

Local Area Networks: Market Overview

In this report:

New Markets for Old Pros	-102
Global Activity	-103
Cooperative Ventures	-104
IBM's LAN Product Blitz	-106

Synopsis

Editor's Note

This report focuses on the LAN and LAN internetworking markets. For information on LAN technology, see Report 520-201. For detailed specifications of over 1,000 products from more than 200 LAN vendors in comparison column format, see Report 520-301.

Market Highlights

The terminology of LANs has escalated from connectivity to interconnectivity, from networking to internetworking, and from operability to interoperability. All kinds of diverse equipment and software are talking to each other, and all kinds of vendors are working together to accommodate interconnected, global communications. From its simple beginnings as a departmental network, the LAN has graduated to a position of prominence in communications, cutting across office, campus, city, and country boundaries.

Sales of LAN products—hardware, software, and cabling—amounted to more than \$5 billion in 1989, and

the forecast for the next few years is encouraging for those in this market. Anticipated sales for the mid-90s can more than double the 1989 figure. Users are not only increasing the number of nodes in their LANs, they are paying less per node as costs to implement the technology continue to decrease.

Integrating the components in networks and the networks with other networks remains the greatest of challenges. Vendors have made peace with the existence of communications equipment from competitors and are actively promoting compatibility. "Vendor friendliness" can characterize the market's approach to the '90s. Vendors that formerly would not mention competitors' names are now boasting of their alliances and interoperability with the products of those very same competitors.

—By *Barbara Callahan*
Associate Editor

Analysis

In an era of retrenchment, streamlining, and restructuring, companies participating in or entering the LAN and LAN internetworking markets can draw comfort from the healthy prognosis for the industry. Connecting networks has become the goal of the '90s, and this intricate task creates opportunities for companies involved in producing connectivity hardware, software, and media, and even more opportunities for the companies that can tie them all together.

Since there is still room for many in the LAN and internetworking fields, the industry has not experienced the shakeout that often occurs when a technology achieves maturity. Although LANs have been around for awhile, growth and development factors have not diminished. Having noted this situation, many data communications companies have turned to LAN products to revitalize flat sales. To illustrate the high level of activity in the market, Table 1 presents an overview of the internetworking products announced by 108 companies during 1990.

Established vendors continue to innovate and refine products. Names like Novell, Banyan, 3COM, and Ungermann-Bass are still synonymous with LANs. The leader in token-ring technology, IBM, is far from complacent, having released a spate of LAN products in 1990. At the same time, new names are entering the field along with names associated with other communications devices—names like Microcom, General DataComm, and Hayes.

Many vendors have set their sights on overseas markets to continue growth and expand opportunities. Proteon, a LAN leader, has set up a sales office in Sydney, Australia, to handle sales that have increased more than 100 percent in the past two years in Australia and New Zealand. Codenoll Technology has signed a distribution agreement with Soliton of Japan to take advantage of the opportunities in the rapidly growing Japanese networking market.

Issues and Trends

New Markets for Old Pros

During 1990, attendees at trade shows featuring local area network products might have wondered if they had strayed into the wrong halls. Many of the names emblazoned over booths were old pros in the data communications field, but newcomers to the local area networking market. Having ascertained that the LAN market can still accommodate many participants, vendors formerly associated with products such as modems, multiplexers, and switches are entering the field. Some modem manufacturers, perhaps anticipating declining sales from the rapid digitalization that is occurring throughout the world, have set their sights on LANs to revitalize business.

Hayes, a name almost certain to be followed in a word-association test by "modem," has established "Hayes for LANs," a family of products that includes EtherMate 8, EtherMate 8UTP, and EtherMate Trio16. EtherMate 8UTP is an 8-bit half-card adapter that connects to thick or unshielded twisted-pair Ethernet environments through DB 15 AUI and RJ-45 connectors. EtherMate 8UTP is designed for IBM XT/AT, PS/2 (Models 25 and 30), EISA, and IBM-compatible computers. EtherMate 8 is an 8-bit half-card that connects to thick or thin Ethernet cables, designed for IBM XT/AT, PS/2 (Models 25 and 30), EISA, and IBM-compatible computers. EtherMate Trio 16 is a 16-bit, 3/4-length adapter servicing all media—thick, thin, and unshielded twisted-pair Ethernet cables on a single board. It is also designed for the computers supported by EtherMate 8 and EtherMate 8UTP.

Another vendor whose name is practically synonymous with modems, Microcom, has shifted direction slightly and moved into the LAN market. Microcom, which pioneered error correction and data compression in modems, still attracts customers for its modems and is enjoying a healthy business. A Microcom spokesperson commented, "Our customers won't let us get away from modems." The Microcom LAN Bridge (MLB) puts Microcom into the internetworking arena. MLB includes a family of high-performance, MAC-layer, remote LAN bridges. In May, Microcom added to the MLB line with Release 2.0 of the Microcom LAN

Bridge family with network management capabilities, the MLB/6500 with support for X.25 links, and the MLB/5500 for ISDN connections.

Another leading modem vendor, General DataComm, has introduced a LAN offering to complement existing products. The MEGA*BRIDGE, a system for integrating multiple local area networks and remote local area networks at high speeds into a single communications network, complements MEGAMUX TMS, General DataComm's T1 networking multiplexer, and GEN*NET, its line of statistical multiplexers.

In another word-association test, the name Telco would be followed by T1. Telco is still in the T1 network business but has entered the LAN market with FASTLANE, a 4:1 LAN/WAN compression bridge. With this product, Telco has not abandoned T1, but it enables customers to incorporate LAN access into their T1 networks. Len Eisenstein, vice president of sales and marketing, commented, "We have always been firmly rooted in the customer premises side of T1. As new office equipment plugs into the T1 network, we have adapted accordingly. This LAN/WAN compression bridge, a natural extension of our product line, is our response to customers who want to bridge LANs across a campus or across the country over T1 lines."

Bytex of Southborough, MA, a supplier of fault-tolerant electronic matrix switching systems, is now expanding its business focus by including LAN solutions. Jeffrey S. Goodman, president of Bytex, explained the company's decision. "Our entire business is focused around increasing our customers' network availability and reliability, as well as providing increased capabilities to control and manage their networks. Therefore, the decision to work with our customers to develop and deliver products that give them greater control of their LANs was an easy one for us to make and has initiated a series of investments." To further its entry into the LAN market, Bytex acquired Vance Systems Corp. of Chantilly, VA, a company that develops and markets the ATS LAN 1000 protocol analyzer. This product was also marketed under an OEM agreement with Atlantic Research as the Interview 1000 Series. The acquisition gives Bytex exclusive development, manufacturing, and distribution rights to all Vance Systems' products.

Global Activity

During 1990, many LAN vendors, noting worldwide opportunities for their products, extended their operations to countries outside the United States. Wayne Fitzsimmons, vice president of international operations for *Banyan Systems* of Westboro, MA, outlined Banyan's international channel distribution strategy at Networks '90 in Birmingham, England. Fitzsimmons stressed the importance of partnerships with international distributors and the value of products that facilitate multilingual networking. At the same time, he announced a comarketing agreement with Apricot Computer Plc. Fitzsimmons stated that "Banyan is operating today in over 35 countries and has an installed base of nearly half a million users." Internationally, Banyan distributes principally through "country partners," regional distributors that support and sell Banyan products through a second tier of local resellers. The country partners act as Banyan's marketing representatives in their own regions, but they also participate in the development of products designed to meet the specific needs of their markets.

An outgrowth of these relationships has been the introduction of multilingual VINES, which is being prepared for delivery in French and German. Other languages, including two-byte versions of VINES, are also planned. Fitzsimmons indicated that "28 percent of Banyan's revenue comes from international operations today. Our goal is to increase that to 35 percent by 1991."

Advanced Computer Communications (ACC) of Santa Barbara, CA, has established a branch office near London to support its growing base of customers and resellers in Europe. ACC's European Support Center is staffed with technical personnel experienced in computer network planning, product design, and sales. In addition, the center maintains a stock of ACC's internetworking bridges, routers, and network management systems for demonstrations or for replacements of systems on warranty or under service contract.

Codenoll Technology of Yonkers, NY, signed a distribution agreement with Soliton systems of Japan under which Soliton sells Codenoll LAN systems in Japan. A leading supplier of Ethernet LAN systems, Codenoll has recently introduced network systems based on FDDI technology. Michael Coden, president of Codenoll, said, "Soliton is a proven performer in the rapidly growing Japanese

networking market, and we anticipate significant revenue from this new arrangement. Codenoll has also entered into distribution and OEM agreements with Bull of France, Robert Bosch of Germany, and Eurolan of Italy.

DAVID Systems of Sunnyvale, CA, has advanced its European distribution plan by signing an agreement with Trend Communications A/S of Denmark that covers the DAVID 10BASE-T Ethernet family of products. Henry R. Nothhaft, president and CEO of DAVID Systems, commented, "The signing of Trend, a significant, respected player in the data market in Denmark and Europe, is a welcome addition to our distribution network for Europe, which currently includes the United Kingdom, France, Germany, Switzerland, and Italy."

Newport Systems of Newport Beach, CA, a supplier of WAN and LAN connectivity products, announced a nonexclusive distribution agreement with Suntze Communications Engineering PTE LTD of Singapore for its complete line of communications products. The agreement calls for Suntze to distribute Newport Systems' LAN²LAN family of multilink router-level bridges and other products in Singapore, Malaysia, and Indonesia.

Proteon of Westborough, MA, has set up a sales office in Sydney, Australia, to provide sales and marketing support for Proteon's distributors and VARs in Australia and New Zealand. According to Daniel Berger, director of Proteon's Asia/Pacific Operations, Proteon's business has grown by more than 100 percent during 1989 and 1990 in Australia and New Zealand, which are two of Proteon's fastest-growing markets worldwide.

Thomas-Conrad of Austin, TX, has signed a distribution agreement with Ingram Micro D, Inc. to distribute its products internationally. Ingram Micro D serves as a wholesale distributor to over 40,000 reseller customers in the U.S., Canada, and Europe. It operates two international subsidiaries: Ingram Micro D Ltd. of Canada and Ingram Software of Belgium.

Cooperative Ventures

LAN vendors have acknowledged the virtues of cooperation. By combining expertise and resources, they bypass the rigors and expense of individual research and development efforts. This cooperation has enhanced vendors' opportunities

because the LAN market is sufficiently vast to accommodate and reward many participants. An overview of cooperative ventures inaugurated in 1990 follows.

Advanced Computer Communications (ACC) and Digital Equipment Corp. In April 1990, Advanced Computer Communications (ACC) of Santa Barbara, CA, and Digital Equipment Corp. of Maynard, MA, announced a Basic Ordering Agreement under which Digital can purchase ACC data communications products and services, including the ACS Series 4000 family of bridges, routers, and network management products. The contract provides Digital with a blanket purchasing agreement that allows the company to acquire ACC's data communications products for resale or internal use.

AT&T and cisco Systems. AT&T Computer Systems Division of Morristown, NJ, and cisco Systems of Menlo Park, CA, have entered into an OEM relationship in which cisco supplies AT&T with high-performance, multiprotocol network routers for LAN interconnect solutions for AT&T's customers.

Banyan and cc:Mail. Banyan Systems of Westboro, MA, and cc:Mail of Mountain View, CA, announced a VINES network-specific version of the cc:Mail E-mail package—cc:Mail for VINES.

British Telecom and Advanced Computer Communications (ACC). The agreement states that British Telecom resells and supports ACC's LAN bridge/routers, incorporating them into its T-NET IN2000 range. The bridge/router products covered in the agreement provide links between T-NET LANs across X.25 packet-switching networks and private circuits. ACC is located in Santa Barbara, CA.

cisco and Cabletron. Cabletron of Rochester, NH, and cisco have entered into an alliance to integrate cisco's internetworking routing technology into Cabletron's Multi-Media Access Center (MMAC) intelligent hub products. Cabletron and cisco are jointly working on developing a router module that plugs into the MMAC chassis, resulting in MMAC's first routing capability.

Codenoll and LANEX. Codenoll Technology of Yonkers, NY, and LANEX of Beltsville, MD, entered into a strategic alliance to develop additional technology and products for FDDI networks.

Codenoll and NYNEX. Codenoll Technology and NYNEX Science & Technology of New York, the research and development arm of NYNEX Corp., have signed a five-year agreement to cooperate in the development of high-speed fiber optic-based products and other local area network products and technology.

Cryptall Communications and Telco Systems. Cryptall of Cranston, RI, entered into an OEM agreement with Telco Systems of Norwood, MA, under which Cryptall supplies Telco with the 8023 LAN/WAN bridge for Ethernet to T3 and the 8025 bridge for token-ring to T3. The products are marketed to interexchange carriers, local exchange carriers, and large corporations.

DAVID Systems and Syntrex. DAVID Systems of Sunnyvale, CA, and Syntrex of Eatontown, NJ, signed a strategic partnership agreement that enables Syntrex to market DAVID's line of Ethernet connectivity products.

Moses and DacEasy. Moses Computers of Los Gatos, CA, and DacEasy of Dallas, TX, finalized an OEM agreement for bundling products in September. The agreement establishes plans for creating a commercially offered, bundled IBM-compatible LAN with accounting software targeted for the microcomputer market. The network bundle incorporates ChosenLAN from Moses for sub-assembly by DacEasy into an integrated offering for small business accounting applications.

Proteon and Acer, Inc. Since July 1990, Acer has been reselling Proteon's IBM-compatible token-ring networking solutions. The agreement called for Acer to incorporate Proteon's ProNET-4/16 network interface cards and the Series 70 Intelligent Wire Center into its Acer Token Ring Network 5290 Series. Proteon is located in Westborough, MA, and Acer's headquarters are in Taipei, Taiwan.

Proteon and Codex. Proteon has entered into a VAR agreement with Codex of Mansfield, MA, under which the Systems Division of Codex markets Proteon's line of token-ring networking and internetworking products. Codex is offering the products through custom bids as part of a complete networking solution. Codex is marketing Proteon's p4100+ bridging router and ProNET-4/16 token-ring products.

Proteon and HP/PSI. In August 1990, Proteon announced a marketing agreement with

Hewlett-Packard and Performance Systems International (PSI) for its p4100+ Multi-Protocol Bridging Router. PSI became a value-added reseller of the p4100+, and Hewlett-Packard references and recommends p4100+ to prospective Apollo Token Ring users and its installed base. The p4100+ combines an HP Apollo Token Ring interface with support for the DOMAIN operating system.

Retix and SynOptics. In August, Retix of Santa Monica, CA, announced an additional OEM product agreement with SynOptics of Mountain View, CA, in which the high-speed remote bridge technology jointly developed with SynOptics is integrated in the LattisNet System 3000 intelligent wiring concentrator.

StrataCom and CrossComm. The agreement between StrataCom of Campbell, CA, and CrossComm of Marlborough, MA, calls for CrossComm to build support for StrataCom's frame relay interface into its ILAN internetwork server product family. When CrossComm's frame relay development is completed, it will enable frame relay traffic to pass between the company's ILAN internetwork server and StrataCom's fast packet IPX networking system.

3Com and SynOptics. In August 1990, 3Com of Santa Clara, CA, and SynOptics of Mountain View, CA, announced a strategic alliance to enhance interoperability and to integrate network management of 3Com's Ethernet adapter and SynOptics' intelligent hub products. Under terms of the agreement, 3Com resells SynOptics' System 3000 Ethernet intelligent wiring hubs and integrates the System 3000 into its network management architecture. SynOptics, in turn, integrates 3Com-managed adapter cards into its network management systems and also offers 3Com adapters. The agreement also gives 3Com the option to build value-added modules, such as internetworking and communications server devices for 3Com's hub platform.

Thomas-Conrad and Performance Technology. In August 1990, Thomas-Conrad of Austin, TX, and Performance Technology of San Antonio, TX, announced a strategic partnership, which consists of technology transfers and an OEM relationship to market local area networking products. Initially, both companies are working toward integrating their product lines.

Tricord and Valinor. In June 1990, Tricord Systems of Minneapolis, MN, and Valinor Inc. of

Westford, MA, announced a joint reseller agreement in which Tricord supplies Valinor with the PowerFrame family of superservers for LANs and client/server computing.

Ungermann-Bass (U-B) Agreements.

Ungermann-Bass of Santa Clara, CA, has entered into agreements with Norton-Lambert of Santa Barbara, CA; GTE of Stamford, CT; LANSystems of New York, NY; and British Telecom.

The U-B Norton-Lambert agreement calls for U-B to resell Norton-Lambert's Close-Up software and to integrate it into U-B's customer support programs. In conjunction with the agreement, U-B introduced ReDI (Remote Diagnostics), a support program enhancement that exploits the remote link features of Close-Up software.

In June 1990, U-B and GTE Corp. signed a two-year, multimillion dollar agreement under which GTE Telephone Operations sells U-B's full line of Access/One intelligent wiring systems.

LANSystems and U-B announced a two-year, multimillion dollar VAR agreement in which LANSystems offers U-B's full Access/One product line as part of its own network integration solutions.

British Telecom and U-B entered into an agreement that includes plans for joint development of OSI products and inclusion of T-NET local area networks under British Telecom's CONCERT network management system.

Vitalink and StrataCom. Vitalink Communications of Fremont, CA, and StrataCom of Campbell, CA, have established a joint development program to address the need for multivendor network management of wide area networks. The program is a bilateral effort between the two companies within the context of Digital Equipment Corp.'s Enterprise Management Architecture (EMA) program.

Wellfleet and Digital Equipment Corp. In July 1990, Wellfleet of Bedford, MA, and Digital Equipment Corp. announced that the two companies had jointly defined the basis for an SNMP-based Access Module that enables the DECmcc Management Station to manage a network of Wellfleet Feeder Node, Link Node, and Concentrator Node multiprotocol router/bridges. At the same time, Wellfleet announced that it had joined Digital's DECmcc Strategic Vendor Program. Under this program, Wellfleet provides Digital with the

specifications for its SNMP Management Information Base (MIB), which Digital plans to incorporate into the DECmcc Management Station.

Xyplex and Vitalink. Xyplex of Boxborough, MA, and Vitalink of Fremont, CA, are developing complementary products to provide WAN-link interoperability using the Vitalink Communication Protocol (VCP), which Xyplex has licensed from Vitalink. The first product from the alliance, announced in June 1990, is the MAXserver 6510 remote bridge card. A reseller provision in the Xyplex/Vitalink agreement allows Xyplex to resell Vitalink's family of TransLAN bridges and TransPATH bridge/routers. The products retain the Vitalink label, but Xyplex provides installation and support.

Unisys and Novell. In June 1990, Unisys of Blue Bell, PA, and Novell of Provo, UT, announced two agreements that enable Unisys to provide local area networking services to customers using the NetWare operating system. The strategic agreements certify Unisys as an authorized "NetWare Support Organization," capable of providing on-site and technical support to NetWare end users, and establish Unisys as a "Novell Authorized Education Center," able to provide NetWare certification training to Unisys service technicians and engineers.

IBM's LAN Product Blitz

In September 1990, IBM released a flurry of products, many of which serve the LAN market.

IBM 8230 Controlled Access Unit (CAU) is a powered cable attachment that connects devices to IBM Token-Ring LANs.

LAN Network Manager V1.0 and V1.1 and *LAN Network Manager Entry* replace the previous IBM LAN Manager products. LAN Network Manager V1.0 offers OS/2 database support for LAN management data. LAN Network Manager V1.1 offers extended host control from NetView with 80 commands. LAN Network Manager Entry is similar to V1.1 but does not support a local operator interface.

LAN Station Manager is a licensed program for DOS and OS/2 workstations. It provides information about the adapter, the workstation, and user data to the IBM LAN Network Manager.

Enhancements to IBM 8209 LAN Bridge include an upgraded Ethernet feature and a new token-ring feature.

Enhanced Ethernet Attachment Module offers token-ring network management information across an Ethernet LAN segment.

IBM LAN-to-LAN Wide Area Network Program allows users to employ their existing SNA or X.25 network for IEEE 802.2 NetBIOS LAN traffic.

IBM LAN Asynchronous Connection Server (LANACS) provides LAN access to IBM and ASCII hosts using a variety of terminal emulation packages.

Workstation Data Save Facility/VM handles backup and archive services.

SAA Delivery Manager implements software distribution between host computers and programmable workstations.

Table 1. Networking Product Announcements in 1990

Company	Location	Product	Company	Location	Product
Advanced Micro Devices (AMD)	Sunnyvale, CA	Am79C98EVAL 10BASE-T transceiver development kit; Am7997 Transceiver	AT&T	Morristown, NJ	StarServer S, StarGROUP Server for IBM LAN Clients, FDDI-to-802.3/Ethernet bridge, StarWAN Multi-Bridge, StarWAN Router, Model 450, and StarLAN 100 Network Concentrator
Abletec	Fremont, CA	AFS/386, ALS-2 LANStation, AE-2000 Ethernet board			
Accton Technology	Fremont, CA	TransPair-T 10BASE-T Transceiver, EN5090 Ethernet chip, EtherPocket-10T adapter, EtherPocket-CX adapter, SlimStations diskless workstations	Banyan	Westborough, MA	VINES support for medialess PS/2 55 LS workstations, cc:Mail for VINES, VINES SMP, VINES SNMP Agent, VINES SNMP MIB, VINES 4.0 Application Toolkit, Advanced 3270/SNA and Advanced 3270/SNA Graphics options for VINES
Advanced Computer Communications (ACC)	Santa Barbara, CA	ACS Series 4000 bridge/router, ACS 4810 LAN monitor, ACS 4000TR token-ring option, ACS 2100 local bridge			
Alantec	Fremont, CA	T1IM T1 Interface Module; MLS 425, MultiLAN Manager, SNMP Agent Software	BICC Data Networks	Westborough, MA	ISOLAN EtherConnect System/4 Structured Wiring Hub 1201-3 STP System, 1182 STP Transceiver, 1205 Managed Bridge Line Card, 1201-4 Multiport Transceiver Line Card, ISOLAN Ethernet UTP Controller Card for IBM AT and compatibles, ISOVIEW Network Manager
Allen-Bradley	Cleveland, OH	LAN/1-TCP/IP GatewayControl-View Operator Interface Software			
Allied Telesis	Mountain View, CA	CentreCOM 270 and 470 transceivers, CentreCOM 810 Ethernet transceiver/concentrator, CentreCOM 3000 repeaters			
Alloy	Marlborough, MA	EarthStation III, 386/MultiNode Software, PC-Slave/286, Silvercard	Cabletron	Rochester, NH	MRX and MRXI 10BASE-T hubs, Token Ring STP/UTP MIM boards, Intelligent Repeater Bridging Module (IRBM), enhancements to Desktop Network Interface (DNI) PC cards
Andrew	Torrance, CA	Bridgeport/7606 Local Source Routing Token-Ring Bridge, Intelligent Media Management System			
Artisoft	Tucson, AZ	Micro Channel versions of LANtastic AE-2 Ethernet, LANtastic 2 Mbps, and LANtastic Voice adapters	Canary Communications	San Jose, CA	UTPC-1100 Concentrator, UTP-1000 one AUI Port Transceiver, UTP-2000 two AUI Port Transceiver, UTP-4000 four AUI Port Transceiver
AST Research	Irvine, CA	Zero-k version of SixPak 286			

Table 1. Networking Product Announcements in 1990 (Continued)

Company	Location	Product	Company	Location	Product
Chipcom	Southborough, MA	ONline System Concentrator, ON-line Fault-Tolerant Networking System, ONline Fiber Module, Fault-Tolerant Fiber Transceiver	DAVID Systems	Sunnyvale, CA	DAVID Pair Scanner for troubleshooting 10BASE-T, BNC-MAU Interface Unit, Ether-T PC and Ether-T AT Adapters, 10BASE-T Adapter Kits
cisco Systems	Menlo Park, CA	CSC-R16 Interface Card, "Priority Output Queuing" software feature for router/bridges, Integrated Gateway Server (IGS), IGRP IS-IS routing protocol, STS-10x Terminal Server, Multiport Ethernet Connector (MEC), NetCentral Station Software	Develcon Electronics	Willowdale, ON	Model INB-1000 Internetworking Bridge
CMC	Santa Barbara, CA	Release 3.0 for DRN-3200 Router	Digital Communications Associates (DCA)	Alpharetta, GA	CROSSTALK Communicator, IRMA Workstation for Windows, enhancements to IRMAX DFT and IRMAX Multisessions, DCA/Microsoft Select Communications Server Version 1.0, IRMA-trac Token-Ring Adapter/Convertible, 10NET Plus NetBIOS/RS232 Bridge, 10NET Plus RS232 Version 2.0, IRMALAN for NetWare Gateway Server Products, DCA/Microsoft Select Communications Workstation (Select CW), 10NET Plus LAN OS Version 4.20
Cnet Technology	San Jose, CA	CN800E and CN800E/2 Adapters, CN500E and CN600E Network Interface Cards			
Codenoll	Yonkers, NY	CodeNet-832X Adapter Cards			
Cogent Data Technologies	Friday Harbor, WA	E/MASTER Ethernet Adapter Cards, NetWare 386 Drivers for E/MASTER II			
Commtext	Crofton, MD	Primary Rate Channel Bank (PRCB) Gateway, Cx-Card, Voice Subsystem Option	Digital Equipment Corp.	Maynard, MA	Digital's Unshielded Twisted Pair 802.3/Ethernet Product Family, DEC EtherWORKS LC 802.3/Ethernet PC Controller, DEC EtherWORKS Turbo 802.3/Ethernet PC Controller, OPEN DECconnect Structured Cabling System, DECnet/IPX Portal, DSM DDP-DOS Software
Corvus	San Jose, CA	ReadyNet 1.2 LAN, ReadyRAM Plus Card			
CrossComm	Marlborough, MA	ExpertWatch Service for monitoring ILAN			
Cryptall	Smithfield, RI	Series 4000 LAN/WAN Bridges, Redundant Link for Series 3000 Remote Bridges	Digital Products	Watertown, MA	NetCommander Sub-LAN Version 5.0, MacShare
Cubix	Carson City, NV	ComBridge for Novell LANs	DNA Networks	Malvern, PA	DNA MicroNet LAN for IBM PCs, Groupware Utilities for DNA MegaNet and DNA MicroNet
D-Link Systems	Irvine, CA	D-Link Ethernet Pocket LAN Adapter			
Datapoint	San Antonio, TX	Datapoint 7850 Network Server	Eicon	Montreal, PQ	LAN Router/400
Datatec	Fairfield, NJ	Token Ring Multi-Station Access Unit (MAU) Model 8	Emerald Systems	San Diego, CA	EmSAVE and EmLIB software for NetWare 386 V.30 networks

Table 1. Networking Product Announcements in 1990 (Continued)

Company	Location	Product	Company	Location	Product
Everex	Fremont, CA	SpeedLink/TR Token-Ring Adapters, STEPserver 486/33 File Server, Speed-Link/TP Ethernet Adapter, new versions of Speed-Link/PC and SpeedLink/PC16 Adapters	Hughes Network Systems	Germantown, MD	HNS LAN Gateway, LINC/Term HUB Series of Integrated Terminal Server Modules, ProBridge Family of LAN Bridges, ProLINC Software, ProLINC support of Microsoft Window environment
Fairchild	Scottsdale, AZ	LBR8323 Ethernet to Broadband Bridge	IBM	Armonk, NY	3174, 3745, 3172 Controllers, 8230 Token-Ring Controlled Access Unit, 8209 LAN Bridge Token-Ring Module, LAN-LAN Wide Area Network Program, 8209 LAN Bridge Ethernet Module, LAN Asynchronous Connection Server (LANACS), LAN Network Manager, LAN Station Manager
Fibronics	Hyannis, MA	System Finex Translation Bridge, Programmable Forwarding control (PFC)			
Fresh Technology Group	Gilbert, AZ	Remote Console, FRESH Utilities, FRESH Secure It, MODEM Assist, LAN Assist Plus, Q Assist			
Gandalf	Wheeling, IL	10BASE-T Mini MAU Transceiver			
Gateway Communications	Irvine, CA	Data compression and high-speed file transfer software for G/Remote Bridge Family of IPX Routers, Com-System, G/EtherTwist MC Adapter, G/Ethernet 8 and G/Ethernet 16 Adapters, G/EtherTwist PC, G/EtherTwist PC-WS, G/EtherTwist AT, G/EtherTwist AT-WS Adapters	IMC Networks	Tustin, CA	PCnic TP Family Ethernet Products, EtherNic 8-bit Card, NetWare 386 Driver for 16-bit PCnic and PCnic II Ethernet Interface Cards
			Information Builders	New York, NY	PC/FOCUS LANpak Release 5.5 for VINES
			In-Net	San Diego, CA	Integrated Services Ring (ISR), FiberTalk 5000 802.5 Bridge
General DataComm	Middlebury, CT	MEGA*BRIDGE	Integrated Workstations	San Jose, CA	MultiServer
GVC Technologies	Sparta, NJ	286LANode and 386SX LANode Diskless LAN Workstations	Interlink	Fremont, CA	SNS/B320 Bridge, SNS/BR340 and SNS/BR380 Bridge/Routers, SNS/SNMPconnect
Harris Adacom	Dallas, TX	Token-ring products for its SuperNet Strategy Series, Strategy 9770 Intelligent Token-Ring Gateway	Invisible Software	Foster City, CA	Invisible NET Control Software
			Kalpana	Los Gatos, CA	EPS-700 Multiport EtherSwitch
Hayes Microcomputer Products	Atlanta, GA	Hayes for LANs global family of Ethernet LAN adapters	KMS Systems	Austin, TX	NetAccess
			LANCAST	Amherst, NH	Universal Twisted-Pair/Coax Translator
Hewlett-Packard	Cupertino, CA	HP 9000, HP 3000 Networking Products, NetWare support of HP NewWave software environment	LANsPLUS	Montreal, PQ	EtherRAM LAN Adapter

Table 1. Networking Product Announcements in 1990 (Continued)

Company	Location	Product	Company	Location	Product
Lantana	San Diego, CA	Cypress/1-16, Cypress/2-16, Cypress/3-16, Cypress/1-4, Cypress/3-4 Controllers	Network Interface	Lenexa, KS	STAR/LINK Repeater, NIC10330 and NIC10336 AUI/Thinnet Adapters, NIC 10350 and NIC10356 AUI/UTP Adapters, PcARC Series of 8-bit ARC-NET Adapters, PcARC-AT, 103xx Series Ethernet Interface Cards
Laser Communications	Lancaster, PA	LACE L00-29 4M bps Link	Network Resources	San Jose, CA	Mac1000 32-bit Ethernet Card
MaCo Networks	North Augusta, SC	LANFrame 486, LANFrame4 Server, LANFramePSP, and LANCall	Network Systems	Minneapolis, MN	FE648 FDDI-to-T3 router
Madge Networks	San Jose, CA	Menu-Driven Installation Program for Token-Ring Adapters, Smart Server Software for NetWare 386, Smart Server Software for OS/2 LAN Manager, Smart 16/4 EISA Token Ringnode, Smart-Boot Software	NetWorth	Irving, TX	EtherNext Hubs, EtherNext UTP Hubs
Meridian Data	Scotts Valley, CA	CD Net Software Version 3.0	Nevada Western	Sunnyvale, CA	OMNI Patch Panel, NEV*STAR II Active Hub
Microcom	Norwood, MA	Release 2.0 Microcom LAN Bridge Family, MLB/6500 for X.25 Links, and MLB/5500 for ISDN	Newport Systems	Newport Beach, CA	LAN ² LAN/Compression Router, LAN ² LAN 386 NLM
Microtest	Phoenix, AZ	LANPORT Print Server	North Hills Electronics	Glen Cove, NY	LAT3247 PowerMAU, 2/4-port Token Ring Compact MAUs
Morton Management	Silver Spring, MD	486/33MHz EISA GigaServer Network File Server	Novell	Provo, UT	NetWare SNA Gateway with Token Ring support for AS/400, NetWare Twinax Gateway Support for AS/400, NetWare 386 Version 3.1, ELS NetWare Level I Version 2.12, NetWare support for IBM PS/2s, NetWare DOS Shell Version 3.01, NetWare Requester for OS/2 Version 1.2, NetWare 386 Services for SAA, Client/Server NLM Testing Program, NetWare Remote Management Facility Software, LANtern Services Manager, LANalyzer, NetWare Name Service
Moses Computer	Los Gatos, CA	ChosenLAN Version 1.10	Optical Data Systems	Richardson, TX	ODS a-e Series MAUs
Multi-Tech	Mounds View, MN	MutiCom-Async-Gateway, Multi-Com3270Gateway			
NCR	Dayton, OH	ONS Networking System, NCRNet Manager Release 3.0, NCR WaveLAN Wireless LAN, Bridgeport 7404 Bridge (manufactured by Andrew Corp.)			
Netwise	Boulder, CO	Netwise RPC Tool for NetWare 386 Version 3.0, RPC Tool for MS-Windows, RPC Tool for Macintosh, RPC Monitor, Mainframe RPC			

Table 1. Networking Product Announcements in 1990 (Continued)

Company	Location	Product	Company	Location	Product
Persoft	Madison, WI	Intersect LAN Bridge Software	Standard Microsystems	Hauppauge, NY	ARCNET Drivers, Intelligent Hub
Photonics	Campbell, CA	Building-to-Building Photolink	Star Gate Technologies	Solon, OH	Four-channel Synchronous Board
Promptus	Portsmouth, RI	Promptus T-1 CommServer+	Tecmar	Solon, OH	ProLine LAN backup system, MicroRAM
Proteon	Westborough, MA	ProNET-4/16 Adapter, p4200 FDDI Router, Jitter-Buster technology	Telco Systems	Fremont, CA	FASTLANE 4:1 Compression Bridge
Puredata	Richmond Hill, ON	PD μ C8023 and PDI8023-T Ethernet Cards	Telematics	Fort Lauderdale, FL	Series 9000 Frame Relay Exchange
Racal InterLan	Boxborough, MA	MacConnect-10BT, INX5000 Integrated LAN System, TCP Server for NetWare, NP622S, NI5210-10BT, NI6510-10BT, NI5210-10BT PC/XT, LanGate/LAT, NVL16W-10BT, NVL16S-10BT	Texas Instruments	Dallas, TX	JitterBuster technology
RAD Network Devices	Rochelle Park, NJ	RTB Remote Token-Ring Brouter	Thomas-Conrad	Austin, TX	16/4 Token-Ring Adapter for the AT, 16/4 Token-Ring Adapter for Micro Channel computers, Enhanced Token-Ring Multistation Access Unit for UTP Type 3
Republic Technology	Austin, TX	RPM Family of Diskless Workstations	3Com	Santa Clara, CA	Maxess for Windows, 3+Open TCP NetBIOS, 3+Open XNS
Retix	Santa Monica, CA	OSI LAN Transport for DOS, OSI LAN Transport for OS/2, Retix Adaptive Routing	TOP Microsystems	Santa Clara, CA	ARCNET cards for Toshiba laptops
Samsung	San Jose, CA	386A3 File Server	Touch Communications	Campbell, CA	Worldtalk/400 Gateway for SMTP and UUCP
SBE	Concord, CA	Token-ring products for VME and Multi-bus Systems, X.25 and TCP/IP for CPS1000 Series of Communications Processors	Tricord	Plymouth, MN	PowerFrame Servers for LANs and Client/Server Computing
Sitka	Alameda, CA	Addition of DOS-based Software to InBox Plus 3.0 software	TRW	Torrance, CA	PC2001 hardware/software package, NB2010 MAC layer bridge
			Ungermann-Bass	Santa Clara, CA	16 products for Access/One, Net/One LAN Manager Release 2.0
			SL Waber	Mt. Laurel, NJ	EPC 200

Local Area Networks: Technology Overview

In this report:

Technology Basics	-202
Products	-213
Selection Guidelines	-217

Synopsis

Editor's Note

For information on the local area network market, see Report 520-101; for comparison columns, see Report 520-301.

Technology Highlights

1990 was not a year marked by earthshaking new developments in the local area network marketplace. Rather, trends already under way continued to gather momentum. One of the chief examples was the 10BASE-T segment. This subsection of the IEEE standard for Ethernet—802.3—which describes Ethernet transmission on unshielded twisted pair, attracted much attention from vendors, with seemingly everyone offering 10BASE-T products. Several vendors debuted new wireless LANs based on radio or laser links.

One of the few really new developments was the debut of “superservers” from companies such as NetFrame, Parallan, and Tricord. These multiprocessor machines are the first computers designed from the ground up as network servers and combine the sophisticated I/O capabilities of minicomputers with the ability to run industry-standard network operating systems.

The first section of this report, Technology Basics, defines a local area network and discusses transmission media, topologies, access methods, and standards.

The second section, Products, provides a general overview of the components that must be assembled to build a local area network. These components include hardware—workstations, interface cards, transceivers, servers, and repeaters—and software issues—applications, integrity of data, record and file locking, and file systems.

The final section, Selection Guidelines, addresses issues common to the implementation of any local area network. These issues include advantages and restrictions of local area network resource sharing, integration of functions, channel speed, simplicity and flexibility, security, alternatives to local area networks, and pricing considerations.

Analysis

Technology Basics

What Is a Local Area Network?

In addition to the independent computer networking vendors, most major computer and data communications companies also are active in the LAN marketplace. They each have branded at least one of their offerings a local area network. Although in a broad, functional sense, most of them may be right, consensus holds that the term refers quite specifically to a certain class of products. For this report's purposes, we have selected the following definition:

A local area network is a system for the interconnection of two or more communicating devices that are:

Intracompany, Privately Owned, User Administrated, and Not Subject to Regulation by the FCC: This excludes from our definition traditional local connections over common carrier facilities, such as tie lines, and public local networks, such as Digital Termination Services and local cable television networks.

Structured: Local area networks are integrated into a discrete, physical entity, with devices interconnected by a continuous structural medium. In a local area network, many types of equipment and applications, such as data processing, word processing, electronic mail, video, and voice, can operate over a single cable plant.

Limited in Geographical Scope, with Devices Physically Separated But Not Mobile: Devices can be on different floors of a building, on the same industrial or university campus, or in several buildings in the same city. The maximum distance, depending on the technology, is about 50 miles. Our definition excludes co-located computer systems interconnected by a high-speed parallel bus, global

network systems designed primarily for use as long-haul networks, and mobile radio networks.

Supportive of Full Connectivity: Every user device on the network must be potentially capable of communicating with every other user device. This characteristic excludes traditional local environments that support only hardwired, point-to-point connections between a host computer and its attached terminals.

