OmniPATH/DFT—May 1989.

Number Installed: Information not available.

Distribution: ICOT's products are sold through dealers, distributors, OEM agreements, and value-added resellers (VARs).

Models

ICOT's current product line includes hardware/software combinations that allow PCs and PS/2 Micro Channel Architecture (MCA) computers to communicate with IBM mainframes via local, remote, and gateway connections. Local connections are provided by the ShortCUT II products, and remote connections by Ksaver Series. Also included are specifications on ICOT's recently introduced OmniPATH family of single-user or LAN gateway SNA 3270 communications products for DFT, SDLC, and Token-Ring connections.

ShortCUT II: This is a family of 3270 emulation products that allow PCs and PS/2 MCA computers to communicate with IBM or SNA hosts. ShortCUT II consists of a standard board and emulation software that accommodates CUT or DFT operation. Users need only load the appropriate software in a PC that is coaxially attached to a 3174, 3274, 3276, or compatible controller to establish a session with a host. CUT-mode software supports a single-user connection to the host via the 3X74 control unit; one host session can be established. DFT-mode, single-user software supports up to five simultaneous sessions with the host. The ShortCUT II board can also be used with IBM and IRMA E78 and E78+ emulation software. Terminals emulated include

IBM 3278 Models 2 through 4 and IBM 3279 Models 2A and 2B. A minimum of 85K bytes of memory is needed for operation.

ShortCUT II supports IBM Send/Receive (IND-$FILE) transfer at rates up to 2.35M bps. Features include help screens and keyboard remapping. IBM's EEHLLAPI application programming interface can be used to customize the ShortCUT II user interface to specific applications.

Ksaver: These products are extremely memory efficient, using only 56K to 75K bytes of memory for one to three host sessions. ICOT recently announced that these products also support a new Ksaver XL (ExtraLite) feature that decreases RAM requirements to 40K bytes. Users can choose between ExtraLite or standard memory from a configuration menu. Ksaver XL supports one host session, while standard memory supports two host sessions and a printer session. Ksaver can provide a single-user SDLC or X.25 connection between a PC or PS/2 MCA and a host system. The product can also be configured as a gateway solution that allows PCs on a LAN to concurrently run up to 32 logical sessions with a remote host system. Ksaver gateways come with a network supervisor program that allows users to manage LU availability and generate statistics.

The same user interface is presented whether the connection is established using an X.25 packet-switching network or a dial-up or leased-line link using the SDLC protocol. Changing between SDLC and X.25 requires a software change on the PS/2 and an EPROM change in a PC. The same changes are required to upgrade from a single-user configuration to supporting 8, 16, or 32 LUs as a gateway.

Ksaver products include a board and software. The board contains two processors that handle communications, off-loading the PC. Users can transfer files at data rates up to 19.2K bps using IBM's Send/Receive (IND$FILE), VM, and TSO transfer facilities. Ksaver

650-I060-**106**

Products • I

ICOT
PC-to-Host
and LAN Gateway Products

Datapro Reports on
PC & LAN Communications

products require a synchronous modem or modem eliminator and a full-length I/O slot in a PC or PS/2.

Ksaver's X.25 link capabilities are CCITT 1976/1980/1984 conformant. Window and packet sizes are negotiable. The product also supports PSH or QLLC, the LAPB protocol, and built-in diagnostics. When configured for X.25 transmission, Ksaver supports NIA/NPSI on IBM and compatible hosts. Ksaver is certified in a number of countries, including the United States, the United Kingdom, Germany, Austria, France, Belgium, Sweden, Spain, Norway, and Switzerland. It is also certified on Telenet, British Telecom, and Transpac.

Omnipath Series

The OmniPATH products, first shipped in 1989, are now ICOT's premier products within the PC-to-host line. The products consist of hardware and software that is installed in an IBM PC or PS/2 MCA to facilitate SNA 3270 communications with an IBM mainframe.

OmniPATH emulators are available in standard and Ksaver versions, which are further divided into single-user and gateway solutions. The standard version supports five host sessions (each with a different host, if needed), all of which can be displayed on one screen, using an LU windows interface. The product supports IBM 3278 Models 2 through 5 terminal emulation. IBM 3279 SG3 and 3179/G APA graphics emulation is optional. Host sessions can be configured as 3287 printer LU 1 or 3 printer sessions, as well. Users can hot key to DOS during any of the sessions.

