
Datastorm Technologies ProComm Plus

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Note: Datastorm offers a larger number of terminal emulation types, and four layers of modem parameters instead of the previous three. ProComm Plus is available in a single-user version and a five-user network version.

Internationally recognized as a leader in communications software products, Datastorm's product line consists of ProComm Plus 2.01, a complete standalone system that provides terminal emulation and file transfer capabilities to IBM PC/XT/AT, PS/2, and compatible computers.

Strengths

- Easy-to-understand, menu-driven interface
- Power

Limitations

- Slower performance speed
- Overwhelming list of commands
- Menu structure more difficult than other packages

Competition

DCA Crosstalk Mk.4, Crosstalk for Windows, Crosstalk XVI; Future Soft DynaComm Asynchronous Edition; Hilgraeve HyperAccess/5; Software Ventures Microphone II for Windows; SoftKlone Mirror III; Microcom's Relay Gold; Hayes Smartcom Exec and Smartcom III.

Vendor

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In Canada:

Contact U.S. office.

Price

ProComm Plus costs \$119 for the single-user version and \$595 for the five-user network version. **GSA Schedule:** No.

—By *Melissa S. Morales*
Staff Writer

Product Analysis

ProComm Plus 2.01 is a highly functional communications package offering such features as a comprehensive command language; a complete menu supporting context-sensitive help; a choice of user interfaces; pop-up menus; and 33 types of terminal emulation, all featuring keyboard mapping. Unlike its predecessor, ProComm Plus v2.01 also supports high-speed error correcting protocols, such as zmodem, 1K-xmodem, and 1K-xmodem-G; a fully automated dialing directory; a learn mode for generating logon scripts; and a host mode, allowing users to access remote PCs. Zmodem uses an extremely reliable 32-bit CRC error check and supports windowed transfers and a choice of 256- or 1024-byte packets for enhanced performance with high speed modems. Zmodem is not found in some competitive asynchronous communications software packages. Users can also define their own external protocols to ensure compatibility with other systems.

In addition, the program allows users to set and reset a host of communications parameters for each entry in the dialing directory. Users can change four layers of modem parameters: general options, result messages, modem commands, and port assignments. Under the modem command menu, users can change the initialization command, dialing command, and auto answer command. Under the general options menu, the user is required to wait for a connection. The port assignment menu details specifications for the eight COM ports, allowing users to alter base addresses and IRQ lines. Other user-definable options include terminal emulation, duplex, flow control, line wrap, and screen scroll.

Target Applications

- File transfer
- Terminal emulation
- Remote access to information services and BBSs

Strengths

Ease of Use

A novice can easily install the program and dial a remote service within one sitting. More experienced users can use

the Aspect script language to perform automated logons and unattended file transfers. ProComm Plus software also contains useful script files for automatic logon to CompuServe, Dow Jones, MCI Mail, and other information services. For the hobbyist, sample logons to the PC-BOARD bulletin board are also provided.

Power

According to a hands-on study conducted by National Software Testing Laboratories (NSTL), a Datapro company, ProComm Plus was rated acceptable in the areas of both power and usability.

Limitations

Testers liked ProComm Plus overall, but found these few minor limitations. NSTL stated that ProComm Plus' performance speed was considerably slower than HyperAccess/5. Its documentation was adequate, but Crosstalk's documentation was easier to follow and understand. ProComm Plus' ALT-Z list of commands is helpful, but overwhelming. They also stated that although maneuvering in ProComm Plus is easier than in other packages, the menu structure is not as intuitive as HyperAccess/5.

Competitive Analysis

Since it introduced the original ProComm on the shareware market, Datastorm Technologies has been one of the leading suppliers of communications software for microcomputers. The company has been very successful in the shareware market, which says a lot for its program—other companies were forced to abandon the shareware business when users did not pay for their products. Through ProComm, the company established a reputation for producing one of the most user-friendly communications packages available. Now out of the shareware market and into the asynchronous communications market, ProComm Plus is being passed by its competition because it lacks certain features of some of the programs that are on the market. ProComm Plus needs to serve other environments such as Windows, or applications for the Macintosh. Datastorm's ProComm Plus does have an eye-catching price tag, but it is going to be difficult to continue its winning ways in this market unless it picks up speed and develops more versatility.

Overview

Product Name	ProComm Plus 2.01
Date Announced	January 1991 (initial v2.0)
Date Released	May 1991 (maintenance Release 2.01)
Number Installed	Over 200,000
Base Price	\$119 retail (single user); \$595 (five-user) network version
Configuration	Software
Microcomputers Supported	IBM PC/XT/AT, PS/2, and compatibles
Operating Systems Supported	PC-DOS or MS-DOS, Version 2.0 or later
Support Available	Yes

Decision Points

Model	Requirements	Comments
ProComm Plus	ProComm Plus is an asynchronous communications software program that provides terminal emulation and file transfer capabilities to IBM PC/XT/AT, PS/2, and compatible computers. This product contains useful script files for automatic logon to several information services such as GENIE, CompuServe, and Dow Jones.	Amidst the few small limitations of this product, ProComm Plus is a <i>highly</i> functional communications package with plenty to offer. It was an immediate hit since the day it was released. It remains to be seen if Datastorm will continue in this niche and not change the strategy of the product, but you can be assured that this product will remain a top player in the communications market.

Vendor Analysis

Marketing Strategy

Datastorm constantly stays in tune with the demands of its users so it can provide powerful, easy-to-use, and affordable software. Through its marketing efforts, ProComm Plus has become one of the world's best-selling communications software.

Target Markets

ProComm Plus is geared to meet the needs of anyone with a PC and a modem. It is capable of allowing the most advanced PC users to operate with ease, but yet educate a novice and have it functioning in a short amount of time. ProComm Plus' users consist of corporate managers, bank tellers, insurance agents, and users at home accessing on-line services.

Market Position

In the crowded asynchronous communications software market, Datastorm claims 60%, while DCA captures 25% with more than 1 million products installed.

Major Competitors

Datastorm receives much of its head-to-head competition from Digital Communications Assoc. (DCA). DCA's entry in the low-end market is Crosstalk XVI, which is ProComm Plus' equivalent. Datastorm lacks some features available with other packages on the market, but still maintains high functionality while carrying a low price tag of only \$119.

Microcom Software Division became another major player due to acquisitions by Microcom, of Meridian Technology and Relay Communications, both of which already enjoyed a good deal of success in the asynchronous communications market. The company's main products are Relay Gold and Carbon Copy Plus, a high-end asynchronous communications package and remote control program, respectively.

Sales and Distribution Strategy

Sales

Datastorm sells direct and also through distribution channels.

Distribution

Datastorm claims that its distribution strategy has been successful with approximately 85% of its sales through the distribution channels.

Support

Datastorm's support is adequate but limited. Datastorm does not offer on-site technical support to its users and is the only service provider.

Policies and Programs

Warranty

Magnetic media and documentation are express warranties made for 60 days from the date the software is delivered and are valid for one year.

Support Services

Datastorm offers technical phone support to its customers. Support services are also available on the CompuServe Forum (BBS).

Service Providers

Datastorm is the only service provider. It does not have third-party service providers.

Service Locations

Datastorm does not offer support at a user's site.

Service Hours

Technical support is available Monday through Friday from 9 a.m. to 5 p.m. Central time at (314) 875-0530.

Documentation

Documentation is included with the purchase of ProComm Plus.

Upgrade Policies

Contact a Datastorm representative directly.

Competitors' Programs

All the asynchronous programs that are competitive with ProComm Plus provide, for the most part, related policies and programs. However, Microcom's Relay Gold provides easier upgrading or changes to its software packages with

Competitive Features

	ProComm Plus 2.01	Crosstalk Mk.4 2.0	Smartcom Exec	Smartcom EZ 2.0	HyperAC-CESS/5 1.1	Relay Gold 5.0
Communications Supported	PC-to-host, PC-to-PC, PC-to-information service	PC-to-host, PC-to-PC, PC-to-information service	PC-to-host, PC-to-PC, PC-to-information service	PC-to-host, PC-to-PC, PC-to-information service	PC-to-host, PC-to-PC, PC-to-information service	PC-to-host, PC-to-PC, PC-to-information service
Terminal Emulation	TTY, Digital VT52/100/VT102/220/320; ANSI X3.64, IBM PC, Wyse 50, 75, 100; AT&T 605, 4410; TeleVideo 910, 912, 920, 922, 925, 950, 955, Heath/Zenith 19, Espirit 3, IBM 3101/3161/3270 (async)	TTY, TeleVideo, Digital VT52/100, Digital VT200, VT300, Lear Siegler, IBM 3101, IBM 3270	TTY, Digital VT52/100, ANSI	TTY, Digital VT52/100	Digital VT52/100/220/320, IBM 3101/3278, ANSI, and TTY	TTY, ANSI, Digital VT52-240, IBM 3101 Models 10 & 20, Hazeltine 1410, Adds 25, Lear Siegler ADM-5/38, Tymnet78, Prestel, Minitel/Teletel, Viatel Videotex Terminals, and IBM 3278/79
Minimum Memory Required (bytes)	19.2K	320K	400K	256K	350K	19.2K
Transmission Speed (bps)	300 to 115.2K	300 to 115.2K	300 to 115.2K	300 to 19.2K	300 to 115.6K	300 to 57.6K
File Transfer Protocols	xmodem, Kermit, ASCII, ymodem, 1K-xmodem, 1K-xmodem-G, CompuServe B Plus, ymodem-g, zmodem	xmodem, Kermit, ASCII, ymodem, DART, CROSS-TALK, zmodem, FAST, CompuServe B Plus, IND\$FILE	xmodem, CRC, Kermit, ASCII, ymodem, zmodem	xmodem	Hilgraeve's HyperProtocol, ASCII, Kermit, ymodem, ymodem batch, ymodem-G, IK-xmodem, xmodem auto, xmodem CRC, xmodem Checksum, CompuServe Quick B protocols, zmodem	xmodem, ymodem, zmodem, Kermit, CompuServe B Plus, IND\$FILE, and RELAY/transfer
User Interface	Installation program, status line, command driven, help facility, menu driven, pop-up windows, pull-down menus	Command/menu driven, windowing capability, help facility	Installation program, status line, command driven, help facility, menu driven, nested menus, mouse support, pop-up windows	Status line, command driven, help facility, menu driven, nested menus, pop-up windows	Installation program, status line, command driven, help facility, menu driven, nested menus, pop-up windows, point-and-shoot	Command driven, menu driven, supports multiple sessions, installation program, help facility, on-disk tutorial

immediate access to any upgrades or changes in software packages by dialing Microcom's BBS and downloading the changes into its own software—all available free of charge.

Microcom is also the only asynchronous communications vendor among ProComm Plus competitors to offer free 30-day trials of its software packages.

Specifications

Enhancements

ProComm Plus v2.01	Date	Description
Additional Protocols	1Q 1991	zmodem and raw ASCII (for transparent ASCII transfers). Datastorm also improved external protocol functionality.

Enhancements (Continued)

ProComm Plus v2.01	Date	Description
Additional Terminal Emulation	1Q 1991	New terminal emulations have been added to the list. Now there are 33 terminal emulations available instead of the previous 16. Emulations available include Digital VT100, Wyse 75, Digital VT220, Digital VT320, TeleVideo 912, TeleVideo 922, Data General D100, Data General D200, Data General D210, IBM PC, IBM 3161, Lear Siegler ADM 31, Espirit 3, ADDS Viewpoint 90, AT&T 605, and AT&T 4410.
Script Language	1Q 1991	The ASPECT script language has received nearly 100 new commands, and ASPECT scripts are now compiled for faster execution, greater security, and smaller size.
Dialing Directory	1Q 1991	The Dialing Directory supports all baud rates. It also now offers several new commands including <i>Add</i> , <i>Sort</i> , and <i>Jot</i> .
132-Column Support	1Q 1991	Full 132-column support (both hardware and software) has been added, and EGA/VGA systems can display extra lines throughout the entire program. It is now possible to toggle between several different video modes within the program. It also supports scrolling 132-column emulation.
Enhanced Host Mode	1Q 1991	Users can now add their own custom screen, menus, and file listings.
Filename Clipboard	1Q 1991	This enhancement can cut filenames directly from a BBS listing or directory and then paste the filenames to the remote computer for downloading.
Keyboard Macros	1Q 1991	The keyboard macros used in the previous version have been replaced with Meta keys. Meta keys not only send text strings, they can run external programs and ASPECT scripts—all with a single keystroke.
Mouse Support	1Q 1991	Full Microsoft-compatible mouse support is now available through ProComm Plus. ProComm Plus allows the user to use the mouse throughout the program including the pull-down menus, the redisplay buffer, and the Help facility.

Features/Functions

ProComm Plus v2.01	Description
Communications Supported	PC-to-host, PC-to-PC, PC-to-information service
Terminal Emulation	33
Minimum Memory Required (bytes)	19.2K
Transmission Speed (bps)	300 to 115.2K
File Transfer Protocols	xmodem, Kermit, ASCII, ymodem, Sealink, Telink, Modem 7, zmodem
User Interface	Installation program, status line, command driven, help facility, menu driven, pop-up windows

Pricing

ProComm Plus

	Base Price (\$)
ProComm Plus (single user)	119
ProComm Plus (five-user network version)	595
First-Level licensing agreement	55

David Systems Local Area Network Products



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Product Summary

Editor's Note

David Systems is one of the companies that has carved out a niche for itself in the rapidly expanding 10BASE-T market.

Description

A line of adapter cards, MAUs, hubs, and concentrators for 10BASE-T Ethernet networking.

Strengths

Two 10BASE-T product lines—ExpressNet and entry-level VolksNet. ExpressNet is centered on modular hubs and concentrators. Highly functional, graphics-based network management software.

Limitations

Slightly higher prices than competitor's similar lines.

Competition

Standard Microsystems, NetWorth, Hewlett-Packard.

Vendor

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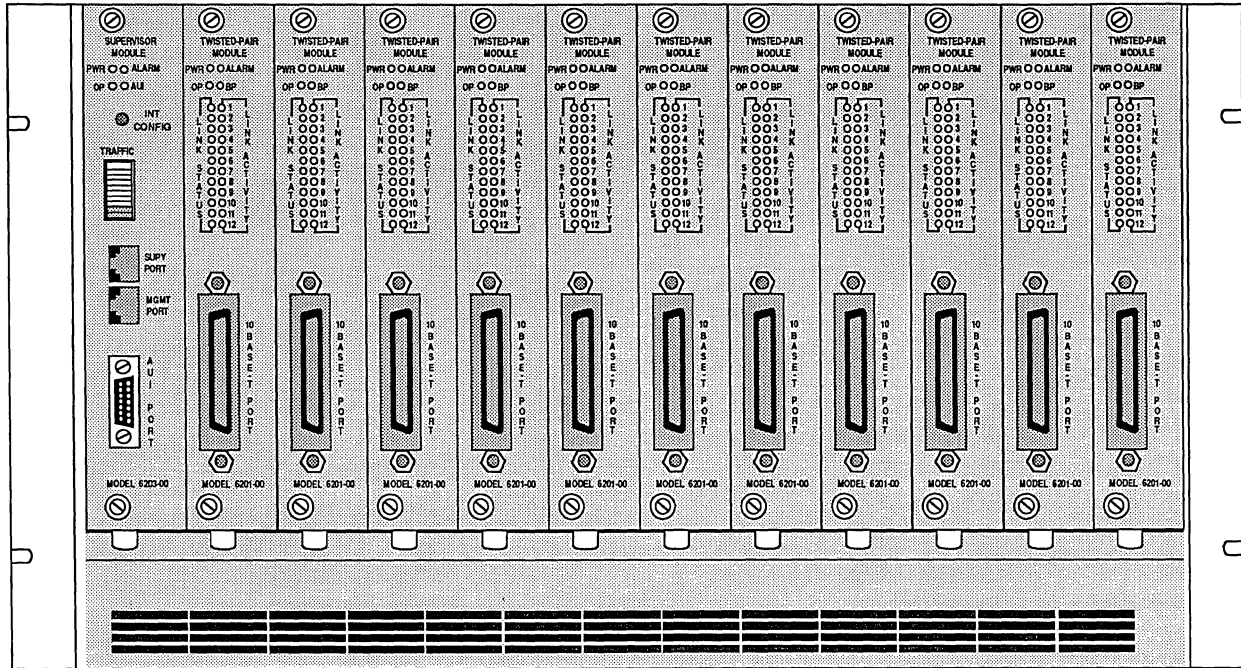
Price

Ether-T adapter cards start at \$350. ExpressNet 12-slot concentrator starts at \$1,500.

GSA Schedule

Yes.

Figure 1.
David ExpressNet 12-Slot Concentrator



This illustration depicts the front panel of a fully loaded 12-slot concentrator. On the extreme left is the Supervisor module. Each of the 11 twisted-pair modules includes 12 ports for a total of 132 10BASE-T connections. The figure shows the configuration of Link Status and Link Activity LEDs for each of the 12 ports, and the 50-pin Amphenol connector for attachment to standard telephone wiring systems.

Analysis

Product Strategy

David Systems has quickly become a force in the burgeoning 10BASE-T market. David has been a manufacturer of data communications products since 1982. In 1984, David Systems introduced the David Information Manager, a unique add-on device that transformed a conventional voice-only PBX or Centrex telephone system into an integrated voice/data system. David experienced a good degree of success with this product and signed distribution agreements with several telephone service providers and equipment manufacturers, including Ameritech in the U.S., Alcatel in France,

and Sharp in Japan. The interest of potential customers, however, has become focused on separate systems for voice and data, so David's entry into the 10BASE-T market is especially timely.

David introduced its ExpressNet product line in 1988 and has continued to enhance the capabilities of this system, most recently by adding network management software. Also under the ExpressNet umbrella are David's fiber optic hubs and MAUs, that allow interconnection of unshielded twisted-pair and fiber optic LAN segments. In early 1990, David introduced its entry-level VolksNet 10BASE-T system, optimized for smaller workgroups of from 6 to 40 users.

The latest additions to the ExpressNet product line underscore David's determination to offer a full array of 10BASE-T solutions. Two models of a local bridge, dubbed the ExpressWay 6215 and 6216, and based on the Motorola 68000 processor, were announced in late 1990. Both models feature intelligent packet filtering and address learning capabilities. The ExpressWay 6216 uses the IEEE 802.1 Spanning Tree Protocol, which allows redundant paths with some bridges in a "standby" mode to provide backup in case a bridge fails. The 6216

Company Profile David Systems, Inc.