High Speed: Since LANs are not subject to the speed limitations imposed by traditional common carrier facilities, they usually support operations in the 1M-to-16M bps range. Minimum and maximum throughput generally ranges from 500K bps for low-speed LANs based on twisted-pair wiring up to over 1 billion bps for fiber optic LANs.

Commercially Available: Although in this report we examine future trends and some technologies under development, our primary concern is to provide information on the current commercial environment and its capabilities.

In local area networking, commercial availability is a matter of degree. Only the simplest LANs are true turnkey products. Most local area networks require a great deal of on-site engineering to ensure the efficient location of stations, ease of reconfiguration and expansion, accessibility for testing and repair, and compliance with building and fire codes. To ensure proper design and installation, users may have to contract with a number of secondary suppliers in addition to the primary vendor of LAN equipment. For example, although some LAN vendors provide complete configuration and installation services, others require the user to purchase and install all but the intelligent components of the network.

One final note regarding our definition of LANs. Although the purpose of any definition is to facilitate unambiguous communication, it cannot be cast in stone. For example, the average geographical scope is not the same for fiber optic LANs as it is for twisted-pair wire-based LANs. With the increasing use of repeaters and bridges within a single LAN installation, the general span length of the communications media constantly

expands. Within a highly integrated multilevel network, the deliniation between a local area network and a wide area network is blurring.

LAN Technology

Initially, it seems that a bewildering number of arcane technologies compete for attention in the LAN market, but the number of distinct techniques used in local area networking is actually quite small. Like most modern methods of data communications, local area networks employ a multilayered model. Only a few technologies, usually two or three, compete to solve the problems of each layer.

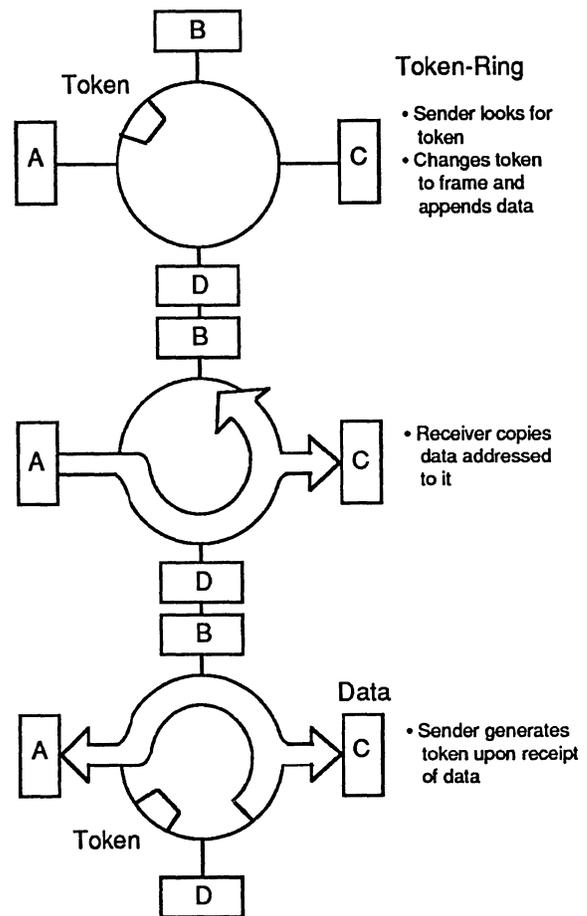
In today's market, however, a great deal of mixing and matching among techniques at different layers creates the illusion of a complex array of technologies. The reality is rather simple when taken a layer at a time. When choosing a local area network, users face the network's:

- physical medium and transmission technique;
- topology, the logical arrangement of its stations;
- access method, the way it arbitrates among its stations for use of the shared medium; and
- higher level services the LAN offers, such as protocol or file format conversion, data encryption, or network management.

Today's market offers three basic choices of media, three of topology, and two of access method. The issue of higher level services is somewhat more complex, since a vendor can offer such services on top of any practical combination of the other three factors. Presently, however, such services are only beginning to emerge as commercial offerings; they depend heavily on specific applications. Another issue is the increasingly important aspect of bridges and gateways to other networks.

This report discusses each of these issues separately, although we must state from the outset that one cannot mix and match LAN technologies at will. Some combinations are currently impractical, while others are simply impossible. Still, one should never underestimate the power of technology. Using a contention access method such as CSMA/CD over fiber optic media was once thought impossible, but LANs using such technol-

Figure 1.
Token-Ring Operation



IBM's Token-Ring Network conforms to the IEEE 802.5 standard for token-ring, baseband LANs. The operation of a single token-passing ring is illustrated here.

ogy are now available. Ethernet over twisted-pair wire was once thought to be impractical, but today products based on the 10BASE-T subsection of the IEEE 802.3 standard are available from nearly every vendor of Ethernet solutions.

Baseband vs Broadband

Most networking schemes offered today are baseband networks. Baseband networks carry one signal at a time at rates from 1 to 16 million bits per second. Baseband signals are always digital, with the presence of a specified voltage representing the "on" condition and the absence of that voltage representing the "off" condition.

Baseband cable cannot extend beyond a few thousand feet without expensive digital repeaters, but it is easy to install and requires almost no maintenance. Baseband networks work well within a single building, though a single baseband network can span a small campus. With current technology, baseband networks can handle only data traffic.

Broadband networks were once used as the primary means of implementing metropolitan area network backbones that might connect several buildings on a campus and stretch for a few kilometers. Signals on a broadband network are analog; bits of information are represented by variations in the strength or frequency of a carrier signal. Broadband networks can carry many signals at a time, each signal occupying a different frequency band on the cable. Broadband networks can also carry voice and video traffic as well as data. While data rates practical on any one channel of a broadband network are somewhat lower than those available with baseband transmission, between 1 and 5 million bits per second, the availability of up to 20 or 30 such channels on a single cable greatly increases the amount of data that the medium can carry.

The attractiveness of broadband networks has faded as higher transmission speeds on baseband cable and fiber optic media have become widely available. Where a broadband network would have been installed as a backbone in the mid-eighties, a 16M bps token-ring on optical fiber is much more likely to be in evidence today, with a clear upgrade path available to 100M bps FDDI when it becomes available. The several clear disadvantages of broadband make it impractical when other means to achieve the same ends are available. A broadband data network requires a careful physical design process, and its components must be tuned carefully to handle specific ranges of frequencies. Broadband networking requires a staff of trained RF technicians, for both design and everyday maintenance.

Transmission Media

Three media types are currently practical for local area networking: twisted pairs of copper wire, coaxial cable, and optical fiber. Each type serves some applications better than others, and each supports certain transmission techniques and has its own price/performance benefits.

Twisted Copper Wire: Twisted copper wire can also be called twisted-pair wire or common telephone wire. Ranging in price from \$0.05 to \$0.25 per foot, it is the least expensive medium available for LAN installations. It is also the easiest to install; a user can string it along a baseboard in minutes. Twisted-pair wire is also the most readily available of all LAN media, since it is in constant, high-volume production for voice telephone use. Twisted-pair wire is best for low-cost, short-distance local area networks, especially for small networks linking personal computers. It can effectively carry data at rates up to 10 million bits per second (bps) over distances up to several hundred feet without repeaters.

Standard twisted copper wire has, however, several significant disadvantages for data transmission. It is extremely susceptible to electrical interference (noise) from outside sources (e.g., typewriters and air conditioners). Such noise interferes minimally, if at all, with an analog voice signal, but causes two interrelated problems for data transmission. First, it limits the speeds at which data can travel, since a burst of noise that would garble only a few bits of low-speed data will destroy many bits of high-speed data. A "line hit" of a given duration garbles a number of bits that increases in proportion to the rate of transmission. Second, it limits the distance that a data signal can travel. A signal grows weaker, or "attenuates," as it travels farther from its source. Signals attenuate on all media, but twisted-pair wire's vulnerability to noise adds another factor. A length of twisted-pair wire acts as an antenna: The longer it gets, the more noise it gathers. After a given distance, the increased noise obliterates the attenuated signal.

Two techniques reduce vulnerability: shielding and repeating. Shielding makes the medium less vulnerable to electrical noise but adds significantly to the wire's cost. Active repeaters, devices that receive a signal and retransmit it to another length of wire or cable, increase the distance a signal can travel. Repeater are expensive and add to the cost of running twisted-pair wire.

Coaxial Cable: Coaxial cable comes in several forms, each suited to a different kind of application. All forms of coaxial cable comprise a central conductor, the part of the cable carrying the signal, that is surrounded by a dielectric, or nonconducting, insulator; a solid or woven metal shielding

layer; and finally, a protective plastic outer coating. All these layers are concentric around a common axis, thus the term "coaxial." Coaxial cable is largely immune to electrical noise and can carry data at higher rates over longer distances than twisted copper wire.

Optical Fiber: Optical fiber is the newest medium in the commercial LAN market. There is no doubt that, in the long run, fiber optic technology has the greatest potential as a transmission medium. Many types of fiber optic cable are available (e.g., single mode, multimode), providing varying bandwidths and transmission speeds. Presently, fiber optic hardware, including optoelectronics and connectors, is the most expensive medium for LANs, but recent developments promise to change that quickly. Netronix introduced a Plastic Optical Fiber (POF) LAN in 1989. AT&T and a partnership of Codenoll Technology Corp. and General Motor's Packard Electric division both announced Plastic Optical Fiber products during the last quarter of 1990. Cheap and much easier to install and maintain than glass fiber optical media, POF promises to bring fiber, along with the high transmission speeds possible with it, to the desktop. Glass optical fiber cable was once extremely difficult to terminate, since each fiber had to be precisely aligned to ensure a continuous connection. Recent developments in the technology have made glass fiber media much easier to work with. Codenoll's plastic fiber media can be terminated in seconds with simple-to-use hand tools.

The principal advantages of fiber optics with present-day transmission technology are sturdiness and security. Optical fiber is immune to both physical and electrical influence from the environment. Copper corrodes; glass and plastic do not. Copper conducts electricity; glass and plastic do not. Fiber optic cable is difficult to tap surreptitiously; with current military technology, operators can isolate a break, or even significant movement, in a fiber optic cable to within a single inch over a mile or more of cable.

Cabling Schemes: When discussing transmission media for local area networking, it is important to touch on two major vendors' cabling schemes: the IBM Cabling System and AT&T's Premises Distribution System (PDS). The IBM Cabling System is

a star-wired system that can connect either computer devices or telephones to wall outlets; the wall outlets, in turn, connect to central wiring closets located on each floor of a building. Transmission media for the cabling system consists of Type 1, Type 2, Type 6, Type 8, and Type 9 data grade shielded twisted pair; Type 5 optical fiber; and Type 3 voice grade unshielded twisted pair. AT&T's PDS is a distribution plan based on fiber optic and twisted-pair technology supporting voice, data, text, and video communications for various environments (multitenant and high-rise buildings, campuses). PDS subsystems comprise various parts of PDS including the fiber optic or twisted-pair media, cross-connect and interconnect hardware, connectors, plugs, jacks, and adapters.

The anticipated widespread acceptance of the IBM Cabling System and the AT&T PDS may signal a decline in the use of coaxial cable as the prime transmission medium for local area networks, a position that coax has held since the birth of the industry.

Table 1 compares the transmission media available for local area networking.

Wireless LANs: One of the most interesting new developments in LAN technology in recent years has been the wireless LAN. First introduced by small start-up companies such as O'Neill Communications and Arlan, wireless is now attracting the attention of several larger firms, most notably Motorola and NCR.

Most wireless LANs are based on low-power radio transmission, though there are also some line-of-sight systems based on laser or infrared transmission. Wireless LANs of all types are expected to find acceptance in businesses where frequent floor plan changes make LAN cabling impractical, and in more or less temporary installations, such as large construction sites. In many cases, wireless LANs will supplement traditional cabled LANs, providing quick connection to the main network wherever temporary workers or teams of specialists are deployed for a limited period.

Topology

A network's topology is the physical and logical arrangement of its stations in relation to one another. For local area networking, we use the term "stations" rather than the more traditional

Table 1. Comparison of Transmission Media

	Twisted-Pair Wire	Baseband Coaxial Cable	Broadband Coaxial Cable	Fiber Optic Cable
Topologies supported	Ring, star, bus, tree	Bus, tree, ring	Bus, tree	Ring, star, tree
Maximum number of nodes per network	Generally, up to 1,024	Generally, up to 1,024	Up to about 25,000	Generally, up to 1,024
Type of signal	Single channel, unidirectional; analog or digital, depending on type of modulation used; half or full duplex	Single channel, bidirectional, digital, half duplex	Multichannel, unidirectional, RF analog, half-duplex (full duplex can be achieved by using two channels)	One single channel, unidirectional, or bidirectional simultaneously over a single wavelength half or full duplex, signal-encoded light-beam per fiber; single-encoded lightbeam per fiber; single fiber per cable
Maximum bandwidth	Generally, up to 16M bps (or higher)	Generally, up to 10M bps	Up to 400MHz (aggregate total)	Up to 200M bps in 10-kilometer range; up to 1G bps in experimental tests
Major advantages	<p>Low cost</p> <p>May be in existing plant; no rewiring needed; very easy to install; easy to support</p>	<p>Low maintenance cost</p> <p>Simple to install and tap</p>	<p>Supports voice, data, and video applications simultaneously</p> <p>Better immunity to noise and interference than baseband</p> <p>More flexible topology (branching tree)</p> <p>Rugged, durable equipment; needs no conduit</p> <p>Tolerates 100% bandwidth loading</p> <p>Uses off-the-shelf, industry-standard CATV components</p>	<p>Supports voice, data and video applications simultaneously</p> <p>Immunity to noise, cross talk, and electrical interference</p> <p>Very high bandwidth</p> <p>Highly secure</p> <p>Low signal loss</p> <p>Low weight/diameter; extremely flexible, pliable; can be installed in small spaces</p> <p>Durable under adverse temperature, chemical, and radiation conditions</p>
Major disadvantages	<p>Low immunity to noise and cross talk</p> <p>Lacks physical ruggedness; requires conduits, trenches, or ducts</p> <p>Speed and distance limitations</p> <p>Existing plant may be unsuited to data transmission (i.e., wire pairs may not be twisted; grade and quality may vary; accurate cable records may not be available)</p>	<p>Lower noise immunity than broadband (can be improved by the use of filters, special cable, and other means)</p> <p>Bandwidth can carry only about 40% load to remain stable</p> <p>Limited distance and topology</p> <p>Conduit required for hostile environments</p> <p>Not highly secure</p> <p>Rigid and bulky, difficult to install</p> <p>More expensive than twisted-pair</p>	<p>High maintenance cost</p> <p>More difficult to install and tap than baseband</p> <p>RF modems required at each user station; modems are expensive and limit the user device's transmission rate</p> <p>Rigid and bulky, difficult to install</p> <p>More expensive than twisted-pair</p>	<p>Higher cost, but declining</p> <p>Requires skilled installation and maintenance personnel</p> <p>Taps not perfected</p> <p>Currently limited to point-to-point connections</p>

“nodes.” A node in a traditional data communications network sits at the intersection of two or more transmission paths and switches traffic among those paths. On most local area networks, a station attaches to a single transmission trunk at one point, catching signals addressed to it and transmitting signals along the single path to other, similar stations.

There are three basic LAN topologies: linear bus, ring, and star. In a linear bus topology, stations are arranged along a single length of cable that can be extended at one of the ends. A tree is a complex linear bus in which the cable branches at either or both ends, but which offers only one transmission path between any two stations. All broadband networks and many baseband networks use a bus or tree topology.

In a ring topology, stations are arranged along the transmission path so that a signal passes through one station at a time before returning to its originating station; the stations form a closed circle. A loop network is a ring network in which one master station controls transmissions. A star network has a central node that connects to each station by a single, point-to-point link. Any communication between one station and another must pass through the central node.

In the United States, bus and tree topologies are presently the most common, due largely to the efforts of the Ethernet community to establish that particular bus architecture as a standard. In Europe, ring architectures are more common because much of the pioneering work in ring networking occurred at European universities. The introduction of the IBM Token-Ring Network has begun the proliferation of ring-type networks in the U.S.

In bus and ring networks, all transmissions are broadcast. Any signal transmitted on the network passes all the network's stations. The receiving intelligence in each station recognizes its address on a given signal and copies only such signals. In star networks, signals sent through the central node are circuit switched to the proper receiving station over a permanently or temporarily dedicated physical path.

Each topology has particular strengths and weaknesses. In choosing a topology, one must examine performance issues including delay, throughput, reliability, and robustness—the net-

work's capability to continue through, or to recover after, the failure of one or more of its stations. Users must also consider such physical constraints as circuit speed (or raw data rate), maximum operating distance, maximum number of stations, channel error rate, and overall system costs. Table 2 compares the three basic topologies, with graphic representations of a number of their variations.

Access Method

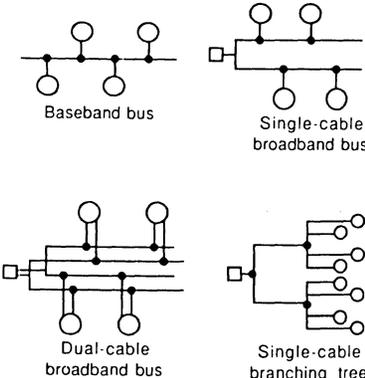
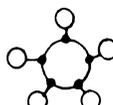
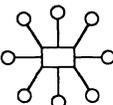
Using a network access method, the network distributes the right to transmit among its participating stations. The right to transmit is an issue only in broadcast topologies, where stations share a single, main data channel on which all stations receive and on which any station can transmit. The access method is the network's way of controlling traffic.

In general, access control can be centralized or distributed. Most conventional networks of computer terminals use central access control: A mainframe or its front-end processor polls the terminals in sequence for their transmissions. Most LANs use distributed access methods: Each station participates equally in controlling the network. There are two general classes of distributed access: random, or “contention,” and deterministic. With a random access method, any station can initiate a transmission at any time. With a deterministic access method, each station must wait its turn to transmit.

Carrier Sense Multiple Access (CSMA): The most common random access method on today's LAN market is carrier sense multiple access (CSMA). In a CSMA network, all stations can sense traffic on the network. When a station wishes to transmit, it “listens” on the main data channel for the sort of electrical activity it recognizes as traffic—it “senses carrier.” If the station senses traffic, it defers its transmission for a random interval and then resumes listening. When the station senses no traffic on the channel, it transmits.

One weakness in CSMA is that two stations may sense a clear channel at the same time and transmit simultaneously. A “collision” results—the signals from simultaneously transmitting stations interfere with one another. Many CSMA networks implement a mechanism for collision detection

Table 2. Comparison of Basic Topologies

Typical Schematics	Performance Considerations	Constraint Considerations
<p>Linear Bus Topology</p>  <p>Baseband bus</p> <p>Single-cable broadband bus</p> <p>Dual-cable broadband bus</p> <p>Single-cable branching tree</p>	<p>Delay—in token bus networks, waiting time is a fixed function dependent on number of nodes in network; in contention bus networks, delay is a variable dependent on current traffic; delay distortion ("jitter") is possible</p> <p>Throughput—in token bus networks, throughput decreases with each node added; in contention networks, throughput is best in light, bursty traffic conditions and decreases in high-volume steady-traffic environments</p> <p>Reliability—failure of one station will not affect the rest of the network; break in cable may affect only part of the network</p> <p>Robustness—relationship between stations is peer-to-peer; network is difficult to monitor; in contention networks, the difference between noise and collisions may be difficult to distinguish</p>	<p>Circuit speed—varies up to 50M bps</p> <p>Distance—generally unlimited by topology</p> <p>Maximum number of nodes—user stations may be added or deleted without reconfiguring the networks; in token bus networks, addition of each station directly affects performance</p> <p>Error rate—bit errors are lowest when fiber optic cable is transmission medium, low when coax cable is used, high with twisted-pair wire</p> <p>Cost—generally, lower cost per user station than star networks and higher than ring networks</p>
<p>Ring Topology</p> 	<p>Delay—waiting time is fixed function dependent on number of nodes in network</p> <p>Throughput—decreases with each added node</p> <p>Reliability—if one station fails, whole network fails unless bypass circuitry has been implemented in each interface or node; if loop is severed, the whole network fails, unless redundancy features have been implemented; potentially low reliability can be compensated for by high-quality engineering design</p> <p>Robustness—Nodes are easy to understand, construct, and maintain; may require custom-designed, device-dependent interface; communications control overhead is generally high; if network fails, recovery may be difficult, and may require complex logic and processing</p>	<p>Circuit speed—varies up to 80M bps</p> <p>Distance—limitations are imposed both on total distance and distance between nodes</p> <p>Maximum number of nodes—may be fixed parameter dependent on command station capacity; addition of each station directly affects performance</p> <p>Error rate—twisted-pair wire is vulnerable to transient errors; fiber optics has very low error rate</p> <p>Cost—generally, lower cost per station than other topologies</p>
<p>Star Topology</p> 	<p>Delay—in heavy traffic conditions, requests for service may be blocked at the switch in a PBX</p> <p>Throughput—dependent on internal bus capacity of central node</p> <p>Reliability—failure of one station does not affect the rest of the network; if central node fails, the whole network fails</p> <p>Robustness—Ready availability of network monitoring and control software; high overhead for communications control; corresponds well to applications in hierarchical (master/slave) networks</p>	<p>Circuit speed—varies considerably depending on medium, to a maximum of 10M bps</p> <p>Distance—limitations are imposed on distance between central node and any user station</p> <p>Maximum number of nodes—expansion limitations are dependent on capacity of central node; difficult to reconfigure</p> <p>Error rate—twisted pair wire is vulnerable to transient errors</p> <p>Cost—high initial cost, but low incremental costs thereafter</p>

SCHEMATIC SYMBOLS

- Transmission medium
- User station
- Connection device (network interface unit, RF modem, transceiver, etc.)
- Command station (central host, PBX switch, etc.) or cable head-end

Table 3. IEEE 802.3 Specifications

	10BASE-5 (Standard Ethernet)	10BASE-2 ("cheapernet")	10BROAD-36 (Broadband Ethernet)	1BASE-5 (1M bps Starlan)	10BASE-T (10M bps Starlan)
Bandwidth	10M bps	10M bps	10M bps	1M bps	10M bps
Media	"Thick" Coaxial Cable	"Thin" Coaxial Cable	CATV Coaxial Cable	Twisted-Pair Wire	Twisted-Pair Wire
Distance	500 Meters	200 Meters	3.6 Kilometers	500 Meters	100 Meters
Topology	Bus	Bus	Bus	Star	Star

(CSMA/CD), which allows stations to recognize a collision, stop transmitting immediately, and resume transmission after a random wait (reducing the probability that any two stations will again transmit at the same time). Another mechanism implemented is collision avoidance (CSMA/CA). Using CSMA/CA, a transmitting station first "senses" whether the line is free. If other traffic is already on the line, the device waits until the line is free before transmitting. If it senses that the line is free, the device waits a predetermined period of time before reserving the line via a "handshake" process.

Token Passing: The most widely used deterministic access method is token passing. In a token-passing network, stations distribute the right to transmit on the channel by circulating a token, a special bit pattern that assigns the right to transmit to the station that receives it. A transmitting station waits until it receives the token from the previous station in the token-passing order. When the station receives the token, it transmits its data, then passes the token to the next station. Token passing is a form of distributed polling; each station on the network polls the next station in line for its transmission. Token-passing networks require a slightly greater effort to configure than do contention networks, because each station must have not only a logical address, but also a logical place in the token-passing sequence. CSMA, CSMA/CD, and CSMA/CA are most often found in bus and tree networks; token passing is most often seen in bus and ring networks.

A network's access method is the most important factor in determining its performance. Each access method functions differently under different kinds of traffic and on networks of different sizes.

CSMA networks perform better with sporadic, or "bursty," traffic patterns in which some stations transmit a great deal of data at a time or transmit very often, while others transmit a smaller amount of data less frequently. Performance on a CSMA network degrades as the likelihood of a collision increases. The probability of a collision increases with the number of stations likely to transmit and with the physical length of the network's main cable (since the time a signal takes to reach the station farthest from the transmitting station affects the likelihood of that station's sensing carrier in time to withhold its transmission). Another factor in CSMA networks is the length of the individual transmissions. A CSMA network operates more efficiently when stations transmit long individual messages rather than a large number of short messages.

Deterministic access methods perform better under uniform, heavy traffic than do CSMA networks. The number of participating stations is the most important factor affecting performance in token-passing networks, since the right to transmit must circulate through every other station before a given station may transmit again. Under any loading conditions, performance is more predictable for deterministic access methods than for random access methods.

High-Level Network Services

The design of most LANs is based on the reference model for OSI proposed by the ISO. All the characteristics we have discussed concern the two lowest levels of network services: those that can be classed as Layer 1 (Physical layer) or Layer 2 (Data Link layer) services in the OSI reference model. These layers pertain to the physical and electrical characteristics of the transmission medium and to link

access management (e.g., transmission setup, address recognition, message acknowledgment, and basic error checking).

A few vendors provide Layer 3 (Network layer) and Layer 4 (Transport layer) services. Layer 3 services involve network control, management, and maintenance. This type of control is generally software based and resident in a network processor, controller, or master unit. Layer 3 services include call establishment, maintenance, and disconnection; end-to-end traffic routing and flow control; management of buffering between end-user devices and the network; packet assembly/disassembly; end-to-end error checking and recovery procedures; network monitoring and diagnostic services; dynamic network reconfiguration; priority and security management; and status and statistics reporting.

Layer 4 functions pertain to "internetworking," the interconnection of one LAN to another or to a public or private long-haul network. Internetworking is generally performed through a software package called a gateway. Gateway functions include store-and-forward operations, protocol/code/interface conversion, and security procedures. Generally, the gateway resides on a single network node, and all traffic traveling between the two networks is funneled through a single port on the node.

TCP/IP is currently the de facto standard for internetworking in the United States. Originally developed for the U.S. military's Arpanet network, the Department of Defense requires TCP/IP for all government and military contracts. TCP/IP software is now used frequently in the private sector for communications between personal computers and other supporting processors linked to mainframes and departmental systems. Until other standards allowing companies to implement an ISO-standard network supplant it, TCP/IP will continue as the de facto standard for high-level applications.

The physical location of network services within a network varies greatly from one LAN product to another. The placement of network intelligence can generally be classified on one of four levels:

1. The end-user device performs all station functions and drives the communications medium; the network provides Layer 1 services only.

2. The end-user device connects to a separate network interface unit that provides Layer 1 and Layer 2 services and a small amount of buffering.
3. The network interface unit provides end-to-end Layer 3 reliability services, plus increased provision for buffering.
4. The network interface unit is a full-fledged micro- or minicomputer that provides all interconnection functions.

Whenever a function resides in the end-user device, it is considered to be outside the network. The user is usually responsible for developing and maintaining this software, though some LAN vendors have begun to provide high-level software for certain applications. Applications-related functions—program-to-program communications, distributed database management, file transfers, peripheral sharing, network management, and applications switching—often identified as the primary purpose for a LAN, are, in most cases, performed outside of the network.

Services at the Session (Layer 5), Presentation (Layer 6), and Application (Layer 7) layers depend heavily on the specific purpose of the individual network. Different types of services are best for different applications. Users can find such services in single-vendor, comprehensive LANs such as Digital Equipment Corporation's adaptation of Ethernet to its DECnet architecture.

Bridges, Routers, and Gateways

As the number of separate, different types of LANs in an organization grows, interest in linking them increases. Bridges, routers, and gateways all perform this function, each at a different layer of the network and each in a different manner.

Bridges: A bridge connects two or more networks at the Media Access Control (MAC) portion of the Data Link layer, where differences in the high-level protocols (such as TCP/IP or OSI) used on the two networks to be linked are not a factor. A bridge will pass packets of any protocol, but the station receiving the packet must employ that protocol to read the packet. Bridges, therefore, generally connect networks with common architectures and protocols. Some bridges can translate packets from networks with differing MAC-layer characteristics, such as Ethernet and token-ring.

Bridges can improve the performance of a large network by splitting it into smaller segments, thus reducing traffic on each of the resulting subnets. Bridges can also connect networks using different types of transmission media, such as coax and twisted pair, or to connect a network to a backbone running between floors or buildings.

Remote bridges may link LANs in widely separated geographical locations over telecommunications lines. Most bridges today are referred to as learning bridges, because they keep tables of network addresses. Each time the bridge reads an address it has never seen before, it broadcasts the packet in question. When the receiver acknowledges, the bridge notes the location in its table, so that when it sees the address again it will know how to get to it.

Routers: Routers, which operate at the Network level of the OSI model, feature more sophisticated addressing software than bridges. Where bridges simply pass along everything that comes to them, routers can determine preferred paths to a final destination. Routers can be employed in complex internetworks and can be programmed to route packets according to various criteria. They can select the cheapest or fastest route, depending on the needs of the network and its users. This additional intelligence, however, makes them slower and more expensive than bridges. In addition, a particular router only works with one protocol. In internetworks with segments that operate under different protocols, a separate router is necessary for each one, but several router devices can reside in one chassis.

Gateways: Gateways operate at the OSI Transport layer or above and link LANs to networks which employ different protocols, such as TCP/IP, IBM SNA, DECnet, and X.25. Packets received by a gateway must be restructured into a format understandable by the destination network. This restructuring means delays in transmission.

LAN Standards

The number of technologies available for local area networking, and the number of practical combinations of those technologies, creates both opportunity and confusion. The opportunity comes to the sophisticated purchaser who can pick and choose carefully among the range of available options to

create a specific solution for specific needs. The confusion comes from the lack of compatibility among different commercial solutions and the end-user equipment that eventually must communicate over the local area network. The local area network market has seen two major efforts to establish standards: one launched by industry organizations attempting to legislate standards in advance of the market, and one by individual vendors and groups of vendors attempting to establish de facto standards by making their interfaces widely available at low cost. Committee 802 of the Institute for Electrical and Electronics Engineers (IEEE) has led the legislative effort; the Ethernet vendors, spearheaded by Xerox Corp., led the initial market effort.

IEEE Committee 802 Standards: Late in 1982, Committee 802 published draft standards for two types of local area networks. The first, Standard 802.3, was published in 1983 and has been adopted by the International Organization for Standardization (ISO) as its 8802-3 standard. It describes a baseband, CSMA/CD network—similar to Ethernet—and includes several addenda adopted since its publication. 10BASE-2 deals with 10M bps baseband networks running on thin coaxial cable. 1BASE-5, similar to AT&T Starlan, is a 1M bps, twisted-pair configuration. 10BROAD-36 is a broadband 10M bps network running over thick coaxial cable. 10BASE-T is a 10M bps network operating on unshielded twisted-pair wire. It requires two separate twisted-pair lines—one for transmit and the other for receive. Table 3 summarizes the 802.3 specifications.

The second standard, Standard 802.4, describes a token-passing, baseband or broadband, bus network, similar to the Manufacturing Automation Protocol (MAP) standard.

IBM presented specifications for its Token-Ring Network to both IEEE Committee 802 and the engineering and trade press. The result is Standard 802.5 for token-ring, baseband local area networks, published in 1985. 802.5 panels are still at work on addenda on Early Token Release and Counter Rotating Rings. Early token release is a method of enhancing token-ring network performance, and counterrotating rings provide fault tolerance through redundant data paths.

Standard 802.1 describes network architecture concepts applicable to all networks. Subcommittees are still developing addenda on bridging and network management under this standard. The Committee has also released specifications for Logical Link Control, the protocol to be used with the two networks, in Standard 802.2. Other 802 committee work includes Standards 802.6 on Metropolitan Area Networks (MANs), 802.7 for broadband LANs, 802.8 on fiber optic media, 802.9 on LANs and Integrated Services Digital Network (ISDN), 802.10 on network security issues, and 802.11 on wireless LANs.

LAN Applications

A local area network can support almost any application now served by conventional point-to-point communications. The implementation of a local area network can, however, be a radical and expensive step—and hard to justify if its sole purpose is simply to replace an existing cable plant for tried-and-true applications. A radical innovation must offer radical benefits. A local area network can simplify and streamline current procedures, of course; but in addition, it can offer benefits not available, or simply too expensive, with conventional local communications. These benefits vary for different applications in different environments. In the following, we list the best capabilities of LANs in several broad areas of application.

General Business Data Processing

Simply running computer programs has never been the job of the corporate data processing department. Data processing must also manage the data that goes into a computer and the information that comes out, design and implement software for new applications, adapt current software to changing needs, maintain current programs and hardware, plan for the expansion of existing facilities and for the replacement of obsolete components, and ensure that such expansions and replacements remain compatible with current programs and procedures. The local area network offers DP managers a chance to restore order from the chaos that was slowly creeping in via cheap personal computers, compromising the DP manager's management and planning functions.

Using a LAN, the DP manager can centralize control of the company's newly distributed computing resources, ensuring, at minimum, that each

department's new computers are compatible with the network and, ideally, that they are compatible with every other department's machines. The DP manager can also ensure that all the company's decisions are based on the same data and not on each planner's custom-tailored collection of numbers. Used properly, a LAN can provide a common interface for a diversity of otherwise incompatible equipment, serving as the backbone of an orderly hierarchy of computing functions extending from the mainframe to the desktop.

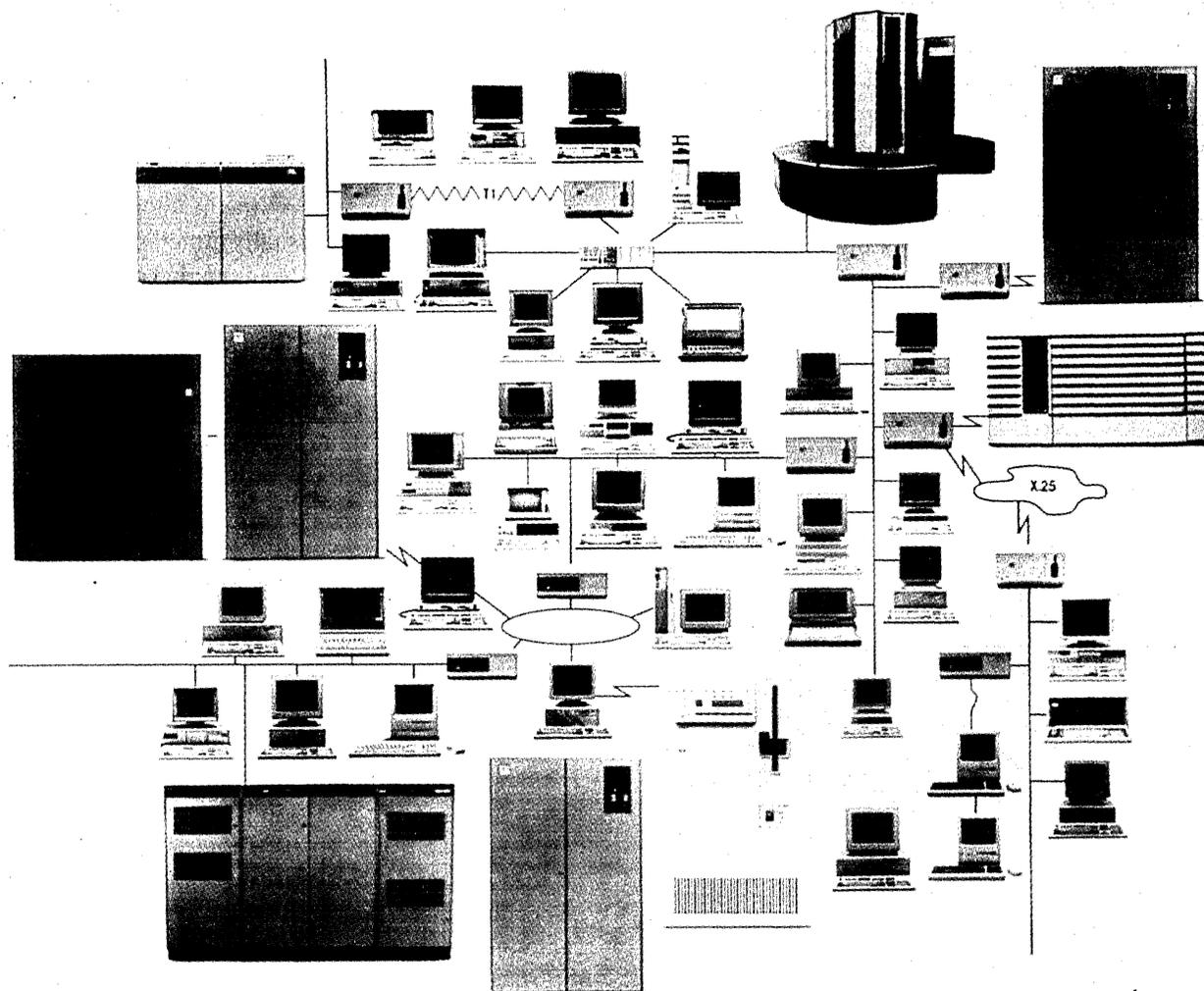
In the computer room, the local area network can relieve the mainframe of the job of arbitrating among users needing access to storage and communications facilities, releasing a greater percentage of its resources for actual computing. The LAN can also streamline users' access to remote communications facilities, eliminating redundant hardware and further easing the mainframe's burden. In large DP shops, it can provide a high-throughput path for computers sharing common databases.

Office Automation

In a data processing shop, integrity and compatibility are big issues. The automated office requires timeliness and friendliness. In the office, the local area network can give users fast and efficient access to a common pool of information including customer lists, supplier lists, schedules, and document formats. In many cases, it allows a company to establish standard formats for files and documents for the first time and to guarantee a minimum of deviation from those standards. A LAN can allow an entire office to pool expensive resources such as printers and duplicators, streamlining the production and distribution of paper documents.

Ultimately, the office local area network can eliminate the need to circulate paper documents by distributing schedules and memorandums almost instantly to each worker's workstation. Workstations have yet to appear on every desk in the office, but in many companies they are now more common than typewriters. In the completely electronic office, a LAN can provide nearly instantaneous desk-to-desk communications, allowing the workstation to function as typewriter, copier, and telephone for internal use. The local area network also offers management a more direct way to monitor staff performance and to control the quality of information handling throughout the office.

Figure 2.
Multivendor Connectivity



This diagram illustrates the multilevel, multivendor nature of today's networking capabilities. All types of machines, from laptop PCs to ultrahigh-speed supercomputers, can be linked to provide true distributed processing.