The Ksaver option to OmniPATH supports three sessions, one of which is designated as a printer session. The product provides IBM 3278 Models 2 through 5 and 3279 Models 2A and 3A terminal emulation and optionally emulates IBM 3279 terminals. While IND-$FILE is the standard file transfer method for any OmniPATH product, the Ksaver version can optionally include a proprietary TSO or VMS file transfer package. Printers emulated include IBM 3287 LU 1 or 3. The Ksaver model uses only 75K bytes of RAM. Users can also choose to use only 40K bytes of RAM, provided only one host session is established at a time; such a choice can be made from a menu selection.

All OmniPATH gateway products support up to 128 concurrent sessions on a LAN and come with standard network management tools. ICOT's Network Supervisor allows a system administrator to monitor and control gateway operations from any workstation on the LAN. The Supervisor generates host LU and LAN adapter statistics; disconnects specific LUs, user nodes, or gateways; and displays network status messages. Network Logger, a memory-resident program, keeps an ASCII log of network status information. A Diagnostic Trace Facility keeps a record of all SNA communications with the host for tracing problems that occur during emulation. Another utility, CheckSNA, tests the hardware communications adapters. OmniPATH products also support NetView monitoring of the gateway and the use of remote access software packages,

such as Microcom's Carbon Copy, on the network. A "hot backup" gateway feature allows the user to switch to up to four backup connections in the event the primary gateway connection fails. Backup connections are not restricted to a single host.

OmniPATH/SDLC: OmniPATH/SDLC products comprise single-user and gateway solutions. The single-user solution supports five simultaneous host sessions, while the gateway supports 8, 32, or 128 LUs on a NETBIOS-compatible LAN. Both versions require a synchronous modem for remote attachment to an SNA host. The single-user version transfers data at rates up to 9600 bps, while the LAN implementation supports rates up to 56K bps.

OmniPATH/DFT: OmniPATH/DFT products also comprise single-user and gateway solutions via a connection to an IBM 3X74 controller. The single-user version supports up to five simultaneous host sessions, while the gateway version supports 5, 20, or 40 host LUs on a NETBIOS-compatible LAN. Supporting over five DFT sessions on a LAN requires that the gateway be attached to a 3299 multiplexing port of a 3X74 controller. Link speeds up to 2.35M bps are supported in a coax attachment.

OmniPATH Token-Ring PC: OmniPATH Token-Ring PC is a single-user, down-stream physical unit (DSPU), which uses token-ring data link control protocol (802.2) to provide communications with a local or remote host system. The product acts as a standalone, multi-dropped node, providing enhanced performance and availability, and is visible to IBM's NetView as a physical unit. OmniPATH Token-Ring PC supports up to five host sessions, windowing capabilities, and APA and S3G graphics. The product features ICOT's RAMiser, allowing it to operate on as little as 29K bytes of user RAM.

OmniPATH Token-Ring Gateway: This product includes software for both gateway and workstation PCs. Like OmniPATH Token-Ring PC, this product acts as a DSPU, communicating with a host system via 802.2. The product offers up to 128 host sessions, each a down-stream logical unit (DSLU). Each PC running the workstation software supports up to five simultaneous, windowed host sessions and can access up to five gateways at a time. When used in conjunction with RAMiser, each workstation can function with as little as 51K bytes for up to five sessions.

Applications Programming Interfaces

OmniPATH and Ksaver emulation packages support IBM's EEHLLAPI and LLAPI. ICOT also offers a high-level, proprietary API for Ksaver that automates repetitive tasks, such as logging on to a host, retrieving mail, and transferring files. Unattended operations can also be set up through the APIs. Some products also support a low-level programming interface, TurboAPI, which works about four times faster than IBM's HLLAPI.

Datapro Reports on
PC & LAN Communications

ICOT
PC-to-Host
and LAN Gateway Products

650-I060-**107**
Products • I

PI2 is a proprietary API for LU 1, 2, or 3 (display and printer) functions. Command Line Interpreter (CLI) is a script language that allows users to automate host logons and file transfer functions; the language operates on a macro level.