Corporate Headquarters

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Officers

President/CEO: Henry R.
Nothhaft

*V.P. of Finance and Ad-
ministration:* Phillip Mc-
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V.P. of Operations:
George Carr

Company Background

Year Founded: 1982

No. Employees: 140

Installed Base: Approxi-
mately 150,000 local area
network ports and 1,100
Information Manager sys-
tems worldwide.

Business Overview

David Systems has pro-
duced an integrated voice

and data communications
system called Information
Manager since 1984, and
local area networking
products compatible with
the IEEE 802.3 10BASE-T
specification in its Ex-
pressNet and VolksNet
product line since late
1988.

Financial Profile

David Systems is a pri-
vately held corporation
and does not disclose
financial information.
Capital has been contrib-
uted by major venture
firms including Sequoia
Capital; Technology Ven-
ture Investors; Burr,
Egan, DeLeage and Com-
pany; and Institutional
Venture Partners. Amer-
itech, Sharp Corp., and
PaineWebber are among

the major corporate in-
vestors in David Systems.

Management Statement

*"David Systems' corpo-
rate mission is to be the
market leader in supplying
products and software that
provide smart wiring sys-
tems and network man-
agement for local area
networks (LANs). This in-
cludes intelligent interac-
tion between LANs, public
switched networks, and
other wide area network
(WAN) offerings. We will
maintain our technology
and price leadership in all
our product lines and con-
tinue to deliver enhanced
voice and LAN features for
Centrex users."*

also includes an SNMP agent to facilitate control of the bridge using the ExpressView network management software.

David has announced plans to further broaden its 10BASE-T line by adding remote bridge and router hardware and software for 10BASE-T LAN-to-WAN connectivity over the public telephone network, X.25 public data networks, and T1 private line data circuits. David also plans to introduce adapter cards for laptops and for the Apple Macintosh, as well as a line of token-ring networking products.

Competitive Position

David Systems is as well positioned as any of the competition to take advantage of the rapid growth of 10BASE-T Ethernet. David is pursuing a two-tiered strategy, one level of which provides a full-featured 10BASE-T system including smart hubs, modular concentrators, fiber optic connectivity, and SNMP network management software, while the other level provides a very basic, low-cost, entry system.

10BASE-T has attracted many companies that, like David, have built their business on other connectivity solutions. Standard Microsystems, for example, which has dominated the Arcnet market for some time, has recently made a strong entry into the 10BASE-T market with a complete product line.

The basis of 10BASE-T is the central hub or concentrator that ties together the arms of the star topology and provides important network management functions. Adapter cards are relatively simple devices that must comply with the standard in order to achieve interoperability. Given these facts, differences between hubs or concentrators, and by extension, the network management software that works with them, are likely to be the driving force behind buying decisions in the 10BASE-T arena. David's concentrators feature a modular construction that should allow easy upgrades when improved hubs become available, or even mixing and matching of various types of hubs. Still, a fully loaded David ExpressNet 5-Slot Intelligent Concentrator which provides 48 10BASE-T connections costs nearly \$2,500 more than the six

Standard Microsystems SMC3508TP hubs required to provide the same functionality.

Curt Wheeling, David Systems' vice president of marketing, points out that since each SMC hub contains a repeater, it is not possible to cascade enough of them to achieve the kind of large-scale concentration that David's products supply. Wheeling also points out that the SMC hubs do not support SNMP network management. "It's our goal to be the price/performance leader," Wheeling says, "and I think we've achieved that goal."

Decision Points

David Systems is a well-established company that has experienced continued success in a well-defined segment of the data communications market. Its introduction and subsequent expansion of its ExpressNet 10BASE-T line have been impressive in all respects. The design of this system exhibits true modularity at every level. ExpressNet hubs can be mounted individually in their own cases, or ganged together in a 5- or 12-slot concentrator. The hubs also feature 50-pin Amphenol connectors that make direct attachment to Type 66 telephone connecting blocks a simple matter. David's ExpressView network management software, with its mouse-driven Windows 3.0 user interface, is a model of ease-of-use, as well as of graphical detail.

As previously noted, some of David's products are slightly higher priced than some of the competition. Even so, the strong design features of the David product line are the primary point of interest for users with the requirement for this kind of full-featured functionality in 10BASE-T connectivity. We believe David Systems will have much success with this product line.



Characteristics

Model: ExpressNet Twisted-Pair LAN.

Date of Announcement: October 1988.

Date First Installed: October 1988.

Number Installed: Approximately 150,000 nodes.

Distribution: Systems integrators, value-added resellers, distributors, and OEMs.

Architecture

David Systems builds hardware for the IEEE 802.3 standard 10BASE-T subsection that describes Ethernet on unshielded twisted pair. Ethernet uses a carrier sense multiple access (CSMA) scheme to manage transmission on the network media. This means that to gain the right to transmit data, individual workstations must "listen" to the network. If the station detects an idle line, it goes ahead with its transmission. If it detects the presence of traffic instead, it defers its transmission for a random time period before listening again. Because two stations can detect a clear line and begin transmission at exactly the same time, collisions that destroy both transmissions occur. In this case, both stations stop transmitting and each waits for a random time period before attempting to transmit again.

The 10BASE-T subsection of the IEEE 802.3 standard describes this CSMA transmission scheme on a star-based topology, using central wiring centers variously referred to as hubs, concentrators, or multistation access units (MAUs). The use of such devices, which possess a degree of intelligence, in a star topology, eases the difficulties network administrators experienced in troubleshooting the original coaxial cable, bus-based Ethernet.

Hardware

Network Interface Cards

Ether-T PC Adapter is an 8-bit card for the IBM PC XT bus. It features 40K of onboard RAM and LEDs that indicate link and collision status and receive and transmit

activity. RJ45 and AUI connectors are provided for 10BASE-T and general Ethernet connection, respectively.

Ether-T AT Adapter is designed for the 16-bit IBM PC AT bus and includes 64K of onboard RAM. It has 8 hardware-selectable I/O addresses, and 11 hardware interrupts. RJ45 for 10BASE-T and AUI connectors are provided. The card has four LEDs that indicate link and collision status and receive and transmit activity.

Ether-T PC/AT Adapter works with either 8-bit XT or 16-bit AT IBM PC buses. It includes 64K of onboard RAM, 8 hardware-selectable I/O addresses, and 11 hardware interrupts. RJ45 for 10BASE-T and AUI connectors are provided. LEDs for link and collision status and receive and transmit activity are provided.

Ether-T MC Adapter is for the Micro Channel Architecture bus used in IBM PS/2 Model 50 and above. Its nine I/O address options can be configured via software using the PS/2's Programmable Option Select (POS) feature.

Hubs/Concentrators

ExpressNet Twisted-Pair Hub is a 12-port device that acts as the central point in the star topology of a 10BASE-T network. The Twisted-Pair Hub uses the same module as the 5- and 12-port concentrators described below. This commonality of modules allows users to start with hubs and later grow into concentrators while protecting their investment.

Twisted-Pair Module is a plug-in module identical to the card used in the ExpressNet Twisted-Pair Hub and is used in either of the concentrators described below.

ExpressNet 5-Slot Intelligent Concentrator is a five-slot enclosure that holds four twisted-pair modules and one Supervisor module, providing up to 48 unshielded twisted-pair network connections. The leftmost card slot is dedicated to use by the Supervisor module, while the other four slots can be used for twisted-pair modules or other plug-in modules. Individual modules can be removed and replaced while the network is up without disturbing the operation of the other modules.

ExpressNet 12-Slot Intelligent Concentrator is similar in all respects to the 5-slot model described above, but supports 11 twisted-pair modules for a total of 132 unshielded twisted-pair network connections.

Supervisor Module is the controller card for the Intelligent Concentrator products described above. It provides network management access to the concentrator and its associated LAN segments through its management port. This management port supports both ASCII and ANSI-compatible terminals. Connecting a modem to the management port allows remote access to network

management functions. The management port is an out-of-band channel, so that network management functions can continue even if the network is down. An indication of the network traffic as seen from the concentrator is given by a traffic monitor LED display graduated on a logarithmic scale. The Supervisor module also allows connection to other concentrators and other types of 802.3 LAN cabling (coax or fiber) through its AUI port.

Supervisor ICM is a daughterboard for use with the Supervisor module described above. The Inband Communications Module (ICM) provides inband signaling for network management applications such as David ExpressView. An SNMP agent, implemented in firmware, allows the concentrator to deliver a Management Information Base (MIB) to a network management station.

ExpressNet TP-MAU connects any IEEE 802.3 device to an unshielded twisted-pair wiring system. It includes a 15-pin AUI connector and an RJ45 modular connector. The TP-MAU has diagnostic LEDs that indicate link status, power, transmit, receive, collision, and SQE "heartbeat." The SQE signal can be disabled by an external switch.

ExpressNet BNC MAU is similar to the TP-MAU described above but connects thin coaxial Ethernet segments to 10BASE-T twisted pair. It is equipped with a BNC connector for thin coax and an RJ45 modular connector.

ExpressNet Fiber Optic Hub provides four fiber optic links using ST connectors, and four twisted-pair ports. An AUI port allows connection to coaxial cable Ethernet segments, and a network management port provides out-of-band signaling for management and control. Fiber optic transmission distances of up to 1,000 meters (3,280 feet) are permitted. The ExpressNet Fiber Optic Hub also contains a retiming repeater making it possible to interconnect many hubs to form larger networks.

ExpressNet Fiber Optic MAU is a unit that connects any standard Ethernet card, through its AUI port, to a fiber optic LAN segment using ST-type connectors.

VolksNet Hub is the central element of an entry-level 10BASE-T LAN and works with David's Ether-T series of adapter cards as well as cards from other manufacturers. Adapter cards without RJ45 connectors can be attached using the AUI interface and a David TP-MAU. The VolksNet Hub is supplied with a 50-pin Amphenol connector for direct attachment to type 66 punchdown telephone wiring blocks. David's Type E adapter plugs into the Amphenol connector to provide 12 RJ45 connections for unshielded twisted-pair wiring.

Additional Hardware Products

ExpressWay 6215 Local Bridge is a two-channel, IEEE 802.3 MAC layer bridge based on the Motorola 68000 microprocessor running at 12MHz. It features intelligent address learning and filtering capabilities. Address tables for each segment are compiled by the bridge from examination of network traffic. The 6215 can be configured for use with either thick or thin Ethernet coaxial cabling, and each of its two channels has both an AUI and a BNC connector. The 6215 filters packets at a rate of 12,000 frames per second, and forwards at 8,400 frames per second. The 6215 is expected to ship in the first quarter of 1991.

ExpressWay 6216 Local Bridge is similar in all respects to the 6215 Local Bridge described above, but also features the IEEE 802.1 Spanning Tree Protocol that allows backup paths to be implemented in bridged networks. The 6216 also contains an SNMP agent for reporting network management information to an SNMP network management station such as David's ExpressView. The 6216's SNMP agent delivers traffic logs and information on bridge status and allows remote configuration of the bridge's mode of operation. The 6216 is expected to be available in the second quarter of 1991.

Pair Scanner is a handheld cable testing device OEM'ed from Microtest. It features a 32-character LCD display that reports problems in easy-to-interpret English phrases. It is capable of isolating wiring breaks, shorts, faulty terminators or connectors, and problems with other LAN devices such as MAUs. DB loss calculation, time domain reflectometry, and hub activation and testing circuitry are some of the advanced functions included. The Pair Scanner can be programmed to find intermittent faults and includes a PC program disk that extends its functionality. It can also be operated remotely through any Hayes-compatible modem. RJ45 and BNC connectors are provided for connection to popular LAN wiring schemes.

Software

ExpressView Network Management uses the industry-standard Simple Network Management Protocol (SNMP) to report on and control workstations, concentrators, bridges, routers, and other network devices using inband signaling. ExpressView can manage up to 20 concentrators or other devices, including 1,024 ports concurrently. Running under Microsoft Windows 3.0 on an 80386 or higher, ExpressView provides the network administrator with a detailed graphical depiction of the network as a whole, and of individual concentrators. Point-and-click mouse operations bring up increasingly detailed levels of information about network components. ExpressView supports the Internet Activities Board (IAB) Management Information Base (MIB) I (RFC 1156) and II (RFC 1158). Managed systems must have

an SNMP agent conforming to RFC 1157. ExpressView requires at least 4M bytes of RAM, 20M bytes of hard disk space, and a VGA card and VGA monitor. A mouse is required.

Support

David Systems provides a technical support line for its resellers and dealers which is in operation from 8 a.m. to 5 p.m. Pacific time.

Installation

Installation is provided by resellers.

Training

David offers 2 one-day classes that are open to resellers and users. The first provides a general introduction to 10BASE-T principles. The second focuses on the specifics of David's products. Classes are held regularly at David's Sunnyvale headquarters. Arrangements can also be made for classes to be held at a customer's location.

Warranty

David Systems provides a two-year warranty on all of its products except the Pair Scanner cable tester, which carries a one-year warranty.

Maintenance

Maintenance is provided by dealers or resellers. Replacement of a defective product is normally from dealer's stock, but the company can provide 24-hour drop shipping in exceptional cases.

Equipment Prices

6500-00	Ether-T PC Adapter	350
6501-00	Ether-T AT Adapter	445
6502-00	Ether-T MC Adapter	460
6503-00	Ether-T PC/AT Adapter	350
6102-00	ExpressNet 5-Slot Intelligent Concentrator	1,200
6103-00	ExpressNet 12-Slot Intelligent Concentrator	1,500
6203-00	Supervisor Module	1,500
6204-00	Supervisor ICM	795
6201-00	Twisted-Pair Module	1,700
6206-00	ExpressNet Twisted-Pair Hub	1,795
6602-00	ExpressNet Fiber Optic Hub	1,780
6209-00	ExpressNet Twisted-Pair MAU	149
6211-00	ExpressNet BNC MAU	495
6603-00	ExpressNet Fiber Optic MAU	450
6250-00	VolksNet Hub	1,199
6215-00	ExpressWay Local Bridge	2,775
6216-00	Expressway Local Bridge with Spanning Tree Protocol and SNMP	3,075
6116-00	Pair Scanner Kit	2,495
6400-00	ExpressView Network Management Software	1,495

DCA Personal Computer Communications Products

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Note: DCA has expanded its various product lines in an attempt to reduce its reliance on its IRMA products, whose market share for terminal emulation decreased in fiscal 1991.

Digital Communications Assoc. (DCA) is a data and voice communications company. It maintains its position as the market leader in terminal emulation products; however, that lead has narrowed as competition increases and the market for terminal emulation product shrinks. Its product line ranges from micro-to-mainframe communications to PC connectivity.

Strengths

- Supports a diverse mix of desktop operating system environments, connectivity methods, and multiple LAN protocols
- Provides cross-platform, heterogeneous connectivity products
- Excellent support facilities

Limitations

- DCA's IRMA products for coaxial terminal emulation provide a technology whose market demand continues to decline.

Competition

AST Research, Avatar, Novell.

Vendor

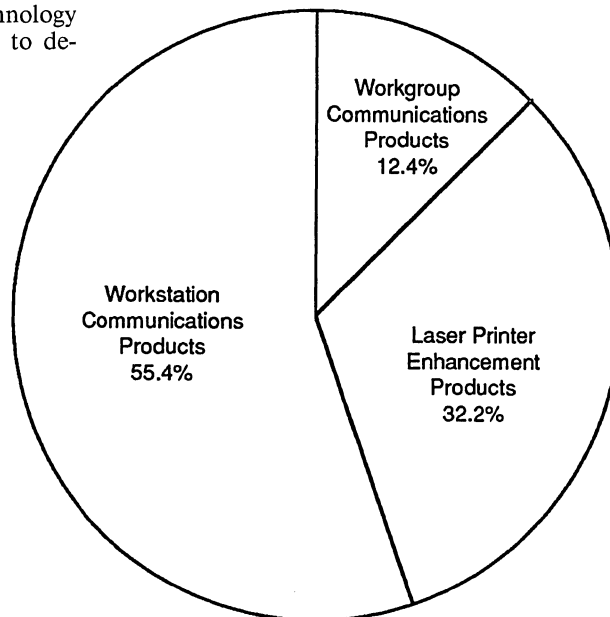
Digital Communications Assoc. (DCA), Inc.
 1000 Alderman Drive
 Alpharetta, GA 30201
 (404) 442-4000

In Canada:

DCA
 Suite 1500, 5650 Yong Street
 North York, ON M4M 4G3
 (416) 226-6166

Price

IRMA products range in price from \$295 for MacIRMA WorkStation Software to \$7,495 for IRMALAN/EP SNA GW/128 CU. **GSA Schedule: Yes.**



Percentage of DCA fiscal 1991 revenue.

—By Donna Horsley
Staff Writer

Product Analysis

DCA's workstation communications product lines include the PC communication family of products, which link individual IBM or compatible PCs to IBM or compatible mainframe computers through SNA networks in local or remote environments. Such hardware and software products include IRMA 2, IRMA 3 Convertible, E78 Plus, E78 Plus for OS/2, Windowlink for IRMA, IRMA WorkStation for Windows, IRMAremote, APA Graphics for DOS, and IRMAX. These products provide users of PCs using DOS, Windows, or OS/2 with connectivity to IBM hosts in control unit terminal (CUT), distributed function terminal (DFT), or graphics terminal modes.

The workstation communications products also include PC-to-mainframe file transfer products, such as FT/Express, and the MacIRMA family of Macintosh-to-IBM mainframe communications products. The latter products include MacIRMA Entry Emulator, MacIRMA Graphics, MacIRMA API, and MacIRMA WorkStation.

DCA's workgroup communications products offer users the benefits of a LAN—allowing easy file sharing, printers, and other resources—and provide a more cost-effective mainframe link than workstation communications products. The company's workgroup communications products include the IRMALAN and Select product lines.

The IRMALAN product line allows DOS PCs on a LAN to communicate with IBM hosts through a combination of gateway and workstation products. IRMALAN products support all major LANs on the market, including Novell, 3Com, and IBM.