Industrial and Laboratory Automation

Efficient process control requires rapid feedback from monitoring devices to the central site. A good feedback loop requires very fast, very reliable, two-way communications. An automated factory or laboratory, with a proliferation of intelligent robots, sensors, and measuring instruments, is a natural environment for the local area network. In the factory, a LAN can simplify "retooling" by allowing the user to download new software to a number of programmable devices simultaneously from a central site. It can allow the near-instantaneous isolation of failures and bottlenecks in plant operation. By permitting feedback among a number of intelligent machines, a LAN enables managers to

automate the minute-by-minute decision-making process to a degree not possible with point-to-point communications through a central mainframe or minicomputer. A LAN also simplifies the gathering of performance information, allowing designers to optimize plant operations and to plan for future growth.

Eventually, laboratory and factory process control networks will hook up directly to the engineers' CAD/CAM workstations and to the data processing department's inventory and distribution records, realizing automation's potential for the entire operation over a single, integrated system.

Products

Local Area Networks for PCs

The most active and lucrative subsection of the LAN marketplace is currently the PC LAN market. Today's microcomputer LANs are complex combinations of communications hardware and software parts—some common between vendors, and some very specialized. The specialized approaches are, of course, what determine how well a given vendor's approach suits the LAN buyer's needs. The fundamental building blocks common to most microcomputer LANs can, however, be used as a basis for evaluation.

Hardware

In addition to cabling to physically connect microcomputers, a variety of other hardware components is involved in the construction of a microcomputer LAN. The first consideration is the choice of microcomputers for user workstations. Next, some type of interface board or transceiver is usually necessary to complete the connections from servers and workstations to the transmission medium. Finally, most LANs have at least one server station for access by the other PCs. This must be chosen and configured to handle the anticipated demands of the network.

Workstations: Individual workstations on the LAN are usually microcomputers from the same or compatible manufacturers, particularly if full compatibility is required. If network software must be resident in each workstation PC, a minimum amount of memory may be a prerequisite. Standardization to a given release of the PC operating system is generally required as well. If the user stations are incompatible types, special provisions must be made for connecting them to a PC LAN. 3Com's Ethernet LANs are a good example. Using special interface cards, Apple Macintosh users can access the LAN, originally designed for the IBM PC and compatibles. Unrestricted file sharing, however, is still limited to compatible devices. Macintosh users can share files and programs (on any network server) with other Macintosh users and can receive electronic mail or straight ASCII files from any other station. Apple users cannot, however, share IBM binary files and programs, or vice versa. Their programs and file formats are entirely different, and the 3Com network, like any

other microcomputer LAN, cannot bridge that kind of compatibility gap. Usually, vendors of smaller LANs do not provide any provision for mixing incompatible PCs on their networks.

Interface Cards: The most common interface between a PC and the network's transmission cable is a network interface card. These printed circuit boards fit inside a PC cabinet, generally into an accessory expansion slot on the motherboard. The transmission cable will usually attach directly to the card, or a short drop to the main cable might be used. The major consideration when installing an interface card is whether the PC power supply can handle the extra load. With the IBM PC and compatible PCs, the card's interrupt address and the number of Direct Memory Access (DMA) channels already in use are also important. Conflicts between addresses of the interface card, disk controllers, modem cards, etc., must be resolved. Shuffling of expansion cards may also be necessary if all available DMA channels are already in use on the intended server PC. IBM's PS/2 personal computers based on the Micro Channel Architecture, however, eliminate the problem of conflicts.

Transceivers: Standalone network transceivers may be required in addition to network interface cards. For example, "thick" Ethernet LANs that use heavily shielded coaxial cable generally require a special transceiver to link a PC to the LAN. Thin cable interfaces are usually made directly to the interface card, using "T" and/or barrel coax connectors. Transceivers are also available to connect interface cards designed for one type of media to a different type. For example, a transceiver can convert the signal from a card intended for coaxial cable to one that can be transmitted over unshielded twisted pair.

Servers: The server station provides a central repository for programs, text, and data available to LAN users. The server is usually a suitably configured microcomputer. For use as a server, a PC must have a hard disk for storing shared information and loading appropriate server control software. The microcomputer must also have enough memory to handle the overhead of the network software. Some networking systems allow a hard disk-equipped PC to also be used as a workstation

while network functions are handled in the background. This will usually slow down overall network response to requests to the server, however, since the PC's I/O capability is limited to one request at a time. For this reason, most IBM PC-oriented LAN users find it practical to dedicate a PC to server use. With the wide availability of microcomputers based on 80286 or 80386 chips and with the next generation of networking software based on the Microsoft OS/2 LAN Manager, some hardware characteristics will change and some limitations eventually disappear.

Not all PC LANs require servers. For example, certain network operating systems provide a configuration that effectively distributes the accessible database throughout the workstations. Implemented at every node, the network software is actually an operating system that converts the LAN into a continuous, multiuser information processing system. In this instance a workstation may request to share information directly with other workstations. The requester must then decide how to store the information. Options are local storage or copying back to the source.

Superservers: A recent development in server technology is the so-called "superserver," which is based on multiple processors and has an I/O architecture similar to that of a minicomputer, with many ports for peripheral attachment. The multiple CPUs of such a machine, generally from two to eight Intel or Motorola processors, can divide tasks among themselves to speed network transactions. Newly formed companies such as NetFrame, TriCORD, and Parallon offer the most technically interesting designs so far, while traditional computer manufacturers have been quick to adopt the "superserver" label for some of their especially high-performance machines. Compaq has brought out a dual-processor model of its SystemPro microcomputer.

Device Sharing: Not all servers provide only disk and file service. As discussed previously, a major feature of a PC LAN is provision for sharing expensive peripherals. While this capability may be an option, most LANs have some provision for parallel printer sharing, including print spooling routines. Some allow sharing of the server's serial ports, permitting the connection of modems and plotters. If the need is great enough, a dedicated

printer server may be justified. Networks needing connection to the outside world via dial-up communications can now purchase a modem server, which gives any network station access to a modem and communications software, as well as allowing the sharing of outside lines.

Repeaters: To overcome distance limitations of the basic network, vendors also may supply repeater or line driver devices that effectively boost the signal strength on the transmission medium, allowing the connection of two or more basic networks. The repeaters enable communications for stations beyond the limitations of a basic network. Repeaters do, however, have their own restrictions—signal propagation delays between extreme ends of a network will generally limit the number of repeaters that can practically be used together. With CSMA/CD networks, unusually long signal delays can subvert the collision detection mechanism, forcing careful adherence to the vendor's published distance limitations.

Software

Software considerations for PC LANs are very important and can be analyzed from two perspectives: network operating system software and applications software. All microcomputer LAN vendors provide some software to facilitate basic network management, file transfer, and connectivity functions. Network services such as electronic messaging, mail, remote access, and print spooling functions may also be available as either part of the basic network software or as add-on modules. The most important consideration in choosing network software is how it interacts with the microcomputer's operating system software and with the applications software to be networked.

Applications: Spreadsheets, word processing, graphics, and other miscellaneous business software packages are the most common applications run on microcomputer LANs. These are traditionally oriented toward the standalone user, and they require no special considerations to operate in a networked environment. Users must merely have some sort of agreement in place regarding access to the data files each creates and maintains. For example, a manager may elect to make some departmental information, such as employee work schedules, addresses, meeting schedules, open

memos, etc., available as public data. Other information such as spreadsheet-created budgets might necessarily be shared only with other managers, and a third type of information might be private and for the manager's review and edit only. The network software can easily handle these classifications.

Multiple access levels can be implemented by combinations of password security and the creation of public, shared, or private information volumes (storage areas). Public volumes are available for reading or copying only; private and shared volumes allow reviewing and editing by privileged users who know the password to access a volume. Initial setup of user volumes is done via administrative routines in the network system software. These provisions are usually implemented and maintained by a designated system administrator and can be changed as applicable.

Integrity of Data: Databases and accounting software present unique problems in a network environment, since access to data files must be controlled to ensure the integrity of the database. If one user of a networked accounting system attempts to generate monthly invoices and statements while another user is posting all applicable receivables, an unfortunate customer might be billed twice for the same purchase. While not a problem with the network per se, it is a typical consideration when migrating applications from stand-alone PCs to a PC LAN.

A more serious task is the implementation of database software on a LAN. Here, some provision must be made for file or record protection to avoid a situation in which two users are simultaneously updating data in the same record. When each record is stored, only the last "copy" of the record written to disk will be available for the next query. In this scenario of simultaneous attempts to update the same record, the last record written will have "old" data in the field that was just updated by the first user, and this old data will corrupt the record. Database users planning to migrate from single PCs to a LAN must keep this in mind when choosing their system, so that some data protection scheme is used. This situation can usually be addressed by updating to a "network" version of the software, by provisions in the LAN's system software, or by the LAN's server configuration itself. Network versions of applications software have

either file- or record-locking provisions to prevent users from simultaneously accessing the same record. They usually depend on some interaction with the LAN's operating system for this protection.

Record and File Locking: Most LAN vendors provide some file or record locking as part of their system software, and as long as users access the files in a way the network expects them to, these provisions will eliminate nearly all data corruption problems. Another type of corruption protection is provided by network servers that qualify as true file servers, as opposed to disk servers that merely respond to workstation requests for information copies. (Today, however, LAN server software has reached such a sophisticated level that users would have a hard time running across a plain disk server program.) File servers have the capability to intercept requests for access to a given file and interleave them as the file is available for edit. This protection may extend to the record level, allowing simultaneous updates of files from multiple workstations without exposure to corruption problems. Some file server programs, such as Novell's NetWare, not only provide concurrency checking but transaction management as well. NetWare's Transaction Tracking System (TTS) provides a rollback capability to transactions that did not complete due to power failures or other incidents that interrupt the processing of a transaction.

Future File Systems: Most of the file integrity issues raised here will, we hope, be nonissues within the next few years. This is because the next generation of personal computer operating systems (e.g., OS/2) and network operating systems (e.g., OS/2 LAN Manager based) will have a consistent filing system. Application programs will have a consistent set of compatible programming interfaces that would support their running on a network without the need for tricky, and most often inconsistent, file- and record-locking facilities. Network programs, such as 3Com's 3+ Open and the IBM OS/2 LAN Server program, which are both based on Microsoft LAN Manager, are designed to support back-end processing of a global database application. They have an integral SQL database engine (IBM OS/2 LAN Server) or are compatible with such a database engine (Microsoft OS/2 LAN Manager and Novell NetWare).

Finally, if the network is installed by a systems house offering the microcomputer LAN as part of a solution, a special adaptation of applications or system software may be provided as part of the installation. In this case it is best to check with the systems house regarding the specifics of file security before implementing the LAN.

Future Trends

Token-ring: The IBM Token-Ring Network is expected to become the dominant networking scheme in the early 1990s, overtaking Ethernet as the leader in number of installed systems. Several clear advantages of token-ring make it an attractive choice. The deterministic token-passing access method makes performance under load predictable and slow to degrade as traffic increases. This predictability and consistency also facilitate expansion, as administrators can judge the effect additional stations will have on the network before actually installing them.

Token-ring is also more fault tolerant, since workstations are attached in a physical star topology to a hub called a multistation access unit (MAU), and the MAUs are linked to form the ring. This arrangement of hardware makes faults easier to isolate and facilitates quick repair.

IBM's range of systems, from PCs to the largest mainframes, can attach to its Token-Ring Network without special devices such as bridges. Keeping in mind that IBM still holds the largest share by far of the business computing market, it should be obvious that this kind of connectivity makes token-ring the network of choice for many potential users. IBM's 1988 introduction of 16M-bit-per-second token-ring presently makes it one of the fastest networks available.

While IBM dominates the token-ring market with a 90 percent share, other vendors have their own ideas about issues in token-ring implementation. The Open Token Foundation (OTF) was formed in December 1988 to help vendors adhere to IEEE standards for token-ring. OTF's 10 full members and 16 associate members include 3Com, Proteon, Gateway, Digital Equipment, Texas Instruments, and National Semiconductor. Thus far, IBM has declined OTF membership but joined OTF members in a multivendor interoperability demonstration at the 1989 NetWorld show in Dallas.

Several vendors have begun to market 16M token-ring networks that run on economical unshielded twisted-pair wiring. IBM initially opposed this trend on the grounds that unshielded cabling is prone to noise interference, particularly at high speeds, as in the 16M bps version. IBM has, however, joined with other token-ring vendors in an IEEE 802.5 Unshielded Twisted Pair study group. Other vendors participating in this group are AT&T, NCR, Proteon, Ungermann-Bass, David Systems, SynOptics, Western Digital, and Cabletron.

FDDI: The Fiber Distributed Data Interface (FDDI) is an ANSI standard for a high-speed fiber optic network. Running at 100M bits per second, FDDI is expected to be used as a high-speed backbone connecting multiple LANs in a single building or as a Metropolitan Area Network (MAN) connecting LANs dispersed over several buildings. Other areas where FDDI is likely to be used are in process control and other realtime applications, where high-speed response is critical to performance, and in applications such as medical imaging that involve the transfer of graphics.

FDDI employs a token-passing ring topology with two separate rings, a primary and a secondary. Under normal conditions all traffic travels on the primary ring. If a cable fault interrupts data flow on the primary ring, the network stations involved can automatically reconfigure the path to use the secondary ring. Any station attached to the physical ring must be a dual attachment station; that is, one that connects to both primary and secondary rings. Another attachment method allows many single attachment stations to connect to concentrators on the physical ring, but in the event of a cable break between the concentrator and the single attachment station, automatic reconfiguration is impossible. Concentrators will, however, provide an economical method of attaching several stations to the ring.

Distributed Processing: Fully distributed application processing is perhaps the most important development on the local area network horizon. With the full implementation of IBM's OS/2 LAN Server under the Systems Application Architecture (SAA) umbrella, and with network implementations based on the Microsoft OS/2 LAN Manager and complying with the IBM SAA specification, all

connected nodes, from the desktop workstation to the mainframe, would become peers. These developments portend that applications will communicate not only with each other peer to peer, but that processing loads can be dynamically distributed for efficient use of CPU resources. For the PC LAN market, distributed application processing offers many advantages.

The major drawback of current PC LAN systems is the inefficient use of CPU power across the network. File servers do nothing but push blocks of data between their local disk storage and client stations' memory and/or disk storage. Because all processing is done at client stations, even a simple query in a database application creates much data traffic over the cable. Bottlenecks can then ensue, negatively affecting response time when there are many such activities running simultaneously. Security is also compromised, because the client station gains access to the entire database instead of receiving extracted information.

SQL Databases: The biggest promise of OS/2 networks is support of SQL-compatible database engines on server machines. This capability allows database applications to execute in two modes—front-end processing of user programs takes place at a user workstation, and back-end processing of core database functions takes place on the database server machine. The potential for improvements in security and reductions in unnecessary network traffic is substantial. LANs for interconnecting OS/2-based systems are also said to provide basic network management functions, including audit trails, network use statistics and report generation, and realtime network administration. Because the industry still awaits a standard for network management, some of the network management software that would be available cannot be expected to be fully functional.

Vendors are wary of incompatibility problems if and when a network management standard is adopted. In the meantime, some vendors feel that offering network management products that are partially compatible with IBM's NetView/PC network management program is a safe bet in the short term. The local area network was never designed to facilitate distributed applications processing, but to provide ease of communications among interconnected computers. Incompatible hardware, operating systems, and communications

protocols that many organizations must contend with, however, necessitated some level of integration in which LANs would play a key role. LANs alone cannot resolve the incompatibility problems in today's computing environments, but they have been the catalyst for impelling standardization efforts, and they surely will continue to do so.

Selection Guidelines

Advantages and Restrictions of LANs

Today's local area network is a wonderfully sophisticated engine for moving several streams of data concurrently, rapidly, reliably, and inexpensively from one physical interface to another. This is, of course, rapidly changing; LANs are slowly becoming the vehicles for true distributed data processing. Every major advantage now offered by a local area network, however, is balanced by one or more restrictions. Some restrictions are built into the technology; others will fall by the wayside as vendors and standards bodies advance the technology.

Resource Sharing

A local area network allows a large number of intelligent devices to share resources, including storage devices, program loads, and data files. Sharing of hardware such as disks, printers, and connections to outside communications distributes the cost of that hardware among all participating devices and offers large savings compared to the installation of individual disk drives, printers, and modems at each station on the network. Sharing software enhances security, since all attached devices use not only the same version but the same master copy of a given program, and further reduces the need for separate storage hardware. Sharing data increases the reliability of a database, ensuring that changes made by one user are immediately available to all other users.

Resource sharing is perhaps the greatest advantage currently offered by local area networking. Unfortunately, current commercial technology limits resource sharing to mutually compatible devices. Incompatible computers or workstations can share the same disk drive but cannot read or update each other's files. Some users can implement LANs in which one vendor provides all-inclusive solutions: the network, the computers, the storage

media, and the software. In such systems, all devices are mutually compatible by definition. Other users, especially those using the local area network to integrate an existing array of incompatible devices, cannot accept a single-vendor solution. For new users, or those who wish to replace an entire existing facility with new equipment, the single-vendor option presents a different set of disadvantages: It precludes mixing, matching, and price shopping.

Some users are large enough or sophisticated enough to design their own answers to the compatibility problem, but even for these users, the effort can be difficult and costly. Most users must rely on a vendor to ensure compatibility, and many vendors know that compatibility sells products.

Many local area network vendors offer aids to compatibility including protocol conversion and file format conversion. Vendors specializing in networks for personal computers are most likely to offer format conversion, especially among file formats for popular models such as the Apple Macintosh and the IBM Personal Computer. Vendors of large-scale, general-purpose networks offer protocol conversion, usually allowing asynchronous ASCII terminals to emulate IBM 2780/3780 BSC or IBM 3270 BSC or SDLC terminals. For many local area networks, protocol conversion is an everyday task; such networks must convert any end-user signal to an internal network protocol for transmission.

Although many commercially available LANs still do not offer protocol or file format conversion, their numbers are shrinking rapidly. The movement toward standardization offers some hope, but more for communications protocols than for file formats. Even for protocols, it may be too early to adopt a universal standard for local area networking. Just as the potential for resource sharing is the major current advantage of local area networking, the incompatibilities blocking that potential's realization form the major current restriction.

Integration of Functions

The capability to integrate a wide range of functions into a single, harmonious system is another potential advantage of LANs. A local area network can provide a rational framework around which management can build everything from office procedures to strategies for planning, purchasing, and

growth. By focusing on the LAN, creative managers can establish an orderly hierarchy of job functions and of hardware, facilitating the flow of responsibility and information in their organizations.

Implementing a management system in hardware is, however, restrictive. A large investment in a given organizational plan generates a proportional amount of inertia against which efforts to change that plan must struggle. Increasing the efficiency of a good system makes it better; increasing the efficiency of a bad system makes it worse.

No hardware system is a panacea, however attractive it may be. The greater a technology's potential to affect an organization, the more carefully managers must plan its implementation. A local area network is only a tool. Creative management can make it a powerful and effective tool.

Higher Channel Speed

A high data transfer rate is inherent in our definition of a local area network. Most LANs transfer data at rates ranging from 1M bps to 16M bps, and the Fiber Distributed Data Interface (FDDI) will reach 100M bps, a rate many times faster than those available over conventional switched facilities. High throughput rates are indispensable for such applications as high-resolution, movable color graphics, which need megabits of information to paint a single screen, and bulk data transfer among mainframe computers. Users must realize that these high data rates apply to throughput over a multiplexed facility, the network's shared main data channel, and are difficult to translate into turnaround and response times applicable to end users.

Turnaround time on a local area network depends as much on the kinds of applications sharing the network as on the total throughput. Three or four high-resolution CAD/CAM stations can generate as much network traffic as 30 or 40 word processors. Fully interactive applications can generate more than twice as much traffic as simple data entry.

Potential LAN users must avoid infatuation with data transfer numbers and look carefully at the size of the proposed network and the nature of the applications to be installed. The network's access method also plays a large part in determining throughput and turnaround time under different loads.

Simplicity and Flexibility

Most local area networks use a simple and elegant architecture with control distributed among the participating stations. Since the entire network does not depend on a single polling or switching device, such networks tolerate isolated failures quite well. A hardware or software failure in one station usually affects only that station. Distributed control also eases reconfiguration and expansion; participating devices in most LAN architectures need not be aware of the precise number or arrangement of the other stations. Users can move or add stations on such networks with relative ease. A LAN's simplicity and flexibility are among its most notable selling points. Again, however, poor initial planning can negate this advantage. Users must plan for both device failures and growth. A faulty network attachment unit is easy to replace, but only if a spare is on hand. An inflexible cable layout might have to be replaced completely in order to expand the network.

Security

By design, most local area networks are easy to tap. This makes networks easy to expand and reconfigure but makes it virtually impossible to prevent simple physical intrusion. At the current state of the art, lack of data security is arguably the biggest disadvantage of a local area network. New, simpler tapping mechanisms exacerbate the problem. Some vendors have addressed the security problem by implementing data encryption as an add-on feature, but encryption can only prevent the use of intercepted data. A relatively unsophisticated vandal can still easily jam or destroy data.

Users should never allow plant security applications, such as card-access locks or security video, to share the same cable plant as everyday data applications. Separate networks should be established for secure and open facilities; if necessary, such networks can be interconnected through a secure bridge or gateway that can block unwanted signals. If possible, redundant cabling should be installed, so that an intentional or unintentional break in the cable will not bring down the network.

The increased use of optical fiber in LANs will alleviate many of these security problems. Fiber optic cable is virtually impossible to tap and is immune to electromagnetic interference (EMI) and radio frequency interference (RFI). See the section

on Transmission Media under LAN Technology for more information on optical fiber.

Alternatives to LANs

For some applications, LANs are either too costly or too unsophisticated technologically. Other technologies are available that can do the job better.

For simple port selection or port contention among one or more computers and a network of terminals, a local area network is simply overkill. In such situations, users wish only to gain access to host-resident applications; the host computers handle requests for storage and peripheral service. Their terminals are usually unintelligent, asynchronous devices with no capability to share software with the host or with one another; these terminals also need to communicate with only one computer. Applications requiring simple port selection and contention are most common on university campuses or in their industrial counterparts' research and development labs.

For port selection among a small number of similar computers with similar operating systems, a shared front-end processor is more effective than a local area network. When mutually incompatible computers are involved, a port selection switch or a data PBX is the best choice. Both front-end processors and data switches have been available for years and offer all the benefits of proven technologies: stable interfaces; time-tested maintenance and control procedures; established, reliable vendors; and a history of satisfied customers. Users should not risk using an infant technology for simple applications when less risky alternatives are available.

Large-scale, fully integrated voice and data networks lie at the other end of the spectrum. No existing LAN can handle a full load of voice telephone traffic along with a full load of data. Local area networks are a creation of the data processing industry, and their technology has bypassed, not solved, the problems of voice communications that the telephone industry has been addressing for decades.

From the telephone industry comes the voice/data PBX, a circuit switch built on a digital matrix and designed to handle both voice and data traffic. In data handling applications, such systems represent a technology even younger than the LAN, and their data transmission capabilities are still somewhat narrow. Nonetheless, they do offer a number

of advantages for large offices in which management would like at least the capability to place a terminal on every desk. Any large office must have a telephone network and, in a large plant, the costs saved by having data applications share that network rather than installing a separate cable plant for data can more than make up for the high initial cost of a voice/data PBX. The big switches' present data handling limitations are not really an issue; vendors will have corrected any bugs long before current LAN vendors teach their networks to switch voice calls.

Both data switch and voice/data PBX vendors are heating up the competition with LAN technology. The resulting products are hybrids of local area networks and traditional circuit switches; individual switches handle local communications in their own domains while participating in a network of similar switches based on a LAN technology such as the token-passing ring. Several vendors of data-only switches now offer such hybrids.

Pricing Considerations

Costs are one of the hardest elements of LAN design to analyze. Comparison is difficult because, in many cases, users are trying to compare disparate systems and because costs are declining rapidly as the market develops. In considering price, many of the rules of thumb that apply to long-haul networks and to data processing technologies in general are applicable to LAN networks:

- Older, established technologies are less expensive than state-of-the-art and experimental technologies.
- Equipment available off the shelf is less expensive than customized systems.

- Prices increase as the level of network services increases.
- Price increases as speed and performance increase.

One frequently used leveler is "average price per workstation connection." The price per connection for a LAN may, however, vary widely, depending on what the price includes. When we asked vendors to approximate the price per connection for their LAN products, the prices they quoted ranged from \$50 to nearly \$40,000, depending on whether the price was simply the cost of tapping a user station into a preexisting LAN, or whether the total cost of the whole network system—including cabling, transmission components, network management hardware and software, connection hardware, installation, and technical support—was averaged over a typical number of workstations.

When requesting preliminary price estimates from several vendors, we suggest users describe a configuration that approximates their needs and specify which components should be included in the price, giving true grounds for comparison. Right now, the typical price to tap a user terminal into a LAN (\$200 to \$1,000) may be more than the cost of the terminal itself. As with other new technologies, however, prices are dropping as the number of users increases and volume production methods are implemented. When LAN standards are accepted, and the interface-on-a-chip becomes available, the connection price is expected gradually to become negligible, comparable to the cost of installing an extra telephone connection on a PBX system. ■

Local Area Network Products: Comparison Columns



In this report:

Vendors -302

Network Operating
Systems -314

Network Servers..... -323

Network Interface
Cards -336

Wiring Centers..... -414

Diskless
Workstations..... -435

Bridges -445

Routers/Brouters -463

Gateways..... -473

Synopsis

Editor's Note

This report contains specification and pricing information on eight categories of products for use with LANs: network operating systems, network servers, network interface cards, wiring centers, diskless workstations, bridges, routers/browsers, and gateways. For more detailed information on the technology behind these products, see Report 520-201. For information on the LAN marketplace, see Report 520-101.

Comparison Column Highlights

During November and December 1990, Datapro surveyed nearly 300 vendors known or believed to be manufacturers of products that fall in the eight categories contained in this report. The resulting comparison columns spotlight the characteristics and pricing of over 1,000 products offered by more than 200 vendors. (Please note that most of the vendors included in this report offer products in two or more categories. To make it easier for you to locate appropriate vendor information, a separate vendor list has been included for each product category.) The breakdown of number of vendors and products by product category is listed in Table 1.

The absence of any company or product from these columns means that the company either failed to respond to our repeated information requests or declined to be part of the survey.

In "Comparison Column Entry Descriptions," we have briefly defined the row headings in the columns. We suggest that the reader consult these descriptions before reading the columns. There are separate descriptions for the eight product categories.

When a vendor did not provide information for a specific entry and we could not locate that information in our files, we have listed "None identified" on the appropriate line. In addition to the lines allocated for vendors to indicate specified information about their products, we have added space at the bottom of the columns for vendor comments about options or special features.

Datapro would like to take this opportunity to thank those vendors listed for their help in providing you with up-to-date, accurate information.

Table 1. Vendor/Product Breakdown

	Vendors	Products
Network Operating Systems	38	58
Network Servers	42	92
Network Interface Cards	112	612
Wiring Centers	48	159
Diskless Workstations	30	67
Bridges	59	129
Routers/Brouters	41	69
Gateways	52	116

Vendors

Network Operating Systems

Alloy Computer Products

165 Forest Street
Marlborough, MA 01752 (508) 481-8500, (800) 544-7551

Artisoft, Inc.

575 E. River Road
Tucson, AZ 85704 (602) 293-6363

AT&T

295 N. Maple Avenue
Basking Ridge, NJ 07920 (201) 221-8694

Banyan Systems, Inc.

120 Flanders Road
Westboro, MA 01581 (508) 898-1000, (800) 828-2404

Bell & Howell Document Management Products Co.

6800 McCormick Road
Chicago, IL 60645 (708) 675-7600, (800) 327-4608

CBIS, Inc.

5875 Peachtree Industrial Boulevard
Building 100, Unit 170
Norcross, GA 30092 (404) 446-1332

Cogent Data Technologies, Inc.

175 West Street
P.O. Box 926
Friday Harbor, WA 98250 (206) 378-2929

Corvus Systems, Inc.

160 Great Oaks Boulevard
San Jose, CA 95119 (408) 281-4100, (800) 426-7887

D-Link Systems, Inc.

5 Musick
Irvine, CA 92718 (714) 455-1688

Datapoint Corp.

9725 Datapoint Drive
San Antonio, TX 78229-8500 (512) 699-7000, (800) 733-1500

Digital Communications Associates, Inc.

1000 Alderman Drive
Alpharetta, GA 30202 (404) 442-4000, (800) 241-4762

Digital Equipment Corp.

146 Main Street
Maynard, MA 01754-2571 (508) 493-5111, (800) 344-4825

DNA Networks, Inc.

351 Phoenixville Pike
Malvern, PA 19355 (215) 296-7420, (800) 999-3622

DSC Communications Corp.

3101 Scott Blvd
Santa Clara, CA 95054 (408) 954-5000, (800) BUY NEXOS

EXZEL Corp.

7721 East Gray Road
Suite 101
Scottsdale, AZ 85260 (602) 951-8503, (800) 833-3897

Grapevine LAN Products, Inc.

P.O. Box 3416
Redmond, WA 98073-3416 (206) 869-2707

Hewlett Packard Co.

19091 Pruneridge Avenue
Cupertino, CA 95014 (800) 572-0900

IN-Net Corp.

15150 Avenue of Science
Suite 100
San Diego, CA 921283495 (619) 487-3693, (800) 283-3334

International Business Machines Corp. (IBM)

Old Orchard Road
Armonk, NY 10504 (914) 764-1900

Invisible Software, Inc.

1142 Chess Drive
Foster City, CA 94404 (415) 570-5967

Microsoft Corp.

One Microsoft Way
Redmond, WA 980526399 (206)-882-8080, (800)-426-9400

Moses Computers

15466 Los Gatos Boulevard
Los Gatos, CA 95032 (408) 358-1550

Motorola Computer Systems

10700 N. DeAnza Boulevard
Cupertino, CA 95014 (408) 255-0900

NCR Corp.

1700 S. Patterson Boulevard
Dayton, OH 45479 (513) 445-5000

Novell, Inc.

122 East 1700, South
Provo, UT 84606 (801) 429-5900

Quantum Software Systems, Ltd.

175 Terrence Matthews Crescent
Kanata, ON Canada K2M 1W8 (613) 591-0931

The Santa Cruz Operation, Inc.

400 Encinal Street
Santa Cruz, CA 95060 (408) 425-7222, (800) 726-8649

Sitka Corp.

Berkeley, CA

Solid Technologies

333 S. Beverly Drive
Suite 103
Beverly Hills, CA 90212 (213) 785-0030, (800) 422-2966

3X USA

One Executive Drive
Fort Lee, NJ 07024 (201) 592-6874

3Com Corp.

5400 Bayfront Plaza
P.O. Box 58145
Santa Clara, CA 95052-8145 (408) 764-5000, (800) 638-3266

Torus Systems, Inc.

240-B Twin Dolphin Drive
Redwood City, CA 94065 (415) 594-9336, (800) 872-5335

US Sage

2005 Tree Fork Lane, Suite 113
Longwood, FL 32750 (407) 331-4400, (800) 999-6770

Ungermann-Bass, Inc.

3900 Freedom Circle
P.O. Box 95054
Santa Clara, CA 95052 (408) 496-0111, (800) 999-3236

Waterloo Microsystems Inc.

295 Phillip Street
Waterloo, ON Canada N2L 3W8 (519) 884-3141

Watlan, Inc.

160 Columbia Street W.
Waterloo, ON Canada N2L 3L3 (519) 746-0550

Webcorp

3000 Bridgeway
Sausalito, CA 94965 (415) 331-1449

Zytec Systems

5323 Spring Valley Road
Dallas, TX 75240 (214) 991-9966

Network Servers

Acer, Inc.

401 Charcot Avenue
San Jose, CA 95131 (408) 922-0333, (800) 777-5277

Advanced Digital Corp.

5432 Production Drive
Huntington Beach, CA 92649 (714) 891-4004

Altos Computer Systems

2641 Orchard Parkway
San Jose, CA 95134 (408) 432-6200, (800) 258-6787

American Mitac Corp.

410 E. Plumeria Drive
San Jose, CA 95134 (408) 432-1160, (800) 648-2287

American Research Corp.

1101 Monterey Pass Road
Monterey Park, CA 91754 (213) 265-0835, (800) 423-3877

Apple Computer, Inc.

20525 Mariani Avenue
Cupertino, CA 95014 (408) 996-1010

Arche Technologies, Inc.

48881 Kato Road
Fremont, CA 94539 (415) 623-8100, (800) 422-4674

AST Research Inc.

16215 Alton Parkway, P.O. Box 19658
Irvine, CA 92713-9658 (714) 727-4141

AT&T

295 N. Maple Avenue
Basking Ridge, NJ 07920 (201) 221-8694

Banyan Systems, Inc.

120 Flanders Road
Westboro, MA 01581 (508) 898-1000, (800) 828-2404

Bell & Howell Document Management Products Co.

6800 McCormick Road
Chicago, IL 60645 (708) 675-7600, (800) 327-4608

Bethel Computer

1723 21st Street
Santa Monica, CA 90404 (213) 828-1415

Compex, Inc.

4055 E. LaPalma, Unit C
Anaheim, CA 92807 (714) 630-7302

Core International, Inc.

7171 N. Federal Highway
Boca Raton, FL 33487 (407) 997-6044

Datamedia Corp.

20 Trafalgar Square
Nashua, NH 03063 (603) 886-1570, (800) 362-4636

Datapoint Corp.

9725 Datapoint Drive
San Antonio, TX 78229-8500 (512) 699-7000, (800) 733-1500

Digital Equipment Corp.

146 Main Street
Maynard, MA 01754-2571 (508) 493-5111, (800) 344-4825

DSC Communications Corp.

3101 Scott Blvd
Santa Clara, CA 95054 (408) 954-5000, (800) BUY NEXOS

DTK Computer, Inc.

15711 E. Valley Boulevard
City of Industry, CA 91744 (818) 333-7533

Gandalf Data, Inc.

1020 S. Noel Avenue
Wheeling, IL 60090 (708) 541-6060, (800) 426-3253

Harris Adacom

16001 Dallas Parkway
Dallas, TX 75248 (214) 386-2000

Hewlett-Packard Co.

19091 Pruneridge Avenue
Cupertino, CA 95014 (800) 572-0900

JC Information Systems

161 Whitney Place
Fremont, CA 94539 (415) 659-8440

Lancer Research

557 W. Covina Boulevard
San Dimas, CA 91773 (714) 592-6003, (800) 966-8866

Lanmaster

1401 North 14 Street
Temple, TX 76501 (817) 771-2124, (800) 441-6189

Maco Networks, Inc.

802 E. Martintown Rd., BTC 361
North Augusta, SC 29841 (803) 278-7225

Morton Management, Inc.

12079 Tech Road
Silver Spring, MD 20904 (301) 622-5600, (800) 548-5744

Motorola Computer Systems

10700 N. DeAnza Boulevard
Cupertino, CA 95014 (408) 255-0900

NCR Corp.

1700 S. Patterson Boulevard
Dayton, OH 45479 (513) 445-5000, (800) 543-1710

NetFRAME Systems

1545 Barber Lane
Milpitas, CA 95035 (408) 944-0600, (800) 852-3726

Network & Communication Technology, Inc.

24 Wampum Road
Park Ridge, NJ 07656 (201) 307-9000

The Network Connection

1324 Union Hill Road
Alpharetta, GA 30201 (404) 751-0889, (800) 327-4853

Samsung Informations Systems America, Inc.

3655 N. First Street
San Jose, CA 95134 (408) 434-5400, (800) 446-0262

Solid Technologies

333 S. Beverly Drive
Suite 103
Beverly Hills, CA 90212 (213) 785-0030, (800) 422-2966

Storage Dimensions, Inc.

Subsidiary of Maxtor Corp.
2145 Hamilton Avenue
San Jose, CA 95125 (408) 879-0300

Sun Microsystems, Inc.

2550 Garcia Avenue
Mountain View, CA 94043 (415) 960-1300, (800) 821-4643

TeleVideo Systems, Inc.

550 E. Brokaw Road
San Jose, CA 95161 (408) 954-8333, (800) 835-3228

3Com Corp.

5400 Bayfront Plaza
P.O. Box 58145
Santa Clara, CA 95052-8145 (408) 764-5000, (800) 638-3266

Top Microsystems

5850 Amapola Drive
San Jose, CA 95129 (408) 980-9813

Wang Laboratories, Inc.

One Industrial Avenue
Lowell, MA 01851 (508) 459-5000, (800) 225-0654

Watlan, Inc.

160 Columbia Street W.
Waterloo, ON Canada N2L 3L3 (519) 746-0550

Zetaco, Inc.

6850 Shady Oak Road
Eden Prairie, MN 55344 (612) 941-9480, (800) 423-3020

Network Interface Cards**Able Computer Communications**

2652 McGaw Avenue
Irvine, CA 92714 (714) 553-1188

Acer, Inc.

401 Charcot Avenue
San Jose, CA 95131 (408) 922-0333, (800) 777-5277

ADI Systems, Inc.

2121 Ringwood Avenue
San Jose, CA 95131 (408) 944-0100

Advanced Digital Corp.

5432 Production Drive
Huntington Beach, CA 92649 (714) 891-4004

Allen-Bradley Co., Inc.

747 Alpha Drive
Highland Heights, OH 44143 (216) 449-6700

Allied Telesis Inc.

627 National Avenue
Mountain View, CA 94043 (415) 964-2771

Altos Computer Systems

2641 Orchard Parkway
San Jose, CA 95134 (408) 432-6200, (800) 258-6787

American Research Corp.

1101 Monterey Pass Road
Monterey Park, CA 91754 (213) 265-0835, (800) 423-3877

Andrew Corp.

2771 Plaza Del Amo
Torrance, CA 90503 (213) 320-7126, (800) 733-0331

Apple Computer, Inc.

20525 Mariani Avenue
Cupertino, CA 95014 (408) 996-1010

Artisoft, Inc.

575 E. River Road
Tucson, AZ 85704 (602) 293-6363

Asante Technologies, Inc.

405 Tasman Drive
Sunnyvale, CA 94089 (408) 734-4844

AST Research Inc.

16215 Alton Parkway, P.O. Box 19658
Irvine, CA 92713-9658 (714) 727-4141

AT&T

295 N. Maple Avenue
Basking Ridge, NJ 07920 (201) 221-8694

Bethel Computer

1723 21st Street
Santa Monica, CA 90404 (213) 828-1415

BICC Data Networks, Inc.