Other Products

ftPATH: This product is a file transfer option specifically designed for use with all ICOT 3270 emulators. The program allows a PC to transfer binary and text files to and from an IBM mainframe running IBM 3270 PC file transfer software. The package can be used in CICS, VM/CMS, and MVS/TSO host environments.

pcPATH BSC-3270: This software package allows IBM PCs to communicate with IBM hosts using the bisync protocol. A PC with pcPATH BSC-3270 installed will appear to the host as a 3270 Control Unit with devices attached.

netPATH SNA-3770: This product addresses the 3770 batch protocol used primarily for batch file transfers and printing functions. The product is a LAN gateway that emulates an IBM Remote Job Entry Workstation, allowing a PC to communicate with an IBM host via an SDLC connection. The gateway supports an unlimited number of users, six concurrent sessions, and unattended operation. The product supports file transfers at rates up to 56K bps.

Support

Phone Support: Registered users can obtain free technical support over the phone by calling (800) SNA-3270. Technical support lines are open from 8 a.m. to 5 p.m., Eastern Standard Time.

Warranty: All of the PC-to-mainframe products are covered by a one-year warranty on software and hardware.

Maintenance: ICOT customers receive free updates for minor releases and enhancements.

Pricing

ICOT's PC-to-host products can be purchased under a one-month evaluation basis. Single-unit prices are listed below. No leasing is available.

Equipment Prices

	Price ($)
ShortCUT II CUT mode	695
ShortCUT II DFT mode	795
Ksaver	850
Ksaver gateway, 8 LUs	1,995
Ksaver gateway, 32 LUs	3,595
OmniPATH SDLC/PC	995
OmniPATH SDLC Gateway, 8 LUs	2,995
OmniPATH SDLC Gateway, 32 LUs	4,995
OmniPATH SDLC Gateway, 128 LUs	7,495
OmniPATH SDLC Gateway, 253 LUs	9,995
OmniPATH DFT/PC	1,095
OmniPATH DFT Gateway, 5 LUs	1,695
OmniPATH DFT Gateway, 40 LUs	3,995

IDEAssociates PC-to-Host Products

In this report:

Note: IDEAssociates released a midrange connectivity product for Windows and the first PC LAN gateway product for multiple concurrent or dedicated PC communications to IBM midrange systems or mainframe hosts. The company also enhanced IDEAlink—its first file transfer software; IDEAlink Version 2.0 features automated file transfer capability; a record selection criteria feature; and a new user-friendly interface that has a "pop-down" menu, context-sensitive help, and a self-prompting feature.

IDEAssociates' IDEAcomm products provide local and remote links for standalone workstation and networked PCs to access IBM mainframe and midrange computers. These terminal emulation products are hardware/software based and provide file transfer capabilities, multiple sessions, a host key to DOS, programming features, keyboard remapping, and national language support.

Strengths

- Offers comprehensive array of communications products

- Features products utilizing minimal host and PC memory

- Integrates a wide array of incompatible components

- Provides technological, innovative product line

- Provides reliable products

Limitations

- IDEAcomm mainframe communications products provide a technology whose market demand continues to decline.

- IDEAcomm micro-to-mainframe series lacks the OS/2 and Macintosh support provided by the IDEAcomm midrange products.

- IDEAssociates provides PC Support, but only as a separate product; it cannot mix terminal emulation and PC Support on the same gateway.

- IDEAcomm Gateway is available only for DOS environments.

Competition

In the midrange connectivity market: AST Research, Emerald Technology, Micro-Integration; in the mainframe connectivity market: Digital Communications Assoc. (DCA), Attachmate, Eicon Technology.

Vendor

IDEAssociates, Inc.
29 Dunham Road
Billerica, MA 01821
(800) 257-5027, (508) 663-6878
In Canada:
Call IDEAssociates' headquarters for information.

Pricing

$625 for IDEAcomm Gateway; $550 for IDEAcomm COAX; $995 for IDEAcomm Mac. **GSA Schedule:** No.

—By Donna Gasiewski
Staff Writer

650-I074-**102**

Products • I

IDEAssociates
PC-to-Host Products

Datapro Reports on
PC & LAN Communications

Product Analysis

IDEAssociates maintains a comprehensive line of connectivity products linking PCs, PS/2s, and Macintoshes to IBM mainframe and midrange host systems in local, remote, standalone, and gateway options. Its products are IBM compliant and operate in DOS, OS/2, and Windows environments.