The Select product family, a joint development effort with Microsoft Corp. for SNA communications in the OS/2 environment, offers enhanced host communications capabilities to PCs on LANs based on the OS/2 LAN Manager platform. These products allow a user to access concurrent sessions on one or more host and peer computers, running on any OS/2 Standard Edition system Version 1.2 or higher. Select Communications products support existing communications boards, coaxial cables, and controllers and provide APPC over all SNA links including coax.

DCA's workgroup communications products also include gateway products for the Apple Macintosh. MacIRMAtrac adapter represents DCA's entry in the token-ring market. The MacIRMALAN Gateway Servers are hardware and software products that merge Apple networks with IBM mainframe resources.

Target Applications

DCA's PC communications products are targeted towards workstation and LAN administrators. The products are intended for business departmental 3270 emulation, such as sales and inventory informations, in DOS, OS/2, Macintosh, and Windows environments.

Overview

Workstation Communications Products

Model	IRMA 2	IRMA 3 Convertible	E78 Plus	Windowlink for IRMA
Date Announced	June 1987	April 1989	January 1988	June 1987
Date Released	—	—	January 1988	—
Base Price (\$)	1,195	695	395	295
Configuration	Hardware/software	Hardware	Software	Software
Microcomputers Supported	IBM PC/XT/AT, PS/2 Model 30, Compaq, or compatibles for IBM 2-PCA; IBM PS/2 Models supporting the Micro Channel Architecture expansion bus or compatible systems for IRMA 2-MCA	IBM PC/XT/AT, PS/2 Model 30, Compaq, or compatibles for IBM 2-PCA; IBM PS/2 Models supporting the Micro Channel Architecture expansion bus or compatible systems for IRMA 2-MCA	IBM PC/XT/AT, PS/2 Model 30, or compatible, or IBM PS/2 Model 50, 60, 70, or 80	IBM PC AT, PS/2, Compaq, or compatible
Operating Systems Supported	MS-DOS Version 2.1 or later, OS/2 Standard Edition Version 1.1, or Extended Edition Version 1.1	PC-DOS or MS-DOS Version 3.1 or newer; DOS Version 3.3 or newer required for CECP and code page switching	MS-DOS or IBM PC-DOS Version 2.0 or newer; Version 3.3 or newer is required for Windows 3.0	MS Windows Version 2.0 or newer, including 3.0; or Windows/386, Version 2.11 or newer; MS-DOS or IBM PC-DOS Version 2.0 or newer; Version 3.3 or newer required for Windows 3.0
Model	IRMA WorkStation for Windows	APA Graphics for DOS	IRMAX DFT	MacIRMA Entry Emulator
Date Announced	June 1990	July 1988	June 1988	November 1990
Date Released	—	—	—	November 1990

Overview (Continued)

Model	IRMA WorkStation for Windows	APA Graphics for DOS	IRMAX DFT	MacIRMA Entry Emulator
Base Price (\$)	495	495	395	1,195
Configuration	Software	Software	Software	Hardware/software
Microcomputers Supported	Compaq 286/386, IBM PC AT, PS/2, or compatible	IBM PC/XT/AT, PS/2 Models 30/50/60/70/80, or compatible	IBM APA graphics devices	Macintosh II, IIx, IIcx, IIci, and IIfx, Macintosh SE or Macintosh SE/30 with at least one available expansion slot and one 800K diskette drive
Operating Systems Supported	MS Windows 3.0, MS-DOS, PC-DOS, or MS-DOS as published by Compaq	IBM PC-DOS Version 3.1, 3.2, or 3.3; MS-DOS Version 3.1, 3.2, or 3.3	IBM PC-DOS Versions 3.1 and newer; MS-DOS Versions 3.1 and newer	Macintosh Operating System Finder Version 5.5 or newer; System Version 4.1 or newer; Multifinder Version 1.0 or newer

Model	MacIRMA Graphics	DCA/Microsoft Select Communications Workstation	MacIRMA WorkStation	IRMAremote SNA
Date Announced	December 1988	April 1990	July 1987	—
Date Released	—	April 1990	November 1987	—
Base Price (\$)	195	495	295	495
Configuration	Software	Software	Software	Software
Microcomputers Supported	Macintosh SE, SE/30, II, IIcx, IIci, IIcx, IIci, IIfx	IBM PS/2, PC AT, Compaq 286/386/486, or compatible	Macintosh II/IIx/IIcx/IIci/IIfx; Macintosh SE or Macintosh SE/30	IBM PC/XT/AT, PS/2
Operating Systems Supported	Macintosh operating system Version 6.0 or newer; Finder or Multi-Finder Version 6.0 or newer	VM/CMS, MNS/TSO, CICS	VM/CMS, MNS/TSO, CICS	IBM PC-DOS Version 2.1 or 3.2 and later, MS-DOS Version 2.11 or newer

Workgroup Communications Products

Model	DCA/Microsoft Select Communications Server	IRMALAN/EP	IRMALAN Standalone Workstation
Date Announced	March 1988	April 1991	August 1986
Date Released	September 1990	April 1991	—
Base Price (\$)	2,995 (8 concurrent users); 5,995 (32 concurrent users)	1,495	395
Configuration	Software/8 CU	Software/8 CU	Software
Microcomputers Supported	Server: OS/2-compatible PC; Clients: IBM PC/XT/AT, PS/2, Compaq, or compatible	IBM PC/XT/AT, PS/2 Models 30 through 80, Compaq, or most IBM compatibles	IBM PC/XT/AT, PS/2 Models 30 through 80, Compaq, or most IBM compatibles
Operating Systems Supported	Server: OS/2 1.21 or later; Client: MS-DOS, PC-DOS 3.2 or later; Windows 3.0 or later; OS/2 1.21 or later	MS-DOS, PC-DOS 3.1 or later	DOS Version 3.1 or newer; for IBM PS/2 or IBM Local Area Network Support Program Version 1.0 or newer, use DOS Version 3.3 or newer

Model	IRMAtrac Token-Ring Adapter/Convertible	MacIRMALAN	Intelligent Synchronous Communications Server
Date Announced	March 1990	January 1990	—
Date Released	September 1990	—	—
Base Price (\$)	795	1,495	995
Configuration	Hardware/4M bps	Software/8 CU	Hardware
Microcomputers Supported	IBM PC/XT/AT, PS/2 Model 30; Compaq 8088/286/386/486	IBM PC/XT/AT, PS/2 Model 30; Compaq 8088/286/386/486	—
Operating Systems Supported	Novell NetWare 286/386, IBM PC Network Program, Microsoft LAN Manager, and 3Com 3+ Open	Novell NetWare 286/386, IBM PC Network Program, Microsoft LAN Manager, and 3Com 3+ Open	—

Decision Points

DCA Workstation and Workgroup Products

Requirements	Performance
Multiplatform Support	Supports DOS, OS/2, and Windows operating systems
Protocol Support	Supports IBM NETBIOS, Novell NetWare IPX/SPX, Microsoft LAN Manager over TCP/IP, and Apple Macintosh AppleTalk protocols
Product Support	Provides comprehensive support policies and programs for domestic and foreign clients. Users are particularly well served by its training facility in Alpharetta, GA. DCA has a network of trained technicians located in branch offices throughout the U.S. and internationally who provide timely support, and, when necessary, on-site service.

Strengths

Much of DCA's continued success in the PC communications market comes from a capability to foresee and respond to emerging market demands while protecting the past investments of its users with comprehensive and reliable support programs and policies.

Today, in response to the market demand for true heterogeneous products, DCA is working with technologies such as OS/2, Micro Channel Architecture (MCA), Windows, and LAN operating systems to provide products that support a diverse mix of desktop operating system environments, connectivity methods, and multiple LAN protocols.

IRMA WorkStation for Windows, for example, provides full Windows 3.0 applications and a full set of connectivity and emulation options in one package. In November 1991, DCA announced an enhanced version that includes a 3270 terminal emulation configuration procedure that automatically identifies the type of communications adapter in a PC for easy installation. In addition to the variety of IBM 3270 terminal emulation functions, IRMA WorkStation for Windows provides IBM 3270 printer emulation, async terminal emulation (such as Digital VT100), file transfer, APPC, and supports HLLAPI. It also provides choices of CUT coax, DFT coax, remote SNA/SDLC, token-ring (802.2 SNA/TIC) connections to an IBM mainframe, and asynchronous connection to an async ASCII host (such as a Digital VAX).

DCA provides products for the current LAN environment, where a mixture of workstation and LAN products revolves around industry standards such as NETBIOS, AppleTalk, IEEE 802.2 and 802.3, and TCP/IP, as well as products that provide smooth integration into new technologies, such as OS/2 and LAN Manager.

DCA's IRMALAN gateway server products are available in either a NETBIOS or Novell IPX/SPX version and contain either an 802.2, an SDLC or a DFT gateway, Client Workstation software, 3278 Printer Workstation Software, and file transfer software.

Limitations

DCA is experiencing decreasing market demand for its IRMA coaxial terminal emulation products, specifically its adapter hardware products, as a result of increased competition and a U.S. market downturn for terminal emulation products. The company has responded by expanding its product offerings in the workgroup communications arena. Last year, for example, DCA's GrandLAN Plan represented its most aggressive marketing program. Its purpose was to establish DCA as a leading player in the

token-ring marketplace through the promotion of the IRMAtrac and MacIRMAtrac adapter products. It is yet to be seen whether or not such LAN product offerings—no matter how impressive or how aggressively marketed—can carry DCA financially.

Vendor Analysis

Product Strategy

Throughout the 1980s IRMA terminal emulation hardware products provided much of the fuel for DCA's growth and contributed a large portion of DCA revenue and gross product. The 1990s, however, may prove less fruitful for IRMA.

In fiscal 1991, DCA experienced a steep sales decline in IRMA terminal emulation adapter hardware products because of increased competition as well as a U.S. market downturn for terminal emulation products. In response, DCA is trying to make its workstation communications product line more competitive, while also expanding its offerings in the workgroup communications arena.

DCA, which held a 30% market share for mainframe connectivity products in 1990, has begun shipping new communications products for several important markets. First was the DCA/Microsoft Select Communications Server, to establish DCA's position in client/server networking. Next, it began shipping IRMA WorkStation for Windows to capitalize on the popularity of the Microsoft Windows operating environment. Third, it introduced IRMAtrac and MacIRMAtrac, so as to participate in the token-ring LAN hardware market. Also, the company began shipping IRMALAN/EP, replacing its IRMALAN Gateway Server line of products with a single, more versatile LAN-to-mainframe gateway package.

DCA's workgroup products for Macintosh-to-IBM connections provide support for industry-standard gateways such as IBM and Novell, as well as DCA's own products, and are forecasted to support all current and future LAN operating systems including LAN Manager, NetWare, and AppleShare.

Research and development expenses were 11.3% of net sales in fiscal 1991, compared to 12.6% of net sales in fiscal 1990 and 20.4% of net sales in fiscal 1989. International sales were 30.8% of net sales in fiscal 1991 compared to 23.9% of net sales in fiscal 1990.

Fiscal Year (millions of dollars)

	1991	1990	1989	1988
Net Sales	191,947	203,156	208,226	227,480
Net Income	15,416	37,423	37,423	42,216

Target Markets

In the wake of sluggish sales of IRMA terminal emulation hardware products due to increased competition and a U.S. market downturn for terminal emulation hardware products, DCA is redirecting much of its interests and energies to the workgroup communications markets, specifically the fast-growing, \$1 billion-per-year LAN hardware market. DCA intends to support industry-standard gateways such as IBM and Novell, as well as DCA's own products, and intends to support all current and future LAN operating systems including LAN Manager, NetWare, and AppleTalk.

DCA interests include targeting the Apple Macintosh market for workgroup and workstation communications. With MacIRMA, DCA established itself as the leader in the coax market for Macintosh environments. The company's present goal is to establish its MacWorkstation software as the de facto industry standard for Macintosh communications with any IBM host.

DCA interests also include the market for OS/2-based network communications. Its mainframe communications products designed for OS/2-based networks, such as Select CS, support the Microsoft LAN Manager operating system. OS/2-based networks such as LAN Manager are expected to comprise 19% of new LAN installations by 1993.

DCA is committed to the international marketplace where its products are localized for all major markets. The company's international sales represented 30.8% of DCA's total net sales in fiscal 1991.

Mergers and Acquisitions

In July 1990, DCA purchased a minority equity interest of under 20% in New York-based Helix Software Co. This

provided DCA with licenses of Helix's PC memory-management technology, which DCA has already implemented in several of its communications products for the DOS environment.

At the end of fiscal 1991, DCA sold its 10Net Communications business unit to Tiara Computer Systems Inc. As part of the transaction, DCA acquired a 10% equity interest in Tiara. 10Net's products were primarily in Ethernet hardware and peer-to-peer software LAN technologies, while DCA is focusing on token-ring and client server products such as IRMAtrac and Select CS.

Competitive Analysis**Market Position**

According to independent studies, U.S. terminal emulation hardware shipments are estimated to have totaled 458,360 units in 1990, down from 485,660 units in 1989. The downturn in this market and increasing competition have affected DCA's product sales. The company's net sales steadily dropped from \$227,480 million in 1988 to \$191,947 million for fiscal 1991.

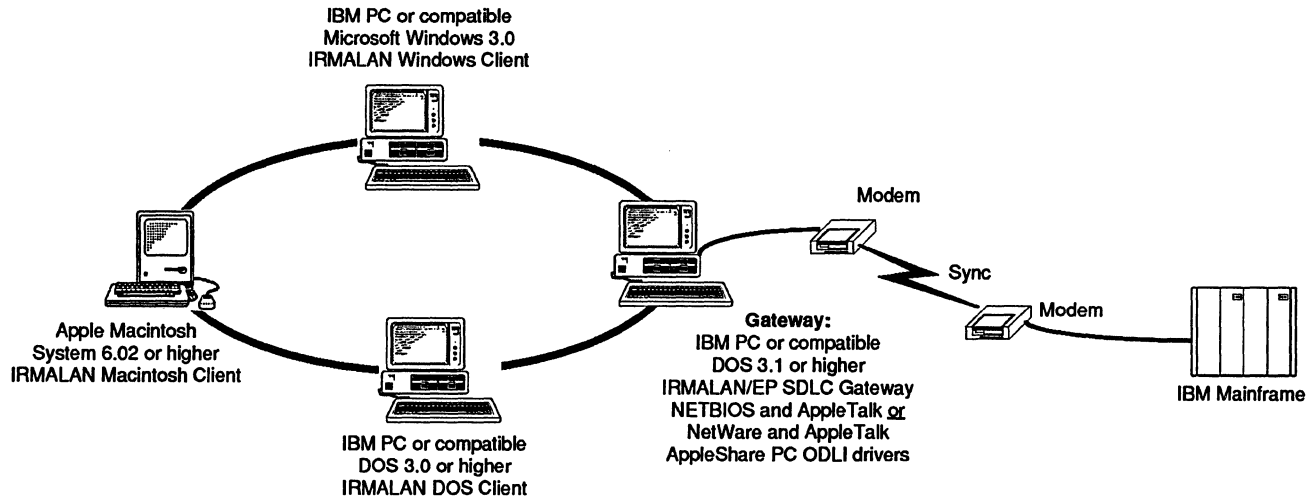
Despite sales and profit losses, DCA remains the market leader in 3270 terminal emulation. The company's 1990 market share for 3270 terminal emulation was 30.6%; it has an installed base of nearly 1 million IRMA boards worldwide. DCA estimates that its share of the coax market for the Apple Macintosh is more than 50%.

At present, DCA sees real growth potential in the workgroup communications market, specifically LAN hardware, and is intensifying its energies and interests there. The company's workgroup products represented 12.4% of DCA's fiscal 1991 revenues.

Company Activity

Date	Activity
7/90	Purchased a minority equity interest of under 20% in New York-based Helix Software Co. This provided DCA with licenses of Helix's PC memory-management technology.
9/90	Established position in client-server network with DCA/Microsoft Select Communications Server.
9/90	Established position in Microsoft Windows operating environment with the introduction of IRMA WorkStation for Windows.
9/90	Entered token-ring LAN hardware market with IRMAtrac and MacIRMAtrac.
6/91	Sold 10Net Communications business unit to Tiara Computer Systems Inc. Acquired a 10% equity interest in Tiara as part of the transaction.
10/91	Announced fiscal 1991 net income of \$15,416, down from \$37,423 in 1990.
10/91	Formed technology relationship with Digital Equipment Corp. In a multiyear agreement, the two companies will provide customized DCA products for users of Digital's Personal Computer System Architecture (PSCA).
10/91	Formed partnership with Banyan Systems, Inc. for the joint development and marketing of products integrating IBM SNA networks with Banyan VINES networking.

Figure 1.
IRMALAN/EP SDLC Gateway



IRMALAN/EP SDLC Gateway

A communications gateway for NETBIOS-compatible, NetWare and AppleTalk networks and DOS, Windows, and Macintosh workstations.

Major Competitors

As many communications vendors struggle for survival in the crowded marketplace for PC connectivity products, DCA has long enjoyed success as a market leader with its IRMA product lines. Nonetheless, some vendors offering products for niche markets are increasingly capturing market share, and often from DCA.

Take Avatar. Its inexpensive MacMainFrame Series products dominate the market for Macintosh-to-mainframe connectivity products. Avatar aggressively matches Apple Computer's growing Macintosh product line with its own family of Macintosh connectivity solutions. The company also provides connectivity products derived from joint ventures with Apple Computer.

Although Avatar's sizable niche in Macintosh connectivity is unmatched by the competition, which also includes Tri-Data, DCA's MacIRMA products are comparable in function and capability to Avatar's offerings. DCA claims its share of the coax market for the Macintosh is more than 50%.

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 interest and energies to the microcomputer marketplace, where it has seen moderate success.

Novell continues to maintain and improve its position as a top competitor in the overall micro-to-mainframe market with its NetWare products, particularly in the LAN marketplace where it is the undisputed market leader. Both its workstation and workgroup products are expansive and address all the major PC-to-mainframe product applications. In September 1991, Novell entered the market for Macintosh connectivity with NetWare 3270 LAN Workstation for Macintosh, which when used in conjunction with NetWare SAA, provides Mac clients on NetWare or other networks with 26 concurrent host display sessions.