1800 W. Park Drive
Westborough, MA 01581 (508) 898-2422, (800) 447-6526

Cabletron Systems, Inc.

35 Industrial Way, P.O. Box 6257
East Rochester, NH 03867 (603) 332-9400

Canai, Computer and Network Architecture Inc.

59 Iber Road
Stittsville, ON Canada K2S 1E7 (613) 831-8300

CASE/Datatel, Inc.

55 Carnegie Plaza
Cherry Hill, NJ 08003 (609) 424-4451, (800) 424-4451

CBIS, Inc.

5875 Peachtree Industrial Boulevard
Building 100, Unit 170
Norcross, GA 30092 (404) 446-1332

Chipcom Corp.

118 Turnpike Road
Southborough, MA 01772 (508) 460-8900, (800) 228-9930

CMC

125 Cremona Drive
Santa Barbara, CA 93117 (805) 968-4262, (800) 262-8023

CNet Technology

62 Bonaventura Drive
San Jose, CA 95134 (408) 954-8000

Codenoll Technology Corp.

1086 N. Broadway
Yonkers, NY 10701 (914) 965-6300

Cogent Data Technologies, Inc.

175 West Street

P.O. Box 926
Friday Harbor, WA 98250 (206) 378-2929

Commtex Inc.
1655 Crofton Boulevard
Crofton, MD 21114-1341 (301) 721-3666

Compatible Systems Corp.
P.O. Drawer 17220
Boulder, CO 80308 (303) 444-9532, (800) 356-0283

Compex, Inc.
4055 E. LaPalma, Unit C
Anaheim, CA 92807 (714) 630-7302

Concord Communications, Inc.
753 Forest Street
Marlboro, MA 01752 (508) 460-4646

Corman Technologies, Inc.
75 Bathurst Drive
Waterloo, ON Canada N2V 1N2 (519) 884-4430

Corvus Systems, Inc.
160 Great Oaks Boulevard
San Jose, CA 95119 (408) 281-4100, (800) 426-7887

D-Link Systems, Inc.
5 Musick
Irvine, CA 92718 (714) 455-1688

Datapoint Corp.
9725 Datapoint Drive
San Antonio, TX 78229-8500 (512) 699-7000, (800) 733-1500

David Systems
701 E. Evelyn Avenue
Sunnyvale, CA 94086 (408) 720-8000

Dayna Communications, Inc.
50 S. Main Street, Fifth Floor
Salt Lake City, UT 84144 (801) 531-0600

DayStar Digital, Inc.
5556 Atlanta Highway
Flowery Branch, GA 30542 (404) 967-2077, (800) 962-2077

DFI, Inc.
2544 Port Street
West Sacramento, CA 95691 (916) 373-1234

Digital Communications Associates, Inc.
1000 Alderman Drive
Alpharetta, GA 30202 (404) 442-4000, (800) 241-4762

Digital Equipment Corp.
146 Main Street
Maynard, MA 01754-2571 (508) 493-5111, (800) 344-4825

DNA Networks, Inc.
351 Phoenixville Pike
Malvern, PA 19355 (215) 296-7420, (800) 999-3622

DSC Communications Corp.
3101 Scott Boulevard
Santa Clara, CA 95054 (408) 954-5000, (800) BUY NEXOS

DTK Computer, Inc.
15711 E. Valley Boulevard
City of Industry, CA 91744 (818) 333-7533

Earth Computer Technologies
P.O. Box 8067
10525 Lawson River Avenue
Fountain Valley, CA 92728 (714) 964-5784, (800) 544-7551

Edimax Computer Co.
3350 Scott Boulevard, Building 9A
Santa Clara, CA 95054 (408) 496-1105

FiberCom, Inc.
P.O. Box 11966
Roanoke, VA 24022-1966 (703) 342-6700, (800) 423-1183

Frontier Technologies Corp.
3510 N. Oakland Avenue
Milwaukee, WI 53211 (414) 964-8689

Gandalf Data, Inc.
1020 S. Noel Avenue
Wheeling, IL 60090 (708) 541-6060, (800) 426-3253

Gateway Communications, Inc.
2941 Alton Avenue
Irvine, CA 92714 (714) 553-1555, (800) 367-6555

General Technology, Inc.
415 Pineda Court
Melbourne, FL 32940 (407) 242-2733, (800) 274-2733

h-three Systems
100 Park Drive, P.O. Box 12557
Research Triangle Park, NC 27709 (919) 549-8334, (800) 622-7464

Hayes Microcomputer Products, Inc.
P.O. Box 105203
Atlanta, GA 30348 (404) 449-8791

Hewlett-Packard Co.
Business Computing Div.
19091 Pruneridge Avenue
Cupertino, CA 95014 (800) 752-0900

IMC Networks Corp.
1342 Bell Avenue, Unit 3E
Tustin, CA 92680 (714) 259-1020, (800) 624-1070

International Business Machines Corp. (IBM)
Old Orchard Road
Armonk, NY 10504 (914) 764-1900

International Communications Equipment
17945 Sky Park Circle
Suite G
Irvine, CA 92714 (714) 660-0191, (800) 486-7800

Interphase Corp.
13800 Senlac
Dallas, TX 75234 (214) 919-9000

Invisible Software, Inc.
1142 Chess Drive
Foster City, CA 94404 (415) 570-5967

JC Information Systems
161 Whitney Place
Fremont, CA 94539 (415) 659-8440

Kodiak Technology
1338 Ridder Park Drive
San Jose, CA 95131 (408) 441-6900

Lancer Research
557 W. Covina Boulevard
San Dimas, CA 91773 (714) 592-6003, (800) 966-8866

Lanmaster
1401 North 14 Street
Temple, TX 76501 (817) 771-2124, (800) 441-6189

LANNET Data Communications, Inc.
7711 Center Avenue
Suite 600
Huntington Beach, CA 92647 (714) 891-1964

Lans Plus Canada, Inc.
277 De La Commune E.
Montreal, PQ Canada H2Y 1J2 (514) 875-9023

Lantana Technology

4393 Viewridge Avenue
Suite A
San Diego, CA 92123 (619) 565-6400

Longshine Technology

2013 N. Capitol Avenue
San Jose, CA 95132 (408) 942-1746

Madge Networks, Inc.

40 Airport Parkway
Suite 150
San Jose, CA 95110 (408) 441-1300, (800) 876-2343

MNC International

2817 Anthony Lane South
Minneapolis, MN 55418 (612) 788-1099, (800) 800-ZMNC

Moses Computers

15466 Los Gatos Boulevard
Los Gatos, CA 95032 (408) 358-1550

Motorola Computer Systems

10700 N. DeAnza Boulevard
Cupertino, CA 95014 (408) 255-0900

Multi-Tech Systems, Inc.

2205 Woodale Drive E.
Mounds View, MN 55112 (612) 785-3500, (800) 328-9717

Mylex Corp.

47650 Westinghouse Drive
Fremont, CA 94539 (415) 683-4600, (800) 446-9539

National Semiconductor

2900 Semiconductor Dr.
Santa Clara, CA 95052 (408) 721-5000, (800) 538-8510

Netronix

1372 N. McDowell Boulevard
Petaluma, CA 94954 (707) 762-2703, (800) 282-2535

Network Interface Corp.

15019 West 95 Street
Lenexa, KS 66215 (913) 894-2277, (800) 343-2853

NetWorth, Inc.

8101 Ridgepoint Drive
Irving, TX 75063 (214) 869-1331, (800) 544-5255

Novell, Inc.

122 East 1700, South
Provo, UT 84606 (801) 429-5900

NTI Group, Inc.

3265 Kifer Road
Santa Clara, CA 95051 (408) 739-2180

Olicom USA

2100 Willowbrook Way
Plano, TX 75075 (214) 596-0011

Optical Data Systems, Inc.

1101 E. Arapaho Road
Richardson, TX 75081 (214) 234-6400

Performance Technology

8000 IH 10W No. 800
San Antonio, TX 78230 (512) 349-2000, (800) 825-5267

Plexcom, Inc.

65 Moreland Road
Simi Valley, CA 93065 (805) 522-3333

Proteon, Inc.

Two Technology Drive
Westborough, MA 01581-5008 (508) 898-2800

PureData Ltd.

1740 South I-35
Carrollton, TX 75006 (214) 242-2040

Quantum Software Systems, Ltd.

175 Terrence Matthews Crescent
Kanata, ON Canada K2M 1W8 (613) 591-0931

Racal InterLan

155 Swanson Road
Boxborough, MA 01749 (508) 263-9929, (800) 526-8255

Racore Computer Products, Inc.

170 Knowles Drive
Los Gatos, CA 95030 (408) 374-8290, (800) 635-1275

Samsung Informations Systems America, Inc.

3655 N. First Street
San Jose, CA 95134 (408) 434-5400, (800) 446-0262

Sitka Corp.

950 Marina Village Parkway
Alameda, CA 94501 (415) 769-9669, (800) 445-8677

Solid Technologies

333 S. Beverly Drive
Suite 103
Beverly Hills, CA 90212 (213) 785-0030, (800) 422-2966

Standard Microsystems Corp.

35 Marcus Boulevard
Hauppauge, NY 11788 (516) 273-3100

TeleVideo Systems, Inc.

550 E. Brokaw Road
San Jose, CA 95161 (408) 954-8333, (800) 835-3228

Thirdware Computer Products

3300 Corporate Avenue # 116
Ft. Lauderdale, FL 33331 (305) 389-9009, (800) 446-5987

Thomas-Conrad Corp.

1908-R Kramer Lane
Austin, TX 78758 (512) 836-1935, (800) 332-8683

3Com Corp.

5400 Bayfront Plaza
P.O. Box 58145
Santa Clara, CA 95052-8145 (408) 764-5000, (800) 638-3266

Tiara Computer Systems, Inc.

1901 Shoreline Boulevard
Mountain View, CA 94043 (415) 965-1700

Top Microsystems

5850 Amapola Drive
San Jose, CA 95129 (408) 980-9813

Torus Systems, Inc.

240-B Twin Dolphin Drive
Redwood City, CA 94065 (415) 594-9336, (800) 872-5335

Toshiba America Information Systems, Inc.

Computer Systems Division
PO Box 19724
Irvine, CA 92713 (714) 583-3700, (800) 334-3445

Tri-Data Corp.

3270 Scott Road
Santa Clara, CA 95054 (408) 727-3270, (800) 874-3282

TRW

Information Networks Div.
23800 Hawthorne Boulevard
Torrance, CA 90505 (213) 373-9161

Ungermann-Bass, Inc.

3900 Freedom Circle

P.O. Box 95054
Santa Clara, CA 95052 (408) 496-0111, (800) 999-3236

Univation Inc.
513 Valley Way
Milpitas, CA 95035 (408) 263-1200, (800) 221-5842

US Sage
2005 Tree Fork Lane, Suite 113
Longwood, FL 32750 (407) 331-4400, (800) 999-6770

Wang Laboratories, Inc.
One Industrial Avenue
Lowell, MA 01851 (508) 459-5000, (800) 225-0654

Watlan, Inc.
160 Columbia Street W.
Waterloo, ON Canada N2L 3L3 (519) 746-0550

Western Digital Corp.
8105 Irvine Center
Irvine, CA 92718 (714) 747-2033, (800) 847-6181

Xinetron
2330-B Walsh Ave.
Santa Clara, CA 95051 (408) 727-5509, (800) 345-4415

Xircom
22231 Mulholland Highway, Suite 114
Woodland Hills, CA 91364 (818) 884-8755, (800) 874-7875

Xylogics, Inc.
53 Third Ave.
Burlington, MA 01803 (617) 272-8140, (800) 225-3317

YamaTech Connectivity Solutions
1255 Laird Boulevard
Montreal, PQ Canada H3P 2T1 (514) 737-5434

Zenith Electronics Corp.
1000 Milwaukee Avenue
Glenview, IL 60025 (708) 391-8000

Zytec Systems
5323 Spring Valley Road
Dallas, TX 75240 (214) 991-9966

Wiring Centers

Allied Telesis Inc.
627 National Avenue
Mountain View, CA 94043 (415) 964-2771

Andrew Corp.
2771 Plaza Del Amo
Torrance, CA 90503 (213) 320-7126, (800) 733-0331

Artel Communications Corp.
22 Kane Industrial Drive
Hudson, MA 01749 (508) 562-2100, (800) 225-0228

Artisoft, Inc.
575 E. River Road
Tucson, AZ 85704 (602) 293-6363

AT&T
295 N. Maple Avenue
Basking Ridge, NJ 07920 (201) 221-8694

BICC Data Networks, Inc.
1800 W. Park Drive
Westborough, MA 01581 (508) 898-2422, (800) 447-6526

Cabletron Systems, Inc.
35 Industrial Way, P.O. Box 6257
East Rochester, NH 03867 (603) 332-9400

Chipcom Corp.
118 Turnpike Road
Southborough, MA 01772 (508) 460-8900, (800) 228-9930

Codenoll Technology Corp.
1086 N. Broadway
Yonkers, NY 10701 (914) 965-6300

Commtext Inc.
1655 Crofton Boulevard
Crofton, MD 21114-1341 (301) 721-3666

Datapoint Corp.
9725 Datapoint Drive
San Antonio, TX 78229-8500 (512) 699-7000, (800) 733-1500

Datatec Industries
23 Madison Road
Fairfield, NJ 07004 (201) 808-4000, (800) DATATEC

David Systems
701 E. Evelyn Avenue
Sunnyvale, CA 94086 (408) 720-8000

Digital Communications Associates, Inc.
1000 Alderman Drive
Alpharetta, GA 30202 (404) 442-4000, (800) 241-4762

Digital Equipment Corp.
146 Main Street
Maynard, MA 01754-2571 (508) 493-5111, (800) 344-4825

Fibermux Corp.
9310 Topanga Canyon Boulevard
Chatsworth, CA 91311 (818) 709-6000

Gandalf Data, Inc.
1020 S. Noel Avenue
Wheeling, IL 60090 (708) 541-6060, (800) 426-3253

Gateway Communications, Inc.
2941 Alton Avenue
Irvine, CA 92714 (714) 553-1555, (800) 367-6555

General Technology, Inc.
415 Pineda Ct.
Melbourne, FL 32940 (407) 242-2733, (800) 274-2733

IMC Networks Corp.
1342 Bell Avenue
Unit 3E
Tustin, CA 92680 (714) 259-1020, (800) 624-1070

International Business Machines Corp. (IBM)
Old Orchard Road
Armonk, NY 10504 (914) 764-1900

Interphase Corp.
13800 Senlac
Dallas, TX 75234 (214) 919-9000

Lancast/Casat Technology
10 Northern Boulevard, Unit 5
Amherst, NH 03031 (603) 880-1833

Lanmaster
1401 North 14 Street
Temple, TX 76501 (817) 771-2124, (800) 441-6189

LANNET Data Communications, Inc.
7711 Center Avenue
Suite 600
Huntington Beach, CA 92647 (714) 891-1964

Lantana Technology
4393 Viewridge Avenue
Suite A
San Diego, CA 92123 (619) 565-6400

Madge Networks, Inc.

40 Airport Parkway
Suite 150
San Jose, CA 95110 (408) 441-1300, (800) 876-2343

Netcor, Inc.

850 Auburn Court
Fremont, CA 94538 (415) 623-3700, (800) 531-1300

NetWorth, Inc.

8101 Ridgpoint Drive
Irving, TX 75063 (214) 869-1331, (800) 544-5255

Nevada Western

Div. of Thomas & Betts
615 N. Tasman Drive
Sunnyvale, CA 94089 (408) 734-2700

Niwot Networks

1930 Central Avenue
Suite E
Boulder, CO 80301 (303) 444-7765

Olicom USA

2100 Willowbrook Way
Plano, TX 75075 (214) 596-0011

Optical Data Systems, Inc.

1101 E. Arapaho Road
Richardson, TX 75081 (214) 234-6400

Plexcom, Inc.

65 Moreland Road
Simi Valley, CA 93065 (805) 522-3333

Proteon, Inc.

Two Technology Drive
Westborough, MA 01581-5008 (508) 898-2800

PureData Ltd.

1740 South I-35
Carrollton, TX 75006 (214) 242-2040

Racal InterLan

155 Swanson Road
Boxborough, MA 01749 (508) 263-9929, (800) 526-8255

Ship Star Assoc.

36 Woodhill Drive
Suite 19
Newark, DE 19711 (302) 738-7782

Standard Microsystems Corp.

35 Marcus Boulevard
Hauppauge, NY 11788 (516) 273-3100

Star-Tek, Inc.

100 Otis Street
Northboro, MA 01532 (506) 393-9393, (800) 225-8528

SynOptics Communications, Inc.

501 E. Middlefield Road
Mountain View, CA 94043 (415) 960-1100, (800) 735-8023

3Com Corp.

5400 Bayfront Plaza
P.O. Box 58145
Santa Clara, CA 95052-8145 (408) 764-5000, (800) 638-3266

Transition Engineering

7448 W. 78th Street
Edina, MN 55439 (612) 941-7600

Ungermann-Bass, Inc.

3900 Freedom Circle
P.O. Box 95054
Santa Clara, CA 95052 (408) 496-0111, (800) 999-3236

Wang Laboratories, Inc.

One Industrial Avenue
Lowell, MA 01851 (508) 459-5000, (800) 225-0654

Xinetron

2330-B Walsh Ave.
Santa Clara, CA 95051 (408) 727-5509, (800) 345-4415

Zenith Electronics Corp.

1000 Milwaukee Avenue
Glenview, IL 60025 (708) 391-8000

Zytec Systems

5323 Spring Valley Road
Dallas, TX 75240 (214) 991-9966

Diskless Workstations**Advanced Digital Corp.**

5432 Production Drive
Huntington Beach, CA 92649 (714) 891-4004

American Mitac Corp.

410 E. Plumeria Drive
San Jose, CA 95134 (408) 432-1160, (800) 648-2287

American Research Corp.

1101 Monterey Pass Road
Monterey Park, CA 91754 (213) 265-0835, (800) 423-3877

AST Research Inc.

16215 Alton Parkway, P.O. Box 19658
Irvine, CA 92713-9658 (714) 727-4141

Bethel Computer

1723 21st Street
Santa Monica, CA 90404 (213) 828-1415

Cubix Corp.

2800 Lockheed Way
Carson City, NV 89706 (702) 883-7611, (800) 829-0550

Daedalus Group

4750 Wiley Post Way, Suite 180
Salt Lake City, UT 84116 (801) 575-6600

Datamedia Corp.

20 Trafalgar Square
Nashua, NH 03063 (603) 886-1570, (800) 362-4636

Datapoint Corp.

9725 Datapoint Drive
San Antonio, TX 78229-8500 (512) 699-7000, (800) 733-1500

Digital Equipment Corp.

146 Main Street
Maynard, MA 01754-2571 (508) 493-5111, (800) 344-4825

DTK Computer, Inc.

15711 E. Valley Boulevard
City of Industry, CA 91744 (818) 333-7533

Earth Computer Technologies

P.O. Box 8067
10525 Lawson River Avenue
Fountain Valley, CA 92728 (714) 964-5784, (800) 544-7551

EXZEL Corp.

7721 East Gray Road
Suite 101
Scottsdale, AZ 85260 (602) 951-8503, (800) 833-3897

International Communications Equipment

17945 Sky Park Circle
Suite G
Irvine, CA 92714 (714) 660-0191, (800) 486-7800

JC Information Systems

161 Whitney Place
Fremont, CA 94539 (415) 659-8440

Kimtron Corp.

4181 Business Center
Fremont, CA 94538 (415) 623-8900, (800) 777-8755

Lancer Research

557 W. Covina Boulevard
San Dimas, CA 91773 (714) 592-6003, (800) 966-8866

Lanmaster

1401 North 14 Street
Temple, TX 76501 (817) 771-2124, (800) 441-6189

Liberty Electronics

270 E. Grand Ave.
S. San Francisco, CA 94080 (415) 742-7000

Netcom Research, Inc.

36C Muckly Drive
Irvine, CA 92718 (714) 727-0724

The Network Connection

1324 Union Hill Road
Alpharetta, GA 30201 (404) 751-0889, (800) 327-4853

Racore Computer Products, Inc.

170 Knowles Drive
Los Gatos, CA 95030 (408) 374-8290, (800) 635-1275

Samsung Informations Systems America, Inc.

3655 N. First Street
San Jose, CA 95134 (408) 434-5400, (800) 446-0262

Solid Technologies

333 S. Beverly Drive
Suite 103
Beverly Hills, CA 90212 (213) 785-0030, (800) 422-2966

Sun Microsystems, Inc.

2550 Garcia Avenue
Mountain View, CA 94043 (415) 960-1300, (800) 821-4643

TeleVideo Systems, Inc.

550 E. Brokaw Road
San Jose, CA 95161 (408) 954-8333, (800) 835-3228

3Com Corp.

5400 Bayfront Plaza
P.O. Box 58145
Santa Clara, CA 95052-8145 (408) 764-5000, (800) 638-3266

Top Microsystems

5850 Amapola Drive
San Jose, CA 95129 (408) 980-9813

Wyse Technology, Inc.

3471 N. First Street
San Jose, CA 95134 (408) 473-1200, (800) 438-9973

Xinetron

2330-B Walsh Ave.
Santa Clara, CA 95051 (408) 727-5509, (800) 345-4415

Allen-Bradley Co., Inc.

747 Alpha Drive
Highland Heights, OH 44143 (216) 449-6700

Allied Telesis Inc.

627 National Avenue
Mountain View, CA 94043 (415) 964-2771

Andrew Corp.

2771 Plaza Del Amo
Torrance, CA 90503 (213) 320-7126, (800) 733-0331

Applitek Corp.

100 Brickstone Square
Andover, MA 01810 (508) 475-4050, (800) 526-2489

Artel Communications Corp.

22 Kane Industrial Drive
Hudson, MA 01749 (508) 562-2100, (800) 225-0228

AT&T

295 N. Maple Avenue
Basking Ridge, NJ 07920 (201) 221-8694

BICC Data Networks, Inc.

1800 W. Park Drive
Westborough, MA 01581 (508) 898-2422, (800) 447-6526

Cabletron Systems, Inc.

35 Industrial Way, P.O. Box 6257
East Rochester, NH 03867 (603) 332-9400

CASE/Datatel, Inc.

55 Carnegie Plaza
Cherry Hill, NJ 08003 (609) 424-4451, (800) 424-4451

CBIS, Inc.

5875 Peachtree Industrial Boulevard
Building 100, Unit 170
Norcross, GA 30092 (404) 446-1332

Chipcom Corp.

118 Turnpike Road
Southborough, MA 01772 (508) 460-8900, (800) 228-9930

Codex Corp.

20 Cabot Boulevard
Mansfield, MA 02048 (508) 261-4000, (800) 446-6336

Concord Communications, Inc.

753 Forest Street
Marlboro, MA 01752 (508) 460-4646

CrossComm Corp.

140 Locke Drive
Marlborough, MA 01752 (508) 481-4060

Cryptall Communications Corp.

2 Thurber Boulevard
Smithfield, RI 02917 (401)-232-7600

Datapoint Corp.

9725 Datapoint Drive
San Antonio, TX 78229-8500 (512) 699-7000, (800) 733-1500

Dayna Communications, Inc.

50 S. Main Street, Fifth Floor
Salt Lake City, UT 84144 (801) 531-0600

Develcon Electronics Ltd.

515 Consumers Road
Suite 500
Willowdale, ON Canada M2J 4Z2 (306) 495-8666

Digital Communications Associates, Inc.

1000 Alderman Drive
Alpharetta, GA 30202 (404) 442-4000, (800) 241-4762

Bridges

Advanced Computer Communications

720 Santa Barbara Street
Santa Barbara, CA 93101 (805) 963-9431, (800) 444-7854

ALANTEC

101 Hammond Avenue
Fremont, CA 94539 (415) 770-1050

Digital Equipment Corp.

146 Main Street
Maynard, MA 01754-2571 (508) 493-5111, (800) 344-4825

Dupont Electronics

Electro-Optic Products Group
P.O. Box 13625
Research Triangle Park, NC 27709 (919) 481-5100, (800) 888-5261

Fairchild Data Corp.

350 N. Hayden Road
Scottsdale, AZ 85257 (602) 949-1155

FiberCom, Inc.

P.O. Box 11966
Roanoke, VA 24022-1966 (703) 342-6700, (800) 423-1183

Fibermux Corp.

9310 Topanga Canyon Boulevard
Chatsworth, CA 91311 (818) 709-6000

Fibronics International Inc.

Communications Way
Independence Park
Hyannis, MA 02601 (508) 778-0700, (800) 456-3279

Halley Systems, Inc.

2730 Orchard Parkway
San Jose, CA 95134 (408) 432-2600

Hayes Microcomputer Products, Inc.

P.O. Box 105203
Atlanta, GA 30348 (404) 449-8791

Hewlett-Packard Co.

19091 Pruneridge Avenue
Cupertino, CA 95014 (800) 572-0900

IN-Net Corp.

15150 Avenue of Science
Suite 100
San Diego, CA 92128-3495 (619) 487-3693, (800) 283-3334

Infotron Systems Corp.

9 N. Olney Avenue
Cherry Hill, NJ 08003 (609) 424-9400

Interlink Computer Sciences, Inc.

47370 Fremont Boulevard
Fremont, CA 94538 (415) 657-9800, (800) 422-3711

International Business Machines Corp. (IBM)

Old Orchard Road
Armonk, NY 10504 (914) 764-1900

LANEX Corp.

7120 Columbia Gateway Drive
Columbia, MD 21046 (301) 312-2200

LANNET Data Communications, Inc.

7711 Center Avenue
Suite 600
Huntington Beach, CA 92647 (714) 891-1964

Lantana Technology

4393 Viewridge Avenue
Suite A
San Diego, CA 92123 (619) 565-6400

Maco Networks, Inc.

802 E. Martintown Rd., BTC 361
North Augusta, SC 29841 (803) 278-7225

Microcom, Inc.

500 River Ridge Drive
Norwood, MA 02062-5028 (617) 551-1000

NCR Corp.

1700 S. Patterson Boulevard
Dayton, OH 45479 (513) 445-5000, (800) 543-0710

Netronix

1372 N. McDowell Boulevard
Petaluma, CA 94954 (707) 762-2703, (800) 282-2535

Network Resources Corp.

2450 Autumnvale Drive
San Jose, CA 95131 (408) 263-8100

Optical Data Systems, Inc.

1101 E. Arapaho Road
Richardson, TX 75081 (214) 234-6400

Performance Technology

8000 IH 10W No. 800
San Antonio, TX 78230 (512) 349-2000, (800) 825-5267

Persoft, Inc.

465 Science Drive
Madison, WI 53711 (608) 273-6000, (800) EMULATE

Plexcom, Inc.

65 Moreland Road
Simi Valley, CA 93065 (805) 522-3333

Racal InterLan

155 Swanson Road
Boxborough, MA 01749 (508) 263-9929, (800) 526-8255

Racal-Milgo

1601 N. Harrison Parkway
Sunrise, FL 33323-2899 (305) 846-1601, (800) 327-4440

Raycom Systems, Inc.

6395 Gunpark Drive
Boulder, CO 80301 (303) 530-1620, (800) 373-1620

Retix

2644 30th Street
Santa Monica, CA 90405-3009 (213) 399-2200

The Santa Cruz Operation, Inc.

400 Encinal Street
Santa Cruz, CA 95060 (408) 425-7222, (800) 726-8649

Ship Star Assoc.

36 Woodhill Drive
Suite 19
Newark, DE 19711 (302) 738-7782

Symicron, Inc.

904 Silver Spur Road No. 677
Rolling Hills Estates, CA 90274 (213) 541-3375

SynOptics Communications, Inc.

501 E. Middlefield Road
Mountain View, CA 94043 (415) 960-1100, (800) 735-8023

3Com Corp.

5400 Bayfront Plaza
P.O. Box 58145
Santa Clara, CA 95052-8145 (408) 764-5000, (800) 638-3266

TRW

Information Networks Div.
23800 Hawthorne Boulevard
Torrance, CA 90505 (213) 373-9161

Ungermann-Bass, Inc.

3900 Freedom Circle
P.O. Box 95054
Santa Clara, CA 95052 (408) 496-0111, (800) 999-3236

Vitalink Communications Corp.

6607 Kaiser Drive
Fremont, CA 94555 (415) 794-1100

Wang Laboratories, Inc.
One Industrial Avenue
Lowell, MA 01851 (508) 459-5000, (800) 225-0654

Routers/Brouters

Advanced Computer Communications
720 Santa Barbara Street
Santa Barbara, CA 93101 (805) 963-9431, (800) 444-7854

Allen-Bradley Co., Inc.
747 Alpha Drive
Highland Heights, OH 44143 (216) 449-6700

Apple Computer, Inc.
20525 Mariani Avenue
Cupertino, CA 95014 (408) 996-1010

APT Communications
9607 Dr. Perry Road
Ijamsville, MD 21754 (301) 831-1182

AT&T
295 N. Maple Avenue
Basking Ridge, NJ 07920 (201) 221-8694

CASE/Datatel, Inc.
55 Carnegie Plaza
Cherry Hill, NJ 08003 (609) 424-4451, (800) 424-4451

cisco Systems, Inc.
1525 O'Brien Drive
Menlo Park, CA 94025 (415) 326-1941, (800) 553-6387

CMC
125 Cremona Drive
Santa Barbara, CA 93117 (805) 968-4262, (800) 262-8023

Compatible Systems Corp.
P.O. Drawer 17220
Boulder, CO 80308 (303) 444-9532, (800) 356-0283

CrossComm Corp.
140 Locke Drive
Marlborough, MA 01752 (508) 481-4060

Digital Equipment Corp.
146 Main Street
Maynard, MA 01754-2571 (508) 493-5111, (800) 344-4825

Eicon Technology Corp.
2196 32nd Avenue
Lachine, PQ Canada H8T 3H7 (514) 631-2592

Fibermux Corp.
9310 Topanga Canyon Boulevard
Chatsworth, CA 91311 (818) 709-6000

Fibronics International Inc.
Communications Way
Independence Park
Hyannis, MA 02601 (508) 778-0700, (800) 456-3279

Gateway Communications, Inc.
2941 Alton Avenue
Irvine, CA 92714 (714) 553-1555, (800) 367-6555

General DataComm, Inc.
1579 Straits Turnpike
Middlebury, CT 06762 (203) 574-1118

Halley Systems, Inc.
2730 Orchard Parkway
San Jose, CA 95134 (408) 432-2600

Hewlett-Packard Co.
19091 Pruneridge Avenue
Cupertino, CA 95014 (800) 572-0900

Interlink Computer Sciences, Inc.
47370 Fremont Boulevard
Fremont, CA 94538 (415) 657-9800, (800) 422-3711

Mitek OpenConnect Systems, Corp.
2033 Chennault Drive
Carrollton, TX 75006 (214) 490-4090

NCR Corp.
1700 S. Patterson Boulevard
Dayton, OH 45479 (513) 445-5000, (800) 543-0710

Network Resources Corp.
2450 Autumnvale Drive
San Jose, CA 95131 (408) 263-8100

Network Systems Corp.
7600 Boone Avenue North
Minneapolis, MN 55428 (612) 424-4888

Newport Systems Solutions, Inc.
4019 Westerly Place
Suite 103
Newport Beach, CA 92660 (714) 752-1511, (800) 662-4677

Niwot Networks
1930 Central Avenue
Suite E
Boulder, CO 80301 (303) 444-7765

Novell, Inc.
122 East 1700, South
Provo, UT 84606 (801) 429-5900

NTI Group, Inc.
3265 Kifer Road
Santa Clara, CA 95051 (408) 739-2180

Phaser Systems, Inc.
651 Gateway Boulevard
Suite 400
South San Francisco, CA 94080 (415) 952-6300

Promptus Communications, Inc.
207 High Point Ave.
Portsmouth, RI 02871 (401) 683-6100, (800) 777-LANS

Proteon, Inc.
Two Technology Drive
Westborough, MA 01581-5008 (508) 898-2800

Retix
2644 30th Street
Santa Monica, CA 90405-3009 (213) 399-2200

The Santa Cruz Operation, Inc.
400 Encinal Street
Santa Cruz, CA 95060 (408) 425-7222, (800) 726-8649

Shiva
1 Cambridge Center
Cambridge, MA 02142 (617) 864-8500, (800) 458-3550

SynOptics Communications, Inc.
501 E. Middlefield Road
Mountain View, CA 94043 (415) 960-1100, (800) 735-8023

3Com Corp.
5400 Bayfront Plaza
P.O. Box 58145
Santa Clara, CA 95052-8145 (408) 764-5000, (800) 638-3266

Tri-Data Corp.
3270 Scott Road
Santa Clara, CA 95054 (408) 727-3270, (800) 874-3282

Ungermann-Bass, Inc.
3900 Freedom Circle
P.O. Box 95054
Santa Clara, CA 95052 (408) 496-0111, (800) 999-3236

Unisync Inc.
1380 W. 9th Street
Upland, CA 91786 (714) 985-5088

Vitalink Communications Corp.
6607 Kaiser Drive
Fremont, CA 94555 (415) 794-1100

Wellfleet Communications
15 Crosby Drive
Bedford, MA 01730 (617) 275-2400

Zenith Electronics Corp.
1000 Milwaukee Avenue
Glenview, IL 60025 (708) 391-8000

Gateways

Able Computer Communications
2652 McGaw Avenue
Irvine, CA 92714 (714) 553-1188

Advanced Digital Corp.
5432 Production Drive
Huntington Beach, CA 92649 (714) 891-4004

Applitek Corp.
100 Brickstone Square
Andover, MA 01810 (508) 475-4050, (800) 526-2489

APT Communications
9607 Dr. Perry Road
Ijamsville, MD 21754 (301) 831-1182

AST Research Inc.
16215 Alton Parkway, P.O. Box 19658
Irvine, CA 92713-9658 (714) 727-4141

AT&T
295 N. Maple Avenue
Basking Ridge, NJ 07920 (201) 221-8694

Attachmate Corp.
13231 SE 36th Street
Bellevue, WA 98006 (206) 644-4010, (800) 426-6283

Avatar Corp.
65 South Street
Hopkinton, MA 01748 (508) 435-3000, (800) 282-3270

CASE/Datatel, Inc.
55 Carnegie Plaza
Cherry Hill, NJ 08003 (609) 424-4451, (800) 424-4451

Chi Corp.
31200 Carter Street
Solon, OH 44139 (216) 349-8600, (800) 354-0599

Commtext Inc.
1655 Crofton Boulevard
Crofton, MD 21114-1341 (301) 721-3666

Data Interface Systems Corp.
8701 N. Lopac, Suite 415
Austin, TX 78759 (512) 699-7000, (800) 351-4244

Datapoint Corp.
9725 Datapoint Drive
San Antonio, TX 78229-8500 (512) 699-7000, (800) 733-1500

Develcon Electronics Ltd.
515 Consumers Road

Suite 500
Willowdale, ON Canada M2J 4Z2 (306) 495-8666

Digital Communications Associates, Inc.
1000 Alderman Drive
Alpharetta, GA 30202 (404) 442-4000, (800) 241-4762

Digital Equipment Corp.
146 Main Street
Maynard, MA 01754-2571 (508) 493-5111, (800) 344-4825

Eicon Technology Corp.
2196 32nd Avenue
Lachine, PQ Canada H8T 3H7 (514) 631-2592

Frontier Technologies Corp.
3510 N. Oakland Avenue
Milwaukee, WI 53211 (414) 964-8689

Gateway Communications, Inc.
2941 Alton Avenue
Irvine, CA 92714 (714) 553-1555, (800) 367-6555

Harris Adacom
16001 Dallas Parkway
Dallas, TX 75248 (214) 386-2000

Hewlett-Packard Co.
19091 Pruneridge Avenue
Cupertino, CA 95014 (800) 572-0900

ICOT
3801 Zanker Road
San Jose, CA 95150 (408) 433-3300, (800) SNA-3270

IDEAssociates, Inc.
29 Dunham Road
Billerica, MA 01821 (508) 663-6878, (800) 257-5027

IN-Net Corp.
15150 Avenue of Science
Suite 100
San Diego, CA 92128-3495 (619) 487-3693, (800) 283-3334

Infotron Systems Corp.
9 N. Olney Avenue
Cherry Hill, NJ 08003 (609) 424-9400

Interlink Computer Sciences, Inc.
47370 Fremont Boulevard
Fremont, CA 94538 (415) 657-9800, (800) 422-3711

International Business Machines Corp. (IBM)
Old Orchard Road
Armonk, NY 10504 (914) 764-1900

Jupiter Technology, Inc./Intel Corp.
2402 W. Beardsley Road
Phoenix, AZ 85027 (602) 869-4023

McData Corp.
310 Interlocken Parkway
Broomfield, CO 80021 (303) 460-9200

Mitek OpenConnect Systems, Corp.
2033 Chennault Drive
Carrollton, TX 75006 (214) 490-4090

Multi-Tech Systems, Inc.
2205 Woodale Drive E.
Mounds View, MN 55112 (612) 785-3500, (800) 328-9717

National Semiconductor Corp.
2900 Semiconductor Drive
Santa Clara, CA 95052-8090 (408) 721-5000, (800) 538-8510

Netlink, Inc.
3214 Spring Forest Road
Raleigh, NC 27604 (919) 878-8612, (800) 638-5465

Network Software Associates, Inc.
39 Argonaut
Laguna Hills, CA 92656 (714) 768-4013

Novell, Inc.
122 East 1700, South
Provo, UT 84606 (801) 429-5900

NTI Group, Inc.
3265 Kifer Road
Santa Clara, CA 95051 (408) 739-2180

ParaData Computer Networks, Inc.
37695 Interchange Drive
Farmington Hills, MI 48335 (313) 478-8400, (800) GATEWAY

Passport Communications, Inc.
2755 Campus Drive
Suite 175
San Mateo, CA 94403 (415) 571-9583, (800) 767-9583

Rabbit Software Corp.
7 Great Valley Parkway
Malvern, PA 19355 (215) 647-0440, (800) 722-2464

Racal InterLan
155 Swanson Road
Boxborough, MA 01749 (508) 263-9929, (800) 526-8255

Retix
2644 30th Street
Santa Monica, CA 90405-3009 (213) 399-2200

The Santa Cruz Operation, Inc.
400 Encinal Street
Santa Cruz, CA 95060 (408) 425-7222, (800) 726-8649

Shiva
1 Cambridge Center
Cambridge, MA 02142 (617) 864-8500, (800) 458-3550

Symicon, Inc.
904 Silver Spur Road No. 677
Rolling Hills Estates, CA 90274 (213) 541-3375

TDT Group Inc.
1070 E. Indiantown Road, Suite 208
Jupiter, FL 33477 (407) 575-9988

3Com Corp.
5400 Bayfront Plaza
P.O. Box 58145
Santa Clara, CA 95052-8145 (408) 764-5000, (800) 638-3266

Tri-Data Corp.
3270 Scott Road
Santa Clara, CA 95054 (408) 727-3270, (800) 874-3282

Ungermann-Bass, Inc.
3900 Freedom Circle
P.O. Box 95054
Santa Clara, CA 95052 (408) 496-0111, (800) 999-3236

Unisync Inc.
1380 W. 9th Street
Upland, CA 91786 (714) 985-5088

Wall Data Inc.
17769 Northeast 78 Place
Redmond, WA 98052 (206) 883-4777, (800) 433-3388

Wang Laboratories, Inc.
One Industrial Avenue
Lowell, MA 01851 (508) 459-5000, (800) 225-0654

Waterloo Microsystems Inc.
295 Phillip Street
Waterloo, ON Canada N2L 3W8 (519) 884-3141

Network Operating Systems

Comparison Column Entry Descriptions

A network operating system is the software that controls communication and resource sharing over the underlying hardware medium of the network and provides users and administrators with the functionality of distributed processing. Vendors responded to questions about the environment in which each particular operating system exists and the various software interfaces provided to connect it to the hardware and to other industry-standard networking schemes.