In November 1991, IDEA unveiled a revamped, consolidated communications product line. It has bundled the features and functions of several IDEAcomm products into single packages to provide more economic and versatile offerings. The recently released IDEAcomm Gateway, for example, allows for multiple concurrent or dedicated PC communications to IBM midrange or mainframe hosts.

The IDEAcomm product lines have also been enhanced with other new products besides IDEAcomm Gateway. The IDEAcomm midrange product line now includes a Windows offering; and the IDEAcomm mainframe product line has been enhanced with IDEAcomm COAX and IDEA Concert 3270 Gateway, which both offer full compatibility with several third-party vendors.

IDEAcomm products support terminal and printer emulation, multiple host sessions, and a hot key to DOS. The midrange products include IDEAlink, a program providing bidirectional file transfer betwen the PC and the host system, and are compatible with PC Support/36 and PC Support/38. The mainframe products provide API support for customizing the host interface and are also compatible with either the BSC or SNA/SDLC link-level protocol.

Target Applications

IDEAssociates' IDEAcomm products are intended for general business applications, specifically transaction processing and information access, such as banking and manufacturing.

Strengths

IDEAssociates offers comprehensive, dependable, and innovative communications products. The IDEAcomm

products are solid entries in the midrange and mainframe markets—providing such features as local and remote connections for both standalone and networked PCs in DOS, OS/2, and Windows environments; terminal emulation and file transfer capabilities; multiple sessions; a hot key to DOS; and programming features, such as API support, keyboard remapping, and national language support. IDEAcomm products also employ memory management techniques requiring minimal host and PC memory.

The IDEAcomm product line integrates a wide array of incompatible components and offers products providing full compatibility with other communications vendors' software. IDEAcomm has products providing support for the twinax, SNA/SDLC, X.25, and BSC protocols, and products supporting resource sharing and OS/2 and Macintosh environments. It also has products, such as IDEAcomm Coax, offering full compatibility with several third-party products: IBM 3270 Workstation Software; IBM PC/3270 Emulation Software; Attachmate EXTRA! software; and DCA IRMA E78, E78 PLUS, and IRMA file transfers.

All IDEAcomm products are developed in-house, with all board products undergoing a three-level testing phase before shipment. The testing—also conducted in-house—consists of bare board, component stage, and functional tests. The result, according to IDEA, is a failure rate of less than one tenth of 1% on its entire line of communications, memory, and multifunction boards.

In researching and developing its own products, the company responds quickly to market demands, often surpassing its competitors. IDEA has claimed many firsts in PC-to-midrange communications, positioning itself at the forefront of the industry. It was the first to create fully functional twinaxial PC to System 3X link (IDEAcomm 5251); the first to provide a 3X emulation product compatible with the Micro Channel Architecture of the IBM PS/2 (IDEAcomm 5251/MC); the first to provide a communications link between the Macintosh workstation and IBM midrange host (IDEAcomm Mac); the first to create a midrange communications product compatible with OS/2; and the first to create a third-party PC communications product compatible with the AS/400's PC Support applications.

Limitations

IDEAssociates is experiencing a decreasing market demand for its IDEAcomm mainframe communications

Overview

Midrange Communications Products

Model	IDEAcomm 5251/Gateway AH	IDEAcomm 5250/Remote Share
System	IBM AS/400 Series minicomputers	IBM System 36/38 or IBM AS/400 Series minicomputers
Microcomputers Supported	IBM PC/XT/AT, and PS/2 Model 30	IBM PC/XT/AT, and PS/2 Model 30
Date Announced	—	August 1987
Operating System Supported	PC versions: DOS 3.1 or higher; MS versions: DOS 3.3 or higher	PC versions: DOS 3.1 or higher; MS versions: DOS 3.3 or higher
Base Price	$1,940 for IDEAcomm 5251/Plus emulation board, the IDEAcomm 5251/Gateway AH software, T-connector, and diagnostic software	$495 for IDEAcomm 5250/Remote Share emulation and IDEAlink file transfer software