Sales and Distribution Strategy

Sales

DCA markets its PC communications products through resellers. DCA has sales representatives in 25 offices throughout the U.S. The sales staff does not sell directly to customers; however, it is trained to sell the entire DCA product line and does assist resellers in that arena.

DCA products sold internationally are offered in 14 languages and are localized for all major markets. Of the total international sales, approximately 90% comes from the European arena. The company's European headquarters is in Geneva, Switzerland, where all sales, second-level support, beta testing coordination, and technical support are handled for Europe, Middle East, and Africa markets. In 1991, DCA opened a support facility in Singapore.

In 1991, DCA consolidated its sales operations, training, marketing support, and customer support to integrate all DCA business units as one unit.

Distribution

DCA has several national distributors handling the entire DCA product line, including the SNA products as well as the LAN and asynchronous product lines and PDP's printer management products.

In the international arena, DCA products are sold through 95 distributors in countries throughout the world. Its distribution facilities are located in Alpharetta, GA; Arcibo, Puerto Rico; San Diego, CA; and Shannon, Ireland. DCA's Shannon, Ireland facility is the distribution center for the European, Middle East, and African marketplace. Translations, packaging, and local sourcing of supplies are done from this facility. In the Asian market, DCA products are sold through distributors located in each country.

Support

Competitors' Programs

In the PC communications market, Novell provides the most comprehensive educational course training. Novell offers six categories of courses: Network User, Reseller, System Manager, Technical Support, Programming, and Computer-Based Training. Its courses are taught by Certified NetWare Instructors (CNIs) at Novell facilities located worldwide, or at the customer location.

Avatar's support services lack the extensive training programs of Novell and the comprehensiveness of DCA's support policies and programs; nevertheless, its call handling, support services, and sales support are rated satisfactory by users.

Policies and Programs

Warranty

DCA IRMA products come with a 90-day warranty on software; a 1-year warranty on hardware.

Support Services

Customer service is available through DCA's Technical Support group, which provides multilevel support across product lines and is based in Alpharetta, GA. DCA Software Maintenance Plan is a fee-based service providing installation, a toll-free technical support number, bulletin

board service access, product update notification, automatic product maintenance releases, and on-site service discounts. Technical support and on-site service, without purchase of a support agreement, are also available through the Technical Support group and a network of technicians located in branch offices throughout the U.S.

DCA has a technical support center in Singapore to service the Asian Pacific region, which includes Singapore, Hong Kong, Indonesia, Malaysia, the Philippines, Australia, New Zealand, Japan, and Korea.

Service Hours

Phone support is available free to DCA users Monday through Friday, 8 a.m. to 8 p.m. DCA users can also access DCA's bulletin board service 24 hours a day at no charge: (404) 740-8428.

Training/Education

Training courses for DCA products are held at DCA corporate headquarters in Alpharetta, GA and at the DCA facility in San Jose, CA. The training facilities have several classrooms specifically designed for training purposes as well as communications resources that allow lab exercise where participants can benefit from hands-on experience.

Fees vary with the length of training, with a price reduction given to customers who have a current maintenance agreement for a particular DCA product. On-site training classes can also be arranged.

Upgrade Policies

With the DCA Software Maintenance Plan, users are provided with the ability to upgrade to new functionality and features of products at reduced rates over non-Software Maintenance users.

Specifications

Enhancements

Feature

DCA Workstation and Workgroup Products

New Products

DS/Express is software for high-speed, multiple file transfers between unattended PCs and mainframes running in the MVS/VTAM environment; applications range from electronic enterprisewide software distribution to backing up PC files to mainframe DASD.

Select CS is OS/2 communications software enabling DOS and OS/2 PCs on LAN Manager to access and share information with mainframe and peer computers.

IRMLAN/EP is DCA's primary LAN-to-mainframe gateway software product; it supports DOS, Windows, and Macintosh workstations.

IRMAtrac and MacIRMAtrac are DCA's first venture into the LAN adapter marketplace.

Enhancements (Continued)

Feature	DCA Workstation and Workgroup Products
Improved Performance	<p>Select CS and CS take full advantage of the multitasking, multithreaded nature of OS/2, with all the speed and robustness that implies the following:</p> <p>A new Standard IRMA Script Language (SISL) significantly reduces the number of keystrokes needed to complete a task and makes complex mainframe operation transparent.</p> <p>IRMAX DFT/IRMAX Multisessions were enhanced to support IBM's OfficeVision and the Lotus-Intel-Microsoft/Expanded Memory Specification (LIM/EMS0), enabling users to take advantage of expanded memory. The new versions provide 15K bps to 20K bps less memory per configuration than the previous version of IRMAX. When used in conjunction with LIM-EMS 4.0, users can off-load emulation—up to 128K bps—into expanded memory which can then be used with other EMS applications.</p> <p>The IRMAtrac family of token-ring LAN adapters was broadened to include a 4M bps version, believed to be the only 4M bps token-ring network interface card that can be upgraded to 16M bps using the same adapter. It also now has a software-selectable RIM that works at 4 and 16M bps.</p>
New Features	<p>Select CS offers extensive network management and configuration capabilities. The servers and clients on the LAN can be configured and managed from any OS/2 workstation. It also supports IBM's NetView network management system, allowing the product to be brought under centralized network management control.</p> <p>Select CS offers advanced network functions that include "dynamic routing." This feature enables users on large, multiple server LANs to automatically be routed through the server that can most easily and quickly accommodate their needs. Dynamic routing also enables network administrators to set up communications services as hot backup for another's, enhancing network reliability. Using hot backup, if one server fails, workstations will automatically be rerouted in seconds through a backup server, minimizing end users' downtime.</p> <p>RamXpander, a newly added memory management feature, off-loads the 3270 emulation software while maintaining a mainframe session. When off-loading the emulator, RamXpander swaps E78 Plus from conventional memory or RAM into extended or expanded memory or onto a disk when running another DOS application. By swapping E78 Plus out of conventional memory, the amount of PC RAM available for other applications is increased.</p> <p>With IRMA Workstation for Windows DCA has incorporated its new Standard IRMA Script Language (SISL). For example, an IRMA WorkStation for Windows feature called QuickScript allows users to easily generate SISL-based scripts that automate routine tasks like logon sequences, to retrieve PROFS E-Mail, or to access a mainframe database. Keystroke sequences are recorded as scripts, saved, and later invoked with a mouse.</p> <p>IRMAX DFT Version 2.1.2 provides multiple communications sessions with an IBM mainframe that include new printing support for mainframe graphics applications. It now includes SNA Character Stream (SCS) passthrough support for local printing of mainframe graphics created with applications such as SAS System 6.0 from SAS Institute Inc., VM/RAPID from VM/CMS Unlimited Inc., and WordPerfect mainframe from WordPerfect.</p>
Improved Features	<p>IRMALAN/EP SNA Gateway has replaced IRMALAN Gateway Server line of products. It is a single, more versatile LAN-to-mainframe package supporting NETBIOS, NetWare, and AppleTalk LANs; local and remote mainframe connections; and mainframe access under the DOS, Windows, and Macintosh operating environments. Connection methods supported by the product include 802.2 token-ring, DFT, SDLC, and token-ring connection types in three separate IRMALAN gateways.</p> <p>MacIRMA API Version 1.3.1 offers LAN, DFT, and CUT connectivity in a single product to aid developers in creating custom applications for use with DCA's MacIRMA WorkStation emulation software and 3270 connectivity hardware. Previously, users had to install two separate drivers to write applications for LAN, DFT, and CUT APIs.</p>
New Options	<p>DCA has combined in a single package its MacIRMA Entry emulator software for single-session Macintosh-to-mainframe communications, its MacIRMA WorkStation software for multiple sessions, and its MacIRMA hardware—offering users the same functionality for as much as \$300 less than if they purchased the products separately.</p>

Features/Functions

Workstation Products

Model	IRMA 2	IRMA 3 Convertible	E78 Plus	Windowlink for IRMA
Minimum Memory Required	—	—	72KB for E78 Lite; 120KB for E78 Plus; 28KB for E78 or E78 Lite with RamXpander	140KB conventional memory; 175KB when using file transfer
Number of Users Supported	Single user	Single user	Single user	Single user
Terminal Emulation	IBM 3278/79	IBM 3278/79	IBM 3278/79	IBM 3278/79
User Interface	Install program; on- line, self-checking diagnostics	Install program; on- line, self-checking diagnostics	Menu-driven; on-line help and information	GUI; mouse driven; command line
File Transfer/Conversion	Text, binary	Text, binary	Text, binary	Text, binary
Number of Host Sessions	Single session	Single session	Single session	5 host sessions
Protocols Supported	SNA, non-SNA, BSC	SNA/SDLC and BSC	SNA/SDLC and BSC	SNA/SDLC and BSC
Host Operating Systems	MVS/TSO and VM/CMS	MVS/TSO and VM/CMS	MVS/TSO and VM/CMS	MVS/TSO, VM/CMS, CICS
Host Connections	Direct RG-62A/U coaxial cable	Coax or twisted-pair cable	Coaxial cable or direct connection to twisted-pair cable	Coaxial connection

Model	IRMA WorkStation for Windows	DCA 3270 APA Graphics	IRMAX DFT	MacIRMA Entry Emulator
Minimum Memory Required	2MB RAM; 4MB hard-disk space	512KB (640KB and EMS recommended)	256KB for non-SNA environments, 384KB for SNA environments; 640KB recommended	—
Number of Users Supported	Single user	Single user	Single user	Single user
Terminal Emulation	Digital, VAX, another PC, or an information service such as CompuServe; ANSI/ ASCII	IBM 3287/3812, or 4224 (non-IPDS) host printer	3270 display stations	Macintosh II/IIx/IIcx/IIci/IIfx, Macintosh SE/SE30
User Interface	GUI conforming to IBM SSA/CUA standard; mouse driven; command line	GUI conforming to IBM SSA/CUA standard; mouse driven	GUI conforming to IBM SSA/CUA standard; mouse driven; command line	GUI conforming to IBM SSA/CUA standard; mouse driven; command line
File Transfer/Conversion	Text, binary	Text, binary	Text, binary	Text, binary
Number of Host Sessions	5 concurrent	5 host graphics sessions	5 concurrent	5 concurrent
Protocols Supported	Kermit, xmodem, ymodem	SNA/SDLC, or Bisync	SNA/SDLC, or Bisync	SNA/SDLC, or Bisync
Host Operating Systems	CICS, MVS/TSO, and VM/CMS	CICS, MVS/TSO, and VM/CMS	CICS, MVS/TSO, and VM/CMS	VM/CMS, MVS/TSO, and CICS
Host Connection	Coaxial cable	Coaxial cable	Coaxial, RG62A/U cable, or IBM type 3 twisted pair with supported adapters	Coaxial RG62A/U cable

Model	MacIRMA Graphics	DCA/Microsoft Select Communications Workstation	MacIRMA WorkStation	IRMAremote SNA
Minimum Memory	—	4MB RAM	—	—
Number of Users Supported	Single	Single	Single	Single
Terminal Emulation	IBM 3270	IBM 3270	IBM Displays 3278/79; Models 2, 3, 4, 5	3278 Models 2, 3, 4, 5 and 3279 Models S2A, S3A, S3B
User Interface	GUI, menu-driven, on-line help	Menu-driven, on-line help	GUI, menu-driven, on- line help	GUI, menu-driven, on- line help
File Transfer/Conversion	Text, binary (IND\$FILE)	Text, binary (IND\$FILE)	Text, binary (IND\$FILE)	Text, binary (IND\$FILE)

Features/Functions (Continued)

Model	MacIRMA Graphics	DCA/Microsoft Select Communications Workstation	MacIRMA WorkStation	IRMArete SNA
Number of Host Sessions	5 concurrent	10 3270 sessions plus 64 LU6.2 sessions	10	5 concurrent
Protocols Supported	DFT, SDLC	DFT, SDLC, X.25, and 802.2 Token-Ring	DFT, SDLC, X.25, and 802.2 Token-Ring	DFT, SDLC, X.25, and 802.2 Token-Ring
Host Operating Systems	VM/CMS or MVS/TSO	CICS, MVS/TSO, VM/CMS	IRMAlink FT/TSO and FT/CMS; MacIRMA WS supports IBM's VM/CMS, MVS/TSO, and CICS	IRMAlink FT/TSO and FT/CMS; FT/Express; IBM PersonalServices/CICS, PersonalServices/TSO, and PersonalServices/3N Gateway Servers
Host Connection	Coaxial RG62A/U cable	Coaxial RG62A/U cable	Coaxial RG62A/U cable	Coaxial RG62A/U cable
Workgroup Products				
Model	DCA/Microsoft Select Communications Server	IRMALAN/EP	IRMALAN Standalone Workstation	
Minimum Memory Required	Comm Server: 6MB RAM; OS/2 Client: 4MB RAM; DOS Client: 512KB RAM	—	138KB	
Number of Users Supported	8, 32, or 64 concurrent users	8, 32, 64, and 128 concurrent user licenses are available	—	
Terminal Emulation	IBM 3278/3279	IBM 3278 Models 2-S; 3279 Models 2A, 2B, 3A, 3B	IBM 3278 Models 2, 3, 4, 5 and Models 3279 Models 2A, 2B, 3A, 3B	
User Interface	Menu-driven, on-line help	Menu-driven, on-line help	Menu-driven, on-line help	
File Transfer/Conversion	Text, binary	Text, binary	Text, binary	
Number of Host Sessions	10 for OS/2 workstations	5 for DOS workstations	5 concurrent	
Protocols Supported	DFT, SDLC, X.25, 802.2 Token-Ring	DFT, SDLC, X.25, 802.2 Token-Ring	DFT, SDLC, X.25, 802.2 Token-Ring	
Host Operating Systems	CICS, MVS/TSO, VM/CMS	CICS, MVS/TSO, VM/CMS	MVS/TSO, VM/CMS	
Host Connection	Up to 32 simultaneous active connections	Up to 32 simultaneous active connections	Up to 32 simultaneous active connections	
Model	IRMAtrac Token-Ring Adapter/Convertible	MacIRMALAN	Intelligent Synchronous Communications Server	
Minimum Memory Required	128KB of adapter RAM for downloading software, including LLC, and for buffer space to boost performance	800KB	512KB of system RAM for DOS Client	
Number of Users Supported	Up to 128 concurrent	Up to 128 concurrent	Up to 8, 32, or 64 concurrent	
Terminal Emulation	IBM 3278/79 Display Station Models 2, 3, 4, and 5 (LU2)	IBM 3278/79 Display Station Models 2, 3, 4, and 5 (LU2)	IBM 3278/79 Display Station Models 2, 3, 4, and 5 (LU2)	
User Interface	Menu-driven, on-line help	Menu-driven, on-line help	Menu-driven, on-line help	
File Transfer/Conversion	—	Binary	—	
Number of Host Sessions	128 pooled or dedicated	—	Up to 5 concurrent 3270 sessions for DOS; 10 concurrent for OS/2	
Protocols Supported	802.5, 802.2	AppleTalk, SNA	DFT, SDLC, X.25, and token-ring	
Host Operating Systems	CICS, MVS/TSO, and VM/CMS	VM/CMS, MVS/TSO, and CICS	CICS, MVS/TSO, and VM/CMS	
Host Connection	For STP: IBM Type 1, 2, 6, 8, or 9 cable; for UTP: IBM Type 3 cable	RS-232 cables	DFT coaxial cable	



Pricing

	Purchase Price (\$)
Workstation Products	
IRMA 2	1,195
IRMA 3 Convertible	695
E78 Plus	395
Windowlink for IRMA	295
IRMA WorkStation for Windows	495
APA Graphics for DOS	495
IRMAX DFT	395
MacIRMA Entry Emulator	1,195
MacIRMA Graphics	195
MacIRMA API	295
MacIRMA WorkStation	295
IRMA Remote SNA	495
Workgroup Products	
DCA/Microsoft Select Communications Server (8 CU)	2,995
IRMALAN/EP (8 CU)	1,495
IRMALAN Standalone WorkStation	395
IRMAtrac (4M bps)	795
MacIRMALAN Server (8 CU)	1,495
Synchronous Communications Adapter	395



DCA

Crosstalk Asynchronous Communications Products

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Product Summary

Editor's Note

DCA continues to devote energy and resources to its personal computer communications products. DCA has strengthened Crosstalk products with enhanced versions and has introduced CROSSTALK Communicator, an entry-level product that offers a migration path to other Crosstalk products.

Description

DCA's Crosstalk product line enables IBM PC/XT/AT, PS/2, and compatible computers to communicate with other PCs, mainframes, minicomputers, and information services.

Strengths

- When it comes to overall powerability, quality, and versatility, CROSSTALK Mk.4 consistently ranks highest among competitive asynchronous communications products.
- CROSSTALK for Windows is consistently recognized for outstanding versatility and ease-of-use features.

Limitations

- The low-end CROSSTALK XVI lacks a variety of popular features common with other comparable products.

Competition

Hilgraeve's HyperACCESS/5, Soft-Klone's Mirror III, Hayes Microcomputer's Smartcom Exec and Smartcom III, and Microcom's Relay Gold.

Vendor

DCA, Inc.
1000 Alderman Drive
Alpharetta, GA 30202-4199
(404) 442-4000

In Canada:

Logiquest
Suite 1500, 5650 Yonge Street
North York, ON M2M 4G3
(416) 226-6166

Price

Prices range from \$99 for the entry-level CROSSTALK Communicator to \$245 for the high-end CROSSTALK Mk.4.

GSA Schedule

Yes.

—By Donna Horsley
Staff Writer

Analysis

Product Strategy

Having spent the last two years reevaluating and restructuring its business, DCA has determined its strength lies in personal computer communications. Consequently, the company has sold its idle wide area network product line and has acquired by merger Pacific Data Products (PDP), whose software products and memory boards expand the capabilities of Hewlett-Packard laser printers.

DCA's focus of energies and resources on PC communications products includes the Crosstalk asynchronous product line. The company believes its Crosstalk products will help shape DCA's direction for the 1990s—"to seek out opportunities in the needs of networked PCs."

With over 1 million installed, Crosstalk products helped DCA earn a generous profit of \$37 million in 1990. The Crosstalk product line comprises CROSSTALK Mk.4, CROSSTALK for Windows, CROSSTALK Communicator, Remote², R2LAN, and CROSSTALK XVI.