Vendor and Product Name. This entry lists the manufacturer and name of each operating system. In most cases, it also includes the current version of the operating system.

Characteristics Server Memory Required (minimum), Bytes. This

entry indicates the amount of RAM required on the network server.

Server Operating System. Some network operating systems run under a standard microcomputer operating system. This entry indicates which of several standard operating systems is used.

Workstation Memory Required (minimum), Bytes. This entry indicates the amount of RAM required in each workstation.

Network Interface Standards Supported. This entry lists several industry standards for interfacing hardware or separate processes running on different machines.

Protocols Supported. A protocol is a set of procedures that establish, maintain, and control communications. Proto-

cols include Transmission Control Protocol/Internet Protocol (TCP/IP), Xerox Network Systems (XNS), DECnet (Digital Equipment Corp.'s network), Open Systems Interconnection (OSI), IBM Systems Network Architecture (SNA), and X.25 (CCITT's packet-switching protocol).

LANs Supported. Vendors selected Ethernet, Starlan, Token-Ring, Arcnet, AppleTalk, FDDI, or Other. Ethernet is a baseband carrier sense multiple access with collision detection (CSMA/CD) network that uses a linear bus topology and operates at 10M bps. Starlan is similar to Ethernet but uses a star topology with central hubs and can operate at 1M or 10M bps. Token-Ring refers to a LAN designed with a ring topology, running at speeds of 4M or 16M bps, that uses the token-passing technique. Arcnet is a baseband LAN that uses a ring or bus topology, runs at 2.5M bps, and also uses a token-passing access method. AppleTalk is Apple's Macintosh networking protocol that can run on most

industry-standard networking schemes. FDDI stands for Fiber Distributed Data Interface and is a 100M bps fiber optic network.

Pricing/Support Price (\$). Vendors provided a wide range of pricing information. Many vendors provided a price for their operating system that supports a defined number of users (e.g., a 10-user network). Other vendors provided an average price per node or station. Still others provided pricing for a pre-packaged version of the software. The comments section was often used to explain pricing differences between vendors.

Date of First Delivery. This entry tells how long the product has been commercially available.

Support Supplied by. Increasingly, products are serviced by the dealer or via a third-party service arrangement.

Comments. This entry includes space for any features, functions, or products not covered by the entries above.

Vendor	Alloy Computer Products	Alloy Computer Products	Artisoft, Inc.	AT&T
Product	386/Multiware 2.01	NTNX 2.1	LANtastic NOS A/I 3.02	StarGroup Software LAN Manager Server
Characteristics				
Server Memory Req., Min. (bytes)	2M	640K	256K	None identified
Server Operating System	DOS	DOS	DOS	UNIX
Workstation Memory Req., Min. (bytes)	0	0	256K	None identified
Network Interface Standards Supported	RS-232	RS-232	NETBIOS	NETBIOS
Protocols Supported	SNA; X.25	NETBIOS	None	OSI; X.25
LANs Supported	Proprietary	Proprietary	Arcnet; Ethernet; Starlan; Token-Ring	Ethernet; Starlan; Token-Ring
Pricing/Support Price (\$)	See comments	See comments	495	1,895
Date of First Delivery Support Supplied by	None identified	None identified	June 1988 Vendor	None identified Vendor
Comments	Contact vendor for pricing information.	Contact vendor for pricing information.		Price shown is for 8 users; unlimited users-\$3,495.

Vendor	Banyan Systems, Inc.	Banyan Systems, Inc.	Banyan Systems, Inc.	Banyan Systems, Inc.
Product	VINES SMP 4.0	VINES Team for 386 Platforms 4.0	VINES for 386 Platforms 4.0	VINES for 486 Platforms 4.0
Characteristics				
Server Memory Req., Min. (bytes)	8M	4M	4M	4M
Server Operating System	UNIX on server/DOS on client	UNIX on server/DOS on client	UNIX on server/DOS on client	UNIX on server/DOS on client
Workstation Memory Req., Min. (bytes)	256K	256K	256K	256K
Network Interface Standards Supported	ISDN; NDIS; NETBIOS; Named Pipes	ISDN; NDIS; NETBIOS; Named Pipes	ISDN; NDIS; NETBIOS; Named Pipes	ISDN; NDIS; NETBIOS; Named Pipes
Protocols Supported	SMTP; SNA; TCP/IP; X.25	SMTP; SNA; TCP/IP; X.25	SMTP; SNA; TCP/IP; X.25	SMTP; SNA; TCP/IP; X.25
LANs Supported	Ethernet; LanStar; Omnet; ProNET; Starlan; VistaLAN	Arcnet; Ethernet; LanStar; Omnet; ProNET; Starlan; Token-Ring	Arcnet; Ethernet; LanStar; Omnet; ProNET; Starlan; Token-Ring; VistaLAN	Arcnet; Ethernet; LanStar; Omnet; ProNET; Starlan; Token-Ring
Pricing/Support Price (\$)	13,995	2,495	5,995	7,490
Date of First Delivery Support Supplied by	September 1990 Dealer; Third party; Vendor	August 1989 Dealer; Third party; Vendor	June 1988 Dealer; Third party; Vendor	June 1990 Dealer; Third party; Vendor
Comments	Supports true symmetric operation of multiple processors in systems like Compaq Systempro; all server-based network applications and services can run on whichever CPU is available. Compatible with other VINES versions.	A network solution for stand-alone workgroups and remote offices with a maximum of 10 users; can incorporate such services as file, print, mail, host connectivity, and communications. Offers most features available on the standard VINES package.	A standards-based distributed network operating system for local or global networking of personal computers, minicomputers, and mainframes in corporate-wide applications; unique features include Street-Talk global directory services.	A standards-based distributed network operating system for local or global networking of personal computers, minicomputers, and mainframes in corporate-wide applications; unique features include Street-Talk global directory services.

Vendor	Bell & Howell Document Management Products Co.	CBIS, Inc.	CBIS, Inc.	Cogent Data Technologies, Inc.
Product	Image Search Plus LAN	Network OS Plus 7.0A	Network-EZ II 2.0A	LAN Manager 2.0
Characteristics				
Server Memory Req., Min. (bytes)	2M	640K	640K	5M
Server Operating System	DOS	DOS	DOS	None identified
Workstation Memory Req., Min. (bytes)	640K	512K	512K	512K; 640K
Network Interface Standards Supported	NETBIOS	NETBIOS	NETBIOS	NDIS; NETBIOS
Protocols Supported	TCP/IP	OSI	OSI	OSI; TCP/IP; XNS
LANs Supported	Ethernet	Arcnet; BUSS; Ethernet; Starlan; Token-Ring	BUSS	AppleTalk; Arcnet; Ethernet; Starlan; Token-Ring
Pricing/Support				
Price (\$)	82,000	1,520	See comments	6,490
Date of First Delivery	July 1988	None identified	None identified	None identified
Support Supplied by	Vendor	Vendor	Vendor	None identified
Comments	Network above is designed for managing documents on optical disk media; price includes document management software, imaging boards, 2 high resolution monitors on workstation; (2) SCSI boards, device driver software, cable, etc.	Free telephone technical support; price shown is for 8 users.	Contact vendor for pricing information; free telephone technical support.	Price shown is unlimited version.

Vendor	Corvus Systems, Inc.	D-Link Systems, Inc.	Datapoint Corp.	Digital Communications Associates, Inc.
Product	PC/NOS 2.1	LANsmart Network OS 2.10	NOE (Network Operating Environment)	10NET Plus LAN OS 4.20.10
Characteristics				
Server Memory Req., Min. (bytes)	256K	640K	2M	128K
Server Operating System	DOS	DOS	None identified	DOS
Workstation Memory Req., Min. (bytes)	128K	512K	1M	128K
Network Interface Standards Supported	NETBIOS	NETBIOS; NETBOIS/IPX	NETBIOS	NETBIOS; SMB
Protocols Supported	X.25	DECnet; IPX; TCP/IP	3270; SNA; TCP/IP; X.25	None identified
LANs Supported	Arcnet; Ethernet; Omninet; TandyLink; Token-Ring	10BASE-T; Arcnet; Ethernet; Pocket LAN; Token-Ring	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring
Pricing/Support				
Price (\$)	1,395	395	See comments	149, max. price is 1,595
Date of First Delivery	November 1986	January 1990	April 1990	July 1990
Support Supplied by	Vendor	Dealer; Third party; Vendor	Vendor	Dealer; Vendor
Comments			Contact vendor for pricing information.	Compatible with Windows 3.0; includes free E-mail and memory relief.

Vendor	Digital Equipment Corp.	DNA Networks, Inc.	DSC Communications Corp.	DSC Communications Corp.
Product	PCSA 2.2	DNA Networks 3.37	NEXOS 286-24 2.80	NEXOS 286-8 2.80
Characteristics				
Server Memory Req., Min. (bytes)	2M	40K	640K	640K
Server Operating System	DOS; OS/2; Ultrix; VMS	DOS	NEXOS	NEXOS
Workstation Memory Req., Min. (bytes)	1M	5K	512K	512K
Network Interface Standards Supported	Named Pipes	NETBIOS	NETBIOS	NETBIOS
Protocols Supported	DECnet; OSI; SNA; TCP/IP	None identified	NEXOS	NEXOS
LANs Supported	Ethernet; FDDI	DNA Networks	Arcnet; Ethernet; Omnet; Token-Ring	Arcnet; Ethernet; Omnet; Token-Ring
Pricing/Support				
Price (\$)	See comments	See comments	995	495
Date of First Delivery	None identified	August 1989	November 1988	November 1988
Support Supplied by	Vendor	Dealer	Dealer; Vendor	Dealer; Vendor
Comments	Contact vendor for pricing information.	Operating system is bundled with file server interface card.	BootROMS available for DSC Arcnet and Ethernet cards and for Novell Ethernet and Novell-compatible Ethernet cards; supports up to 24 users per server; 30-day money back guarantee.	BootROMS available for Dsc Arcnet and Ethernet cards and for Novell Ethernet and Novell-compatible Ethernet cards; supports up to 8 users per server; 30-day money back guarantee.

Vendor	DSC Communications Corp.	DSC Communications Corp.	EXZEL Corp.	Grapevine LAN Products, Inc.
Product	NEXOS 386-255 2.80	NEXOS 386-8 2.80	EasyNetwork 1.88	GV LAN OS 2.0
Characteristics				
Server Memory Req., Min. (bytes)	2M	2M	640K	64K
Server Operating System	NEXOS	NEXOS	DOS	DOS
Workstation Memory Req., Min. (bytes)	512K	512K	512K	64K
Network Interface Standards Supported	NETBIOS	NETBIOS	NETBIOS	NETBIOS
Protocols Supported	NEXOS	NEXOS	None identified	None
LANs Supported	Arcnet; Ethernet; Omnet; Token-Ring	Arcnet; Ethernet; Omnet; Token-Ring	Arcnet; Ethernet	Arcnet; Ethernet; Serial
Pricing/Support				
Price (\$)	3,295	1,995	139, max. price is 649	695
Date of First Delivery	November 1988	November 1988	February 1990	June 1987
Support Supplied by	Dealer; Vendor	Dealer; Vendor	Dealer; Vendor	Dealer; Vendor
Comments	BootROMS available for DSC Arcnet and Ethernet cards and for Novell Ethernet and Novell-compatible Ethernet cards. Supports up to 255 users per server. 30-day money back guarantee.	BootROMS available for DSC Arcnet and Ethernet cards and for Novell Ethernet and Novell-compatible Ethernet cards. Supports up to 8 users per server. 30-day money back guarantee.	Pricing shown is for network starter kits, including networking cards, software, and 20-foot cable; networks 2 IBM or compatible PCs.	Peer-to-peer LAN for IBM PC compatibles; pull-down menus provide point and shoot access to printers, drives, and E-mail from within an application; Windows 3.0 compatible; price shown is for 5-user license.

Vendor	Hewlett-Packard Co.	Hewlett-Packard Co.	Hewlett-Packard Co.	IN-Net Corp.
Product	HP LAN Manager 1.1	HP LAN Manager/X 1.0 HP-UX	HP LAN Manager/X1.1 386/486	FiberTalk 1000 NMS
Characteristics				
Server Memory Req., Min. (bytes)	8M	8M	8M	3M
Server Operating System	OS/2	UNIX	UNIX	OS/2
Workstation Memory Req., Min. (bytes)	4M; 640K	4M; 640K	640K	None identified
Network Interface Standards Supported	NDIS; NETBIOS; Named Pipes	NDIS; NETBIOS; Named Pipes	NDIS; NETBIOS; Named Pipes	None identified
Protocols Supported	TCP/IP	TCP/IP	TCP/IP; X.25	None identified
LANs Supported	Ethernet; Starlan; Token-Ring	Ethernet; Starlan; Token-Ring	Token-Ring	FDDI
Pricing/Support				
Price (\$)	1,295	2,000	1,495	8,000
Date of First Delivery	March 1991	November 1989	March 1991	July 1989
Support Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Price shown is for 5 users; unlimited license is \$3,995; for OS/2 and MS-DOS workstations.	Price shown is for 8 users.	Includes ARPA/Berkeley Services for UNIX 386; unlimited license is \$3,995.	

Vendor	International Business Machines Corp. (IBM)	International Business Machines Corp. (IBM)	Invisible Software, Inc.	Microsoft Corp.
Product	OS/2 LAN Server 1.3	PC LAN Program 1.31	Net/302.0	OS/2 LAN Manager 2.0
Characteristics				
Server Memory Req., Min. (bytes)	None identified	None identified	640K	5M; 6M
Server Operating System	OS/2	DOS	DOS	OS/2; UNIX
Workstation Memory Req., Min. (bytes)	3M; 512K	None identified	512K	3M; 512K
Network Interface Standards Supported	APPC; NDIS; NETBIOS	APPC; NETBIOS	NETBIOS	APPC; NDIS; Named Pipes
Protocols Supported	OSI; SNA; TCP/IP	SNA; TCP/IP	None identified	OSI; SNA; TCP/IP
LANs Supported	Ethernet; Token-Ring	Ethernet; Token-Ring	Ethernet; Proprietary	Arcnet; Ethernet; FDDI; Token-Ring
Pricing/Support				
Price (\$)	1,040	225	See comments	995
Date of First Delivery	None identified	None identified	October 1989	None identified
Support Supplied by	Vendor	Vendor	Dealer; Vendor	Dealer
Comments	Price shown is one-time license fee.		Bundled with network cards; free customer support.	Price shown for server and 5 workstations; unlimited workstations - \$5495.

Vendor	Moses Computers	Motorola Computer Systems	NCR Corp.	Novell, Inc.
Product	ChosenNOS 1.10	SMB Server 1.0	NCR NetWare/X 1.5	Advanced Netware 2.15
Characteristics				
Server Memory Req., Min. (bytes)	24K	640K	4M	2.5M
Server Operating System	DOS	UNIX	UNIX	NetWare
Workstation Memory Req., Min. (bytes)	33K	512K	512K	512K
Network Interface Standards Supported	NETBIOS	NETBIOS	NCR Netware Core Protocols; NETBIOS	IPX/SPX; NETBIOS
Protocols Supported	SMB	DECnet; OSI; SNA; TCP/IP; X.25; XNS	IPX	X.25; XNS
LANs Supported	ChosenLAN	AppleTalk; Arcnet; Ethernet; FDDI; Token-Ring	Ethernet	AppleTalk; Arcnet; Ethernet; FDDI; Starlan; Token-Ring
Pricing/Support				
Price (\$)	499	950, max. price is 4,800	6,500, max. price is 12,000	3,295
Date of First Delivery	1990	1987	April 1990	February 1989
Support Supplied by	Vendor	Vendor	Dealer; Vendor	Dealer; Third party; Vendor
Comments	Incorporates Adaptive Through-out Control (ATC) for through-out rate; price shown is 5-user starter kit; supports software written for IBM PC LAN Program.	Server is LAN Manager compatible.	NCR's version of portable NetWare; runs on Unix V.3 on NCR Towers and Unix V.4 on NCR System 3000 models; access to TCP/IP, NFS, SNA through communications packages running on Unix server provided to Netware DOS clients through terminal emulation.	Price shown is per server; NetWare is hardware-independent.

Vendor	Novell, Inc.	Novell, Inc.	Novell, Inc.	Novell, Inc.
Product	ELS NetWare Level I 2.12	ELS NetWare Level II 2.15	NetWare 386 3.1	SFT Netware 2.15
Characteristics				
Server Memory Req., Min. (bytes)	1M; 2M	1M; 2M	4M	2.5M
Server Operating System	NetWare	NetWare	NetWare	NetWare
Workstation Memory Req., Min. (bytes)	70K	70K	128K	512K
Network Interface Standards Supported	IPX/SPX; NETBIOS	IPX/SPX; NETBIOS	IPX/SPX; NETBIOS; Named Pipes	IPX/SPX; NETBIOS
Protocols Supported	None identified	None identified	OSI; TCP/IP; X.25	X.25; XNS
LANs Supported	Arcnet; Ethernet; Starlan; Token-Ring	AppleTalk; Arcnet; Ethernet; Starlan; Token-Ring	AppleTalk; Arcnet; Ethernet; FDDI; Starlan; Token-Ring	AppleTalk; Arcnet; Ethernet; FDDI; Starlan; Token-Ring
Pricing/Support				
Price (\$)	795	1,895	7,995	4,995
Date of First Delivery	September 1987	August 1988	June 1990	December 1988
Support Supplied by	Dealer; Third party; Vendor	Dealer; Third party; Vendor	Dealer; Third party; Vendor	Dealer; Third party; Vendor
Comments	Four-user version of NetWare designed for PC LAN users in the small business and professional office environments with basic networking needs.	Eight-user version of NetWare designed for PC LAN users in the small business, professional office, and small workgroup environments with advanced networking needs (internetworking, Macintosh support, server-based application).		Price shown is per server; NetWare is hardware-independent.

Vendor	Quantum Software Systems, Ltd.	The Santa Cruz Operation, Inc.	Sitka Corp.	Sitka Corp.
Product	QNX 2.15	SCO Xenix-Net	DosTOPS Network Bundle 3.0	MacTOPS Network Bundle 3.0
Characteristics				
Server Memory Req., Min. (bytes)	150K	1M	640K	1M
Server Operating System	QNX	DOS; Xenix	DOS; Macintosh; UNIX; VMS	Macintosh
Workstation Memory Req., Min. (bytes)	512K	None identified	512K	1M
Network Interface Standards Supported	None identified	NETBIOS; SMB	AppleTalk	AppleTalk
Protocols Supported	SNA; TCP/IP; X.25	TCP/IP	AppleTalk	AppleTalk
LANs Supported	Arcnet	Ethernet; Starlan; Token-Ring	AppleTalk; Ethernet	AppleTalk
Pricing/Support				
Price (\$)	450	695	249	299
Date of First Delivery	1982	June 1987	March 1990	January 1990
Support Supplied by	Vendor	Vendor	Dealer; Vendor	Vendor
Comments	Price is for standalone computer or first node on network.	SMB Protocol Distributed File-System product that supports NETBIOS, can be used over SCO TCP/IP, third party TCP/IP, and IBM Broadband PC Network, price shown is per connection.	\$995 for a 10-pack.	Price shown is per workstation; peer-to-peer file sharing system for Macintosh allows connection to PCs and Sun Workstations running DosTOPS and SunTOPS; includes print spooling, 20-user InBox E-mail, and PC/Macintosh file translators.

Vendor	Sitka Corp.	Solid Technologies	3Com Corp.	3X USA
Product	SunTOPS 2.2b	Solid LAN Operating System 1.6	3+ Open LAN Manager 2.0	Link-16
Characteristics				
Server Memory Req., Min. (bytes)	None identified	640K	4M	130K
Server Operating System	UNIX	DOS	OS/2	DOS
Workstation Memory Req., Min. (bytes)	None identified	512K	640K	80K
Network Interface Standards Supported	AppleTalk	NETBIOS	NDIS; NETBIOS; Named Pipes	NETBIOS
Protocols Supported	AppleTalk	None identified	OSI; TCP/IP; XNS	None identified
LANs Supported	AppleTalk; Ethernet	Arcnet; Ethernet	AppleTalk; Ethernet; Starlan; Token-Ring	3X Link-16
Pricing/Support				
Price (\$)	1,395	See comments	995	139
Date of First Delivery	April 1989	None identified	October 1988	1988
Support Supplied by	Vendor	Dealer; Vendor	Dealer; Third party; Vendor	Dealer; Vendor
Comments	Price shown for cartridge version; \$1295 for SPARC floppy version; file sharing software to allow Macintoshes & PCs to use the Sun workstation as a non-dedicated server; also includes software to allow the Sun workstation to print to Appletalk printers.	Included with price of hardware; a peer-to-peer network operating system that runs all applications written for IBM PC LAN and Novell NetWare.	Price shown is for 5-user server package; unlimited user server package is \$6,490; add-on products provide electronic mail, internetwork routing, remote PC dial-in access, X.500 direction service, diskless PC remote booting, and network management.	Price shown is per node.

Vendor	Torus Systems, Inc.	Ungermann-Bass, Inc.	US Sage	Waterloo Microsystems Inc.
Product	Tapestry II 2.0	Net/One LAN Manager 2.0	MainLAN 3.X	PORT 2.5
Characteristics				
Server Memory Req., Min. (bytes)	None identified	2M; 5M	50K	2M
Server Operating System	DOS; OS/2	OS/2	DOS	DOS
Workstation Memory Req., Min. (bytes)	None identified	1M	15K	512K
Network Interface Standards Supported	NETBIOS; SMB	NDIS; NETBIOS; Named Pipes	NETBIOS	NETBIOS
Protocols Supported	TCP/IP; X.25	TCP/IP; XNS	OSI	X.25
LANs Supported	Arcnet; Ethernet; Starlan; Token-Ring	Ethernet; Token-Ring	Ethernet	Arcnet; Token-Ring
Pricing/Support Price (\$)	2,995	5,995	199.00, max. price is 1,499.00	2,895
Date of First Delivery	January 1988	October 1990	October 1990	April 1985
Support Supplied by	Vendor	Vendor	Vendor	Dealer; Vendor
Comments	Icon-based graphical user interface; supports up to 64,000 stations; price shown is for 8-station network.		\$199 for MainLAN; \$1,499 for MainLAN/386.	Peer-to-peer LAN operating system for IBM PS/2, PC/XT/AT and compatibles; with Waterloo PORT Expander, the network can be increased in 25-user increments to 250 users; price stated is for 25-user version.

Vendor	Waterloo Microsystems Inc.	Watlan, Inc.	Watlan, Inc.	Watlan, Inc.
Product	PORT Lite 2.5	Watstar/A2	Watstar/E10	Watstar/p10
Characteristics				
Server Memory Req., Min. (bytes)	2M	640K	640K	640K
Server Operating System	DOS	RealTime Executive	RealTime Executive	RealTime Executive
Workstation Memory Req., Min. (bytes)	640K	512K	512K	512K
Network Interface Standards Supported	NETBIOS	NETBIOS	NETBIOS	NETBIOS
Protocols Supported	None identified	TCP/IP	TCP/IP	TCP/IP
LANs Supported	Arcnet; Token-Ring	Arcnet	Ethernet	ProNET-10; Token-Ring
Pricing/Support Price (\$)	695	2,250	4,995	4,995
Date of First Delivery	1988	None identified	None identified	None identified
Support Supplied by	Dealer; Vendor	Vendor	Vendor	Vendor
Comments	Peer-to-peer entry-level LAN operating system for IBM PS/2, PC/XT/AT, and compatibles; with PORT Lite Expander, the network can be increased in 5-user increments to 25 users; price stated is for 5-user version.	Intended for small workgroups (up to 30 nodes); bridges at Watstar server enable integration of these networks to systems with up to 40,000 nodes; includes network services and utilities.	Intended for multi-purpose Ethernet systems; bridges at Watstar servers provide connectivity to large-scale systems; includes network services and utilities.	Includes utilities and security functions; supports high capacity (4GB) network servers and over 200,000 user IDs; bridged to other Watstar LANS via Watstar servers; services include account manager, diagnostics, E-mail.

Vendor	Webcorp	Zytec Systems
Product	WEB Network Operating System 2.05	Triac/PC 1.5
Characteristics		
Server Memory Req., Min. (bytes)	55K	120K
Server Operating System	DOS	DOS
Workstation Memory Req., Min. (bytes)	55K	0
Network Interface Standards Supported	IPX emulation; NetWare	NETBIOS; SNB and Extended SMB
Protocols Supported	IPX; OSI	TCP/IP; XNS
LANs Supported	AppleTalk; Arcnet; Ethernet; FDDI; Starlan; Token-Ring	Arcnet; Ethernet; Zytec 815 Custom
Pricing/Support		
Price (\$)	2,495, site license	See comments
Date of First Delivery	July 1990	1988
Support Supplied by	Dealer; Vendor	Vendor
Comments	Peer-to-peer network operating system that features an easy-to-use interface, advanced memory efficiency, extensibility, hardware independence, and network security and management tools; designed for workgroups and small businesses.	Free with starter kits.

Network Servers Comparison Column Entry Descriptions

A number of different products are marketed as network servers. We have tried to fit each product to the specifications listed, to provide an accurate representation of that product's capabilities. Our survey form provided each vendor with a number of choices for each parameter listed. Space was provided to write in an answer when the proper choices for that vendor were not listed.

Vendor and Model. This entry lists the manufacturer and exact model number or name of each device.

Characteristics

Processor. The processor controls the basic functions of the network server. The most popular processors used in net-

work servers are the Intel 80286 and 80386; some newer machines use the 80486. Some servers also use Intel's older 80186 or 8088. Motorola's 68000 and 68020 are also used in some network servers.

Disk Capacity, Bytes.

The network server's disk capacity defines much of its functionality. The larger the disk capacity, the more files and data the server can store and distribute. This answer is given in bytes; an answer of 1M represents 1 megabyte (1 million bytes) of disk capacity.

Minimum Memory, Bytes.

This entry indicates the amount of RAM resident on the network server.

Number of Expansion Slots. Like personal com-

puters, network servers generally offer expansion slots for the attachment of interface boards and peripherals. A network interface board usually must be installed in one of the expansion slots to connect the server to the network.

Operating System Software Supported. Servers must be capable of running the network's operating system software in order to operate on the LAN. Some of the most commonly used network operating systems are Novell NetWare, 3+ / 3+ Open from 3Com, Banyan VINES, Microsoft OS/2 LAN Manager, and IBM OS/2 LAN Server.

Network Interfaces Supported. As mentioned earlier, most servers must be configured with a network interface board in order to operate over the LAN. A server may support Ethernet, Arcnet, token-ring, Starlan, AppleTalk, or FDDI connections. Many servers

provide support for a number of these.

Tape Backup. Many servers provide tape backup to protect stored data in case of a power outage or other event during which data might be lost.

Pricing/Support

Price (\$). Network servers are available with a wide range of prices, depending on the configuration and functionality of the unit.

Date of First Delivery.

This entry tells how long the product has been commercially available.

Standard Warranty. Warranties offered differ from vendor to vendor. Many offer one-year warranties; some offer less.

Service Supplied by. Increasingly, products are serviced by the dealer or via a third-party service arrangement.

Comments. This entry includes space for any features, functions, or products not covered by the entries above.

Vendor	Acer, Inc.	Acer, Inc.	Acer, Inc.	Advanced Digital Corp.
Product	1100/20	1100/25	1100/32	Powerlite
Characteristics				
Processor	80386	80386	80386	80286; 80386
Minimum Disk Capacity (bytes)	None identified	None identified	None identified	40M
Maximum Disk Capacity (bytes)	676M	676M	676M	100M
Minimum Memory (bytes)	2M	2M	4M	1M
Number of Expansion Slots	8	8	8	4
Operating System Software Supported	NetWare	NetWare	NetWare	NetWare
Network Interfaces Supported	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet
Tape Backup	Optional	Optional	Optional	Not Available
Pricing/Support				
Price (\$)	3,395	4,795	6,495	2,500
Date of First Delivery	September 1988	February 1989	July 1989	1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Third party; vendor
Comments	Price shown is 2M-byte configuration.	Price shown is 2M-byte configuration.	Price shown is 4M-byte configuration.	

Vendor	Altos Computer Systems	Altos Computer Systems	Altos Computer Systems	Altos Computer Systems
Product	386 Series 1000 Model 25	386 Series 1000 Model 33	486 System 1000	486 System 5000
Characteristics				
Processor	80386	80386	80486	80486
Minimum Disk Capacity (bytes)	90M	170M	170M	440M
Maximum Disk Capacity (bytes)	5G	5G	5G	30G
Minimum Memory (bytes)	4M	4M	4M	8M
Number of Expansion Slots	2	2	2	8
Operating System Software Supported	Altos System V/386 3.1	Altos System V/386 3.1	Altos System V/386 3.1	Altos UNIX system V/386 3.2
Network Interfaces Supported	Ethernet	Ethernet	Ethernet	Ethernet
Tape Backup	Standard	Standard	Standard	Standard
Pricing/Support				
Price (\$)	15,500	17,700	20,850	See comments
Date of First Delivery	October 1988	April 1989	January 1989	May 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments				Contact vendor for pricing information.

Vendor	American Mitac Corp.	American Research Corp.	Apple Computer, Inc.	Arche Technologies, Inc.
Product	4000G	3885/25C	AppleShare File Server 2.0	Legacy 386-25
Characteristics				
Processor	80386	80386	68020	80386
Minimum Disk Capacity (bytes)	1M	None identified	20M	None identified
Maximum Disk Capacity (bytes)	8M	1.2M	1G	1.52G
Minimum Memory (bytes)	4M	2M	1M	2M
Number of Expansion Slots	8	8	6	7
Operating System Software Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; VINES	NetWare	3+ /3+ Open; AFP; NetWare; OS/2 LAN Manager	NetWare
Network Interfaces Supported	Arcnet; Ethernet; FDDI; Starlan; Token-Ring	Arcnet; Ethernet	AppleTalk; Arcnet; Ethernet; FDDI; Token-Ring	Arcnet; Ethernet; FDDI; Token-Ring
Tape Backup	Not Available	Optional	Optional	Not Available
Pricing/Support				
Price (\$)	4,595	4,631	799	See comments
Date of First Delivery	None identified	None identified	June 1988	October 1990
Standard Warranty	1 year	1 year	90 days	2 years
Service Supplied by	Third party	None identified	Dealer	Dealer; third party; vendor
Comments	BellAtlantic service 1 year on site.		File server software; runs on dedicated Macintosh; supports Macintoshes, MS-DOS PCs, and Apple II workstations.	Contact vendor for pricing information.

Vendor	Arche Technologies, Inc.	Arche Technologies, Inc.	Arche Technologies, Inc.	Arche Technologies, Inc.
Product	Legacy 386-33	Legacy 486-33	Legacy Profile 386-25	Legacy Profile 386-33
Characteristics				
Processor	80386	80486	80386	80386
Minimum Disk Capacity (bytes)	None identified	None identified	None identified	None identified
Maximum Disk Capacity (bytes)	1.52G	1.52G	2.28G	2.28G
Minimum Memory (bytes)	4M	4M	2M	4M
Number of Expansion Slots	8	8	7	8
Operating System Software Supported	NetWare	NetWare	NetWare	NetWare
Network Interfaces Supported	Arcnet; Ethernet; FDDI; Token-Ring	Arcnet; Ethernet; FDDI; Token-Ring	Arcnet; Ethernet; FDDI; Token-Ring; Unix; Xenix	Arcnet; Ethernet; FDDI; Token-Ring
Tape Backup	Not Available	Not Available	Not Available	Not Available
Pricing/Support				
Price (\$)	See comments	See comments	See comments	See comments
Date of First Delivery	March 1990	October 1990	October 1990	March 1990
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	Contact vendor for pricing information.	Contact vendor for pricing information.	Contact vendor for pricing information.	Contact vendor for pricing information.

Vendor	Arche Technologies, Inc.	AST Research Inc.	AT&T	AT&T
Product	Legacy Profile 486-33	Premium 486/25TE	6386/25 WGS	6386E/33 WGS Model S
Characteristics				
Processor	80486	80486	80386	80386
Minimum Disk Capacity (bytes)	None identified	330M	None identified	1.5G
Maximum Disk Capacity (bytes)	1.52G	1G	380M	6.6G
Minimum Memory (bytes)	4M	4M	4M	4M
Number of Expansion Slots	8	10	8	10
Operating System Software Supported	NetWare	3+ /3+ Open; DOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; UNIX; VINES	AT&T StarGroup Software; NetWare; VINES	AT&T UNIX System V/386 3.2.2; NetWare; VINES
Network Interfaces Supported	Arcnet; Ethernet; FDDI; Token-Ring	Arcnet; Ethernet; Token-Ring	Ethernet; FDDI; Starlan	Ethernet; FDDI; Starlan; Token-Ring
Tape Backup	Not Available	Optional	Optional	Standard
Pricing/Support				
Price (\$)	See comments	7,995, max. price is 15,495	6,375	17,400, max. price is 22,225
Date of First Delivery	October 1990	May 1989	September 1989	December 1989
Standard Warranty	2 years	1 year	1 year	1 year
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Vendor	Vendor
Comments	Contact vendor for pricing information.			Available in base, UNIX multiuser, & Network Server configurations; twisted-pair Ethernet (10M Starlan card) is pre-installed as well as AT&T PMX/starMAIL.
Vendor	AT&T	Banyan Systems, Inc.	Banyan Systems, Inc.	Bell & Howell Document Management Products Co.
Product	6386E/33 WGS	Banyan/CNS 386	Banyan/CNS 486	Record Server
Characteristics				
Processor	80386	80386	Intel i486	80386
Minimum Disk Capacity (bytes)	None identified	80M	146M	300M
Maximum Disk Capacity (bytes)	600M	660M	660M	300M
Minimum Memory (bytes)	4M	4M	8M	2M
Number of Expansion Slots	10	8	8	8
Operating System Software Supported	AT&T UNIX System V/386 3.2.2; NetWare; VINES	VINES	VINES	DOS
Network Interfaces Supported	Ethernet; Fiber; Starlan; Token-Ring	Arcnet; Ethernet; Omnet; Starlan; Token-Ring	Arcnet; Ethernet; Omnet; Starlan; Token-Ring	Ethernet
Tape Backup	Optional	Optional; Standard	Optional; Standard	Standard
Pricing/Support				
Price (\$)	11,475, max. price is 13,575	21,995	31,395	21,760
Date of First Delivery	October 1989	June 1988	January 1990	July 1988
Standard Warranty	1 year	90 days	90 days	1 year
Service Supplied by	Vendor	Dealer; third party; vendor	Dealer; third party; vendor	Vendor
Comments	Standard configurations includes 4MB RAM, combination floppy/hard disk ESDI controller; supports X Windows application development.	386-based network server, fully optimized for Banyan's network operating system; price shown is base.	High-end server based on Intel's i486 CPU; fully optimized for Banyan's VINES network operating system; price shown is base.	

Vendor	Bethel Computer	Bethel Computer	Compex, Inc.	Core International, Inc.
Product	286 FS	386 FS	System	386/33
Characteristics				
Processor	80286	80386	80386	80386
Minimum Disk Capacity (bytes)	None identified	None identified	None identified	150M
Maximum Disk Capacity (bytes)	None identified	None identified	1.5G	5G
Minimum Memory (bytes)	1M	1M	16M	4M
Number of Expansion Slots	8	8	8	8
Operating System Software Supported	NetWare	NetWare	NetWare	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Network Interfaces Supported	Arcnet; Ethernet	Arcnet; Ethernet	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring
Tape Backup	Optional	Optional	None identified	Optional
Pricing/Support				
Price (\$)	2,000	2,000	5,995	8,000
Date of First Delivery	1987	1987	May 1990	August 1987
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Third party
Comments	Can be ordered according to customers' configurations.	Can be ordered according to customers' configurations.	Multi channel disk control, multi channel network interface control.	

Vendor	Datamedia Corp.	Datamedia Corp.	Datamedia Corp.	Datapoint Corp.
Product	NETmate/dx25 386/25-01/-04	NETmate/dx33 386/33-01/-A0	NETmate/dx425 486/25-01/-04	7850
Characteristics				
Processor	80386	80386	80486	80486
Minimum Disk Capacity (bytes)	40M	40M	100M	142M
Maximum Disk Capacity (bytes)	170M	170M	170M	3G
Minimum Memory (bytes)	2M	2M	4M	16M
Number of Expansion Slots	3	3	3	5
Operating System Software Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	NOE
Network Interfaces Supported	Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Token-Ring
Tape Backup	Not Available	Not Available	Not Available	Optional
Pricing/Support				
Price (\$)	4,095, max. price is 4,820	5,295, max. price is 6,690	7,795, max. price is 9,190	See comments
Date of First Delivery	August 1990	August 1990	August 1990	April 1990
Standard Warranty	1 year	1 year	1 year	30 days
Service Supplied by	Vendor	Vendor	Vendor	Third party
Comments				Symmetric, multi-processor, 80486 based system; maximum memory now available is 32MB and can support 4 Arcnet connections; contact vendor for pricing information.