Datapro Reports on
PC & LAN Communications

IDEAssociates
PC-to-Host Products

650-I074-**103**

Products • I

Decision Points

IDEAssociates' Midrange and Mainframe
Communications Products

Requirements	Performance
Multiplatform Support	IDEAcomm products support DOS, OS/2, and Windows operating systems.
Minimal Host and PC Memory	IDEAssociates employs memory management techniques requiring only 88K of working DOS RAM thereby leaving sufficent work area for the most powerful productivity software programs.
Excellent User Interface	Each of the midrange and mainframe communications products includes IDEAssociates' IDEAlink file transfer program. IDEAlink Version 2.0 provides automated file transfer procedures between an IBM PC or Apple Macintosh and a midrange or mainframe host. It also provides a record selection criteria feature and a "pop down" menu interface with context-sensitive help and a self-prompting feature.
Broad Range Protocol Support	IDEA communications products support IBM NETBIOS, Novell NetWare, IBX/SPX, Microsoft LAN Manager over TCP/IP, and Apple Macintosh protocols.

products because of increased competition and a U.S. market downturn for terminal emulation products. The company has responded by making its 3270 workstation communications product line more competitive, while also expanding its offering in the 3270 workgroup arena. Its mainframe communications offerings, however, could still benefit from the kind of OS/2, Windows, and Macintosh support provided by the IDEAcomm midrange product line. Also, IDEAssociates provides PC Support, but only as a separate product; it cannot mix terminal emulation and PC Support on the same gateway.

Vendor Analysis

Product Strategy

IDEAssociates entered the communications market in 1984 and quickly became one of the top suppliers of midrange and mainframe connectivity products. Boasting one of the most extensive communications lines available, IDEA also produces midrange and mainframe terminals, as well as an impressive line of memory and multifunction add-in boards.

The privately held company, which earned $178 million in revenue in 1990 and considers itself extremely profitable, is divided into three operations: the original IDEAssociates, which manufactures midrange and mainframe communications products and midrange terminals and multifunction add-in boards; IDEA Courier, which produces mainframe terminals, controllers, and printers; and IDEA Servcom, which provides computer maintenance and service.

IDEAssociates' continued commitment to emerging technologies in the micro-to-midrange communications market has kept IDEA at the forefront of the communications industry. In addition to designing many firsts for midrange connectivity, IDEA also brought its innovative style to the manufacturing floor in 1986 when it became the first company to use surface-mount technology in the

production of multifunction boards—a move which enabled IDEA to pack up to 16 megabytes of memory into a single slot. IBM used this same surface-mount technology a year later to create the PS/2. That introduction shook the PC industry, yet IDEA also introduced a total of 11 products within the next seven months—more than anyone else, including IBM—for the new Micro Channel Architecture.

As the market continues to be crowded with mainframe connectivity products, IDEAssociates would benefit to continue its main focus on midrange communications to improve its market position. As IBM's AS/400 maintains its popularity, the demand for micro-to-midrange connectivity products should also remain. To maintain its comprehensive coverage of this area, combined with its technological leadership, IDEA could solidify its role as a major vendor in the midrange connectivity market.

Target Markets
IDEA targets *Fortune* 2500 companies interested in general business applications for transaction processing and information access, such as banking and manufacturing. IDEAcomm clients range from major airlines to shoe stores.

The company is also committed to the international marketplace where its products are localized for all major markets. The company's international sales represent approximately 40% of IDEAcomm total net sales.

Competitive Analysis

Market Position
In the market for midrange connectivity, IDEAssociates ranks second among the top five 5250 communications vendors, which includes IBM (the market leader), Micro-Integration, AST Research, and Eicon Technology. The IDEAcomm midrange products have captured approximately 25% of both the gateway and standalone markets for 5250 connectivity. IDEA's midrange products have experienced a dramatic annual growth rate between 8% and 9%.

According to Scott Opitz, IDEAssociates product manager, "It is our clear intent to absorb the midrange market share."