Present Status

CROSSTALK Mk.4, DCA's high-end asynchronous communications software, is the company's most powerful and versatile product. First introduced in 1985 and since updated, the product has enjoyed exemplary reviews from numerous trade publications.

CROSSTALK for Windows, which provides the popular Microsoft Windows interface, maintains a strong hold in that niche marketplace and, like CROSSTALK Mk.4, has received critical acclaim from third-party publications. In May, DCA announced the enhanced CROSSTALK for Windows Version 1.2.

Within the last year, DCA released CROSSTALK Communicator, a cost-effective, entry-level asynchronous product. The Crosstalk product line also includes Remote² and R2LAN, which were first installed in 1988 and allow users

to control one PC from another within the local area network. In 1990, DCA announced the enhanced Remote² and R2LAN Version 2.1.

The low-end CROSSTALK XVI was the first Crosstalk product. First introduced in 1985, it has consistently been a top-selling PC communications software product. However, *The Software Digest Ratings Report* on advanced asynchronous communications packages has panned CROSSTALK XVI. The report ranks CROSSTALK XVI last among 11 vendors' software packages and criticizes CROSSTALK XVI's lack of support for Windows 3.0 and its minimal features. Despite its limitations, CROSSTALK XVI is easy, efficient software that provides reliable access from one PC to another PC, mini, or mainframe.

Program Features

CROSSTALK XVI features a command- or menu-driven user interface, a programming language, and emulation for several popular terminals. It supports text and binary file transfers with error checking using xmodem, Kermit, or a proprietary CROSSTALK protocol. It provides phone book entries that can store phone numbers, modem parameters, and script files for each entry and that can be saved to disk and recalled for automatic dialing. CROSSTALK XVI supports all full-duplex, internal and external modems. Once communications have been established with a remote system, data can be routed to disk or printer. Pre-defined scripts exist for logging on to on-line services such as CompuServe. Its programming language includes conditional statements and can be used to program unattended file transfers and macros for automatic logons.

CROSSTALK Mk.4 and CROSSTALK for Windows provide all the features of CROSSTALK XVI and add multiple-session support and an extended programming language. The products provide LAN support: offering INT14 and NASI (basic and advanced modes) for access to network modem pools and asynchronous communications servers (ACs). In addition to the protocols available from CROSSTALK XVI, these two high-end packages provide support for zmodem and the proprietary DART error-checking protocols. Users of CROSSTALK Mk.4 can use menus, commands, and/or ALT key combinations to control the program, while CROSSTALK for Windows users are provided with an MS-Windows interface, which

Company Profile Digital Communications Associates, Inc.

Fiscal Year
(millions of dollars)

	1990	1989	1988	1987
Net Sales	203,156	208,266	227,480	181,399
Net Income	37,423	17,710	42,216	28,433

Corporate Headquarters

1000 Alderman Drive
Alpharetta, GA 30201
(404) 442-4000

In Canada

Suite 1500, 5650 Yonge
Street
North York, ON M2M 4G3
(416) 226-6166
International Distribution
Center in Shannon, Ire-
land

Officers

Chairman: Bertil D. Nordin
CEO: Charles G. Betty
CFO: Craig J. Huffaker
Vice Presidents: David A.
Brookmire, H. David
Miller, and Paul A. Rod-
wick

Company Background

Year Founded: 1972. Pub-
licly held since 1983.
No. Employees: 1,448

An established leader in
the computer and com-
munications markets,

DCA built its reputation on
the IRMA add-in terminal
emulation board, which it
acquired from Technical
Analysis Corp. Its
Crosstalk products are
part of DCA's popular
workstation communi-
cations product line and
have helped bring DCA to
the forefront of asynchro-
nous communications.

Initially, Crosstalk Com-
munications operated as
a division of DCA, created
by the merger of DCA
with Microstuf in 1986.
However, in June 1991,
the company declared
that all DCA products
function as a whole, and it
terminated all DCA Inde-
pendent Business Units.
Today, three product divi-
sions exist: workstation
communications prod-
ucts, laser printer en-
hancements products,
and LAN communications
products.

The Crosstalk and IRMA
product lines represent
DCA's popular worksta-
tion communications
hardware and software
products. The laser
printer enhancements
product line was created
when DCA acquired Pa-
cific Data Products in
March 1990. With it, DCA
upgrades the capabilities
and performance of
Hewlett-Packard and
other major brands of la-
ser printers. (Such prod-
ucts include printer-
resident emulation and
typeface software and
memory expansion hard-
ware.)

DCA's third product line,
LAN Communications,
comprises the hardware
and software to construct
LANs as well as products
that allow PCs on LANs to
communicate with IBM
mainframes. Within this
category fall IRMAtrac, a
hardware adapter for

building networks on the
token-ring; a new twisted-
pair product family, de-
signed to comply with the
emerging 10BASE-T stan-
dard; and IRMALAN LAN-
to-mainframe gateway
products.

Targeting *Fortune* 1000
companies, DCA has
sales offices throughout
the U.S. and in five inter-
national cities within Can-
ada, Europe, and Asia.
The company earned
more than \$37 million in
1990, with product sales
of more than \$203,000.
DCA attributed decreased
sales in recent years to a
decline in its PC commu-
nications product sales
due to increased competi-
tion. The company's ex-
port sales have increased
slightly over recent years
to 24% of net sales in
1990.

includes such features as pull-down menus, mouse
operation, dialog boxes, and on-line indexed help.

CROSSTALK Communicator is an entry-
level asynchronous product that features an afford-
able, easy migration path to other Crosstalk
products. Like other Crosstalk products, it features
on-line, context-sensitive help, terminal emulation,
and numerous file transfer protocols. It provides a
point-and-shoot dialing directory interface and has
a host answer mode for password-protected elec-
tronic mail, file transfers, and disk access.

CROSSTALK Communicator also features time-
saving login scripts with CROSSTALK Application
Script Language subset and runs scripts prepared
with CROSSTALK Mk.4.

Remote² and R2LAN's file transfer and ter-
minal emulation features are like those of other
Crosstalk products. Remote² and R2LAN provide
remote control features: remote control of PCs,
LAN control of PCs, peripheral access, and host-
initiated calling. Its security features include access
control, callback, screen and keyboard disable, en-
crypted file, and call activity logs.

Table 1. Feature Comparison

Model	CROSSTALK XVI	CROSSTALK Mk. 4	CROSSTALK for Windows	CROSSTALK Communicator
Minimum Memory	128K bytes plus DOS	320K bytes	150K bytes	320K bytes
Maximum Transmission Speed	115.2K bps	300K bps to 115,200K bps	19.2K bps	300K bps to 115,200K bps
User Interface	Command driven, help facility	Command/menu driven, windowing capability, help facility	Menu driven, pop-up windows, help facility, graphic icons, mouse support, windows interface	Command driven, help facility, supporting script for popular information services
File Transfer Protocols	xmodem, CROSSTALK, Kermit, Super Kermit, X-on/X-off	xmodem, Kermit, ASCII, ymodem, DART, CROSSTALK, zmodem, FAST, CompuServe B Plus, IND\$FILE	xmodem, Kermit, ASCII, ymodem, DART, CROSSTALK, zmodem	xmodem, ymodem, zmodem, Kermit, CompuServe B Plus
Terminal Emulation	TeleVideo 910/920 Series, IBM 3101, ADDS Viewpoint, DEC VT100, VT102, VT52, Texas Instruments 940	AT&T 510/513, ADD5 Viewpoint, DGDash 200 Series, Datapoint 3601, DEC VT52, VT100, VT102, VT220, VT320, Hazeltine Esprit III, IBM 3101, 525x, 529x via DCA Smart Alec Twinax Interface, 327x (IRMA or IBM adapter), Lear Siegler ADM, TeleVideo 912/920/925/950 Series, TYMNET 78	DEC VT52, VT102, VT220, VT320, IBM 3101, BBS-style ANSI color terminal, CompuServe VIDTEX graphics terminals	DEC VT52, VT100, VT102, VT220, VT320, IBM 3101, TeleVideo 912, 920, 925, 950 Series, Generic TTY, ANSI color graphics

Competitive Position

Capturing 25% of the competitive asynchronous communications market, the Crosstalk products are maintaining and improving DCA's strong standing in asynchronous communications, with more than 1 million products installed.

CROSSTALK Mk.4 was the only software program among 11 vendors' advanced asynchronous communications packages to receive a four-star rating in *The Software Digest Ratings Report*, which was conducted by National Software Testing Laboratories (NSTL)—an independent organization that rates personal computer software. Included in the report were Hayes Microcomputer's Smartcom Exec and Smartcom III, Hilgraeve's HyperACCESS/5, SoftKlone's Mirror III, Microcom's Relay Gold, and Datastorm's Procomm Plus.

The Software Digest Ratings Report gave CROSSTALK Mk.4 top billing in overall powerability, quality, and versatility.

"Although the top five programs are comparable, versatility puts CROSSTALK Mk.4 at the top," the report stated.

CROSSTALK Mk.4 offers good usability, good performance, and more features than any of the other programs. Users pay for the advanced features in CROSSTALK Mk.4's higher price (\$245).

In comparison, HyperAccess/5 has almost as many features as CROSSTALK Mk.4 and better performance and usability, making it a better choice at \$195 for some users. HyperACCESS/5 also offers remote control features that Crosstalk and Procomm Plus products do not. Mirror III edges out CROSSTALK Mk.4 in performance, and Smartcom Exec offers an excellent value at \$129.

Two industry publications named CROSSTALK Mk.4 the recipient of Editor's Choice and Best Buy awards.

Among the Windows programs, CROSSTALK for Windows offers the best package of applications, according to *The Software Digest Rating Report*. However, it stated that Relay for Windows and HyperAccess for Windows provide competitive packages. Another trade publication named CROSSTALK for Windows its Communications Product of the Year.

The Software Digest Rating Report stated that CROSSTALK for Windows is the best and least

expensive of the graphical interface packages. It is the only one with zmodem support, and its Kermit, while not the fastest, is at least adequate. The report added that the VT102 emulation of CROSSTALK for Windows is among the best.

CROSSTALK XVI came in last—eleventh in *The Software Digest Rating Report*. It lacks a variety of major features and support for Windows 3.0. “No matter what the communications need, there is bound to be a better program,” the report stated.

Decision Points

Versatility

In *The Software Digest Ratings Report* on advanced asynchronous communications packages, CROSSTALK Mk.4 ranked highest in versatility among 11 vendors' packages. CROSSTALK for Windows also provides strong versatility; it ranked fourth in the report.

The report stated that CROSSTALK Mk.4 provides the best features for standard and advanced communication applications. Its programming language is strong, it supports a broad list of protocols, and like Relay Gold, it doubles as a synchronous communications package. Among the Windows packages, CROSSTALK for Windows is the most powerful. It supports the most protocols and possesses a more powerful programming language than does MicroPhone II for Windows.

CROSSTALK Mk.4 is easy to learn, providing excellent usability; it provides excellent windowed Kermit implementation, supports Kermit text mode and zmodem, is network ready, supports X.PC, provides 3101 emulation in block mode, and resumes interrupted transfers. It is powerful, provides elegant programming facilities, and offers multiple communications session support. CROSSTALK Mk.4 provides excellent performance overall, excellent Digital VT320 emulation, excellent documentation, and excellent file transfer display and supports 16,550 DART buffering and the HayesESP.

Ease of Use

According to *The Software Digest Rating Report*, CROSSTALK Mk.4 provides excellent ease-of-use features; however, it is not especially easy to learn. CROSSTALK Mk.4 provides an excellent point-and-shoot file selection method that makes file transfer fast and easy and one of the best among

advanced communications programs. The CASL programming language is easy to use, and good error messages aid in debugging scripts. The editor is easy to access and use. CROSSTALK Mk.4 also features an excellent file selection facility and one of the best transfer displays.

CROSSTALK XVI also provides excellent ease-of-use features, although it was not ranked as high as CROSSTALK Mk.4 in *The Software Digest Rating Report*.

“Its commands are easy to use once mastered; however, its programming language is simplistic, debugging can be difficult, and it lacks an editor,” the report said about CROSSTALK XVI.

In terms of CROSSTALK Communicator, DCA claims its newest entry is the easiest-to-use communications product on the market. Offering excellent file transfer, CROSSTALK Communicator is installed and configured in three minutes. It provides an easy-to-use dialing directory that allows users to get started quickly, and it has entries and supporting scripts for popular information services and on-line, context-sensitive help. The product also provides an easy migration path to other CROSSTALK products.

Characteristics

Models: CROSSTALK XVI, CROSSTALK Mk.4, Remote², R2LAN, CROSSTALK for Windows; CROSSTALK Communicator.

Date Announced: CROSSTALK XVI—1983; CROSSTALK Mk.4—1985; Remote², R2LAN—1988; CROSSTALK for Windows—1989, CROSSTALK Communicator—1990.

Date First Installed: CROSSTALK XVI—1983; CROSSTALK Mk.4—1987; Remote²—1988; R2LAN—1988; CROSSTALK for Windows—July 1989; CROSSTALK Communicator—1990.

Number Installed: 1,000,000.

Distribution: DCA products are distributed only through authorized dealers and distributors.

Environment

Computer Supported: IBM PC/XT/AT, PS/2, and compatible systems.

Operating Systems Supported: All Crosstalk products are MS-/PC-DOS compatible. (CROSSTALK for Windows requires Microsoft Windows 3.0.)

Media: Crosstalk products are available on 3.5-inch and 5.25-inch diskettes.

Communications

Addressable Ports: COM1 through COM4, for all products. In addition, CROSSTALK Mk.4 supports up to 15 concurrent communications sessions; ports beyond COM4 require that interrupts and addresses be set by the user on the Port Configuration setup panel. CROSSTALK Communicator and CROSSTALK Mk.4 also support the eight standard serial port addresses on PS/2 systems.

File Transfer: All products support the transfer of text, binary, and graphics files. In addition, the packages support batch transfer and allow screen data to be routed to disk, screen, or printer.

Modem Command Sets: Each package is fully Hayes AT command set compatible and contains modem configurations for more than 60 Hayes and non-Hayes modems.

Parameters: Transmission rate, word length, parity, stop bits, character filtering, and protocol are set by command/menu and stored in the packages' phone book entries.

Operation

Host/Remote Operations: All of the programs offer an auto answer mode and unattended file transfer capabilities.

Security: All Crosstalk programs provide single-level password security. Remote² provides more features, such as access control, call-back, screen and keyboard disable, encrypted file, and call activity logs.

Data Handling: Incoming control characters can be filtered, tabs and blank lines can be expanded in outgoing text, and line feed characters can be suppressed.

Programmability: All the programs (except Remote²) support user-defined function keys and script languages. CROSSTALK Mk.4 and CROSSTALK for Windows feature the CASL programming language, which supports conditional branching, variables, floating-point mathematics, calls to subroutines, and full screen control; there is also a learn facility to create scripts from the users' actions and a compiler to compile scripts into machine-readable code.

Operational Modes: Each program supports auto answer, auto dial, auto redial, and unattended file transfer.

Calling Facilities: Entries can store phone numbers, modem parameters, communications port resignation, passwords, protocols, and script files to be recalled and automatically executed. Predefined logon scripts are available for CompuServe, Delphi, Dow Jones News/Retrieval, Newsnet, the Official Airline Guides (OAG), MCI Mail, and Lexis/Nexis. CROSSTALK for Windows also has dialing queues.

Support

Phone Support: Technical support is available from 8 a.m. to 8 p.m., Monday through Friday, Eastern Standard Time at (404) 442-3210. An electronic bulletin board (BBS) is available at 404-740-8428.

Warranty: All products have a 90-day warranty against a defective diskette.

Maintenance: Free upgrades are provided for minor changes; a nominal fee is charged for major upgrades.

Pricing

	Single- Unit List Price (\$)
CROSSTALK Mk.4	245
CROSSTALK for Windows	195
CROSSTALK XVI	195
CROSSTALK Communicator	99
Remote ²	195
R2LAN	795

Digital Equipment Corp. Internetworking Products

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Product Summary

Editor's Note

In June 1991, Digital Equipment Corp. announced a strategy for incorporating Open Systems Interconnection (OSI) support into DECnet, a cluster of software and hardware products that connect separate systems into a single network. The new approach, ADVANTAGE-NETWORKS, effectively replaces DECnet Phase V.

Description

Digital's internetworking products can be categorized as Extended Ethernet Products, FDDI Products, and ADVANTAGE-NETWORKS Family. Digital also markets routers and gateways. The Extended Ethernet Products include LAN Bridge 150, LAN Bridge 200, METRO-WAVE Bridge, and Vitalink Communication Corp.'s TransLAN Bridge. Included in the FDDI line are DECconcentrator 500; DECbridge 500 and 600; and DEC FDDI-controller 400, 700, and 700-C.

ADVANTAGE-NETWORKS enables users to transmit data from applications conforming to OSI over DECnet or TCP/IP networks. It also

allows users in multiprotocol environments to support mixes of DECnet, TCP/IP, or OSI.

Strengths

Digital's products are backward compatible with each other. In addition, the company has incorporated extensive interoperability capabilities into its products.

Limitations

As yet, Digital's products do not support token-ring applications.

Competition

AT&T, Cisco, IBM, Novell, Proteon, SynOptics, Ungermann-Bass, Wellfleet.

Vendor

Digital Equipment Corp. (DEC)
146 Main Street
Maynard, MA 01754-2571
(508) 493-5111

Price

Digital FDDIcontroller 700—
\$6,000; DEC WANrouter 100—
\$5,500.

—By *Barbara Callahan*
Associate Editor

Analysis

Product Strategy

In June 1991, Digital revised its approach to networking by replacing DECnet Phase V, a program followed for four years, with ADVANTAGE-NETWORKS, a strategy that incorporates Open Systems Interconnection (OSI) support into DECnet. By discarding DECnet Phase V, Digital is smoothing the path to OSI for users, who can now gain access to an OSI backbone without restructuring applications.

Representing Digital's fifth generation of networking, ADVANTAGE-NETWORKS serves as the foundation for open, distributed applications and for interenterprise communications. Within the platform, Digital has incorporated support for OSI, TCP/IP, and DECnet, all of which can coexist and be integrated with each other and with personal computer and SNA networks. To manage enterprise networks, Digital still relies on its Enterprise Management Architecture (EMA).