Vendor	Datapoint Corp.	Digital Equipment Corp.	DSC Communications Corp.	DSC Communications Corp.
Product	7950	DECstation 200-300 Series	NS165-255	NS165-8
Characteristics				
Processor	80386	80286; 80386; RISC/VAX	80386	80386
Minimum Disk Capacity (bytes)	276M	20M	165M	165M
Maximum Disk Capacity (bytes)	30G	None identified	None identified	None identified
Minimum Memory (bytes)	16M	1M	2M	2M
Number of Expansion Slots	20	6	8	8
Operating System Software Supported	NOE	None identified	NEXOS 386-255 (bundled)	NEXOS 386-8 (bundled)
Network Interfaces Supported	Arcnet; Ethernet; Token-Ring	Ethernet; FDDI	Arcnet; Ethernet; Token-ring	Arcnet; Ethernet; Token-ring
Tape Backup	Optional	Optional	Standard	Standard
Pricing/Support				
Price (\$)	See comments	See comments	10,495	9,295
Date of First Delivery	April 1988	None identified	November 1988	November 1988
Standard Warranty	30 days	90 days	1 year	1 year
Service Supplied by	Third party	Vendor	Dealer; vendor	Dealer; vendor
Comments	Contact vendor for pricing information.	Contact vendor for pricing information.	20 Mhz CPU; 2MB system; 150MB tape unit; installed with NEXOS 386-255 user.	20 Mhz CPU; 2MB system memory; 105MB tape; installed with NEXOS 386 8 user.

Vendor	DSC Communications Corp.	DSC Communications Corp.	DSC Communications Corp.	DSC Communications Corp.
Product	NS260-255	NS260-8	NS680-255	NS80-8
Characteristics				
Processor	80386	80386	80386	80386
Minimum Disk Capacity (bytes)	260M	260M	680M	80M
Maximum Disk Capacity (bytes)	520M	520M	1.36G	160M
Minimum Memory (bytes)	4M	4M	4M	2M
Number of Expansion Slots	8	8	8	8
Operating System Software Supported	NEXOS 386-255 (bundled)	NEXOS 386-8 (bundled)	NEXOS 386-255 (bundled)	NEXOS 386-8 (bundled)
Network Interfaces Supported	Arcnet; Ethernet; Token-ring	Arcnet; Ethernet; Token-ring	Arcnet; Ethernet; Token-ring	Arcnet; Ethernet; Token-ring
Tape Backup	Standard	Standard	Standard	Standard
Pricing/Support				
Price (\$)	14,695	13,495	16,295	8,495
Date of First Delivery	November 1989	None identified	November 1989	November 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	33 Mhz CPU; 150MB tape.	33 Mhz CPU; 150MB tape.	33 Mhz CPU; 105MB tape.	20 Mhz CPU/2MB system memory; 150MB tape unit; installed with NEXOS 386-8 8 user.

Vendor	DTK Computer, Inc.	DTK Computer, Inc.	DTK Computer, Inc.	DTK Computer, Inc.
Product	KEEN-2000 (Desktop)	KEEN-2000 (Tower)	KEEN-2500 (Desktop)	KEEN-2503 (Tower)
Characteristics				
Processor	80286; 80386	80386	80386	80386
Minimum Disk Capacity (bytes)	None identified	None identified	None identified	None identified
Maximum Disk Capacity (bytes)	None identified	None identified	None identified	None identified
Minimum Memory (bytes)	1M	1M	8M	8M
Number of Expansion Slots	8	8	8	8
Operating System Software Supported	NetWare	NetWare	NetWare	NetWare
Network Interfaces Supported	Arcnet; Ethernet	Arcnet; Ethernet	Arcnet; Ethernet	Arcnet; Ethernet
Tape Backup	None identified	None identified	Not Available	Not Available
Pricing/Support				
Price (\$)	1,099	1,325	1,899	2,049
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer	Dealer	Dealer	Dealer
Comments				

Vendor	DTK Computer, Inc.	Gandalf Data, Inc.	Harris Adacom	Hewlett-Packard Co.
Product	KEEN-3304 (Tower)	StarPort	9574 Strategy Network Controller	HP 3000
Characteristics				
Processor	80386	80286; 80386	80386	68000; 80286; 80386; HP RISC
Minimum Disk Capacity (bytes)	None identified	None identified	None identified	40M
Maximum Disk Capacity (bytes)	None identified	None identified	None identified	1G
Minimum Memory (bytes)	8M	640K	4M	1M; 2M; 640K
Number of Expansion Slots	8	12	6	7; 8; 9
Operating System Software Supported	NetWare	NetWare	UNIX	3+ /3+ Open; HP Officeshare, HP LAN Manager; NetWare
Network Interfaces Supported	Arcnet; Ethernet	Arcnet; Ethernet; Token-Ring	Ethernet; Token-Ring	Ethernet; Starlan; Token-Ring
Tape Backup	Not Available	Standard	Optional	Optional
Pricing/Support				
Price (\$)	3,099	See comments	See comments	4,000
Date of First Delivery	None identified	January 1988	August 1990	January 1986
Standard Warranty	1 year	None identified	1 year	1 year; 30 days; 90 days
Service Supplied by	Dealer	Vendor	Vendor	Vendor

Comments		Provides DOS applications & Netware LAN functionality to ASCII terminals, and serves as a network server for PCs. Contact vendor for pricing information.	Enables connection of coax terminals, token-ring LAN devices and Ethernet LAN devices to an IBM host; contact vendor for pricing information.	HP PC LAN Networks support both dedicated and non-dedicated file servers ranging from PC-DOS & OS/2, to UNIX to MPE; price shown is base.
-----------------	--	---	---	---

Vendor	Hewlett-Packard Co.	Hewlett-Packard Co.	JC Information Systems	JC Information Systems
Product	HP 9000	HP Vectra	5188-620	5196-320
Characteristics				
Processor	68000; 80286; 80386; HP RISC	68000; 80286; 80386; HP RISC	80286	80386
Minimum Disk Capacity (bytes)	40M	40M	0	0
Maximum Disk Capacity (bytes)	1G	1G	320M	760M
Minimum Memory (bytes)	1M	1M	1M	1M
Number of Expansion Slots	7; 8; 9	7; 8; 9	8	8
Operating System Software Supported	3+ /3+ Open; HP OfficeShare, HP LAN Manager; NetWare	3+ /3+ Open; HP OfficeShare, HP LAN Manager; NetWare	CBIS Network O/S; NetWare	CBIS Network O/S; NetWare
Network Interfaces Supported	Ethernet; Starlan; Token-Ring	Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan	Arcnet; Ethernet; Starlan
Tape Backup	Optional	Optional	Optional	Optional
Pricing/Support				
Price (\$)	4,000	4,000	945	1,795
Date of First Delivery	January 1986	January 1986	July 1988	August 1989
Standard Warranty	1 year; 30 days; 90 days	1 year; 30 days; 90 days	1 year	1 year
Service Supplied by	Vendor	Vendor	Dealer	Dealer
Comments	HP PC LAN Networks support both dedicated and non-dedicated file servers ranging from PC-DOS & OS/2, to UNIX to MPE.	HP PC LAN Networks support both dedicated and non-dedicated file servers ranging from PC-DOS & OS/2, to UNIX to MPE; price shown is base.	20MHz operation, up to 8M RAM at full CPU speed, 0 wait-state; utility and diagnostic software provided.	25MHz operation with 32K cache; up to 32M RAM directly addressed by CPU; utility and diagnostic software provided.

Vendor	Lancer Research	Lanmaster	Maco Networks, Inc.	Morton Management, Inc.
Product	FS300/FS400 Series	Lanmaster File Servers	LANFrame	GigaServer
Characteristics				
Processor	80386; 80486	80286; 80386	80386; 80486	80386; 80486
Minimum Disk Capacity (bytes)	80M	20M	300M	160M
Maximum Disk Capacity (bytes)	600M	None identified	4.8G	2.3G
Minimum Memory (bytes)	1M	1M	32M	16M
Number of Expansion Slots	8	5; 8	8	12; 8
Operating System Software Supported	NetWare	3+ /3+ Open; LifeNet; NetWare; Network OS; VINES; ViaNet	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program
Network Interfaces Supported	Arcnet; Ethernet	Arcnet; Ethernet; Token-Ring	AppleTalk; Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; FDDI; Starlan; Token-Ring
Tape Backup	Optional	Optional	Optional	Optional
Pricing/Support				
Price (\$)	2,400, max. price is 6,100	See comments	See comments	3,495, max. price is 22,995
Date of First Delivery	October 1990	September 1988	April 1989	January 1989
Standard Warranty	1 year	2 years	5 years (motherboard)	1 year; 3 years
Service Supplied by	Dealer; vendor	Dealer; vendor	Vendor	Dealer; third party; vendor
Comments		Lanmaster servers ship custom configured or as a turnkey system with NetWare; contact vendor for pricing information.	Contact vendor for pricing information.	Industrial duty LAN servers, desktop or rackmounted configurations; 1-year overnight replacement.

Vendor	Motorola Computer Systems	NCR Corp.	NCR Corp.	NCR Corp.
Product	Multipersonal Computer	System 3340 for NCR NetWare/ X	System 3345 for NCR NetWare/ X	System 3445 for NCR NetWare/ X
Characteristics				
Processor	M88100	80486	80486	80486
Minimum Disk Capacity (bytes)	300M	100M	340M	None identified
Maximum Disk Capacity (bytes)	20G	700M	2G	3.3G
Minimum Memory (bytes)	16M	8M	8M	8M
Number of Expansion Slots	7	4	4	7
Operating System Software Supported	UNIX	NetWare; UNIX V.4	NetWare; UNIX V.4	NetWare; UNIX V.4
Network Interfaces Supported	AppleTalk; Arcnet; Ethernet; FDDI; Token-Ring	Ethernet	Ethernet	Ethernet
Tape Backup	Standard	Standard	Standard	Standard
Pricing/Support				
Price (\$)	23,985, max. price is 59,985	7,995	7,995	7,995
Date of First Delivery	June 1990	February 1991	February 1991	February 1991
Standard Warranty	1 year	30 days	30 days	30 days
Service Supplied by	Third party; vendor	Vendor	Vendor	Vendor
Comments	Each system is bundled with UNIX, Ethernet, X/Motif, Looking Glass desktop Manager, Uniplex Office Automation, SoftPC for DOS applications and a FrameMaker demo 3 X-terminals also included.	Price is for network software.	Price is for network software.	Price is for network software.

Vendor	NetFRAME Systems	Network & Communication Technology, Inc.	The Network Connection	The Network Connection
Product	NF100/NF300/NF400	Rack Mount Server System	Triumph 3000/2000	Triumph 4000
Characteristics				
Processor	80386; 80486	80386	80286; 80386	80486
Minimum Disk Capacity (bytes)	380M	40M	20M	20M
Maximum Disk Capacity (bytes)	42.7G	4.8G	1.2G	1.2G
Minimum Memory (bytes)	8M	2M	1M	1M
Number of Expansion Slots	8	8	8	8
Operating System Software Supported	NetWare; OS/2 LAN Manager	NetWare; PC LAN Program	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Network Interfaces Supported	AppleTalk; Ethernet; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring	AppleTalk; Arcnet; Ethernet; FDDI; Starlan; Token-Ring	AppleTalk; Arcnet; Ethernet; FDDI; Starlan; Token-Ring
Tape Backup	Optional	Optional	Optional	Optional
Pricing/Support				
Price (\$)	19,950	See comments	See comments	See comments
Date of First Delivery	November 1989	June 1988	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer	Dealer	Third party; vendor	Third party; vendor
Comments		Contact vendor for pricing information. Holds 4.5 full height disk drives; chassis includes rack slides for easy access.	Guaranteed 24-hour replacement; contact vendor for pricing information.	Guaranteed 24-hour replacement; contact vendor for pricing information.

Vendor	The Network Connection	The Network Connection	Samsung Informations Systems America, Inc.	Samsung Informations Systems America, Inc.
Product	Triumph AT Terminal	Triumph TNX	386A3	386AE
Characteristics				
Processor	68000 Series; 80286; 80386	68000 Series; 80386; 80486	80386	80386
Minimum Disk Capacity (bytes)	20M	20M	None identified	None identified
Maximum Disk Capacity (bytes)	1.2G	1.2G	None identified	None identified
Minimum Memory (bytes)	1M	1M	4M	4M
Number of Expansion Slots	8	8	8	8
Operating System Software Supported	3+/3+Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+/3+Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	NetWare	NetWare
Network Interfaces Supported	AppleTalk; Arcnet; Ethernet; FDDI; Starlan; Token-Ring	AppleTalk; Arcnet; Ethernet; FDDI; Starlan; Token-Ring	Arcnet; Ethernet	Arcnet; Ethernet; FDDI; Starlan; Token-Ring
Tape Backup	Optional	Optional	Not available	Not available
Pricing/Support				
Price (\$)	See comments	See comments	4,999	3,299
Date of First Delivery	None identified	None identified	May 1991	1987
Standard Warranty	1 year	1 year	1 year; Intelogic trace on-si	Intelogic trace on-site; one
Service Supplied by	Third party; vendor	Third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	Guaranteed 24-hour replacement; contact vendor for pricing information.	Guaranteed 24-hour replacement; contact vendor for pricing information.	33MHz CPU Speed, Samsung Advanced BIOS, 100% NetWare compatible, NetWare certified, up to 16MB capacity, up to 256KB cache, Novell FDC/DCB controller card is standard, five half-height drive bays available.	Novell-co-labelled fileserver; 16Mhz CPU speed; expendable to 8M, 1.2M diskette drive, 2S/1P; 375W power supply, Novell DCB/FCB optional, five drive bays (half-height) available, Samsung Novell Advanced NetWare BIOS.
Vendor	Solid Technologies	Solid Technologies	Storage Dimensions, Inc.	Sun Microsystems, Inc.
Product	386-25 LAN Server	386-SX LAN Server	FileMaster Series	SPARCserver 330
Characteristics				
Processor	80386	80386	80386	SPARC
Minimum Disk Capacity (bytes)	100M	100M	150M	669M
Maximum Disk Capacity (bytes)	600M	600M	2G	3.6G
Minimum Memory (bytes)	2M	2M	4M	8M
Number of Expansion Slots	8	8	8	6; 9
Operating System Software Supported	Solid LAN Operating System	Solid LAN Operating System	NetWare; VINES	SunOS (BSD UNIX 4.3)
Network Interfaces Supported	Solid LAN Network Cards Supported	Solid LAN Network Cards Supported	Arcnet; Ethernet; FDDI; Token-Ring	Ethernet; FDDI; Starlan
Tape Backup	Optional	Optional	Not available	Standard
Pricing/Support				
Price (\$)	2,637	2,237	7,799, max. price is 13,389	29,900
Date of First Delivery	None identified	None identified	December 1989	April 1989
Standard Warranty	1 year	1 year	One year	90 days
Service Supplied by	Vendor	Vendor	Third party	Vendor
Comments	Pre-installed with the Solid LAN Operating system and user's choice of Solid LAN networking card.	Installed with the Solid LAN Operating system and user's choice of Solid LAN networking card.	High performance file server optimized for NetWare 286 & NetWare 386.	

Vendor	Sun Microsystems, Inc.	Sun Microsystems, Inc.	Sun Microsystems, Inc.	TeleVideo Systems, Inc.
Product	SPARCserver 490	SPARCserver 2	SPARCserver 470	Tele386/25
Characteristics				
Processor	SPARC	SPARC	SPARC	80386
Minimum Disk Capacity (bytes)	711M	669M	669M	0
Maximum Disk Capacity (bytes)	29G	7.6G	9.2G	150M
Minimum Memory (bytes)	32M	16M	32M	4M
Number of Expansion Slots	16	3	12	12
Operating System Software Supported	SunOS (BSD UNIX 4.3)	SunOS (BSD UNIX 4.3)	SunOS (BSD UNIX 4.3)	NetWare; SCO Xenix
Network Interfaces Supported	Ethernet; FDDI; Starlan	Ethernet	Ethernet; FDDI; Starlan	Ethernet
Tape Backup	Optional	Standard	Standard	Not available
Pricing/Support				
Price (\$)	99,900	24,595	59,900	3,995
Date of First Delivery	None identified	November 1990	May 1990	April 1989
Standard Warranty	90 days	90 days	90 days	1 year
Service Supplied by	Vendor	Vendor	Vendor	Third party

Comments

Vendor	TeleVideo Systems, Inc.	TeleVideo Systems, Inc.	3Com Corp.	3Com Corp.
Product	Tele386TE	Tele486Te	3Server/500	3Server/600
Characteristics				
Processor	80386	80486	80386	80486
Minimum Disk Capacity (bytes)	80M	80M	150M	150M
Maximum Disk Capacity (bytes)	200M	200M	4G	4G
Minimum Memory (bytes)	4M	4M	8M	8M
Number of Expansion Slots	7	7	4	4
Operating System Software Supported	NetWare	NetWare; OS/2 LAN Manager; SCO Xenix	3+/3+ Open; NetWare; OS/2 LAN Manager	3+/3+ Open; NetWare; OS/2 LAN Manager
Network Interfaces Supported	Ethernet	Ethernet	AppleTalk; Ethernet; Token-Ring	AppleTalk; Ethernet; Token-Ring
Tape Backup	Not available	Not available	Optional	Optional
Pricing/Support				
Price (\$)	5,245	9,995	8,345, max. price is 16,145	22,300
Date of First Delivery	December 1990	January 1991	August 1989	October 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Dealer; third party	Dealer

Comments

Network-optimized server running multiple services at once; ported memory architecture allows concurrent disk and network I/Os; supports additional functions including mail service, internetwork routing, printer service, and network bridging.

Network optimized server; utilizes a 128KB cache memory to provide peak performance to network users; employs triported memory architecture; supports file, printer, and mail service, internetwork routing, and concurrent CPU and disk I/O.

Vendor	Top Microsystems	Top Microsystems	Wang Laboratories, Inc.	Wang Laboratories, Inc.
Product	TF-286	TF-386	LS-125	LS-140
Characteristics				
Processor	80286	80386	80386	80486
Minimum Disk Capacity (bytes)	40M	40M	80M	80M
Maximum Disk Capacity (bytes)	400M	400M	2.3G	2.3G
Minimum Memory (bytes)	640K	640K	4M	4M
Number of Expansion Slots	6; 8	6; 8	10	10
Operating System Software Supported	NetWare	NetWare	VINES	VINES
Network Interfaces Supported	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; FDDI; Starlan; Token-Ring	Arcnet; Ethernet; FDDI; Starlan; Token-Ring
Tape Backup	Optional	Optional	Standard	Standard
Pricing/Support				
Price (\$)	1,100	2,200	23,995	25,795
Date of First Delivery	September 1989	September 1989	January 1990	May 1990
Standard Warranty	1 year	1 year	90 days	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments			Price shown is base.	Price shown is base.

Vendor	Wang Laboratories, Inc.	Wang Laboratories, Inc.	Wang Laboratories, Inc.	Wang Laboratories, Inc.
Product	LS-50	LS-65	PC280/20	PC350/16S
Characteristics				
Processor	80386	80386	80286	80386
Minimum Disk Capacity (bytes)	60M	60M	40M	40M
Maximum Disk Capacity (bytes)	642M	1.2G	642M	400M
Minimum Memory (bytes)	4M	4M	1M	2M
Number of Expansion Slots	8	8	8	5
Operating System Software Supported	3+ /3+ Open; NetWare; VINES			
Network Interfaces Supported	Arcnet; Ethernet; FDDI; Starlan; Token-Ring			
Tape Backup	Optional	Optional	Optional	Optional
Pricing/Support				
Price (\$)	14,010	14,740	3,790	14,000
Date of First Delivery	December 1989	April 1990	January 1990	October 1989
Standard Warranty	90 days	90 days	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments				

Vendor	Wang Laboratories, Inc.	Watlan, Inc.	Watlan, Inc.	Zetaco, Inc.
Product	PC 480	ELS Series	HPS Series	NETstor Server
Characteristics				
Processor	80486	80286	80386	80186
Minimum Disk Capacity (bytes)	60M	75M	500M	3G
Maximum Disk Capacity (bytes)	1.2G	330M	3.5G	80G
Minimum Memory (bytes)	2M	640K	640K	None identified
Number of Expansion Slots	8	6	6	9
Operating System Software Supported	3+ /3+ Open; NetWare; VINES	Watstar/pc	Watstar/pc	UNIX
Network Interfaces Supported	Arcnet; Ethernet; FDDI; Starlan; Token-Ring	Token-Ring	Token-Ring	Ethernet
Tape Backup	Optional	Optional	Optional	Standard
Pricing/Support				
Price (\$)	16,590	6,000	76,000	See comments
Date of First Delivery	June 1990	January 1984	January 1984	January 1989
Standard Warranty	1 year	1 year	1 year	90 days
Service Supplied by	Vendor	Vendor	Vendor	Third party
Comments		Entry-level Watstar/pc network servers.	Includes 8-inch platter high duty cycle disk storage for LANs with heavy user traffic.	Contact vendor for pricing information.

Network Interface Cards

Comparison Column Entry Descriptions

Interface cards plug into an expansion slot on the PC to be networked. They provide the computer with its physical connection to the network. We have tried to fit each product to the specifications listed, to provide an accurate representation of that product's capabilities. Our survey form provided each vendor with a number of choices for each parameter listed. Space was provided to write in an answer when the choices listed were inadequate to describe a specific product.

Vendor and Model. This entry lists the manufacturer and exact model number or name of each device.

Characteristics

LANs Supported. Vendors selected Ethernet, Starlan, Token-Ring, Arcnet, AppleTalk, FDDI, or

Other. Ethernet is a baseband carrier sense multiple access with collision detection (CSMA/CD) network that uses a linear bus topology and operates at 10M bps. Starlan is similar to Ethernet but uses a star topology with central hubs and can operate at 1M or 10M bps. Token-Ring refers to a LAN designed with a ring topology, running at speeds of 4M or 16M bps, that uses the token-passing technique. Arcnet is a baseband LAN that uses a ring or bus topology, runs at 2.5M bps, and also uses a token-passing access method. AppleTalk is Apple's Macintosh networking protocol that can run on most industry-standard networking schemes. FDDI stands for Fiber Distributed Data Interface and is a 100M bps fiber optic network.

Microcomputer Bus Supported. Entries in this category specify the machine and bus a card is designed for. Entries include IBM PC, PC AT (ISA), or compatible; the Extended Industry Standard Architecture (EISA); the IBM Micro Channel Architecture (MCA) used in PS/2 Models 50 and above; Apple Macintosh II Nu-Bus; or other models/makes.

Bus Size. This entry indicates the number of physical connections to the main data path of the computer and is largely dependent on the "bus supported" entry above. Cards for the IBM PC bus, for example, are 8-bit cards; those for the PC AT (ISA) bus may be 8- or 16-bit cards.

Maximum Data Rate, bps. The speed at which data is carried over the network is specified. Entries include 2.5M, 4M, 10M, 16M, and other.

Media Supported. Entries here indicate the type of cable used to connect network devices and include Standard Ethernet coaxial, Thin Ethernet coaxial, Broadband coaxial,

Shielded twisted pair, Unshielded twisted pair, Optical fiber, and Other.

Operating Systems Supported. Vendors specified which of several major network operating systems are supported by the interface card. Entries include Novell NetWare, 3Com 3+/3+ Open, IBM PC LAN Program, Banyan VINES, Microsoft OS/2 LAN Manager, IBM OS/2 LAN Server, and Other.

Pricing/Support Price. The basic price of the unit, excluding any options, is noted here.

Date of First Delivery. The date when the vendor first delivered the product to market.

Standard Warranty. Vendors indicated the length of their warranties.

Service Supplied by. The vendor usually offers service on an on-site or factory repair/return basis. In some cases, a dealer or third party provides service.

Comments. In this space, vendors listed special characteristics of their products, such as additional capabilities, features, or software not covered in the column.

Vendor	Able Computer Communications	Acer, Inc.	Acer, Inc.	Acer, Inc.
Product	FP 106	5220	5220A	5270
Characteristics LANs Supported	Proprietary	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	Q-Bus	AT (ISA)	AT (ISA)	MCA
Bus Size Maximum Data Rate (bps)	16-bit 1M	8-bit 10M	16-bit 10M	16-bit 10M
Media Supported	Optical fiber; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	VMS	NetWare	NetWare	NetWare
Pricing/Support Price (\$)	2,995	259	299	399
Date of First Delivery Standard Warranty	October 1988 1 year	None identified 1 year	None identified 1 year	None identified 1 year
Service Supplied by	Third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	Provides async connectivity for DEC VAX users; supports functionality of DECserver 550.	—	—	—

Vendor	ADI Systems, Inc.	ADI Systems, Inc.	ADI Systems, Inc.	ADI Systems, Inc.
Product	AQ-PCA 216	AQ-PCA 108	AQ-PCA 316	AQ-PCA 116
Characteristics LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size Maximum Data Rate (bps)	16-bit 2.5M	8-bit 2.5M	16-bit 2.5M	16-bit 2.5M
Media Supported	Baseband coaxial	Baseband coaxial	Unshielded twisted-pair	Baseband coaxial
Operating Systems Supported	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry
Pricing/Support Price (\$)	325	149	325	275
Date of First Delivery Standard Warranty	1989 2 years	1989 2 years	1989 2 years	1989 2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Arcnet high impedance with hyper driver; VLSI technology.	VLSI technology.	Twisted-pair Arcnet with hyper driver; VLSI technology.	Arcnet adapter with hyper driver; VLSI technology.

Vendor	ADI Systems, Inc.	ADI Systems, Inc.	ADI Systems, Inc.	ADI Systems, Inc.
Product	AQ-PCA 308	AQ-PCA 208	AQ-PCE 116-EM	AQ-PCE 116-TP
Characteristics				
LANs Supported	Arcnet	Arcnet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size	8-bit	8-bit	16-bit	16-bit
Maximum Data Rate (bps)	2.5M	2.5M	10M	10M
Media Supported	Baseband coaxial	Baseband coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair
Operating Systems Supported	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry
Pricing/Support				
Price (\$)	195	195	425	See comments
Date of First Delivery	1989	1989	1989	1990
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	High impedance Arcnet; VLSI technology.	High impedance Arcnet adapter; VLSI technology.	Ethernet with 128K buffer memory; Fujitsu EtherStar controller.	Twisted-pair Ethernet 10BASE-T; Fujitsu EtherStar controller; contact vendor for pricing information.
Vendor	ADI Systems, Inc.	ADI Systems, Inc.	ADI Systems, Inc.	ADI Systems, Inc.
Product	AQ-PCE 108-TP	AQ-PCE 100	AQ-PSA 100	AQ-PSE
Characteristics				
LANs Supported	Ethernet	Ethernet	Arcnet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	MCA	MCA
Bus Size	8-bit	8-bit	16-bit	16-bit
Maximum Data Rate (bps)	10M	10M	2.5M	10M
Media Supported	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Baseband coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry	NetWare; PC LAN Program; PowerLAN; 10Net+; Network-OS; LANtastic; Tapestry
Pricing/Support				
Price (\$)	See comments	295	395	495
Date of First Delivery	1990	1989	1989	1989
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Twisted-pair Ethernet 10BASE-T; Fujitsu EtherStar controller; contact vendor for pricing information.	Ethernet adapter; Fujitsu EtherStar controller.	Micro Channel Arcnet.	Ethernet for Micro Channel; Fujitsu EtherStar controller.

Vendor	Advanced Digital Corp.	Allen-Bradley Co., Inc.	Allen-Bradley Co., Inc.	Allen-Bradley Co., Inc.
Product	Ethernet-ADNet	Intelligent Ethernet LAN Adapter	LAN/PC	MAP PLC Interface
Characteristics				
LANs Supported	Ethernet	Ethernet	Arcnet	MAP 3.0
Microcomputer Bus Supported	AT (ISA)	AT (ISA); MCA; PC	AT (ISA); EISA; MCA; PC	Proprietary
Bus Size	None identified	16-bit; 8-bit	8-bit	None identified
Maximum Data Rate (bps)	10M; 4M	10M	2.5M	5M
Media Supported	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Broadband coaxial	Broadband coaxial; Standard Ethernet coaxial
Operating Systems Supported	CBIS Network O/S; NetWare	None identified	3+/3+ Open; NetWare	MAP 3.0 MMS
Pricing/Support				
Price (\$)	395	1,095	See comments	See comments
Date of First Delivery	1989	1989	1984	1987
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Vendor	Vendor	Vendor
Comments	—	TCP/IP support.	Contact vendor for pricing information.	Contact vendor for pricing information. Baseband/broadband/carrierband.

Vendor	Allied Telesis Inc.	Altos Computer Systems	Altos Computer Systems	American Research Corp.
Product	CentreCOM AT-1010	ACPA/1000	ACPA/AT	ARCboard-BU
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Arcnet
Microcomputer Bus Supported	AT (ISA); PC	None identified	AT (ISA)	AT (ISA)
Bus Size	8-bit	16-bit	16-bit	None identified
Maximum Data Rate (bps)	10M	10M	10M	2.5M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	RG-62 A/U coaxial
Operating Systems Supported	NetWare; PC/TCP	Altos System V/386	Altos UNIX System	NetWare
Pricing/Support				
Price (\$)	395	See comments	See comments	135
Date of First Delivery	June 1989	None identified	None identified	None identified
Standard Warranty	2 years	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; third party; vendor	Dealer; third party; vendor	None identified
Comments	—	Contact vendor for pricing information. Networking board designed specifically to be installed in the 386 and 486 Series 1000 product line to allow provision of UNIX system resources to PC through Ethernet.	Contact vendor for pricing information. Included in Altos AT-Connection; comes with software designed to allow a PC connect to an AltosDOS/UNIX integrated LAN; specifically designed to work with Altos networking software.	—

Vendor	American Research Corp.	American Research Corp.	American Research Corp.	American Research Corp.
Product	ARCboard-ST	Etherboard-10BT	Etherboard-16B	Etherboard-8B
Characteristics LANs Supported	None identified	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	PC
Bus Size Maximum Data Rate (bps)	None identified 2.5M	None identified 10M	16-bit 10M	8-bit None identified
Media Supported	RG-62 A/U coaxial	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare
Pricing/Support Price (\$)	130	275	285	225
Date of First Delivery Standard Warranty	None identified 1 year	None identified 1 year	None identified 1 year	None identified 1 year
Service Supplied by	None identified	None identified	None identified	None identified
Comments	—		—	—

Vendor	Andrew Corp.	Andrew Corp.	Andrew Corp.	Andrew Corp.
Product	TRA-4116AT	TRA-4116MCA	TRA-4116PC	TRA-AT
Characteristics LANs Supported	Token-Ring	Token-Ring	Token-Ring	Token-Ring
Microcomputer Bus Supported	AT (ISA)	MCA	PC	AT (ISA)
Bus Size Maximum Data Rate (bps)	16-bit 16M	16-bit 16M	8-bit 16M	16-bit 4M
Media Supported	Shielded twisted-pair; Un- shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; PC LAN Pro- gram	3+ /3+ Open; NetWare; OS/2 LAN Manager; PC LAN Pro- gram	3+ /3+ Open; NetWare; OS/2 LAN Manager; PC LAN Pro- gram	3+ /3+ Open; NetWare; OS/2 LAN Server; PC LAN Program
Pricing/Support Price (\$)	899	899	799	599
Date of First Delivery Standard Warranty	October 1990 1 year	October 1990 1 year	October 1990 1 year	May 1989 1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	On board memory can be up- graded to 512K.	On board memory can be up- graded to 512K.	On board memory can be up- graded to 512K.	—

Vendor	Andrew Corp.	Andrew Corp.	Apple Computer, Inc.	Apple Computer, Inc.
Product	TRA-MCA	TRA-PC	EtherTalk NB Card	TokenTalk NB Card
Characteristics				
LANs Supported	Token-Ring	Token-Ring	Ethernet	Token-Ring
Microcomputer Bus Supported	MCA	AT (ISA); PC	NuBus	NuBus
Bus Size Maximum Data Rate (bps)	16-bit 4M	8-bit 4M	16-bit 10M	16-bit 4M
Media Supported	Shielded twisted-pair; Un- shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair
Operating Systems Supported	3+/3+ Open; NetWare; OS/2 LAN Manager; PC LAN Pro- gram	3+/3+ Open; NetWare; OS/2 LAN Server; PC LAN Program	3+/3+ Open; NetWare; OS/2 LAN Manager	3+/3+ Open; NetWare; OS/2 LAN Manager
Pricing/Support				
Price (\$)	599	499	699	1,249
Date of First Delivery	May 1989	May 1989	March 1987	August 1989
Standard Warranty	1 year	1 year	90 days	90 days
Service Supplied by	Vendor	Vendor	Dealer; third party	Dealer; third party
Comments	—	—	—	—

Vendor	Artisoft, Inc.	Artisoft, Inc.	Artisoft, Inc.	Artisoft, Inc.
Product	2Mbps	2Mbps MC	AE-2 Ethernet	AE-2 MC Ethernet
Characteristics				
LANs Supported	Proprietary	Proprietary	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); EISA; PC	MCA	EISA	MCA
Bus Size Maximum Data Rate (bps)	8-bit 2M	8-bit 2M	16-bit; 8-bit 10M	16-bit; 8-bit 10M
Media Supported	Shielded twisted-pair; Un- shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	LANtastic	LANtastic	LANtastic; NetWare; PC LAN Program	LANtastic; NetWare; PC LAN Program
Pricing/Support				
Price (\$)	249	349	349	449
Date of First Delivery	January 1988	December 1990	March 1990	December 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Asante Technologies, Inc.	Asante Technologies, Inc.	Asante Technologies, Inc.	Asante Technologies, Inc.
Product	MacCon II/TR	MacCon+ IIE	MacCon+ IIET	MacCon+ IITR
Characteristics				
LANs Supported	Token-Ring	Ethernet	Ethernet	Token-Ring
Microcomputer Bus Supported	NuBus	NuBus	NuBus	NuBus
Bus Size	32-bit	32-bit	32-bit	32-bit
Maximum Data Rate (bps)	4M	10M	10M	4M
Media Supported	Shielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	AppleShare; NetWare; TOPS	3+/3+Open; AppleShare; NetWare; TOPS	3+/3+Open; AppleShare; NetWare; TOPS	NetWare; TOPS
Pricing/Support				
Price (\$)	695	495	495	795
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	None identified	None identified	None identified	None identified
Service Supplied by	Vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	—	—	10BASE-T compatible.	—

Vendor	Asante Technologies, Inc.	Asante Technologies, Inc.	Asante Technologies, Inc.	Asante Technologies, Inc.
Product	MacCon+ SE30E	MacCon+ SE30ET	MacCon+ SEE	Maccon+ SEET
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	SE/30	SE/30	SE	SE
Bus Size	32-bit	32-bit	32-bit	32-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair	Unshielded twisted-pair	Unshielded twisted-pair
Operating Systems Supported	3+/3+Open; AppleShare; NetWare; TOPS	3+/3+Open; AppleShare; NetWare; TOPS	3+/3+Open; AppleShare; NetWare; TOPS	3+/3+Open; AppleShare; NetWare; TOPS
Pricing/Support				
Price (\$)	495	495	395	395
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	None identified	None identified	None identified	None identified
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	—	10BASE-T compatible.	10BASE-T compatible.	10BASE-T compatible.

Vendor	AST Research Inc.	AT&T	AT&T	AT&T
Product	EtherNode	PC 6300 Network Access Unit	StarLAN 10 EN100 Network Access Unit	StarLAN 10 Fiber Network Access Unit
Characteristics				
LANs Supported	Ethernet	Starlan	Ethernet; Starlan	Starlan
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size	8-bit	None identified	None identified	16-bit; 8-bit
Maximum Data Rate (bps)	10M	1M	10M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair	Standard Ethernet coaxial; Unshielded twisted-pair	Optical fiber
Operating Systems Supported	NetWare; OS/2 LAN Manager	AT&T StarGroup Software; NetWare; VINES	AT&T StarGroup Software; NetWare; VINES	NetWare; VINES
Pricing/Support				
Price (\$)	395	295	495	500
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	2 years	None identified	None identified	None identified
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	AT&T	AT&T	Bethel Computer	Bethel Computer
Product	StarLAN 10 MC200 Network Access Unit	StarLAN 10 PC Network Access Unit	AC 1600	AC 800
Characteristics				
LANs Supported	Starlan	Starlan	Arcnet	Arcnet
Microcomputer Bus Supported	MCA	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size	None identified	None identified	16-bit	8-bit
Maximum Data Rate (bps)	10M	10M	2.5M	2.5M
Media Supported	Unshielded twisted-pair	Unshielded twisted-pair	Baseband coaxial	Baseband coaxial
Operating Systems Supported	NetWare; VINES	AT&T StarGroup Software; NetWare; VINES	NetWare	NetWare
Pricing/Support				
Price (\$)	445	295	75, max. price is 125	75, max. price is 125
Date of First Delivery	None identified	None identified	1987	1987
Standard Warranty	None identified	None identified	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Bethel Computer	Bethel Computer	BICC Data Networks, Inc.	BICC Data Networks, Inc.
Product	EN 1600	EN 800	4101-0 ILSOLAN	4110-2 ISOLAN
Characteristics LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size Maximum Data Rate (bps)	16-bit 10M	8-bit 10M	16-bit 10M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	NetWare	NetWare	3+/3+ Open; NetWare; OS/2 LAN Manager; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; VINES
Pricing/Support Price (\$)	75, max. price is 125	75, max. price is 125	375	349
Date of First Delivery Standard Warranty	1987 1 year	1987 1 year	None identified 1 year	1989 1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	IBM-AT busmaster NIC with RJ45 port for connection to an unshielded twisted pair network and an AUI interface for connection to other media.	IBM-AT busmaster NIC with BNC port for thin Ethernet connection and AUI port for connection to other media.
Vendor	BICC Data Networks, Inc.	Cabletron Systems, Inc.	Cabletron Systems, Inc.	Cabletron Systems, Inc.
Product	4110-3 ISOLAN	E1000 Series	E2000 Series	E3000 Series
Characteristics LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	PC	AT (ISA)	MCA
Bus Size Maximum Data Rate (bps)	16-bit 16M	8-bit 10M	16-bit 10M	16-bit 10M
Media Supported	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+/3+ Open; NetWare; OS/2 LAN Manager; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; VINES
Pricing/Support Price (\$)	375	215, max. price is 400	280, max. price is 500	375, max. price is 595
Date of First Delivery Standard Warranty	1989 1 year	August 1989 1 year	August 1989 1 year	August 1989 1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	IBM-MCA busmaster NIC with BNC port for thin Ethernet connection and AUI port for connection to other media.	All drivers shipped with DNI card; support concurrent driver operation (user can run Novell & PC-NFS at same time); supports AUI & somemedia typeport; incorporates LANVIEW LEDs for transmit, receive, link, & collision indications.	All drivers shipped with card; supports concurrent driver operation (can load multiple drivers at same time); supports both AUI & some media type; incorporates LANVIEW LEDs indicating transmit, receive, link, & collision.	All drivers shipped with DNI card; supports multiple drivers loaded at once providing concurrent operation of ntwk. operating systems; supports AUI & one media type connection; incorporates LANVIEW LEDs.