In the market for mainframe connectivity, IDEAssociates ranks third among captured market share, behind

650-I074-**104**

Products • I

IDEAssociates
PC-to-Host Products

Datapro Reports on
PC & LAN Communications

Overview (Continued)

Midrange Communications Products (Continued)

Model	IDEAcomm 5251/Gateway Plus	IDEAcomm 5250/Remote Gateway	IDEAcomm Mac
System	IBM System 36/38 or IBM AS/400 Series Minicomputer	IBM System 36/38 or IBM AS/400 Series Minicomputer	All models of IBM Midrange System 36/38, and AS/400
Microcomputers Supported	PC versions: IBM PC/XT/AT, or PS/2 Model 30 with 128K RAM, PC-DOS 3.1 or higher; MC versions: IBM PS/2 Models 50/60/80 with 256K RAM, PC-DPS 3.3	PC versions: IBM PC/XT/AT, or PS/2 Model 30 with 128K RAM, PC-DOS 3.1 or higher MC Versions: IBM PS/2 Models 50/60/80 with 256K RAM, PC-DPS 3.3	Apple Macintosh II or Apple Macintosh SE
Date Announced	—	August 1987	May 1989
Operating System Supported	PC versions: DOS 3.1 or higher MS versions: DOS 3.3 or higher	PC versions: DOS 3.1 or higher MS versions: DOS 3.3 or higher	Macintosh System Software Version 6.03 or higher, or Macintosh System Software Version 4.2 or higher
Base Price	$1,210 for IDEAcomm 5250/Gateway Plus emulation and IDEAlink file transfer software	$1,295 for IDEAcomm 5250/Remote Gateway emulation and IDEAlink file transfer software	$995 for IDEAcomm Mac communications card for Macintosh SE

DCA's IRMA products and Attachmate's EXTRA! software, which have each captured 25% of the mainframe market, respectively.

In the international marketplace for midrange and mainframe communications, IDEA has successfully positioned itself as a market leader overseas. The company has established distributorships in Germany, France, and the United Kingdom, with an international headquarters in Paris. In the Asia-Pacific market, IDEA has used innovative technology and an office in Hong Kong to effectively compete. IDEA has a long-standing OEM agreement to supply communications products to Toshiba, Japan.

Major Competitors

In the midrange market, IDEA competes with IBM, Micro-Integration, and Eicon Technology. AST Research, traditionally a strong competitor in the PC-to-host marketplace, is no longer a leader in the IBM mainframe and midrange connectivity market. Since 1990, that company has refocused its interests and energies to the microcomputer markeplace where it has seen moderate success.

IDEA contributes much of its success in the PC communications marketplace to its midrange connectivity products, which rank second in the industry behind IBM. Micro-Integration's (MI) midrange gateway products, however, provide strong competition. Its gateways offer features that the leading competitors do not have, such as the ability to put more than one gateway in a machine. Its users do not have to dedicate as many PCs as there are gateways. IDEA can only do this when adapter handler software is added. Also, only MI has the capability to give nodes on the gateway the capacity to run PC Support sessions with terminal emulation. IDEA provides PC Support, but only as a separate product; it cannot mix terminal emulation and PC Support on the same gateway.

Among its competitors, IDEA is the only vendor to provide support for Macintosh systems. Competing vendors claim they will consider supporting the Macintosh platform when its users demand it.

In the mainframe market, where many vendors are struggling for survival, IDEA has enjoyed modest success.

DCA remains the dominant market leader, earning 30.6% of the 1990 market for 3270 terminal emulation products. DCA estimates that its share of the coax market for the Apple Macintosh is more than 50%. IDEA does not provide Macintosh or Windows support, something it should consider as other vendors, such as Avatar and Novell, strengthen their postions in mainframe connectivity with such niche markets.

Sales and Distribution Strategy

Sales

IDEA products are sold direct to the user or through a network of leading VARs and distributors, supported by sales offices in Virginia, Texas, Illinois, and California, and through international sales offices in Paris and Hong Kong.

Distribution

IDEA products are distributed through a network of leading VARs and distributors throughout the U.S., and in more than 40 countries worldwide.

Support

Competitors' Programs

The communications programs that compete with IDEAssociates' connectivity products provide comparable technical phone support, with the exception of AST Research whose phone support is less accessible. The various vendors typically provide technical phone support from 8 a.m.