A supporter of TCP/IP since 1984, Digital is offering TCP/IP products on its ADVANTAGE-NETWORKS platform. Since OSI is currently making inroads into the TCP/IP market, however, Digital is promoting the coexistence and integration of the two. Expecting users to choose one of the two, or to blend TCP/IP and OSI, Digital is prepared to accommodate any selection. Although OSI will attract many users, Digital does not foresee the disappearance of TCP/IP. In fact, the company anticipates that TCP/IP will retain its position for quite some time as a significant network technology.

ADVANTAGE-NETWORKS resulted from a sizable research and development effort by Digital, which abandoned its DECnet Phase V program in favor of this new platform. Digital has expressed the intention of going with OSI as its long-term strategic infrastructure because of its global nature and the OSI model's support of X.25, Ethernet, token-ring, FDDI, and synchronous/asynchronous

links. Digital also recognizes the benefits of OSI's support of multivendor electronic mail and electronic data interchange (EDI).

Although Digital is stressing OSI compliance, the company is no stranger to this networking scheme. Since 1986, Digital has been marketing OSI-compliant networking products. In addition, the company has actively participated in the International Organization for Standardization's (ISO) projects for over 10 years.

Recent Digital internetworking moves have also been in the direction of FDDI. The company is actively promoting the connection of its popular VAX machines and Ethernet LANs to FDDI-based networks. Digital's interest in fiber centers on the medium's many advantages, such as high bandwidth capacity and data rate, low transmission loss, immunity from electromagnetic interference, security, safety, and light weight.

The Digital-Ethernet connection dates back to 1980 when Digital, Xerox, and Intel developed the concept of Ethernet as a data communications network for high-speed communications within a local environment. Digital's Ethernet local area network makes use of baseband and broadband transmission methods. Both techniques provide high-speed, 10M bps, peer-to-peer communication links between computers and other intelligent devices. Digital gives no evidence of lessening its interest and activities in the Ethernet segment of the market.

In preparation for the increasing acceptance of fiber as a preferred transmission medium, Digital incorporated support of fiber into its OPEN DECconnect wiring scheme. As evidence of its belief in the inevitability of user migration to FDDI, Digital recommends to its customers that they add 50 percent to 100 percent to the actual fiber count of their present needs to accommodate future growth.

A company, however, does not rise to the stature of Digital Equipment Corp. by ignoring current realities. OPEN DECconnect also supports 10BASE-T, ThinWire cable, EIA/TIA 568-compliant unshielded twisted pair, and standard broadband cable for video connections.

Competitive Position

Digital's networking strategy originated with its Digital Network Architecture (DNA) and DECnet ►

Company Profile Digital Equipment Corp.

Corporate Headquarters

146 Main Street
Maynard, MA 01754-2571
(508) 493-5111

In Canada

Digital Equipment of Canada, Ltd.
P.O. Box 13000, 100
Herzberg Road
Kanata, ON K2K 2A6
(613) 592-5111

Officers

President: Kenneth H. Olsen

Senior Vice President, Engineering, Manufacturing, and Product Marketing:

John F. Smith
President and CEO, European Operations: Pier Carlo Falotti

Company Background

Year Founded: 1957
No. Employees: 125,000
No. Systems Sold (cumulative): More than 500,000

Led by Kenneth H. Olsen, three engineers founded Digital Equipment Corp. in 1957. Using their own money in addition to funding from a Boston venture-capital firm, they set up operations in an old brick wool mill in Maynard, MA.

Digital's first product was a set of electronic modules for computer test equipment. Three years after its founding, Digital introduced its first computer, the Programmed Data Processor Model 1, or PDP-1. In 1963, the

company introduced its landmark PDP-8, the first successful minicomputer.

The PDP-8 established a whole new market for smaller computers and made Digital a rising star within an industry then dominated by mainframe vendors. Digital's smaller machines soon became a price/performance alternative to big mainframes and also introduced the concept of distributed processing.

In 1977, Digital introduced the VAX (virtual address extension) Series of 32-bit minicomputers, one of the most successful product launches in computer industry history. Since introducing the first VAX, the 11-780, Digital has continued to enhance the basic VAX architecture and VAX/VMS operating system with announcements of new and more powerful VAX models over the years.

To support its systems, Digital offers disk, storage array, and solidstate memory products; optical disks; tape devices; and printers. Besides hardware and software, Digital offers a range of communications and networking products and services.

Business Overview

Digital likes to characterize itself as the world's

leading supplier of networked computer systems, as well as a leader in systems integration. To remain a leader, particularly in these specific areas, the company believes it must support openness and industry standards to remain competitive in the 1990s. The company is a key participant in industry standards organizations such as the Open Systems Foundation (OSF), an industry group founded in 1988 to develop industry-recognized specifications for UNIX. UNIX will be the standard operating system for users who prefer open systems rather than proprietary systems.

Financial Profile

Digital continues to rank as the second largest U.S. computer company as measured by total revenues. While Digital enjoyed record revenue and profit growth through the 1980s—largely on the strength of its VAX platform and networking architecture—sales and profits have been sluggish within the last few years.

It is evident from the company's report of an 80 percent drop in earnings for the first quarter of 1991 that Digital continues to undergo hard times. For the first quarter of fiscal 1991, ended September 30, 1990, Digital reported revenue of \$3.09 billion, down 1.2 percent from \$3.13 billion for the same period the previous year. Net income was \$26.18 million, a staggering 82.6 percent drop from \$150.78 million in the

year-ago period. Digital blamed the profit drop on an economy in recession and lower demand for high-margin products.

Second-quarter 1991 reported revenues of \$3.35 billion, up 5 percent from second-quarter 1990. Net income was \$111.2 million. According to Digital, the company began to see the benefits of investments, cost-control efforts, and improved revenue growth.

In May 1991, Digital announced a continuation of cost-reduction measures, started in 1990, among which were reductions in personnel and plant consolidations. Compounding Digital's problems, sales in Europe, formerly a source of growth, stagnated during the first part of 1991.

Management Statement

Digital is making a \$1.5 billion investment toward new product development. According to the president's letter, Digital is "continuing to invest heavily in VAX and RISC-based systems and VMS and UNIX software." Within the next year, "Digital's strategy is to focus on the computing environment of the 1990s. Digital will offer the widest selection of technology and continue to make significant investments in R&D and new products in response to dynamically changing customer needs."

► (Analysis continued)

products. Digital networks IBM products and those of other vendors. The company is currently the leader in Ethernet installations and can supply LANs running over coaxial cable and twisted-pair wire. Digital provides enterprise-wide nets with connections into wide area networks and IBM SNA networks. The blitz of products unfurled at the most recent DECworld establishes Digital as a major contender in the client/server arena.

In the internetworking market, Digital faces formidable competition, ranging from giants such as IBM to dynamic, young companies such as Syn-Optics. In addition, vendors from other fields, notably modems, are entering the internetworking market as a catalyst to revitalize their product lines and revenues. The greatest offensive Digital can launch stems from the reliability of its own good name and its 16 years' experience in standards-based computing.

Although the company has recently experienced hard times, Digital expects to rebound

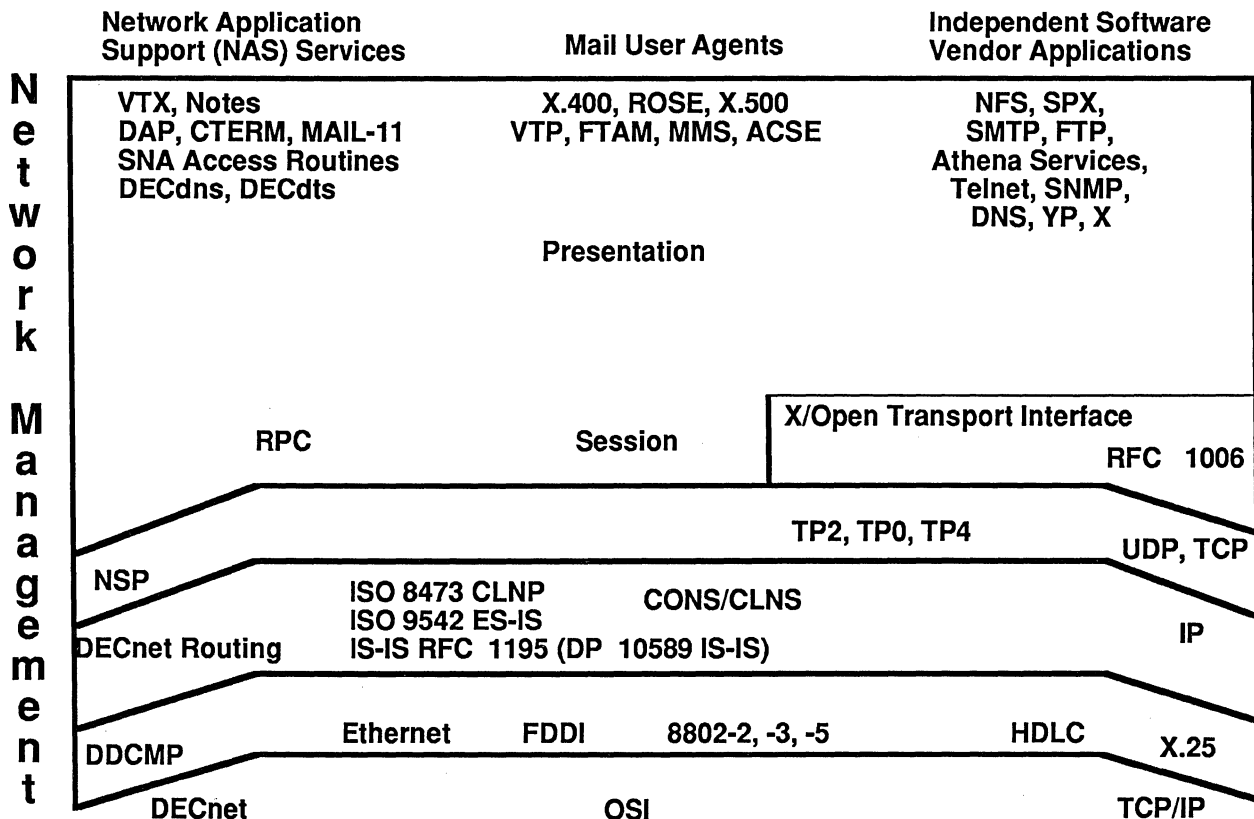
through its expertise in networking. The company estimates that the total market for networked systems running multiple network protocols will produce about \$6 billion in sales by 1994, and that is just in the United States.

Digital stands poised to take advantage of this market through its ADVANTAGE-NETWORKS platform. At the announcement of ADVANTAGE-NETWORKS, William R. Johnson, Jr., Digital's vice president of corporate marketing planning, expressed the company's optimism. He commented, "With these announcements, Digital's ADVANTAGE-NETWORKS offers, by definition, a multiprotocol, multivendor network that takes advantage of the standards guiding the industry today. Over the next four years, Digital expects to have in excess of 1.5 million open networking licenses in customer locations, doubling the existing installed base and positioning the company as the industry's leader in OSI and multivendor networking in commercial and technical markets."

To enhance its position in the internetworking market through ADVANTAGE-NETWORKS,

Figure 1.
 ADVANTAGE-NETWORKS Platform

ADVANTAGE-NETWORKS Environment



Digital plans to release Network Integration Server (NIS) 600, the first in a series of modular, multi-protocol routers; DEC WANrouter 150 and DEC WANrouter 250, which will support synchronous and asynchronous connections and X.25 datalinks; and Network Application Support (NAS) services to 802.5/Token Ring desktops through a portfolio of hardware and software products.

Decision Points

The announcement of ADVANTAGE-NETWORKS removes any doubts users might have about the direction in which Digital is heading. The company is committed to open networking and is promoting the standards that will take it there. Worldwide, Digital participates in 120 standards committees.

The company also conducts interoperability testing with competitors and partners in the industry. Recently, Digital's internal testing center in Littleton, MA, received accreditation from the U.S. government's National Institute of Standards and Technology (NIST) to test for OSI compliance to the Government OSI Profiles (GOSIP), and for TCP/IP compliance to the United States Defense Communications Agency (DCA). Digital is one of three companies in the world that has attained this difficult accreditation.

Users with wide area networking needs can benefit from Digital's addition of frame-relay technology to its routing products. This development resulted from Digital's coauthoring of the Frame Relay Specification with StrataCom and Northern Telecom.

When deciding on the use of Digital's internetworking hardware, potential buyers should become acquainted with the DEC MicroServer, the hardware base for many of the routers and gateways offered by the company. This powerful device enables users to perform global networking over DECnet, IBM SNA, or X.25 networks. The MicroServer can supply the connection when users want to communicate from an Ethernet LAN to a WAN. By supporting high-speed lines, the product enables users to take advantage of cost-effective tariffs and Public Switched Data Networks (PSDNs).

A prime example of the extensive capabilities of Digital's internetworking line is the DECbridge 500, a self-learning, intelligent hardware device

that provides the interconnection between a 10M bps, IEEE 802.3/Ethernet local area network and a 100M bps, FDDI-based network backbone. In addition to filtering and forwarding, the DECbridge 500 performs high-speed, transparent translation of network data packets between the FDDI and 802.3/Ethernet LANs. Since the product is protocol independent, it accommodates multiple protocols running on FDDI and 802.3/Ethernet LANs. It operates transparently for plug-and-play network operation.

Addressing the intricacies of managing internetworking equipment, Digital offers DECelms management software that provides users with a common tool for managing both 802.3/Ethernet and 100M bps, FDDI-based LAN devices from a single management station in the network. The software enables network managers to configure, manage, monitor, control, and troubleshoot a DECconcentrator 500 and LAN bridges in an extended 802.3/Ethernet LAN and FDDI network. A superset and replacement product for Digital's Remote Bridge Management Software (RBMS) V2 software, DECelms will be included with the DECmcc Management Station products.

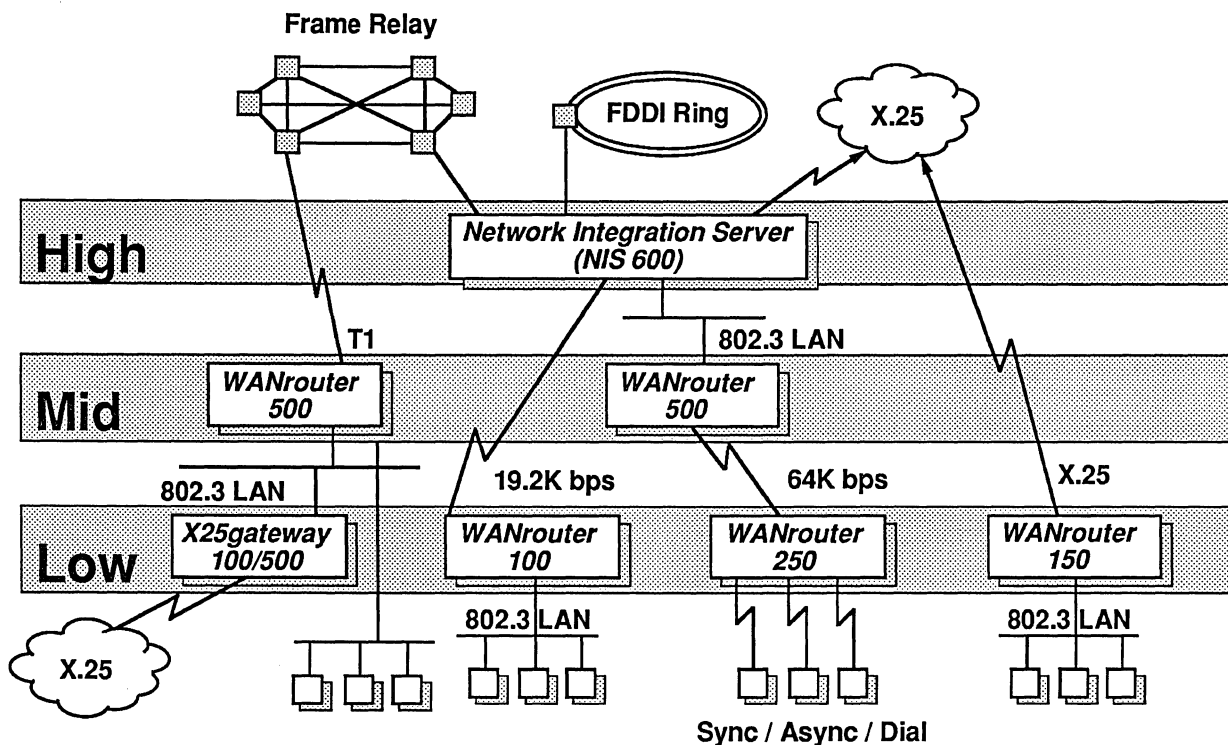
The system automatically builds a registry of accessible DECconcentrator 500 devices and bridges within the extended FDDI and 802.3/Ethernet network. It automatically or manually polls devices stored in the host registry for faults, errors, and altered information.

Characteristics

Date Announced: DECconcentrator 500, DECbridge 500, FDDIcontroller 700, DECelms software—July 1990; DECnet/SNA Data Transfer Facility V3.0, DECrouter 150, DECserver 300 Version 2.0, DECserver 300 for MS-DOS V2.0—April 30, 1991; DECnet/OSI for ULTRIX Version 5.0, Extensions for DECnet-VAX Version 5.4, OSI Application Developer's Toolkit, DEC WANrouter 100, DEC WANrouter 500, DEC X25gateway 100, DEC

Figure 2.
 Digital Products

Digital's Open Backbone Network Product Portfolio



X25gateway 500, DECbridge 500, DECbridge 600, DEC-concentrator 500 Copper Port Cards, DEC FDDIcontroller 700-C, DEC FDDIcontroller 400, DECCmcc Extended LAN Manager—June 3, 1991.

DECnet Installed Base: Approximately 850,000 licenses worldwide on VAX, ULTRIX, and personal computer platforms.

Extended Ethernet LAN Products

Digital's extended LANs use the LAN Bridge 150, LAN Bridge 200, METROWAVE Bridge, and Vitalink Communication Corp.'s TransLAN bridge to extend the distance between LANs and to augment the number of nodes directly linked to 10M bps, 802.3/Ethernet LANs.