Vendor	Cabletron Systems, Inc.	Cabletron Systems, Inc.	Cabletron Systems, Inc.	Cabletron Systems, Inc.
Product	E4000 Series	E5000 Series	E6000 Series	T1000 Series
Characteristics				
LANs Supported	EtherTalk; Ethernet	EtherTalk; Ethernet	EtherTalk; Ethernet	Token-Ring
Microcomputer Bus Supported	SE	SE/30	NuBus	PC
Bus Size	16-bit	16-bit	16-bit	8-bit
Maximum Data Rate (bps)	10M	10M	10M	4M
Media Supported	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	AppleShare	AppleShare	AppleShare	NetWare; PC LAN Program
Pricing/Support				
Price (\$)	400, max. price is 595	400, max. price is 595	400, max. price is 595	See comments
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Supports both AUI & some media type; incorporates LANVIEW LEDs indicating transmit, receive, collisions, & link.	Supports both AUI & some media port type; incorporates LANVIEW LEDs indicating transmit, receive, collision, & link.	Supports both AUI & some media type; incorporates LANVIEW LEDs indicating transmit, receive, collisions, & link.	Supports Type 1, 2, 6, 9, & 3 cabling; incorporates LANVIEW LEDs indicating activity, connection, 0-idle; for pricing information contact vendor.
Vendor	Cabletron Systems, Inc.	Cabletron Systems, Inc.	Cabletron Systems, Inc.	Canai, Computer and Network Architecture Inc.
Product	T2000 Series	T3000 Series	T6000 Series	Wavebus
Characteristics				
LANs Supported	Token-Ring	Token-Ring	Token-Ring; TokenTalk	Ethernet; FDDI; Token-Ring; Wavebus
Microcomputer Bus Supported	AT (ISA)	MCA	NuBus	AT (ISA); EISA; PC; VME
Bus Size	16-bit	32-bit	16-bit	16-bit; 32-bit
Maximum Data Rate (bps)	16M; 4M	16M; 4M	16M	100M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Optical fiber
Operating Systems Supported	NetWare; PC LAN Program	NetWare; PC LAN Program	NetWare	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	See comments	See comments	See comments	2,995
Date of First Delivery	None identified	None identified	None identified	August 1991
Standard Warranty	1 year	1 year	1 year	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Supports Type 1, 2, 6, 9, & 3 cabling; software selectable between 4M bps & 16M bps; incorporates LANVIEW LEDs; contact vendor for pricing information.	Supports Type 1, 2, 6, 9, & 3 cabling; software selectable; incorporates LANVIEW LEDs; contact vendor for pricing information.	Supports Types 1, 2, 6, 9, & 3 cabling; software configurable; incorporates LANVIEW LEDs; contact vendor for pricing information.	Wavebus is a 100Mbps fibre optic network, fully compatible with installed base of 802.3, 802.5, networks, at around one third of FDDI.

Vendor	CASE/Datatel, Inc.	CASE/Datatel, Inc.	CASE/Datatel, Inc.	CBIS, Inc.
Product	6520	6521	6522	Network-EZ II
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	BUSS
Microcomputer Bus Supported	AT (ISA); MCA	AT (ISA); MCA	AT (ISA); MCA	PC
Bus Size	None identified	None identified	None identified	None identified
Maximum Data Rate (bps)	10M	10M	10M	2.5M; 4M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	None identified
Operating Systems Supported	NETBIOS I/P; NetWare; PC LAN Program; TOPS	NETBIOS I/P; NetWare; PC LAN Program; TOPS	NETBIOS I/P; NetWare; PC LAN Program; TOPS	Network EZ II
Pricing/Support				
Price (\$)	765	765	765	See comments
Date of First Delivery	December 1988	December 1988	December 1988	None identified
Standard Warranty	None identified	None identified	None identified	6 months
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Price shown is base.	Price shown is base.	Price shown is base.	Free telephone technical support. Contact vendor for pricing information.
Vendor	Chipcom Corp.	CMC	CMC	CMC
Product	Ornet/PC Fiber Adapter Card	CMC-1055 FDDI Adapter	CMC-1056 FDDI Adapter	CMC-130 Ethernet Adapter
Characteristics				
LANs Supported	Ethernet	FDDI	FDDI	Ethernet
Microcomputer Bus Supported	AT (ISA); PC	VMEbus	VMEbus	VMEbus
Bus Size	8-bit	16-bit; 32-bit; 8-bit	16-bit; 32-bit; 8-bit	16-bit; 32-bit; 8-bit
Maximum Data Rate (bps)	10M	100M	100M	10M
Media Supported	Optical fiber	Optical fiber	Optical fiber	Standard Ethernet coaxial
Operating Systems Supported	3+/3+ Open; Decnet-DOS; NetWare; PCSA; SCO Xenix	UNIX	UNIX	UNIX
Pricing/Support				
Price (\$)	795	8,950	9,950	3,195
Date of First Delivery	October 1989	January 1990	January 1990	None identified
Standard Warranty	1 year	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Supports TCP/IP, UNIX streams V.3, IBM OS/2 Extended Edition.	Single attachment intelligent FDDI station interface for VMEbus employing CMC's FXP architecture with an AM29000 RISC processor at 25MHz, 512KB DRAM dedicated to the processor, and 512KB multiport video DRAM.	Dual attachment intelligent FDDI station interface for VMEbus employing CMC's FXP architecture with an AM29000 RISC processor at 25MHz, 512KB DRAM dedicated to the processor, and 512KB multiport video DRAM.	Intelligent Ethernet adapter for VMEbus with a Motorola 68020 processor at 20MHz, 256KB DRAM dedicated to the processor and 256KB multiport Video DRAM, 802.3 10BASE5 thick coax Ethernet transceiver interface.

Vendor	CMC	CMC	CNet Technology	CNet Technology
Product	ENPL-Series Ethernet Adapters	ENPI-Series Ethernet Adapters	190 SBT/2	CN 200E
Characteristics				
LANs Supported	Ethernet	Ethernet	Arcnet	Ethernet
Microcomputer Bus Supported	Multibus; VMEbus; Versabus	AT (ISA); Multibus; Q-Bus; UNibus; VMEbus	AT (ISA); PC	AT (ISA)
Bus Size Maximum Data Rate (bps)	16-bit; 32-bit; 8-bit 10M	16-bit; 32-bit; 8-bit 10M	16-bit 2.5M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	RG 62 coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	UNIX	UNIX	NetWare	NetWare
Pricing/Support				
Price (\$)	1,595, max. price is 3,195	1,095, max. price is 3,150	545	439
Date of First Delivery	None identified	None identified	1989	1989
Standard Warranty	2 years	1 year; 2 years-VMEbus	5 years	5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	A line of Ethernet link-level adapters for VMEbus, MULTibus and VERSAbus host systems; targeted primarily toward developers who can't justify the purchase of an intelligent processor to off-load the protocol processing.	A line of intelligent Ethernet adapters for VMEbus, MULTibus, Qbus, UNIBUS and PC/XT/AT host systems; these adapters increase the performance of the network by executing the communications protocols on-board.		
Vendor	CNet Technology	CNet Technology	CNet Technology	CNet Technology
Product	CN 200E/2	CN 300E	CN 400E	CN 500E
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	AT (ISA)	AT (ISA)	PC
Bus Size Maximum Data Rate (bps)	16-bit 10M	16-bit 10M	16-bit 10M	8-bit 10M
Media Supported	Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare
Pricing/Support				
Price (\$)	449	459	459	405
Date of First Delivery	None identified	1989	1989	1990
Standard Warranty	5 years	5 years	5 years	5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	Conforms to 10BASE-T standards.

Vendor	CNet Technology	CNet Technology	CNet Technology	Codenoll Technology Corp.
Product	CN 600E	CN 800E	CN 800E/2	CodeNet-8300
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	MCA	EISA
Bus Size Maximum Data Rate (bps)	16-bit 10M	16-bit 10M	16-bit 10M	32-bit 10M
Media Supported	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Thin Ethernet coaxial	Optical fiber
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare; OS/2 LAN Manager
Pricing/Support				
Price (\$)	405	405	445	1,295
Date of First Delivery	1990	1989	1989	January 1990
Standard Warranty	5 years	5 years	5 years	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Conforms to 10BASE-T standards.	—	Conforms to 10BASE-T and 10Base5. Complies with all IEEE 802.3 Ethernet standards.	Requires a single slot in any EISA bus computer and provides connection to a passive fiber optic Ethernet star.

Vendor	Codenoll Technology Corp.	Codenoll Technology Corp.	Codenoll Technology Corp.	Codenoll Technology Corp.
Product	CodeNet-8301	CodeNet-8320	CodeNet-8321	CodeNet-8331
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	EISA	MCA	MCA	AT (ISA); EISA; PC
Bus Size Maximum Data Rate (bps)	32-bit 10M	16-bit 10M	16-bit 10M	8-bit 10M
Media Supported	Optical fiber	Optical fiber	Optical fiber	Optical fiber
Operating Systems Supported	NetWare; OS/2 LAN Manager	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	1,295	895	895	595
Date of First Delivery	None identified	May 1990	May 1990	December 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Requires a single expansion slot in any EISA bus computer and provides connection to an active Ethernet star.	Occupies a single expansion slot in an MCA computer and attaches to a passive fiber optic hub.	Occupies a single expansion slot in an MCA computer and attaches to an active fiber optic star hub.	—

Vendor	Codenoll Technology Corp.	Codenoll Technology Corp.	Codenoll Technology Corp.	Codenoll Technology Corp.
Product	CodeNet-8350	CodeNet-8601	CodeNet-8621	CodeNet-8631
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); EISA; PC	EISA	MCA	AT (ISA); EISA; PC
Bus Size	8-bit	32-bit	16-bit	8-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Optical fiber	Plastic optical fiber	Plastic optical fiber	Plastic optical fiber
Operating Systems Supported	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	NetWare; OS/2 LAN Manager	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	585	1,295	795	495
Date of First Delivery	December 1989	January 1991	January 1991	January 1991
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Codenoll Technology Corp.	Cogent Data Technologies, Inc.	Cogent Data Technologies, Inc.	Cogent Data Technologies, Inc.
Product	CodeNet-9543	E/MASTER II AT/TP	E/MASTER II/AT	E/MASTER II MCA/TP
Characteristics				
LANs Supported	FDDI	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); EISA	AT (ISA); EISA	AT (ISA); EISA	MCA
Bus Size	16-bit	16-bit	16-bit	16-bit
Maximum Data Rate (bps)	100M	10M	10M	10M
Media Supported	Optical fiber	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair
Operating Systems Supported	AT&T UNIX System V 3.2; NetWare; OS/2 LAN Manager; OS/2 LAN Server	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program
Pricing/Support				
Price (\$)	7,395	895	895	895
Date of First Delivery	December 1989	None identified	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	—	—	—	—

Vendor	Cogent Data Technologies, Inc.	Cogent Data Technologies, Inc.	Commtext Inc.	Compatible Systems Corp.
Product	E/MASTER I	E/MASTER II MCA	CX-Card	Ether+
Characteristics				
LANs Supported	Ethernet	Ethernet	Proprietary	Ethernet
Microcomputer Bus Supported	AT (ISA); EISA	MCA	AT (ISA)	SLSI
Bus Size Maximum Data Rate (bps)	16-bit 10M	16-bit 10M	8-bit 2.048M	8-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program	Any NetBIOS; NetWare; PC LAN Program	3+ /3+ Open; AppleShare; NetWare
Pricing/Support				
Price (\$)	695	895	1,995	495
Date of First Delivery	None identified	None identified	1990	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Vendor	Vendor
Comments	—	—	One of the PC components of Commtext's multimedia LAN [this LAN transports data full motion video; high quality stereo audio and voice to multimedia PCs when combined with Commtext Sound Subsystem board, PCs connected to Commtext Multi	Two models available: Ether+ supports thin or thick Ethernet, Ether+ Twisted Pair supports 10BASE-T or Thick Ethernet.
Vendor	Compatible Systems Corp.	Complex, Inc.	Complex, Inc.	Complex, Inc.
Product	Ether2	ANET-1	ANET-1/16	ANET-12
Characteristics				
LANs Supported	Ethernet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	NuBus	PC	AT (ISA)	PC
Bus Size Maximum Data Rate (bps)	16-bit 10M	8-bit 2.5M	16-bit 2.5M	8-bit 2.5M
Media Supported	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Baseband coaxial	RG-62IU	RG 62 coaxial
Operating Systems Supported	3+ /3+ Open; AppleShare; NetWare	NetWare	NetWare	NetWare
Pricing/Support				
Price (\$)	395	175	355	229
Date of First Delivery	None identified	July 1987	September 1988	July 1987
Standard Warranty	1 year	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Two models available: Ether2 supports thin or thick Ethernet, Ether2 Twisted Pair supports 10BASE-T or thick Ethernet.	Externally mounted node ID switch, socket for 8K boot ROM, diagnostic LEDs.	Externally mounted node ID switch, socket for 8K boot ROM, diagnostic LEDs.	Linear bus technology for RG62U Coax; supports 8 stations per 1000 chain; externally mounted Node ID switch socket for 8K boot ROM, diagnostic LEDs.

Vendor	Compex, Inc.	Compex, Inc.	Compex, Inc.	Compex, Inc.
Product	ANET-4	ANET-4/16	ANET-MC	ANET-TP
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	PC	AT (ISA)	MCA	PC
Bus Size	8-bit	16-bit	8-bit	8-bit
Maximum Data Rate (bps)	2.5M	2.5M	2.5M	2.5M
Media Supported	RG-62IU	RG-62IU	RG-62IU	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare
Pricing/Support				
Price (\$)	345	395	395	175
Date of First Delivery	July 1987	September 1988	July 1987	July 1987
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Provides network interface plus 4 active hubs (expandable to 16) socket for 8K ROM, diagnostic LEDs.	Provides network interface plus 4 active hubs (expandable to 16), externally mounted node ID switch, socket for 8K boot ROM, diagnostic LEDs.	Micro Channel Compatible supports programmable options select (POS) socket for 8K Boot ROM Diagnostic LEDs	Supports 10 Nodes on 300' daisy chain, externally mounted Node IDswitch, socket for 8K boot ROM, diagnostic LEDs.
Vendor	Compex, Inc.	Compex, Inc.	Compex, Inc.	Compex, Inc.
Product	ANET-TP/16	ENET-16/TP	ENET-M	ENET-M/16
Characteristics				
LANs Supported	Arcnet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	PC	AT (ISA)
Bus Size	16-bit	16-bit	8-bit	16-bit
Maximum Data Rate (bps)	2.5M	10M	10M	10M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare
Pricing/Support				
Price (\$)	395	395	295	375
Date of First Delivery	September 1988	October 1990	May 1988	1989
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Supports 10 nodes on 300' daisy chain, externally mounted node IDswitch, socket for 8K boot ROM, diagnostic LEDs.	10 Base-T compatible.	Select for 8K boot ROM.	16K of high speed RAM mapped into 8K on host, socket for 8K boot ROM.

Vendor	Concord Communications, Inc.	Concord Communications, Inc.	Corman Technologies, Inc.	Corman Technologies, Inc.
Product	Series 1210/1215	Series 1410	CorNet A111	CorNet A200
Characteristics				
LANs Supported	Token Bus	Token Bus	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); MCA; PC	MCA	AT (ISA)
Bus Size Maximum Data Rate (bps)	16-bit; 8-bit 10M	16-bit; 8-bit 10M	8-bit 2.5M	16-bit 2.5M
Media Supported	Broadband coaxial; Optical fiber; carrierband	Broadband coaxial; Carrierband; Optical fiber	Baseband coaxial	Baseband coaxial; Unshielded twisted-pair
Operating Systems Supported	OSI	OSI	NetWare	NetWare
Pricing/Support				
Price (\$)	1,395	1,395	595	See comments
Date of First Delivery	September 1986	September 1986	January 1988	February 1990
Standard Warranty	90 days	90 days	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Provides full 7-layer OSI software conforming to MAP 3.0; Concord is IBM's authorized MAP application specialist; price shown is base.	Price shown is base; provides full 7-layer OSI software conforming to MAP 3.0. Concord is IBM's authorized MAP applications specialist.	Diagnostic LEDs.	Operates in 8K of memory space; certified Novell drivers included; star and bus topologies; active hubs available; contact vendor for pricing information.
Vendor	Corman Technologies, Inc.	Corman Technologies, Inc.	Corvus Systems, Inc.	Corvus Systems, Inc.
Product	CorNet A300	CorNet AF102	16/4 Mbps Switchable Token Ring Cards	4 Mbps Token Ring Network Cards
Characteristics				
LANs Supported	Arcnet	Arcnet	Token-Ring	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA); MCA; PC	AT (ISA); MCA; PC
Bus Size Maximum Data Rate (bps)	8-bit 2.5M	8-bit 2.5M	16-bit; 32-bit; 8-bit 16M; 4M	16-bit; 8-bit 4M
Media Supported	Baseband coaxial; Unshielded twisted-pair	Optical fiber	IBM Type 1; IBM Type 3; Shielded twisted-pair; Unshielded twisted-pair	IBM Type 1; IBM Type 3; Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	NetWare	NetWare	NetWare; OS/2 LAN Manager; PC LAN Program	NetWare; OS/2 LAN Manager; PC LAN Program
Pricing/Support				
Price (\$)	See comments	See comments	745, max. price is 845	469, max. price is 569
Date of First Delivery	February 1990	January 1988	September 1990	September 1990
Standard Warranty	2 years	2 years	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Operates in 8K of memory space; certified Novell drivers included; star and bus topologies; active hubs available; contact vendor for pricing information.	Setup menu; diagnostic LEDs; active hubs available; contact vendor for pricing information.	—	—

Vendor	Corvus Systems, Inc.	Corvus Systems, Inc.	Corvus Systems, Inc.	Corvus Systems, Inc.
Product	Ethernet Card	Omninet/1 Micro Channel Card	Omninet/1 Transporter Card	Omninet/4 Card
Characteristics				
LANs Supported	Ethernet	Omninet	Omninet	Omninet
Microcomputer Bus Supported	PC	MCA	AT (ISA); PC; SE	AT (ISA); PC
Bus Size	8-bit	8-bit	8-bit	8-bit
Maximum Data Rate (bps)	10M	1M	1M	4M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	NetWare; OS/2 LAN Manager; PC LAN Program; PCNOS; VINES	NetWare; OS/2 LAN Manager; PC LAN Program	NetWare; OS/2 LAN Manager; PC LAN Program	NetWare; OS/2 LAN Manager; PC LAN Program
Pricing/Support				
Price (\$)	240	329	159	269
Date of First Delivery	1989	May 1981	1981	March 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Corvus Systems, Inc.	D-Link Systems, Inc.	D-Link Systems, Inc.	D-Link Systems, Inc.
Product	Omninet/4 Micro Channel Card	DA-100	DA-110	DA-120
Characteristics				
LANs Supported	Omninet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	MCA	PC	PC	PC
Bus Size	8-bit	8-bit	8-bit	8-bit
Maximum Data Rate (bps)	4M	4M	4M	4M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	RG-62	RG-62	RG-62
Operating Systems Supported	NetWare; OS/2 LAN Manager; PC LAN Program	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program
Pricing/Support				
Price (\$)	449	195	225	260
Date of First Delivery	March 1988	March 1988	May 1988	May 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	—	—	—	—

Vendor	D-Link Systems, Inc.	D-Link Systems, Inc.	D-Link Systems, Inc.	D-Link Systems, Inc.
Product	DA-200	DA-300	DE-100	DE-100 TP
Characteristics				
LANs Supported	Arcnet	Arcnet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); PC	MCA	PC	PC
Bus Size	16-bit	16-bit	8-bit	8-bit
Maximum Data Rate (bps)	4M	4M	10M	10M
Media Supported	RG-62	RG-62	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program; Sun NFS; TCP/IP; Xenix	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program; Sun NFS; TCP/IP; Xenix
Pricing/Support				
Price (\$)	275	345	245	320
Date of First Delivery	January 1990	January 1990	March 1988	August 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	—	—	Compatible with Novell NE-1000 adapter.	Compatible with Novell NE-1000 Adapter; 10BASE-T compatible.

Vendor	D-Link Systems, Inc.	D-Link Systems, Inc.	D-Link Systems, Inc.	D-Link Systems, Inc.
Product	DE-150	DE-200	DE-200 TP	DE-300
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	PC	AT (ISA)	AT (ISA)	MCA
Bus Size	8-bit	16-bit	16-bit	16-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	3+ /3+ Open; LANSmart; NetWare; PC LAN Program; Sun NFS; TCP/IP; Xenix	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program; Sun NFS; TCP/IP; Xenix	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program; Sun NFS; TCP/IP; Xenix	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program; Sun NFS; TCP/IP; Xenix
Pricing/Support				
Price (\$)	175	320	375	495
Date of First Delivery	February 1990	January 1989	August 1990	June 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	—	Compatible with Novell NE-2000 adapter.	Compatible with Novell NE-2000 adapter; 10BASE-T compatible.	—

Vendor	D-Link Systems, Inc.	D-Link Systems, Inc.	D-Link Systems, Inc.	D-Link Systems, Inc.
Product	DE-300 TP	DE-600 AUI	DE-600 Pocket LAN Adapter	DE-600 TP Pocket LAN Adapter
Characteristics LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	Parallel port	Parallel port	Parallel port
Bus Size Maximum Data Rate (bps)	16-bit 10M	None identified 10M	None identified 10M	None identified 10M
Media Supported	Standard Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial	Thin Ethernet coaxial	Standard Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program; Sun NFS; TCP/IP; Xenix	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program; Sun NFS; TCP/IP; Xenix	3+ /3+ Open; LANSmart; NetWare; PC LAN Program; Sun NFS; TCP/IP; Xenix	3+ /3+ Open; LANSmart NOS; NetWare; PC LAN Program; Sun NFS; TCP/IP; Xenix
Pricing/Support Price (\$)	495	495	495	495
Date of First Delivery Standard Warranty	August 1990 1 year	February 1990 1 year	February 1990 1 year	February 1990 1 year
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	10BASE-T compatible.	—	—	10 BASE-T compatible.

Vendor	D-Link Systems, Inc.	Datapoint Corp.	David Systems	David Systems
Product	DX-100 8-Bit ARCnet Compatible	1722	Ether-T AT	Ether-T MC
Characteristics LANs Supported	Arcnet	Arcnet	Ethernet	Ethernet
Microcomputer Bus Supported	PC	PC	AT (ISA)	MCA
Bus Size Maximum Data Rate (bps)	8-bit 2.5M	16-bit; 8-bit 2.5M	16-bit 10M	16-bit 10M
Media Supported	Shielded twisted-pair; unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair; coax	Standard Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	LANSmart	None identified	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; VINES
Pricing/Support Price (\$)	195	See comments	445	460
Date of First Delivery Standard Warranty	June 1989 1 year	None identified 30 days	June 1990 2 years	August 1990 2 years
Service Supplied by	Dealer; vendor; third party	Third party	Vendor	Vendor
Comments		Contact vendor for pricing information.	UTP implementation is 10BASE-T; TCP/IP supported.	UTP implementation is 10BASE-T.

Vendor	David Systems	David Systems	Dayna Communications, Inc.	Dayna Communications, Inc.
Product	Ether-T PC	Ether-T PC/AT	DL/2	DL/2000
Characteristics LANs Supported	Ethernet	Ethernet	AppleTalk	AppleTalk
Microcomputer Bus Supported	PC	AT (ISA); PC	MCA	AT (ISA); PC
Bus Size Maximum Data Rate (bps)	8-bit 10M	16-bit 10M	32-bit 230K	32-bit 230K
Media Supported	Standard Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; VINES	NetWare	NetWare	NetWare
Pricing/Support Price (\$)	350	350	399	299
Date of First Delivery Standard Warranty	June 1990 2 years	September 1990 2 years	March 1990 1 year	March 1990 1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	UTP implementation is 10BASE-T; TCP/IP support.	Card adapts to 8-or 16-bit bus; UTP implementation is 10BASE-T.	—	—

Vendor	Dayna Communications, Inc.	Dayna Communications, Inc.	Dayna Communications, Inc.	Dayna Communications, Inc.
Product	DaynaPORT E/30	DaynaPORT E/II	DaynaPORT SE	DaynaTALK MC Card
Characteristics LANs Supported	Ethernet	Ethernet	Ethernet	AppleTalk
Microcomputer Bus Supported	SE/30	NuBus	SE	MCA
Bus Size Maximum Data Rate (bps)	16-bit 10M	16-bit 10M	16-bit 10M	32-bit 1.7M
Media Supported	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	AppleShare; NetWare	AppleShare; NetWare	AppleShare; NetWare	NetWare
Pricing/Support Price (\$)	499	499	499	399
Date of First Delivery Standard Warranty	August 1990 1 year	August 1990 1 year	December 1990 1 year	February 1990 1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Dayna Communications, Inc.	DayStar Digital, Inc.	DayStar Digital, Inc.	DFI, Inc.
Product	DaynaTALK PC Card	LT200 Connection Interface Board (AT)	LT200 Connection Interface Board (MCA)	DFINET-300
Characteristics				
LANs Supported	LocalTalk	AppleTalk	AppleTalk	Ethernet
Microcomputer Bus Supported	AT (ISA); EISA; PC	AT (ISA); PC	MCA	PC
Bus Size	32-bit	8-bit	8-bit	8-bit
Maximum Data Rate (bps)	1.7M	230K	230K	10M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair	Shielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare	3+ /3+ Open; NetWare	3+ /3+ Open; NetWare	NetWare
Pricing/Support				
Price (\$)	299	249	395	349
Date of First Delivery	July 1990	1985	1989	January 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	Volume discounts available.

Vendor	DFI, Inc.	Digital Communications Associates, Inc.	Digital Communications Associates, Inc.	Digital Communications Associates, Inc.
Product	DFINET-400	10M Coax Adapter	10M Fiber Adapter	10M Twisted Pair Adapter
Characteristics				
LANs Supported	Ethernet	Ethernet	Starlan	Ethernet; Starlan
Microcomputer Bus Supported	AT (ISA)	AT (ISA); MCA	AT (ISA)	AT (ISA); MCA
Bus Size	16-bit	8-bit	8-bit	8-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber	Unshielded twisted-pair
Operating Systems Supported	NetWare	10NET Plus	10NET Plus	10NET Plus; NetWare
Pricing/Support				
Price (\$)	449	495, max. price is 549	795	425, max. price is 475
Date of First Delivery	January 1989	June 1989	June 1989	July 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Volume discounts available.	ISA version: \$495; MCA version: \$549.	—	Bundled with Novell driver; ISA version: \$425; MCA version: \$475.

Vendor	Digital Communications Associates, Inc.	Digital Communications Associates, Inc.	Digital Equipment Corp.	DNA Networks, Inc.
Product	1M Fiber Adapter	IRMAtrac Token-Ring Adapter/Convertible	DEC EtherWorks PC LAN Controller Family	MegaNet Master
Characteristics				
LANs Supported	Starlan	Token-Ring	Ethernet	DNA Networks
Microcomputer Bus Supported	AT (ISA)	AT (ISA); MCA; PC	MCA	AT (ISA); EISA; PC
Bus Size	8-bit	16-bit; 8-bit	16-bit; 8-bit	8-bit
Maximum Data Rate (bps)	1M	16M; 4M	10M	10M
Media Supported	Optical fiber	Shielded twisted-pair; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair
Operating Systems Supported	10NET Plus	3+ /3+ Open; NetWare; OS/2 LAN Manager; PC LAN Program	OS/2 LAN Manager; all NDIS compliant products	DNA Networks
Pricing/Support				
Price (\$)	595	895	See comments	695
Date of First Delivery	June 1988	October 1990	None identified	August 1989
Standard Warranty	1 year	1 year	90 days	1 year
Service Supplied by	Dealer; vendor	Vendor	Vendor	Dealer
Comments	—	4Mbps & 16Mbps; STP & UTP media; AT (ISA) and Microchannel bus architectures, all major LAN operating systems in one adapter through unique hardware design.	Contact vendor for pricing information.	DNA Networks operating systems is bundled at no charge.
Vendor	DNA Networks, Inc.	DNA Networks, Inc.	DNA Networks, Inc.	DNA Networks, Inc.
Product	MegaNet Station	MicroNet Master	MicroNet Station	Microchannel Master
Characteristics				
LANs Supported	DNA Networks	DNA Networks	DNA Networks	DNA Networks
Microcomputer Bus Supported	AT (ISA); EISA; PC	AT (ISA); EISA; PC	AT (ISA); EISA; PC	MCA
Bus Size	8-bit	8-bit	8-bit	8-bit
Maximum Data Rate (bps)	10M	2M	2M	2.5M
Media Supported	Shielded twisted-pair	Shielded twisted-pair	Shielded twisted-pair	Shielded twisted-pair
Operating Systems Supported	DNA Networks	DNA Networks	DNA Networks	DNA Networks
Pricing/Support				
Price (\$)	395	295	See comments	695
Date of First Delivery	August 1989	January 1990	January 1990	April 1987
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer	Dealer	Dealer	Dealer
Comments	—	DNA Networks operating system is bundled at no charge.	Contact vendor for pricing information.	DNA Networks operating system is bundled at no charge.

Vendor	DNA Networks, Inc.	DSC Communications Corp.	DSC Communications Corp.	DSC Communications Corp.
Product	Microchannel Station	NEXOS 8-bit Arcnet	NEXOS Arcnet/2	NEXOS Ether-16
Characteristics				
LANs Supported	DNA Networks	Arcnet	Arcnet	Ethernet
Microcomputer Bus Supported	MCA	AT (ISA)	MCA	AT (ISA); PC
Bus Size	8-bit	8-bit	8-bit	16-bit
Maximum Data Rate (bps)	2.5M	1.5M	1.5M	10M
Media Supported	Shielded twisted-pair	Baseband coaxial	Baseband coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	DNA Networks	NEXOS	NEXOS; NetWare; PC LAN Program	NEXOS; NetWare; PC LAN Program
Pricing/Support				
Price (\$)	395	395	695	495
Date of First Delivery	April 1987	January 1985	January 1989	November 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer	Vendor	Dealer; vendor	None identified
Comments	—	BootROM available for NEXOS OS.	MCA Arcnet NIC.	BootROMS available for NEXOS; NE2000 compatible ENIC.

Vendor	DSC Communications Corp.	DSC Communications Corp.	DTK Computer, Inc.	DTK Computer, Inc.
Product	NEXOS Ether-3500	NEXOS Turbonet/2	PCI-001	PCI-003
Characteristics				
LANs Supported	Ethernet	Ethernet	Arcnet	Ethernet
Microcomputer Bus Supported	AT (ISA); PC	MCA	AT (ISA)	AT (ISA)
Bus Size	8-bit	8-bit	8-bit	8-bit
Maximum Data Rate (bps)	10M	10M	2.5M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair	Standard Ethernet coaxial
Operating Systems Supported	NEXOS; NetWare; PC LAN Program	NEXOS; NetWare; PC LAN Program	NetWare	NetWare
Pricing/Support				
Price (\$)	250	695	99	225
Date of First Delivery	November 1988	None identified	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Vendor	Dealer	Dealer
Comments	BootROM available for NEXOS OS.	MCA Ethernet NIC.	—	—

Vendor	Earth Computer Technologies	Earth Computer Technologies	Earth Computer Technologies	Earth Computer Technologies
Product	Earthnet IIa/S	Earthnet IIe/R	Earthnet Ia/4	Earthnet Ia/S
Characteristics				
LANs Supported	Arcnet	Ethernet	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC
Bus Size	16-bit	16-bit	8-bit	8-bit
Maximum Data Rate (bps)	2.5M	10M	2.5M	2.5M
Media Supported	Broadband coaxial; RJ-62	Standard Ethernet coaxial; Thin Ethernet coaxial	Broadband coaxial; Unshielded twisted-pair; coax RG-62	Broadband coaxial; standard RJ-62
Operating Systems Supported	LANSmart; NetWare; PC LAN Program	LANSmart; NetWare; PC LAN Program	LANTastic; NetWare; Network OS; PowerLan	LANSmart
Pricing/Support				
Price (\$)	225	225	145	105
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Earth Computer Technologies	Earth Computer Technologies	Earth Computer Technologies	Earth Computer Technologies
Product	Earthnet IIe/8	Earthnet IIe/U	Earthnet MCA/S	Earthnet MCE/8
Characteristics				
LANs Supported	Ethernet	Ethernet	Arcnet	Ethernet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	MCA	MCA
Bus Size	8-bit	8-bit	16-bit	16-bit
Maximum Data Rate (bps)	10M	10M	2.5M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair	Broadband coaxial; RG-62	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	LANSmart; NetWare; PC LAN Program	LANSmart; NetWare; PC LAN Program	LANSmart; NetWare; PC LAN Program	LANSmart; NetWare; PC LAN Program
Pricing/Support				
Price (\$)	215	295	295	495
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	1 year on enclosure and power supply	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Edimax Computer Co.	Edimax Computer Co.	FiberCom, Inc.	Frontier Technologies Corp.
Product	AL Series	EN Series	WhisperLAN/PC	802.3/TP MCA Intelligent
Characteristics				
LANs Supported	Arcnet	Ethernet	Ethernet	10BASE-T; Ethernet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	PC	MCA
Bus Size Maximum Data Rate (bps)	16-bit; 8-bit 2.5M	16-bit; 8-bit 10M	8-bit 10M	16-bit 10M
Media Supported	Shielded twisted-pair; Thin Ethernet coaxial	Shielded twisted-pair; Thin Ethernet coaxial	Optical fiber	Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager	3+ /3+ Open; NetWare; OS/2 LAN Manager	NetWare	None identified
Pricing/Support				
Price (\$)	45, max. price is 75	99, max. price is 110	1,750, max. price is 1,900	895
Date of First Delivery	None identified	None identified	1989	April 1990
Standard Warranty	2 years	2 years	1 year	90 days
Service Supplied by	None identified	Vendor	Vendor	Vendor
Comments	—	—	TCP/IP support.	Also available in a standard (non-intelligent) version; priced at\$445.00.

Vendor	Frontier Technologies Corp.	Frontier Technologies Corp.	Gandalf Data, Inc.	Gateway Communications, Inc.
Product	802.3/TP-16 Intelligent (AT)	802.3/TP-8 Intelligent (XT)	LANLine/AT	G/EtherTwist AT
Characteristics				
LANs Supported	10BASE-T; Ethernet	10BASE-T; Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	PC	AT (ISA); PC	AT (ISA); EISA
Bus Size Maximum Data Rate (bps)	16-bit 10M	8-bit 10M	16-bit 10M	16-bit 10M
Media Supported	Unshielded twisted-pair	Unshielded twisted-pair	Unshielded twisted-pair	Unshielded twisted-pair
Operating Systems Supported	None identified	None identified	3+ /3+ Open; NetWare	3+ /3+ Open; NDIS; NetWare; OS/2 LAN Manager; VINES
Pricing/Support				
Price (\$)	895	695	419	445
Date of First Delivery	April 1990	April 1990	None identified	February 1990
Standard Warranty	90 days	90 days	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Dealer
Comments	Also available in a standard (non-intelligent) version, priced at\$395.00.	Also available in a standard (non-intelligent) version, priced at\$345.00.	Conforms fully to the current 10BASE-T standard.	Supports TCP/IP; 10BASE-T compatible.

Vendor	Gateway Communications, Inc.	Gateway Communications, Inc.	Gateway Communications, Inc.	Gateway Communications, Inc.
Product	G/EtherTwist MC	G/EtherTwist PC	G/Ethernet 16	G/Ethernet 16-bit AT Adapter
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	AT (ISA); PC	AT (ISA)	AT (ISA)
Bus Size	16-bit	8-bit	16-bit	16-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Unshielded twisted-pair	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	3+ /3+ Open; NDIS; NetWare; OS/2 LAN Manager; VINES	3+ /3+ Open; NDIS; NetWare; OS/2 LAN Manager; VINES	NDIS; NetWare	3+ /3+ Open; NDIS; NetWare; OS/2 LAN Manager; VINES
Pricing/Support				
Price (\$)	460	370	300	425
Date of First Delivery	June 1990	February 1990	April 1990	November 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer	Dealer	Dealer	Dealer
Comments	Supports TCP/IP; 10BASE-T compatible.	Supports TCP/IP; 10BASE-T compatible.	—	Supports TCP/IP.

Vendor	Gateway Communications, Inc.	Gateway Communications, Inc.	Gateway Communications, Inc.	Gateway Communications, Inc.
Product	G/Ethernet 16-bit MC Adapter	G/Ethernet 8	G/Ethernet 8-bit PC Adapter	G/Ethernet 8-bit WS Adapter
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC
Bus Size	16-bit	8-bit	8-bit	8-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Thin Ethernet coaxial
Operating Systems Supported	3+ /3+ Open; NDIS; NetWare; OS/2 LAN Manager; VINES	NDIS; NetWare	3+ /3+ Open; NDIS; NetWare; OS/2 LAN Manager; VINES	3+ /3+ Open; NDIS; NetWare; OS/2 LAN Manager; VINES
Pricing/Support				
Price (\$)	495	250	370	345
Date of First Delivery	April 1988	April 1990	September 1987	November 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer	Dealer	Dealer	Dealer
Comments	Supports TCP/IP.	—	Supports TCP/IP.	Supports TCP/IP.