Datapro Reports on
PC & LAN Communications

IDEAssociates
PC-to-Host Products

650-I074-**105**
Products • I

Overview (Continued)

Mainframe Communications Products

Model	IDEAcomm Coax	IDEA Concert 3270 Gateway
System	IBM System 36/38 or IBM AS/400 Series Minicomputer	IBM System 36/38 or IBM AS/400 Series Minicomputer
Microcomputers Supported	IBM PC/XT/AT, PS/2 Model 30, and compatibles	IBM PC/XT/AT, PS/2, and compatibles
Date Released	September 1991	September 1991
Base Price	$550 for IDEAcomm Coax emulation board, IDEAcomm emulation software and template	$4,195 for IDEA Concert 3270 Gateway with one 16/4M bps token-ring adapter card, one host link adapter card, 2MB memory, and one available expansion slot

Dual Mainframe/Midrange Communications Products

Model	IDEAcomm Gateway (single user)	IDEAcomm Gateway
System	80286	80286
Microcomputers Supported	IBM PC/XT/AT, PS/2 Model 30, and compatibles	IBM PC/XT/AT, PS/2 Model 30, and compatibles
Date Released	September 1991	September 1991
Base Price	$625 for IDEAcomm Host Link Adapter Card and the IDEAcomm Gateway multi-host terminal emulation software	$625 for IDEAcomm Host Link Adapter Card and the IDEAcomm Gateway multi-host terminal emulation software

to 7 p.m. EST weekdays, but AST Research's phone support is available only from 7:30 a.m. to 3:00 p.m. Pacific time.

Eicon Technology provides the most comprehensive training course among the competing vendors. For a fee, it provides a five-day training course for most of its Access series of communications gateway products.

Among its competitors, Micro-Integration is the only vendor to provide a lifetime warranty on its software products and a 30-day money back guarantee for dissatisfied customers. MI's competing vendors typically provide a one-year warranty on software products. MI and AST Research are the only vendors to offer a bulletin board service to customers.

Policies and Programs

Warranty
IDEAcomm products include a one-year, on-site warranty with service provided throughout the U.S. and Canada by IDEA Servcom.

Support Services
IDEA provides consulting and connectivity support during the warranty period. After the warranty period, it will replace or repair its products for a nominal fee.

Service Hours
Phone support is available to IDEAcomm users at (800) 257-5027, Monday through Friday, 8 a.m. Eastern Standard Time to 7 p.m. Pacific time.

Training/Education
IDEA has not established a standard training program for its products. Specific arrangements in the form of customer-site and vendor-site training, however, can and have been made to accommodate clients.

Documentation
IDEA provides a technical and user-oriented, printed manual.

Upgrade Policies
New versions of IDEAcomm packages are available to IDEAcomm users at a nominal fee.

650-I074-**106**
Products • I

IDEAssociates
PC-to-Host Products

Datapro Reports on
PC & LAN Communications

Specifications

Enhancements

Features	IDEAssociates' Midrange and Mainframe Communications Products
New products	The IDEAcomm product lines have been enhanced with IDEAcomm Gateway, for both midrange and mainframe connections; IDEA Terminal Emulation for Windows, for midrange connections; and IDEAcomm Coax and IDEA Concert 3270 Gateway for mainframe connections.
Improved Performance	IDEAcomm 5251/Gateway Plus has IDEAcomm 5251 Plus hardware emulation that is compatible with other IDEAcomm emulation and gateway software, thus enabling users to alternate IDEAlink file transfer software and IBM's PC Support/400. By using PC Support/400 only when absolutely required, users can conserve host and PC memory.
New Features	IDEAssociates has enhanced IDEAlink—its first file transfer software for IBM PC and Macintosh communications. IDEAlink Version 2.0 features automated file transfer capability; a record selection criteria feature; and a new user-friendly interface that has a "pop-down" menu, context-sensitive help, and a self-prompting feature.
New Options	IDEAcomm Gateway is the first PC LAN gateway for multiple concurrent or dedicated PC communications to IBM mainframe systems or mainframe hosts.