LAN Bridge 150: This bridge interfaces two transceiver drop cables. The fiber optic version of LAN Bridge 150 interfaces one transceiver cable and one fiber optic link, which must connect to another fiber optic LAN Bridge 150 or to a fiber optic DEC repeater 200.

LAN Bridge 200: This device comes in three versions: local, 3-km. fiber optic, and 10-km. fiber optic. Port A of each version enables users to switch between ThinWire

and thickwire IEEE 802.3/Ethernet segments. Port B handles thickwire IEEE 802.3/Ethernet segments or optical fiber connections, depending on the version chosen. The fiber optic LAN Bridge 200 interfaces one transceiver cable and one fiber optic link. Users can build a LAN Bridge 200-based fiber optic link by using a pair of 3-km. bridges, a pair of 10-km. bridges, or a 3-km. bridge and the fiber optic DEC repeater 200.

METROWAVE Bridge: This bridge interfaces one transceiver drop cable at each end with a microwave link. The device connects geographically dispersed LANs in up to 7.25-km., bridge-to-bridge arrangements in situations in which cable is not practical. Transparent to the user, the bridge implements high-speed transmission via a 23GHz wideband, duplex, frequency-modulated microwave link. The device spans single-link, line-of-sight distances up to 4.5 miles, bridge to bridge. Digital manufactures the microwave equipment for this product with a marketing partner, M/A-Com, Inc.

Vitalink's TransLAN Bridge: The TransLAN Bridge goes across distances greater than a few miles in areas where coaxial cable, fiber optic cable, or microwave links are unavailable or impractical. TransLAN supplies industry-standard V.35 or RS-449/422 connections and transmits at a maximum rate of 2.048M bps.

In June 1991, Digital announced the availability of Vitalink's TransLAN Bridge Access Module for the DECmcc platform, which allows Vitalink's customers to manage their TransLAN Bridge products from Digital's DECmcc Network Management System.

Routers, Portals, and Gateways

DECnet/SNA Gateway for Synchronous Transport: This product connects IEEE 802.3/Ethernet LANs to IBM hosts, making use of high-performance and high-bandwidth connections to front-end processors. This product uses the MicroServer (DEMSA) as a hardware base when communication occurs from an Ethernet LAN to a wide area network (WAN).

DECnet/SNA Gateway for Channel Transport: This gateway connects an IEEE 802.3/Ethernet LAN to an IBM host via direct attachment to a System/370 channel.

DECnet/SNA Data Transfer Facility (DTF) V3.0: This facility serves as a transparent file-transfer mechanism between an IBM VM or IBM MVS host system in an IBM SNA environment to one or more Digital nodes in a DECnet environment. Users can initiate data transfer in either environment. Supported Digital nodes include VMS, RSX, ULTRIX, MS-DOS, or OS/2 systems.

Internet Portal: The Internet Portal furnishes transparent communications between separate TCP/IP networks over a DECnet backbone.

X25portal 2000: The X25portal enables multivendor systems linked as data terminal equipment (DTE) to communicate with other multivendor X.25 DTEs joined to the same or different portals.

DECrouter 100: The DECrouter 100 provides an economical solution for environments that require a single routing circuit within a DECnet Phase IV Level 1 area.

DECrouter 150: The DECrouter 150 supports two serial ports and an IEEE 802.3/Ethernet port, and provides IEEE 802.3/Ethernet LANs at branch offices and remote sites with wide area access to corporate networks. The device supports two lines—one at 56K/64K bps and one at 9.6K bps simultaneously—or two lines at 19.2K bps simultaneously.

DECrouter 250: The DECrouter 250 transfers data packets from DECnet nodes on an IEEE 802.3/Ethernet LAN to remote DECnet nodes or other IEEE 802.3/Ethernet LANs over asynchronous/synchronous lines.

DECrouter 2000: The DECrouter 2000 implements synchronous connections to a remote DECnet system and LANs in a WAN or between remote LANs on DECnet.

DECnet/Internet Router 2000: The DECnet/Internet Router 2000 combines the Internet Portal and DECrouter 2000 for routing TCP/IP traffic across the backbone of an enterprise.

DECnet/Internet Router 250: This unit packages the Internet Portal and DECrouter 250 for routing data packets across the backbone of an enterprise.

X25router 100: This device offers DECnet routing over X.25 packet-switching services.

DEC X.25 Access for ULTRIX: This device, available only in Europe, provides transparent access to the X.25 network.

X25router 2000: This router combines the capabilities of a DECrouter 2000 with X.25 connections to Packet Switched Data Networks (PSDNs). This device enables DECnet and X.25 to run concurrently.

DEC MicroServer (DEMSA)

The DEC MicroServer (DEMSA) serves as the hardware base for the DECrouter 2000, X25router 2000, the DECnet/SNA Gateway-ST, and the X25portal 2000. The unit supplies connections whenever communication originates from an 802.3/Ethernet LAN into a WAN. Network users can access global destinations via DECnet, X.25, or IBM SNA networks by connecting the suitable version of DEC MicroServer to the 802.3/Ethernet network. The DEC MicroServer enables users of DECnet backbone networks to use leased lines or X.25 PSDNs. The device can also support a network-to-network connection from DECnet to SNA.

Residing in a LAN Bridge 150-type enclosure, the DEC MicroServer can be placed on a desktop or mounted in a standard 19-inch rack. Designed as a single-board communications engine, the hardware includes a MicroVAX II chipset, 2M bytes of onboard memory, one Ethernet interface port, power supply, and four synchronous ports.

FDDI Products

The hardware in this product grouping features the Digital-developed FDDI chipset, which the company has licensed to semiconductor suppliers for use in multivendor equipment. DECelms software provides management capabilities for these products.

DECconcentrator 500: This concentrator implements the attachment of FDDI-based devices, such as workstations, systems, DECbridge 500 units, or other concentrators, to the FDDI-based backbone network. This product requires firmware revision 3.0 or higher to support either of the six-port copper option modules. The DECmcc Extended LAN Manager is necessary to make full use of the monitoring and control capabilities of the DECconcentrator 500.

DECconcentrator 500 Copper Port Cards: These cards include the DEFCN-S Port Card, which supports 150-ohm Type 1, 2, and 6 shielded twisted pair (STP), and the DEFCN-T Port Card, which supports 50-ohm ThinWire coaxial cable.

DECbridge 500 and DECbridge 600: These bridges support FDDI connections to one and three 802.3 Ethernet LANs, respectively. The products feature Dual Attachment Station options, single-mode fiber options, support for AppleTalk protocol and Kinetics' devices, and SNMP-based network management capabilities.

DEC FDDIcontroller 400: This unit acts as a communications adapter for XMI-based systems. It provides direct interconnection of VAX 6000 and VAX 9000 systems and servers to the bandwidth of an FDDI network. The FDDIcontroller 400, which provides a Single Attachment Station (SAS) connection, must have a corresponding concentrator port card supporting the same media interface for 62.5/125 micro multimode fiber. VMS Version 5.4-3 provides DECnet Phase IV and LAT support for this product.

DEC FDDIcontroller 700: This device directly connects the DECstation 5000 Model 200 to FDDI-based networks.

DEC FDDIcontroller 700-C: This unit supports DECstation and DECsystem 5000 TURBOchannel-based products, and features switch-selectable connections for 150-ohm Type 1, 2, and 6 STP or 50-ohm ThinWire coaxial cable. This product must have a corresponding concentrator port card to provide the same interface (STP or ThinWire) as the physical media. The ULTRIX operating system Version 4.2 is required for use of the DECstation 5000 and DECsystem 5000.

ADVANTAGE-NETWORKS Family

In June 1991, Digital announced the ADVANTAGE-NETWORKS family, formerly known as the Phase V program, which provides an open network backbone for open, distributed applications and interenterprise communications. ADVANTAGE-NETWORKS represents Digital's fifth generation of networking and serves as the platform that supports applications supplied through Digital's Network Application Support (NAS). Protocols supported by the platform include OSI, TCP/IP, and DECnet, which can coexist and be integrated, along with PC and SNA networks. The ADVANTAGE-NETWORKS platform also supports enterprise management through Digital's Enterprise Management Architecture (EMA). Operating system support includes VMS, ULTRIX, MS-DOS, Macintosh, OS/2, and RSX.

Since the routing technology of ADVANTAGE-NETWORKS eliminates the addressing barriers of DECnet Phase IV, users can communicate among multivendor systems and over a range of networks. The

unrestrictive network size supported by ADVANTAGE-NETWORKS enables users to create small workgroup networks as well as worldwide networks. A network can connect to another autonomous network, supporting connections between customer and supplier networks via EDI and X.400.

ADVANTAGE-NETWORKS makes use of Digital's Distributed Name Service (DECdns) to store node names and obtain protocol selection information. The DECdns namespace replaces the DECnet Phase IV node database. DECdns equips distributed applications with a consistent, network-wide set of names, referred to as the namespace, which is stored on servers throughout the network. In client/server computing environments, this feature off-loads the node database from each system to a few servers.

The Digital Time Service (DECdts) feature of ADVANTAGE-NETWORKS is an architecture that maintains correct times in a distributed system. Time servers in DECdts supply time to clients through intermediary systems. After obtaining the time from a server, systems can exchange synchronized transactions over any size network.

To ensure backward compatibility, Digital is supporting a convenient transition from DECnet Phase IV to ADVANTAGE-NETWORKS. DECnet Phase IV nodes can also participate as members of ADVANTAGE-NETWORKS.

ADVANTAGE-NETWORKS Products

DECnet/OSI for ULTRIX Version 5.0: This product implements OSI and DECnet protocols for Digital's ULTRIX operating system. ULTRIX FTAM is the first OSI application offered with DECnet/OSI for ULTRIX. Included with FTAM is an applications gateway between the Internet File Transfer Protocol (FTP) and FTAM. Version 5.0 supports local and wide area network configurations. It can coexist with TCP/IP on the same processor. The DECmcc Access Module can manage DECnet/OSI for ULTRIX as part of an integrated environment. Hardware requirements include any VAX, MicroVAX, VAXstation, VAXserver, or RISC-based DECstation or DECsystem. DECnet/OSI for ULTRIX Version 5.0 is packaged with every Digital ULTRIX system.

Extensions for DECnet-VAX Version 5.4: These extensions provide an OSI-end system stack in addition to the DECnet Phase IV stack for VMS users making the transition to the ADVANTAGE-NETWORKS environment. The DECnet components in the extensions kit support the optional use of the Digital Distributed Name Service (DECdns) namespace for the nodes list, along with DECdns and Digital Distributed Time Service (DECdts) and node name management tools. DECnet-VAX license, media, and documentation are packaged with each VAX/VMS system.

OSI Application Developer's Toolkit: The toolkit enables users to write distributed applications for

open networks and to make use of the OSI services provided by DECnet-VAX with the DECnet-VAX Extensions and DECnet/OSI for ULTRIX. The Toolkit consists of an interface to File Transfer, Access, and Management (VMS and ULTRIX); interfaces to the ACSE and Presentation layers (VMS); and Abstract Syntax Notation One (ASN.1) tools (VMS). The toolkit allows developers to use the services of the upper layers of OSI in their applications. The ASN.1 tools consist of a compiler and a library of encoding and decoding routines to assist the writer in generating and processing transmitted data.

Hardware requirements include VAX/VMS, VAX/ULTRIX, or RISC-based ULTRIX systems. Software requirements for VMS users include VMS 5.4 or later with DECnet-VAX and DECnet-VAX Extensions. The software requirement for ULTRIX users calls for ULTRIX 4.2 with DECnet/OSI for ULTRIX Version 5.0.

DEC WANrouter 100 and DEC WANrouter 500: These products serve as software enhancements to DECrouter 100 and DECrouter 2000 products, respectively. A combination of hardware and software platforms, the routers support OSI, TCP/IP, and DECnet. The routers are based on the Integrated Intermediate System to Intermediate System (IS-IS) draft standard. Remote sites with light network traffic use DEC WANrouter 100 to connect LANs over a wide area network. The DEC WANrouter 500 functions in midrange to heavily trafficked network sites to connect LANs over a WAN.

DEC WANrouter 100 and DEC WANrouter 500 are Digital's first products that support frame-relay capabilities based on the joint efforts of Digital, StrataCom, and Northern Telecom.

DEC X25gateway 100 and X25gateway 500: These gateways allow Digital and non-Digital X.25-based systems to connect to public and private packet switched data networks.

DECnet for SCO UNIX: This product acts as a stream-based Phase IV end-node implementation of DECnet for the SCO UNIX System V/386 Release 3.2.2 and Open Desktop (ODT) V1.1 operating systems for Intel 386/486 systems. The product enables SCO UNIX users to participate as Phase IV DECnet end systems in new and existing Digital networks. Third-party software vendors can build SCO UNIX applications on top of Phase IV DECnet. This product is going to serve as a foundation for future Digital Network Application Support (NAS) applications and services.

The following systems can run DECnet for SCO UNIX: DECstation 316+, DECstation 325c, DECstation 333c, ApplicationDEC 433MP, Compaq SystemPro 386/25, and Compaq SystemPro 386/33. These systems require one 3½-inch or 5¼-inch disk drive; 8M bytes of memory; and one of the following Ethernet controller cards: Digital EtherWORKS DE100/DE200, 3Com 3C503, or Western Digital WD8003E.

Additional Software

DECmcc Basic Management System (BMS): This system provides the open platform for managing elements in the enterprise network; it is an EMA-compliant DECmcc Director.

DECmcc Extended LAN Manager: This software manages Digital's DECbridge, LAN Bridge, and DECconcentrator products; it is EMA compliant.

DECmcc Developer's Toolkit: The toolkit initiates a process for writing, designing, and testing management module software for EMA compliance.

DECmcc Management Stations (SMA and EMS): These systems consolidate network management products.

DECelms (Extended LAN Management Software): This software enables network managers at a Digital VMS management station to configure, monitor, and control the company's FDDI concentrators, 802.3/Ethernet-to-FDDI bridges, and 802.3/Ethernet LAN Bridges on 802.3/Ethernet and FDDI-based networks.

LAN Traffic Monitor (LTM): The monitor measures bandwidth utilization on multivendor 802.3/Ethernet local area networks.

MMCC/VAX ETHERnim: This software serves as a fault isolation and configuration management tool for extended 802.3/Ethernet local area networks.

MMCC/DECnet Monitor: This monitor serves as a wide area network performance, fault, and configuration management tool for DECnet products.

DEC Management Station for ULTRIX: This system provides remote management capabilities layered on the ULTRIX operating system.

DECmcc WANdesigner: This software acts as a designer tool for Digital wide area networks.

Remote System Manager (RSM): RSM furnishes application and configuration management for multiple, distributed MicroVAX and/or VAXstation systems.

DECserver 300 Version 2.0 Software: This software supports concurrent LAT and TCP/IP Telnet sessions to both Digital and non-Digital hosts. Version 2.0 integrates DECserver 300 terminal servers into multivendor environments, connecting multiple terminals, printers, and other serial devices to a local or remote host. Software requirements are as follows: for each VAX and DECsystem acting as a load host, either the VMS operating system software with DECnet-VAX network software or the ULTRIX/ULTRIX-32 operating system software running DECnet-ULTRIX networking software.

DECserver 300 for MS-DOS V2.0: This product features a downline load capability from a PC instead of a VAX host. The software contains the DECserver 300 V2.0 terminal server image and the host software for an AT-class PC. Hardware requirements include an AT-class PC, a DECserver 300, a 1M-byte disk for installation, and a 0.75M-byte disk after installation. Software requirements include MS-DOS V3.1 or V3.3 and PATHWORKS for DOS V3.0.

Support

Digital is currently offering services that focus on the development and integration of customers' open network environments.

DECnet/OSI Transition Planning Service: This service facilitates customers' transitions to open network environments. Pricing for this service is set on a per-contract basis.

Open Network Customer Training: This service offers network managers, application developers, and network planners access to Digital Services courses on a variety of open networking subjects. Courses range in price from \$500 to \$1,895.

NETsupport Operations Management Services: These services provide customers with ongoing management of their DECnet/OSI and/or TCP/IP network resources. Pricing is set on a per-contract basis.

NETsupport Shared TCP/IP Service: This service provides customers with operations support for TCP/IP networks, including network management hardware and software, on-site consulting, and telephone advisory support. NETsupport costs \$2,875 per month.

Pricing

The following prices are for purchase only.

Equipment and Software Prices

	Purchase Price (\$)
Internetworking Products	
DTF Server	1,510-63,200
DTF Utilities	640-27,000
DTF for IBM MVS	30,900
DTF for IBM VM	21,000
DECrouter	3,250
DECserver 300 for MS-DOS V2.0	650
DECconcentrator 500 Port Card (DEFN-S or DEFN-T)	3,000
DEC FDDIcontroller 700-C	4,500
DEC FDDIcontroller 400	19,900
DECnet/OSI for ULTRIX V5.0 (separate license) for VAXserver 3100	1,050
DECnet/OSI for ULTRIX V5.0 (separate license) for VAX 9000 Series	13,900
OSI Application Developer's Toolkit license for ULTRIX and VMS systems	3,350
DEC WANrouter 100	5,500
DEC WANrouter 500	12,600
DECbridge 500 Series	25,000-41,000
DECbridge 600 Series	21,000-45,000
DEC X25gateway 100	6,000
DEC X25gateway 500	15,000
DECnet for SCO UNIX V1.0 license	725
DECmcc LAN Manager Access Module	2,950
DECmcc LAN Manager Functional Module package	1,180

Digital Products Printer Sharing Products

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Product Summary

Editor's Note

Since our last report, Digital Products has expanded its printer and peripheral sharing products to include the first in a series of LAN-based products: an add-in board that solves the problem of slow graphics printing on a local area network.

Description

Digital Products manufactures and markets asynchronous printer and peripheral sharing devices for the RS-232 and LAN markets.

Strengths

Digital Products provides strong, high-speed printer sharing products. Its products print jobs flawlessly and at speeds unmatched by the competition.

Limitations

Digital Products offerings are priced on the high end in the printer sharing and peripheral products market, primarily when users choose the company's expensive cabling.

Competition

Fifth Generation Systems, Extended Systems (ESI), Rose Electronics, Western Telematic, Buffalo Products.

Vendor

Digital Products, Inc.
108 Water Street
Watertown, MA 02172
(800) 243-2333

Price

Prices range from \$445 for LANSprint to \$6,750 for the high-end NetCommander.

GSA Schedule

Yes, via distributors.

—By Donna Horsley
Staff Writer

Analysis

Product Strategy

Digital Products is shedding its "sub-LAN" image and repositioning itself as a leader in printer sharing. In April, the company began shipping LANSprint to emphasize its know-how in high-speed printer sharing and to lay the basis for Digital Products' entry into the local area network market.

The company intends LANSprint to be the first of many products that it will introduce to the LAN market. LANSprint, an add-in board for Novell's NetWare, increases the printing speed of graphic print files over a LAN more than 100 times.

"With LANSprint, Digital Products is broadening its product line to include cost-effective, complementary printer sharing products that compensate for printing deficiencies on LANs," Pete Peterson, Digital Products president, said. "Prior to LANSprint, users printing graphics on a LAN could wait up to an hour for a page to print. This was both time consuming and unproductive. Now those users will wait only a few minutes for the same page to print."

Despite Digital Products move into the LAN market, the company plans to maintain its key player status in the RS-232 market. It has spent the past two years restructuring and redesigning its PrintDirector and NetCommander printer sharing products to improve functionality, useability, and speed.

Printer Sharing and Peripheral Products

LANSprint

LANSprint, an add-in board for Novell's NetWare 2.15 and 3.0, increases the maximum speed at which a file server or remote workstation can print graphics data and download fonts from about 1,000 to 9,000 cps to approximately 100,000 cps. Introduced in January, LANSprint is compatible

with all network wiring topologies including Ethernet, thin wire Ethernet, token-ring, and Arcnet. It drives parallel cable 100 feet, rather than the typical 15 feet, and is easily installed in either a file server or remote workstation.

PrintDirector Series

Rather than have different names for the PrintDirector products, Digital Products now offers one PrintDirector that is available with three levels of functionality—Gold, Silver, and Bronze.

In January, Digital Products boosted the functionality of PrintDirector Gold, formerly the PD Management Series, to include file transfer and the option of E-Mail so it can be viewed as a low-cost LAN alternative. The product offers high-speed graphics printing with a throughput speed of 12,000 cps, and it supports distributed IBM mainframe printing to a local laser printer via its Gateway-3287 protocol converter.

PrintDirector Silver, formerly Printer Director +, is designed for sharing printers within PC work clusters. It has a throughput speed of 6,500 cps.

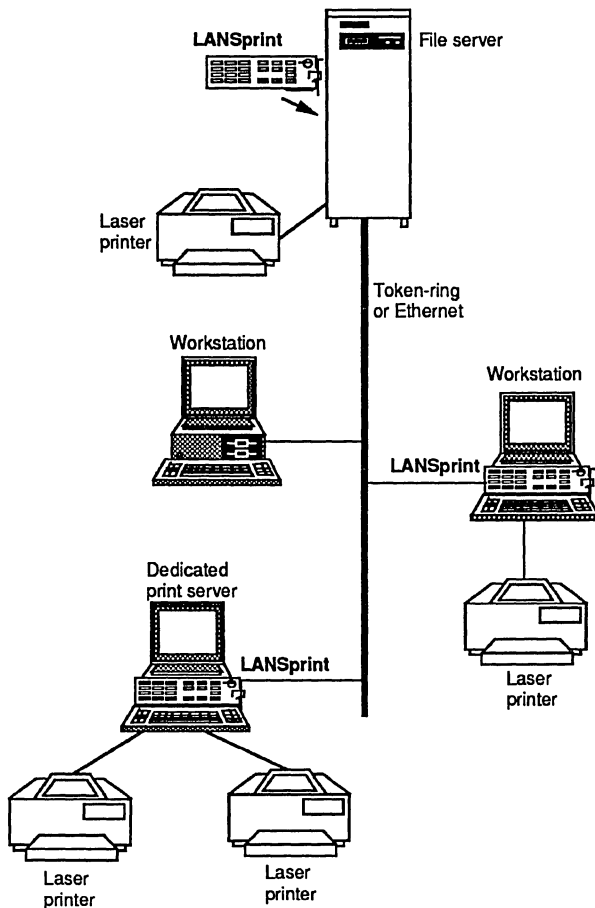
PrintDirector Bronze, formerly PrintDirector Jr., is available in two models. The standalone model allows five users to share one printer of any type. The second model, the Laserboard, is installed in the I/O slot of the HP LaserJet II or III and allows a maximum of six PCs to share the printer. It offers a printing throughput speed of 2,500 cps.

NetCommander

NetCommander is an asynchronous network for departmental connectivity that supports full printer and management features as well as file sharing, file transfer, automatic tape backup of all PCs on the NetCommander, minicomputer and mainframe links, and modem communications. The product provides file sharing at 115K bytes per port per second, PC-to-PC and PC-to-host file transfer, any port-to-any port connections, security controls, and contention management for concurrent use.

NetCommander is available in three standard models with 10, 16, and 32 ports. Units can be linked to connect an unlimited number of devices.

Figure 1.
LANsprint High-Speed Printer Sharing



Digital Products' LANsprint, an add-in board for Novell's NetWare 2.15 and 3.0, increases the maximum speed at which a file server or remote workstation can print graphics data and download fonts from about 1,000 to 9,000 cps to approximately 100,000 cps. Digital Products intends LANsprint to be the first of many products that it will introduce to the LAN market.

Other Connectivity Products

Besides printer sharing products, Digital Products provides office and workgroup connectivity options—gateways to mini and mainframe environments, modem sharing, and printer support utilities.

Digital Products Certified Cabling

Digital Products offers cables and connectors for various wiring environments. With its DOCTOR diagnostic program (available with PrintDirector

Silver and Gold and NetCommander), the company can locate cabling problems during installation and validate the maximum serial transmission rate each PC can support.

Competitive Position

Digital Products holds 20 percent of the printer sharing market, with more than 100,000 of its printer sharing and peripheral products installed nationwide. In 1990, the company's PrintDirector and NetCommander products earned more than \$10 million in sales.

Digital Products' printer sharing and peripheral devices provide superior software and faster speed and are more reliable than the competition, which includes Fifth Generation Systems, Extended Systems (ESI), Rose Electronics, Western Telematic, and Buffalo Products.

In comparative tests by three third-party sources, Digital Products' offerings ranked superior in the following categories: software compatibility with other applications, hardware compatibility with shared devices, software included in a package, and documentation.

During the past two years, the company has redesigned its PrintDirector and NetCommander products for faster throughput. PrintDirector Bronze—the low end of the PrintDirector series—has a speed almost identical to many high-end printer sharing products. PrintDirector Silver offers the fastest speed in its market at 6,500 cps. Both the PrintDirector Gold and NetCommander offer a throughput of 12,000 cps, which is almost as fast as a direct connection between a PC and a Hewlett-Packard LaserJet III.

The company's products are priced on the high end in the printer sharing and peripheral products market. For example, NetCommander's per-port cost is almost twice that of Rose Electronics' Rose MasterSwitch—a product comparable to NetCommander. However, NetCommander's high price is justified because of its high-quality software.

In the LAN arena, Digital Products is the leader in high-speed printing. LANsprint is the only product to solve both the problem of how to conveniently locate network printers and the problem of slow graphics. Intel Corp.'s NetPort competes with LANsprint; however, it cannot match LANsprint's high-speed features. With LANsprint,

Table 1. Capabilities Guide

	PrintDirector			NetCommander
	Bronze	Silver	Gold	
Sustained printer sharing speed (cps)	2,500	6,500	12,000	12,000
Share one printer	X	X	X	X
Share multiple printers		X	X	X
Share plotters/modems/other peripherals		X	X	X
Graphics printing		X	X	X
Wiring closet		X	X	X
Mainframe printing			X	X
File transfer			X	X
E-Mail			X	X
File sharing/backup				X
Advanced printer controls				X
Port selection and data collection				X

the maximum speed at which a file server or remote workstation can print graphics data and download fonts is approximately 100,000 cps. Most modern laser printers can currently accept and print binary graphics data or download font speeds from approximately 15,000 to 100,000 cps.

Decision Points

Viable LAN Alternative Solutions

For the user with a few PCs that share a printer and occasionally exchange files, a local area network may be overkill. With Digital Products' peripheral sharing products, users enjoy benefits over traditional LANs, such as cost savings, simplicity, and access to the advanced features of today's printers.

Digital Products' devices avoid the hidden costs of LANs—the expense of support personnel and the high cost of network adapters and cables. The company's use of RS-232 and telephone cables provides easier installation than the coaxial cables used in LANs. PrintDirector Silver, for example, installs in minutes without software if the user wants to share one printer. It contains an easy automatic installation program with menu-driven point and shoot interface for configuring applications with multiple printers or peripherals. It also

provides built-in DOCTOR diagnostic software for fast troubleshooting and installs in any wiring closet.

In terms of features, Digital Products' offerings provide superior performance and features. The products print jobs flawlessly, provide file sharing and file transfer, and allow users to share mainframe resources and modems. Supporting all software applications, including Windows, its peripheral sharing devices provide buffering features that allow attached printers and PCs to run at high transmission speeds. The PrintDirector products provide buffer options from 256K to 4M bytes. PrintDirector Gold provides the best choice for graphics printing, with throughput speeds of up to 12,000 cps.

Company Profile

Digital Products, a privately held company headquartered in Watertown, MA, reported \$10 million in revenue in 1990. Its PrintDirector and NetCommander products connect approximately 600,000 devices in a variety of office environments from small local businesses to *Fortune* 2000 companies worldwide, such as American Airlines, Mobil Oil, Liberty Mutual, and Stat Oil of Norway.

Founded in 1984 by Cornelius (Pete) Peterson, president and CEO, Digital Products pioneered the sub-LAN concept, a cost-effective

method for achieving departmental connectivity without the higher price and complexities of a full LAN. PrintDirector (formerly MultiSpool) was the first printer sharing product in the industry.

During the past two years, Digital Products has worked to shed its sub-LAN image and reposition itself as a premier printer sharing company to meet industry demands. The company enhanced and expanded its family of printer and peripheral sharing products and entered the LAN market with its recent debut of LANSprint, an add-in board solving the problem of slow graphics printing on a LAN.

In February, *New England Business*, a monthly magazine, named Digital Products to its list of New England's 100 fastest-growing companies (both public and private). The magazine cited Digital Products' 465 percent sales growth rate from 1985 to 1989.

Digital Products has approximately 100 employees, with international distributors throughout the world accounting for 10 percent of company sales.



Characteristics

Models: LANSprint, PrintDirector Series, NetCommander.

Date Announced: LANSprint—January 1991; PrintDirector Series—1984; NetCommander—1984.

Date First Installed: LANSprint—April 1991; PrintDirector Series—1984; NetCommander—1984.

Number Installed: 600,000 ports; 100,000 units.

Distribution: Through authorized master resellers, including data communications equipment resellers, resellers of high-performance printers, and resellers of PC-based office automation equipment.

Models

The company's individual products and their general specifications are as follows.

LANSprint: This product consists of an add-in board and software. It is available in both single- and dual-port versions for a PC/XT/AT-style bus, as well as a single-port version for a Micro Channel-style bus. LANSprint installs in a file server, dedicated print server, or workstation and works with Ethernet, token-ring, or Arcnet. It supports both Netware 2.15+ and NetWare 3.0.

LANSprint works with current cabling and supports banner pages, copies, form feed, and Novell NOTIFY. It drives parallel cable up to 100 feet, supporting parallel cable at 115K bytes up to 4,000 feet using Digital Products' Parallel Distance Extenders over two-pair telephone-type cabling.

PrintDirector Gold: This printer sharing product operates at throughput speeds of up to 12,000 cps, supporting printing from minis, hosts, Macintoshes, and LANs with default routing. It has models with 6, 10, and 16 ports in a variety of parallel and serial configurations including four-wire and eight-wire RJ connection. It has no input or output restrictions on any ports.

PrintDirector Gold features an automatic installation program with menu-driven point and shoot interface using only two screens. Users can select printers with either PDPop hot key or AutoSelect. The product provides resident font and feature support for all printer types and brands, including the full Hewlett-Packard line. PrintDirector Gold supports a personal printer on any connected PC, dynamically allocating buffered memory options from 1M byte to 4M bytes. It also provides DOCTOR diagnostic software for troubleshooting.

PrintDirector Silver: This printer sharing product operates at throughput speeds of up to 6,500 cps, sharing any kind of printer, including laser, color, PostScript, dot matrix, and multiemulation. It has 6-, 10-, and 16-port models with a variety of serial and parallel configurations with no input/output restrictions.

For sharing one printer, PrintDirector Silver installs in minutes without software. For multiple printers or peripherals, it features menu-driven software. SmallPop, a 13K-byte, hot key-activated, pop-up menu, provides easy access to all attached printers and features from within an application.

PrintDirector Silver supports all software applications, including Windows. It also features buffer options from 256K to 4M bytes, DOCTOR diagnostic software for automatic troubleshooting and support, and selectable time-outs for printer management and productivity. For modem support, it provides true bidirectional, full-duplex, serial connections.

PrintDirector Bronze: This printer sharing product is designed for small PC workgroups that perform similar tasks and need to share the same printer.

PrintDirector Bronze, which installs in minutes without software, works best with text and spreadsheets. It allows up to five PCs to share any printer and has port options of six serial, six parallel, or four serial and two parallel-DB25 connectors. The product provides dynamically allocated buffer options from 256K to 4M bytes.

NetCommander: This office connectivity solution provides printer sharing, file transfer, E-Mail, and support for mainframe distributed printing. It also supports peer-to-peer file sharing and automatic unattended backup.

NetCommander provides all the printer sharing features of PrintDirector Gold. It supports incoming and outgoing auto dial modems; independent data rates at each port; and full-duplex, bidirectional data paths, even for four-wire connections.

In terms of mini/mainframe links and port selection, NetCommander allows VAX, 3B2, HP 3000 applications. It also allows any terminal or PC in terminal mode to access any CPU port group, even IBM 3174 asynchronous ports. It can access through a backbone data switch or multiplexer and provides user-definable character break and length.

For data collection, NetCommander works well with bar code, laboratory, alarm monitoring, and factory control equipment. It works in polled and tagged modes and buffers collect data until the unit is polled by the master CPU, and it can put a source identification banner on data in FIFO collection modes.

For user programmability, NetCommander provides a command processor for operating features from other programs' batch files. It provides DC1 file sharing software and optional DC2 automatic backup.

Gateway-3287: This protocol converter enables high-speed ASCII printers, including lasers, to be used in IBM 3270 mainframe environments. Gateway-3287 is available as an option to the PrintDirector Gold and NetCommander products. Ten-port versions of the PrintDirector Gold and NetCommander are available with a built-in Gateway-3287.

GW-Twinax: This product, which will be available in July, enables users in IBM System/34, /38, and AS/400 computing environments using 5251 Model 12 or 5294 remote control units to print to high-speed ASCII printers, including lasers connected to a PrintDirector Gold or NetCommander. It emulates IBM 5246, 5225, 5219 and 4214 printers, and it contains a parallel output port.

ModemManager: This product enables the sharing of a modem while using PrintDirector Silver and Gold or NetCommander. Working with all popular communications software, ModemManager automatically issues proper selection codes for a Digital Products' unit and selects modem and Baud rate. It writes script language and dials numbers (CrossTalk XVI, Relay Gold, VTERM, and SmartCom).

Auto Selector: This easy-to-use automatic printer selection program can be used with all DOS applications on Windows 386. It interprets LPT1, 2, and 3 requests and selects preassigned printer, font, and time-out. Providing a 1K-byte, RAM-resident program, Auto Selector is included in PrintDirector Gold, Release 4.1 of PrintDirector Silver, and Release 5.1 of NetCommander.

JetPropulsion: This product increases the printing speed of raster graphics packages like Lotus Freelance and Harvard Graphics by 50 to 500 percent. A small TSR (2K), JetPropulsion installs in minutes on a workstation. It works out of both parallel and serial PCs attached directly to a Digital Products' printer sharing product or via a LAN to a printer. It supports the HP LaserJet IIP, III, and IIID; DeskJet printers; and PCL 5.0 compatibles.

GW-EMail: This product enables users of PrintDirector Gold and NetCommander to easily edit, send, and receive notes and memos (including files from word processing and spreadsheet packages) to and from all serially connected PCs. Supporting group messaging and user-specified attachment files, it runs from the DOS prompt and is selectable from both PDPop and BigPop menus. GW-EMail is included on NetCommander and is available as an option on PrintDirector Gold.

Support

Digital Products equipment is supported by its dealer network on the local level. It maintains a toll-free technical assistance line with eight support personnel, as well as a 24-hour user bulletin board.

Installation: Digital Products resellers assist customers with installation. Digital Products personnel may assist with large installations.

Training: Digital Products offers a one-day installation and support course at the customer's site for up to six people at a cost of \$1,250 plus travel expenses for Digital Products personnel. A two-day course for customer technical support staff is also given in Boston, priced at \$1,500 per person.

Warranty: All Digital Products equipment is covered by a one-year warranty, and two- or five-year protection plans are available that include immediate replacement of defective units. These plans cost 15 percent of the unit price for two years or 25 percent of the unit price for five years.

Product Prices

	Purchase Price (\$)
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LANSprint Series	
LANSprint 1AT/2AT/MCA	495-695
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NetCommander Series	
NetCommander 32S and 32SP	5,450-6,750
NetCommander 16S and 16SP	2,950-3,895
NetCommander 10G	2,495-3,395
NetCommander 10S and 10SP	1,895-2,795
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PrintDirector Series	
PrintDirector Gold 62 and 6SP	995-1,695
PrintDirector Gold 10S and 10SP	1,395-2,095
PrintDirector Gold 10G	2,695-3,395
PrintDirector Gold 16S and 16SP	2,395-3,095
PrintDirector Silver 6S and 6SP and S6P	695-1,395
PrintDirector Silver 10S and 10SP	995-1,695
PrintDirector Silver 16S and 16SP and 16PS	1,695-2,395
PrintDirector Bronze LASBRD-DB	345
PrintDirector Bronze LASBRD-6	495
PrintDirector Bronze PDB6S and PDB6SP and PDB6	445-1,145
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