Features/Functions

Midrange Communications Products

Model	IDEAcomm 5251/Gateway AH	IDEAcomm 5250/Remote Share
Terminal Emulation	3180, 3196, 5251-11, 5291, 5292-1, 5292-2	5251-11, 5291, 5292-1
PC Memory Required	—	128K
Multiple Host Sessions	Seven	Up to nine concurrently
No. of Users	—	—
Controller Emulation	—	5294, 5251-12
Printer Emulation	5219, 5225, 4214, 5256, 5224	5219, 5225, 5256, 5224
Transmission Speed	1M bit/sec.	19.2K bit/sec.
LAN Support	NETBIOS	—
Protocol Support	RS-232, Async, SNA/SDLC	RS-232, Async, SNA/SDLC

Model	IDEAcomm 5251/Gateway Plus	IDEAcomm 5250/Remote Gateway	IDEAcomm Mac
Terminal Emulation	User PC: 5292-1, 5291, 5251-11. Server PC: 5251-11, 5291, 5292-1, 3180, 3196, 5292-2	User PC: 3180, 5292-1, 5251-11, 5291. Server PC: 3810, 5292-1, 5251-11, 5291	3180, 3196
PC Memory Required	128K	—	Min. 2-4MB System for Mac II; minimum 1MB System (2.5MB recommended) for Mac SE
Multiple Host Sessions	Up to seven concurrently	Up to nine concurrently	—
No. of Users	210	36	Up to four (one configured as printer)

Datapro Reports on
PC & LAN Communications

IDEAssociates
PC-to-Host Products

650-I074-**107**
Products • I

Features/Functions (Continued)

Model	IDEAcomm 5251/Gateway Plus	IDEAcomm 5250/Remote Gateway	IDEAcomm Mac
Controller Emulation	—	5251-12, 5294	—
Printer Emulation	5219, 5224, 5225, 5256	5219, 5224, 5225, 5256	IBM 5256, 5224, 5225
Transmission Speed	Speeds dependent on the maximum speed of the LAN on which it is running	Speeds dependent on the maximum speed of the LAN on which it is running	1MB/sec.
LAN Support	NETBIOS	NETBIOS	NETBIOS
Protocol Support	Twinax	RS-232-C	Twinax

Mainframe Communications Products

Model	IDEAcomm COAX	IDEA Concert 3270 Gateway
Software/File Transfer Compatibility	IDEAcomm 3270 software, IBM 3270 Workstation software, IBM PC/3270 Emulation software, Attachmate EXTRA! Software, DCA IRMA E78, E78 PLUS, and IRMA file transfers	IBM PC/3270, Attachmate EXTRA! 3270 Gateway, and DCA IRMALAN Gateway
Terminal Emulation	3270	3270
PC Memory Required	—	2MB
Multiple Host Sessions	Single host session	—
No. of Users	—	A maximum of 64 LAN-attached PC workstations
Controller Emulation	—	3174-class
Transmission Speed	—	64K bps
LAN Support	—	Token-ring
Protocol Support	802.2, SDLC, X.25 protocols	802.2, SDLC, X.25 protocols

Dual Mainframe-Midrange Communications Products

Model	IDEAcomm Gateway (single user)	IDEAcomm Gateway
Software/File Transfer Compatibility	IBM 3270 Workstation software, IBM PC/3270 Emulation software, Attachmate EXTRA! Software, DCA IRMA E78, E78 PLUS, and IRMA file transfers	IBM 3270 Workstation software, IBM PC/3270 Emulation software, Attachmate EXTRA! Software, DCA IRMA E78, E78 PLUS, and IRMA file transfers
Terminal Emulation	3270 and 5250	3270 and 5250
PC Memory Required	88K	88K
Multiple Host Sessions	Up to 10 3270 and/or 5250, two notepad and one Digital VT320 sessions windows	—
No. of Users	Single user	—
LAN Support	Novell IPX, Microsoft LAN Manager, and IBM Token-Ring	Novell IPX, Microsoft LAN Manager, and IBM Token-Ring
Protocol Support	SDLC, 802.2	SDLC, 802.2

650-I074-**108**
Products • I

IDEAssociates
PC-to-Host Products

Datapro Reports on
PC & LAN Communications

Pricing

	Purchase Price ($)
Midrange Communications Products	
IDEAcomm 5251/Gateway AH	1,940
IDEAcomm 5250/Remote Share	495
IDEAcomm 5251/Gateway Plus	1,210
IDEAcomm 5250/Remote Gateway	1,295
IDEAcomm Mac	995
Mainframe Communications Products	
IDEAcomm Coax	550
IDEA Concert 3270 Gateway	4,195
Dual Mainframe/Midrange Communications Products	
IDEAcomm Gateway (single user)	625
IDEAcomm Gateway	625

■