Vendor	Gateway Communications, Inc.	Gateway Communications, Inc.	Gateway Communications, Inc.	Gateway Communications, Inc.
Product	G/Ethernet AT-WS Adapter	G/Ethernet MC-WS Adapter	G/Net Adapter	G/Net VS Adapter
Characteristics				
LANs Supported	Ethernet	Ethernet	Proprietary baseband, linear bus	Proprietary baseband, linear bus
Microcomputer Bus Supported	AT (ISA); PC	MCA	PC	AT (ISA); PC
Bus Size	16-bit	16-bit	8-bit	8-bit
Maximum Data Rate (bps)	10M	10M	1.43M	7.16M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	RG 62 coaxial; Standard Ethernet coaxial; Thin Ethernet coaxial	RG 62 coaxial; Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	3+ /3+ Open; NDIS; NetWare; OS/2 LAN Manager; VINES	3+ /3+ Open; NDIS; NetWare; OS/2 LAN Manager; VINES	NetWare; PC LAN Program	NetWare; PC LAN Program
Pricing/Support				
Price (\$)	425	475	395	595
Date of First Delivery	November 1988	November 1988	September 1983	March 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer	Dealer	Dealer	Dealer
Comments	Supports TCP/IP.	Supports TCP/IP.	—	—

Vendor	General Technology, Inc.	General Technology, Inc.	General Technology, Inc.	General Technology, Inc.
Product	GTTC16-16	GTTC16-4	GTTC8-4	GTTCMC-4
Characteristics				
LANs Supported	Token-Ring	Token-Ring	Token-Ring	Token-Ring
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	PC	MCA
Bus Size	16-bit	16-bit	8-bit	None identified
Maximum Data Rate (bps)	16M	4M	4M	4M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	NetWare; PC LAN Program	NetWare; PC LAN Program	NetWare; PC LAN Program	NetWare; PC LAN Program
Pricing/Support				
Price (\$)	845	499	399	499
Date of First Delivery	October 1990	March 1990	March 1990	March 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	LLC Option (802.2) included.	802.2 option for LLC-\$70.00 (required for PC LAN Program). PTMF-6Media Filter-\$37.00.	802.2 option for LLC-\$70.00 (required for PC LAN Program); PTMF-6Media Filter-\$37.00.	802.2 option for LLC-\$70.00 (required for PC LAN Program); PTMF-6Media Filter-\$37.00.

Vendor	h-three Systems	h-three Systems	h-three Systems	h-three Systems
Product	MacRing 030DS 16/4	MacRing NB	MacRing NB 16/4	MacRing SE
Characteristics LANs Supported	Token-Ring	Token-Ring	Token-Ring	Token-Ring
Microcomputer Bus Supported	Macintosh 030DS	NuBus	NuBus	SE
Bus Size Maximum Data Rate (bps)	16-bit 16M; 4M	32-bit 4M	32-bit 16M; 4M	16-bit 4M
Media Supported	Shielded twisted-pair; Un- shielded twisted-pair	Shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair
Operating Systems Supported	3+/3+Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+/3+Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+/3+Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	NetWare; VINES
Pricing/Support Price (\$)	995	895	995	795
Date of First Delivery Standard Warranty	January 1991 1 year	June 1990 1 year	January 1991 1 year	October 1989 1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	h-three Systems	Hayes Microcomputer Products, Inc.	Hayes Microcomputer Products, Inc.	Hayes Microcomputer Products, Inc.
Product	MacRing SE/30	EtherMate 8	EtherMate 8UTP	EtherMate Trio16
Characteristics LANs Supported	Token-Ring	Ethernet; NETBIOS	Ethernet	Ethernet
Microcomputer Bus Supported	Macintosh 030DS; SE/30	AT (ISA); EISA; PC	AT (ISA); EISA; PC	AT (ISA); EISA; PC
Bus Size Maximum Data Rate (bps)	16-bit 4M	8-bit 10M	8-bit 10M	16-bit 10M
Media Supported	Shielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Un- shielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	NetWare	3+/3+Open; NetWare; OS/2 LAN Manager; PC LAN Pro- gram	3+/3+Open; NetWare; OS/2 LAN Manager; PC LAN Pro- gram	3+/3+Open; Any NetBIOS; Net- Ware; OS/2 LAN Manager; PC LAN Program
Pricing/Support Price (\$)	895	249	329	349
Date of First Delivery Standard Warranty	June 1990 1 year	September 1990 4 years	November 1990 4 years	December 1990 4 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	Full compliance with IEEE 802.3; on board boot ROM socket to "install" optional boot ROMs for diskless workstation applications.	Full compliance with IEEE 802.3 10BASE 5 and 10BASE-T.	Services all media on a single board.

Vendor	Hewlett-Packard Co.	Hewlett-Packard Co.	Hewlett-Packard Co.	IMC Networks Corp.
Product	HP ThinLAN Adapter Card 27250A	StarLAN 10	ThinLAN	EtherNic (PC/AT)
Characteristics LANs Supported	Ethernet	Ethernet; Starlan 10	Ethernet; Starlan 10	Ethernet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); MCA	IBM PC/XT/AT; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	AT (ISA); PC
Bus Size Maximum Data Rate (bps)	16-bit 10M	16-bit 10M	16-bit 10M	8-bit 10M
Media Supported	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	3+ /3+ Open; HP Lan Manager; NDIS; NetWare	3+ /3+ Open; HP LAN Manager, HP OfficeShare; NetWare	3+ /3+ Open; HP LAN Manager, HP OfficeShare; NetWare	NetWare; TCP/IP
Pricing/Support Price (\$)	450	495	695	199
Date of First Delivery Standard Warranty	September 1987 1 year	May 1987 90 days	January 1986 90 days	July 1990 5 years
Service Supplied by	Dealer; vendor	Vendor	Vendor	Dealer; vendor
Comments	—	—	—	Mfr. suggested list price includes jumper-selectable remote boot PROM.

Vendor	IMC Networks Corp.	IMC Networks Corp.	IMC Networks Corp.	IMC Networks Corp.
Product	EtherNic (AT)	PCnic 8bit TP	PCnic TP	PCnic II
Characteristics LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA); PC	AT (ISA)	MCA
Bus Size Maximum Data Rate (bps)	16-bit 10M	8-bit 10M	16-bit 10M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare; TCP/IP	NetWare; PC-NFS; TCP/IP	NetWare; PC-NFS; TCP/IP	NetWare; PC-NFS; TCP/IP
Pricing/Support Price (\$)	249	275	325, max. price is 350	395, - 425.00
Date of First Delivery Standard Warranty	October 1990 5 years	May 1990 5 years	May 1990 5 years	June 1988 5 years
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Mfr. suggested list price includes jumper-selectable remote boot PROM.	—	—	All PCnic Family Ethernet LAN products for coaxial cabling support both "thick" and "thin" 50 Ohm coaxial cabling as well as optionally supporting non-standard 75 Ohm (PC/Net, G/Net) and 93 Ohm (Arcnet, IBM 3270) coaxial cabling.

Vendor	IMC Networks Corp.	IMC Networks Corp.	IMC Networks Corp.	IMC Networks Corp.
Product	PCnic II TP	PCnic FO	PCnic 8bit	PCnic II FO
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	AT (ISA)	AT (ISA); PC	AT (ISA)
Bus Size	16-bit	16-bit	8-bit	16-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Unshielded twisted-pair	Optical fiber	Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber
Operating Systems Supported	NetWare; PC-NFS; TCP/IP	NetWare; PC-NFS; TCP/IP	NetWare; PC-NFS; TCP/IP	NetWare; PC-NFS; TCP/IP
Pricing/Support				
Price (\$)	350, max. price is 375	675, max. price is 695	345	695, max. price is 725
Date of First Delivery	May 1990	November 1990	August 1988	January 1991
Standard Warranty	5 years	5 years	5 years	5 years
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	—	—	All PCnic Family Ethernet LAN products for coaxial cabling support both "thick" and "thin" 50 Ohm coaxial cabling as well as optionally supporting non-standard 75 Ohm (PC/Net, G/Net) and 93 Ohm (Arcnet, IBM 3270) coaxial cabling.	—
Vendor	IMC Networks Corp.	International Business Machines Corp. (IBM)	International Business Machines Corp. (IBM)	International Business Machines Corp. (IBM)
Product	PCnic	IBM Token Ring Network 16/4 Adapter	IBM Token Ring Network 16/4 Adapter/A	IBM Token Ring Network PC Adapter
Characteristics				
LANs Supported	Ethernet	Token-Ring	Token-Ring	Token-Ring
Microcomputer Bus Supported	AT (ISA)	AT (ISA); EISA; PC	MCA	AT (ISA); PC
Bus Size	16-bit	8-bit	16-bit	8-bit
Maximum Data Rate (bps)	10M	16M; 4M	16M; 4M	4M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	NetWare; PC-NFS; TCP/IP	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	395, - 425.00	921	921	669
Date of First Delivery	June 1988	November 1988	November 1988	November 1985
Standard Warranty	5 years	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	All PCnic Family Ethernet LAN products for coaxial cabling support both "thick" and "thin" 50 Ohm coaxial cabling as well as optionally supporting non-standard 75 Ohm (PC/Net, G/Net) and 93 Ohm (Arcnet, IBM 3270) coaxial cabling.	—	—	—

Vendor	International Business Machines Corp. (IBM)	International Communications Equipment	International Communications Equipment	International Communications Equipment
Product	IBM Token Ring Network PC Adapter/A	ICE-1+	ICE-3+	ICE-4+
Characteristics				
LANs Supported	Token-Ring	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	MCA	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size	16-bit	None identified	None identified	None identified
Maximum Data Rate (bps)	4M	2.5M	2.5M	2.5M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	RG-62 coaxial	Unshielded twisted-pair	Coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	NetWare; VINES	NetWare; VINES	NetWare
Pricing/Support				
Price (\$)	772	179	199	199
Date of First Delivery	October 1985	July 1988	January 1989	January 1989
Standard Warranty	1 year	5 years	5 years	5 years
Service Supplied by	Dealer; vendor	Vendor	Vendor	Vendor
Comments		—	—	—

Vendor	International Communications Equipment	International Communications Equipment	International Communications Equipment	Interphase Corp.
Product	ICE-5	ICE-IE	ICE-IIE	V/Ethernet 3207 Hawk
Characteristics				
LANs Supported	Arcnet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	VMEbus
Bus Size	None identified	None identified	None identified	32-bit
Maximum Data Rate (bps)	2.5M	10M	10M	10M
Media Supported	RG-62 coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial
Operating Systems Supported	NetWare	NetWare	NetWare	UNIX
Pricing/Support				
Price (\$)	395	295	495	1,595
Date of First Delivery	January 1989	July 1989	October 1989	April 1987
Standard Warranty	5 years	5 years	5 years	1 year
Service Supplied by	Vendor	Vendor	Vendor	Dealer; vendor
Comments	Arcnet & 5-port active Hub on one card.	—	—	—

Vendor	Interphase Corp.	Interphase Corp.	Interphase Corp.	Interphase Corp.
Product	V/Ethernet 4207 Eagle	V/FDDI 3211 Falcon	V/FDDI 4211 Peregrine	V/Token-Ring 4212 Owl
Characteristics				
LANs Supported	Ethernet	FDDI	FDDI	Token-Ring
Microcomputer Bus Supported	VMEbus	VMEbus	VMEbus	VMEbus
Bus Size	32-bit	32-bit	32-bit	32-bit
Maximum Data Rate (bps)	10M	100M	100M	16M
Media Supported	Standard Ethernet coaxial	Optical fiber	Optical fiber; Shielded twisted-pair	Shielded twisted-pair
Operating Systems Supported	UNIX	UNIX	UNIX	UNIX
Pricing/Support				
Price (\$)	3,595	9,000	8,995, max. price is 10,995	3,595
Date of First Delivery	October 1989	June 1988	June 1990	October 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	—	—	—	—

Vendor	Invisible Software, Inc.	Invisible Software, Inc.	Invisible Software, Inc.	Invisible Software, Inc.
Product	200	300	300/A	Ethernet
Characteristics				
LANs Supported	Proprietary	Proprietary	Ethernet	Ethernet
Microcomputer Bus Supported	PC	AT (ISA); PC	MCA	PC
Bus Size	8-bit	16-bit; 8-bit	16-bit; 32-bit	8-bit
Maximum Data Rate (bps)	1.8M	3M	10M	10M
Media Supported	Unshielded twisted-pair	Unshielded twisted-pair	Thin Ethernet coaxial	Thin Ethernet coaxial
Operating Systems Supported	NetWare	Net/30; NetWare	Net/30; NetWare	Net/30; NetWare
Pricing/Support				
Price (\$)	215	315	399	369
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Free technical support.	Free technical support.	Free technical support.	Free technical support.

Vendor	Invisible Software, Inc.	Invisible Software, Inc.	JC Information Systems	JC Information Systems
Product	Ethernet 16	Ethernet/A	1405-100	1405-200
Characteristics				
LANs Supported	Ethernet	Ethernet	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA)	MCA	AT (ISA)	AT (ISA)
Bus Size	16-bit	16-bit	8-bit	8-bit
Maximum Data Rate (bps)	10M	10M	2.5M	2.5M
Media Supported	Thin Ethernet coaxial	Thin Ethernet coaxial	Baseband coaxial; Unshielded twisted-pair	Baseband coaxial; Unshielded twisted-pair
Operating Systems Supported	Net/30; NetWare	Net/30; NetWare	CBIS Network O/S; NetWare	CBIS Network O/S; NetWare
Pricing/Support				
Price (\$)	369	469	65	75
Date of First Delivery	None identified	January 1990	February 1986	August 1986
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer	Dealer
Comments	Free technical support.	Free technical support.	Star bus twisted-pair (RJ11).	Star bus twisted-pair (RJ11).

Vendor	JC Information Systems	JC Information Systems	JC Information Systems	Kodiak Technology
Product	1405-300	1416-100	1417-100	Dual-Raven
Characteristics				
LANs Supported	Arcnet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size	8-bit	16-bit; 8-bit	16-bit; 8-bit	16-bit
Maximum Data Rate (bps)	2.5M	10M	10M	10M
Media Supported	Baseband coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	CBIS Network O/S; NetWare	CBIS Network O/S; NetWare	CBIS Network O/S; NetWare	NetWare
Pricing/Support				
Price (\$)	75	120, max. price is 150	120, max. price is 150	699
Date of First Delivery	February 1986	September 1989	September 1989	September 1990
Standard Warranty	1 year	1 year	1 year	5 years
Service Supplied by	Dealer	Dealer	Dealer	Vendor
Comments	Star bus twisted-pair (RJ11).	Uses NE1000 and NE2000 drivers.	Uses NE1000 and NE2000 drivers.	2-channel Ethernet card.

Vendor	Kodiak Technology	Kodiak Technology	Kodiak Technology	Kodiak Technology
Product	Quad-Raven	Raven-16	Raven-16 UTP	Raven-8
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	AT (ISA); PC
Bus Size	16-bit	16-bit	16-bit	8-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare
Pricing/Support				
Price (\$)	1,299	249	299	199
Date of First Delivery	July 1990	May 1990	September 1990	May 1990
Standard Warranty	5 years	5 years	5 years	5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Multichannel Ethernet card.	64KB on-board memory; CHKnet diagnostic Software supplied; available through Arrow Electronics.	64MB; CHKnet Diagnostic Software supplied.	64KB on-board memory; CHKnet diagnostic software supplied; available through Arrow Electronics.
Vendor	Kodiak Technology	Kodiak Technology	Lancer Research	Lancer Research
Product	Raven-8 UTP	Wild Card	Arc-8S/16S	Ether-8/16
Characteristics				
LANs Supported	Ethernet	Ethernet	Arcnet	Ethernet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA)	PC	PC
Bus Size	8-bit	16-bit	16-bit; 8-bit	16-bit; 8-bit
Maximum Data Rate (bps)	10M	10M	2.5M	10M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare
Pricing/Support				
Price (\$)	249	799	185, max. price is 495	185, max. price is 495
Date of First Delivery	September 1990	December 1990	None identified	None identified
Standard Warranty	5 years	5 years	1 year	1 year
Service Supplied by	Vendor	Vendor	Dealer; vendor	Dealer; vendor
Comments	64KB memory; CHKnet Diagnostic Software supplied.	Resides in PC; provides Ethernet connection to PC; inverts twisted-pair to coax & vice versa.	—	—

Vendor	Lanmaster	Lanmaster	Lanmaster	Lanmaster
Product	AMF 230	AMH 220	AMP 240	AMT 210
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	MCA	AT (ISA)
Bus Size	8-bit	8-bit	8-bit	8-bit
Maximum Data Rate (bps)	2.5M	2.5M	2.5M	2.5M
Media Supported	Optical fiber	Baseband coaxial	Baseband coaxial	Baseband coaxial
Operating Systems Supported	NetWare; Univation LifeNet, CBIS Network OS; VINES; ViaNet	NetWare; Univation LifeNet, CBIS Network OS; VINES; ViaNet	NetWare; Univation LifeNet, CBIS Network OS; VINES; ViaNet	NetWare; Univation LifeNet, CBIS Network OS; VINES; ViaNet
Pricing/Support				
Price (\$)	995	245	495	195
Date of First Delivery	September 1988	September 1987	September 1987	September 1987
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Dual mode; work with RX-NET drivers in the I/O mode and enhanced Lanmaster drivers in the memory mapped mode.	Dual mode; work with RX-NET drivers in the I/O mode and enhanced Lanmaster drivers in the memory mapped mode.	Dual mode; work with RX-NET drivers in the I/O mode and enhanced Lanmaster drivers in the memory mapped mode.	Dual mode; work with RX-NET drivers in the I/O mode and enhanced Lanmaster drivers in the memory mapped mode.

Vendor	Lanmaster	Lanmaster	Lanmaster	Lanmaster
Product	AMT 216	ETH - 210 WD	ETH - 216 WD	PS/2 Ethernet Card
Characteristics				
LANs Supported	Arcnet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	MCA
Bus Size	16-bit	8-bit	16-bit	8-bit
Maximum Data Rate (bps)	2.5M	10M	10M	10M
Media Supported	Baseband coaxial	Baseband coaxial	Baseband coaxial	Baseband coaxial
Operating Systems Supported	NetWare; Univation LifeNet, CBIS Network OS; VINES; ViaNet	3+/3+ Open; NetWare; VINES; Western Digital ViaNet; Sun NFS	3+/3+ Open; NetWare; VINES; Western Digital ViaNet; Sun NFS	3+/3+ Open; NFS; NetWare; VINES; ViaNet
Pricing/Support				
Price (\$)	295	299	399	515
Date of First Delivery	September 1987	September 1989	September 1989	September 1988
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Dual mode; work with RX-NET drivers in the I/O mode and enhanced Lanmaster drivers in the memory mapped mode.	Provide further connectivity by operating with universal protocols such as TCP/IP, which are separately available as a complete package.	Provide further connectivity by operating with universal protocols such as TCP/IP, which are separately available as a complete package.	—

Vendor	LANNET Data Communications, Inc.	LANNET Data Communications, Inc.	LANNET Data Communications, Inc.	LANNET Data Communications, Inc.
Product	LEC-25	LEC-35	LEC-45	LEC-45T
Characteristics LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC
Bus Size Maximum Data Rate (bps)	8-bit 10M	8-bit 10M	8-bit 10M	8-bit 10M
Media Supported	Optical fiber	Shielded twisted-pair; Standard Ethernet coaxial	Unshielded twisted-pair	Standard Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; DECNET; FTP PC/ TCP; NDIS; NFS; NetWare; OS/ 2 LAN Manager; PC LAN Program; PCSA; VINES	3+ /3+ Open; DECNET; FTP PC/ TCP; NDIS; NFS; NetWare; OS/ 2 LAN Manager; PC LAN Program; PCSA; VINES	3+ /3+ Open; DECNET; FTP PC/ TCP; NDIS; NFS; NetWare; OS/ 2 LAN Manager; PC LAN Program; PCSA; VINES	3+ /3+ Open; DECNET; NDIS; NFS; NetWare; OS/2 LAN Manager; PC LAN Program; PC/ TCP; PCSA; VINES
Pricing/Support Price (\$)	795	395	395	395
Date of First Delivery Standard Warranty	March 1990 1 year	May 1990 1 year	May 1990 1 year	August 1990 1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Uses synchronous signalling for Ethernet. Compatible with hubs from DEC, Zenith, Lannet, Fiberdata, Chipcom.	Uses synchronous Ethernet signalling.	Uses synchronous Ethernet signalling.	10BASE-T-compatible; includes polarity detection & correction.
Vendor	Lans Plus Canada, Inc.	Lans Plus Canada, Inc.	Lans Plus Canada, Inc.	Lans Plus Canada, Inc.
Product	EtherLAN/ 16-UTP EL516	EtherLAN/ 8-UTP EL408	EtherLAN/16 EL216	EtherLAN/8 EL108
Characteristics LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC
Bus Size Maximum Data Rate (bps)	16-bit 10M	8-bit 10M	16-bit 10M	8-bit 10M
Media Supported	Unshielded twisted-pair	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support Price (\$)	599	399	499	299
Date of First Delivery Standard Warranty	None identified Lifetime limited to original end user	None identified Lifetime limited to original end user	None identified Lifetime limited to original end user	None identified Lifetime limited to original end user
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Optional 64K buffer memory (EL564) and boot PROM socket; supportsTCP/IP; 10BASE-T compatible.	Optional 32K buffer memory (EL432) and boot PROM socket; supportsTCP/IP; 10BASE-T compatible.	Optional 64K buffer memory (EL264); and boot PROM socket; supports TCP/IP.	Optional 32K buffer memory (EL132) and boot PROM socket; supportsTCP/IP.

Vendor	Lans Plus Canada, Inc.	Lans Plus Canada, Inc.	Lans Plus Canada, Inc.	Lans Plus Canada, Inc.
Product	EtherLAN/MC EL316	EtherLAN/MCT EL616	EtherRAM/ 8 ER108	EtherRAM/ 8-UTP ER408
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	MCA	AT (ISA); PC	AT (ISA); PC
Bus Size	16-bit	16-bit	8-bit	8-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair	Standard Ethernet coaxial	Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	495	595	499	599
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	5 years	5 years	Lifetime limited to original end user	Lifetime limited to original end user
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Ethernet 10BASE5 and 10BASE2 Micro Channel version; supports TCP/IP.	Ethernet 10BASE-T Micro Channel version; supports TCP/IP.	Provides 256K of additional DOS RAM optimized for network use; supports TCP/IP.	Provides 256K of additional DOS RAM optimized for network use; supports TCP/IP; 10BASE-T compatible.
Vendor	Lantana Technology	Lantana Technology	Lantana Technology	Lantana Technology
Product	ASTER/1+	ASTER/2+	ASTER/3	CYPRESS/1-16
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Token-Ring
Microcomputer Bus Supported	PC	MCA	AT (ISA)	PC
Bus Size	8-bit	16-bit	16-bit	8-bit
Maximum Data Rate (bps)	2.5M	2.5M	2.5M	16M; 4M
Media Supported	Broadband coaxial; Shielded twisted-pair; Unshielded twisted-pair	Broadband coaxial; Shielded twisted-pair; Unshielded twisted-pair	Broadband coaxial; Shielded twisted-pair; Unshielded twisted-pair	IBM Type 1; Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	NetWare	NetWare	NetWare	3+ /3+ Open; NDIS, IEEE 802.2 option; NetWare; OS/2 LAN Manager; PCLAN Program
Pricing/Support				
Price (\$)	175	475	445	895
Date of First Delivery	November 1990	November 1990	March 1990	November 1990
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Lantana Technology	Lantana Technology	Lantana Technology	Lantana Technology
Product	CYPRESS/2-16	CYPRESS/2-4	CYPRESS/3-16	CYPRESS/3-4
Characteristics				
LANs Supported	Token-Ring	Token-Ring	Token-Ring	Token-Ring
Microcomputer Bus Supported	MCA	MCA	AT (ISA)	AT (ISA)
Bus Size	16-bit	16-bit	16-bit	16-bit
Maximum Data Rate (bps)	16M	4M	16M	4M
Media Supported	IBM Type 1; Shielded twisted-pair; Unshielded twisted-pair	IBM Type 1; Shielded twisted-pair; Unshielded twisted-pair	IBM Type 1; Shielded twisted-pair; Unshielded twisted-pair	IBM Type 1; Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NDIS; NetWare; OS/2 LAN Manager; PC LAN Program	3+ /3+ Open; NDIS, IEEE 802.2 option; NetWare; OS/2 LAN Manager; PCLAN Program	3+ /3+ Open; NDIS, IEEE 802.2 option; NetWare; OS/2 LAN Manager; PCLAN Program	3+ /3+ Open; NDIS, IEEE 802.2 option; NetWare; OS/2 LAN Manager; PCLAN Program
Pricing/Support				
Price (\$)	995	695	995	695
Date of First Delivery	November 1990	August 1988	November 1990	October 1990
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Lantana Technology	Lantana Technology	Lantana Technology	Longshine Technology
Product	TAMARIX/1	TAMARIX/2	TAMARIX/3	LCS-8634
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	PC	MCA	AT (ISA)	AT (ISA)
Bus Size	8-bit	16-bit	16-bit	16-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare; TCP/IP	NetWare; TCP/IP	NetWare; TCP/IP	NetWare; PC LAN Program
Pricing/Support				
Price (\$)	275	495	595	139
Date of First Delivery	August 1988	August 1988	November 1990	May 1989
Standard Warranty	2 years	2 years	2 years	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Longshine Technology	Longshine Technology	Longshine Technology	Longshine Technology
Product	LCS-8830CB	LCS-8830CS	LCS-8830H-C	LCS-8830H-T
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size	8-bit	8-bit	16-bit	8-bit
Maximum Data Rate (bps)	1M	1M	1M	1M
Media Supported	Baseband coaxial	Baseband coaxial	Baseband coaxial	Unshielded twisted-pair
Operating Systems Supported	NetWare; PC LAN Program	NetWare; PC LAN Program	NetWare; PC LAN Program	NetWare; PC LAN Program
Pricing/Support				
Price (\$)	61	58	148	176
Date of First Delivery	August 1989	August 1989	August 1989	August 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Arcnet card for bus configuration.	Arcnet card for star configuration.	Arcnet hub card with 4-port active hub and LAN adapter RG-62/U93 ohm coax cable.	Arcnet hub card with 4-port active hub and LAN adapter for unshielded twisted-pair network.
Vendor	Longshine Technology	Longshine Technology	Longshine Technology	Madge Networks, Inc.
Product	LCS-8830T	LCS-8834	LCS-8834/II	SMART 16/4 AT Ringnode
Characteristics				
LANs Supported	Arcnet	Ethernet	Ethernet	Token-Ring
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	MCA	AT (ISA); PC
Bus Size	8-bit	8-bit	8-bit	16-bit
Maximum Data Rate (bps)	1M	10M	10M	4M
Media Supported	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair
Operating Systems Supported	NetWare; PC LAN Program	NetWare; PC LAN Program	NetWare; PC LAN Program	3+ /3+ Open; NetWare; PC LAN Program; VINES
Pricing/Support				
Price (\$)	67	119	169	995
Date of First Delivery	August 1989	July 1988	November 1989	June 1990
Standard Warranty	1 year	1 year	1 year	5 years
Service Supplied by	Vendor	Vendor	Vendor	Dealer; vendor
Comments	Arcnet adapter card uses 105-ohm twisted-pair wire (unshielded).	—	—	Hardware/software switchable 4M/16M bps ring data rate; senses an 8- or 16-bit slot and automatically adjusts; includes diagnostic software, LAN support software, IPX/SPX protocols; 802.2 (LLC), NETBIOS, LAN Manager NDIS.

Vendor	Madge Networks, Inc.	Madge Networks, Inc.	Madge Networks, Inc.	Madge Networks, Inc.
Product	SMART 16/4 EISA Ringnode	SMART 16/4 MC Ringnode	SMART AT Ringnode	SMART ISA Ringnode
Characteristics LANs Supported	Token-Ring	Token-Ring	Token-Ring	Token-Ring
Microcomputer Bus Supported	EISA	MCA	AT (ISA); PC	AT (ISA); PC
Bus Size Maximum Data Rate (bps)	32-bit 4M	32-bit 16M; 4M	16-bit 4M	8-bit 4M
Media Supported	Shielded twisted-pair	Shielded twisted-pair	Shielded twisted-pair	Shielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; PC LAN Program; VINES	3+ /3+ Open; NetWare; PC LAN Program; VINES	3+ /3+ Open; NetWare; PC LAN Program; VINES	3+ /3+ Open; NetWare; PC LAN Program; VINES
Pricing/Support Price (\$)	1,495	995	750	550
Date of First Delivery Standard Warranty	July 1990 5 years	September 1990 5 years	April 1989 5 years	April 1989 5 years
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Hardware/software switchable 4M/16M bps ring data rate; includes diagnostic software, LAN support software, IPX/SPX protocols, 802.2 (LLC), NETBIOS, LAN Manager NDIS drivers, and NetWare drivers.	Hardware/software switchable 4M/16M bps ring data rate; senses an 8- or 16-bit slot and automatically adjusts; includes diagnostic software, LAN support software, IPX/SPX protocols, 802.2 (LLC), NETBIOS; LAN Manager NDIS.	128K onboard RAM allows for downloading of network driver software, thereby using as little as 3K of DOS memory; includes diagnostic software, LAN support software, IPX/SPX protocols, 802.2 (LLC), NETBIOS Manager NDIS.	128K onboard RAM allows for downloading of network driver software, thereby using as little as 3K of DOS memory. Includes diagnostic software, LAN support software, IPX/SPX protocols, 802.2 (LLC), NETBIOS Manager NDIS.
Vendor	Madge Networks, Inc.	MNC International	MNC International	MNC International
Product	SMART MC Ringnode	QC-9219	QC-9220	QC-9230
Characteristics LANs Supported	FDDI; Token-Ring	Arcnet	Arcnet; Token-Ring	Arcnet
Microcomputer Bus Supported	MCA	MCA	LTX-NEC; PC	LTX-NEC
Bus Size Maximum Data Rate (bps)	16-bit 4M	16-bit 2.5M	8-bit 16M; 2.5M	16-bit 2.5M
Media Supported	Shielded twisted-pair	Optical fiber; Standard Arcnet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Arcnet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Unshielded twisted-pair; coaxial
Operating Systems Supported	3+ /3+ Open; NetWare; PC LAN Program; VINES	NetWare; OS/2 LAN Server; VINES	NetWare; OS/2 LAN Server; VINES	NetWare; VINES
Pricing/Support Price (\$)	750	250, max. price is 400	95	250
Date of First Delivery Standard Warranty	November 1988 5 years	1986 1 year on enclosure and power supply Vendor	1987 1 year	1989 1 year
Service Supplied by	Dealer; vendor	Vendor	Vendor	Vendor
Comments	128K onboard RAM allows for downloading of network driver software, thereby using as little as 3K of DOS memory; includes diagnostic software, LAN support software, IPX/SPX protocols, 802.2 (LLC), NETBIOS Manager NDIS.	—	—	—

Vendor	MNC International	Moses Computers	Motorola Computer Systems	Multi-Tech Systems, Inc.
Product	QC-9241	ChosenLAN PL200S	MNME-374	AN301CX/16
Characteristics				
LANs Supported	Arcnet	ChosenLAN	Ethernet	Arcnet
Microcomputer Bus Supported	AT (ISA)	AT (ISA); PC	VME	AT (ISA)
Bus Size	16-bit	None identified	32-bit	16-bit
Maximum Data Rate (bps)	2.5M	3.58M	10M	2.5M
Media Supported	Optical fiber; Standard Arcnet coaxial; Unshielded twisted-pair	Unshielded twisted-pair	Broadband coaxial; Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Broadband coaxial
Operating Systems Supported		ChosenLAN	SMB server for UNIX	NetWare
	110			
	1989			
	1 year			
Pricing/Support				
Price (\$)	Vendor	179	1,995	299
Date of First Delivery	—	1990	October 1989	None identified
Standard Warranty		1 year	1 year	2 years
Service Supplied by		Vendor	Vendor	None identified
Comments		—	Used only in server configuration.	—

Vendor	Multi-Tech Systems, Inc.	Multi-Tech Systems, Inc.	Multi-Tech Systems, Inc.	Multi-Tech Systems, Inc.
Product	AN301CX/8/AN302CXB/8	AN301CX/PS	AN301CXB/PS	AN301TP/16
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA); PC	MCA	MCA	AT (ISA)
Bus Size	8-bit	8-bit	8-bit	16-bit
Maximum Data Rate (bps)	2.5M	2.5M	2.5M	2.5M
Media Supported	Broadband coaxial	Broadband coaxial	Broadband coaxial	Unshielded twisted-pair
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare
Pricing/Support				
Price (\$)	189	489	499	299
Date of First Delivery	None identified	January 1990	March 1990	1990
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	Bus topology.	—

Vendor	Multi-Tech Systems, Inc.	Multi-Tech Systems, Inc.	Multi-Tech Systems, Inc.	Multi-Tech Systems, Inc.
Product	AN301TP/8	EN301CA/16	EN301CA/8	EN301CA/PS
Characteristics				
LANs Supported	Arcnet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA)	AT (ISA); PC	MCA
Bus Size	8-bit	16-bit	8-bit	16-bit
Maximum Data Rate (bps)	2.5M	10M	10M	10M
Media Supported	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare
Pricing/Support				
Price (\$)	189	349	329	489
Date of First Delivery	1990	None identified	None identified	None identified
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Multi-Tech Systems, Inc.	Multi-Tech Systems, Inc.	Multi-Tech Systems, Inc.	Mylex Corp.
Product	EN301TP/16	EN301TP/BR	EN301TP/PS	LN1390
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA); PC	MCA	AT (ISA)
Bus Size	16-bit	8-bit	16-bit	None identified
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Unshielded twisted-pair	Unshielded twisted-pair	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare
Pricing/Support				
Price (\$)	349	329	489	390
Date of First Delivery	None identified	None identified	March 1990	January 1990
Standard Warranty	2 years	2 years	2 years	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Mylex Corp.	National Semiconductor	National Semiconductor	National Semiconductor
Product	LNE390	EtherNODE 16 NB	EtherNODE 16 SE	EtherNODE 32 SE/30
Characteristics				
LANs Supported	Ethernet	EtherTalk; Ethernet	EtherTalk; Ethernet	EtherTalk; Ethernet
Microcomputer Bus Supported	EISA	NuBus	SE	SE/30
Bus Size	None identified	16-bit	16-bit	32-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare
Pricing/Support				
Price (\$)	500	495	445	595
Date of First Delivery	January 1990	October 1990	December 1990	October 1990
Standard Warranty	1 year	5 years	5 years	5 years
Service Supplied by	Vendor	Dealer; vendor	Vendor	Vendor
Comments	—	16-bit Ethernet adapter for NUBUs; thick & thin Ethernet coaxial support; includes user diagnostic software; auto-sensing feature (automatically senses type of cabling & configures board accordingly).	16-bit Ethernet adapter for slot of Macintosh SE; includes user diagnostic software, thick & thin Ethernet coaxial support.	32-bit Ethernet adapter for the PDS slot of the Macintosh SE/30; thick & thin Ethernet coaxial support; includes user diagnostic software; includes new SONIC Ethernet chip.
Vendor	National Semiconductor	National Semiconductor	National Semiconductor	National Semiconductor
Product	EtherNODE TPA	EtherNODE*08PC	EtherNODE*16AT	EtherNODE*16AT-T
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); EISA; MCA; NuBus; PC; SE; SE/30	PC	AT (ISA); PC	AT (ISA); PC
Bus Size	16-bit; 32-bit; 8-bit	8-bit	16-bit; 8-bit	16-bit; 8-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	Software independent	NetWare	3+ /3+ Open; FTP PC/TCP; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; FTP PC/TCP; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	149	295	345	395
Date of First Delivery	January 1991	December 1990	June 1990	December 1990
Standard Warranty	5 years	5 years	5 years	5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	External device; converts existing thick Ethernet coaxial connectors to unshielded twisted pair connectors; plugs directly to AUI connector or via cable; incl. LED indicators for power & link test; external switches disable SQE test.	Y2 size for laptops; NE1000 compatible; surface mount PCB; user diagnostics included; Boot ROM socket.	Three-quarter length card; surface mount PCB; self-configurable 8- or 16-bit; NE2000 compatible; user diagnostics included; boot ROM socket.	Three-quarter length card; surface mount PCB; self-configurable for 8- or 16-bit slots; NE2000 compatible; software configuration; option for Check-Point upgrade; boot ROM socket.

Vendor	National Semiconductor	Netronix	Network Interface Corp.	Network Interface Corp.
Product	EtherNODE*16ATX	PNA 101/102	10330	10336
Characteristics LANs Supported	Ethernet	Broadband	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC
Bus Size Maximum Data Rate (bps)	16-bit; 8-bit 10M	8-bit 2M	8-bit 10M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Broadband coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	3+/3+ Open; FTP PC/TCP; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	NetWare; PC LAN Program	NetWare; PC LAN Program	NetWare; PC LAN Program
Pricing/Support Price (\$)	375	595	295	495
Date of First Delivery Standard Warranty	December 1990 5 years	June 1987 1 year	December 1990 2 years	December 1990 2 years
Service Supplied by	Vendor	Vendor	Dealer; vendor	Dealer; vendor
Comments	Three-quarter length card; surface mount PCB; self-configurable for 8- or 16-bit slots; NE2000 compatible; software configuration; option for CheckPoint upgrade; boot ROM socket.	Frequency agile broadband adapter.	—	—
Vendor	Network Interface Corp.	Network Interface Corp.	Network Interface Corp.	Network Interface Corp.
Product	10350	10356	PcARC	PcARC - AT
Characteristics LANs Supported	Ethernet	Ethernet	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC
Bus Size Maximum Data Rate (bps)	8-bit 10M	16-bit 10M	8-bit 2.5M	16-bit 2.5M
Media Supported	Unshielded twisted-pair	Unshielded twisted-pair	Broadband coaxial; Thin Ethernet coaxial	Broadband coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare; PC LAN Program	NetWare; PC LAN Program	NetWare; PC LAN Program; VINES	NetWare; VINES
Pricing/Support Price (\$)	395	595	250	525
Date of First Delivery Standard Warranty	December 1990 2 years	December 1990 2 years	1984 2 years	1990 2 years
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	—	—	—	Internal active hub connector.

Vendor	Network Interface Corp.	Network Interface Corp.	Network Interface Corp.	Network Interface Corp.
Product	PcARC - AT/20	PcARC - AT/50	PcARC - AT/F2	PcARC/20
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC
Bus Size	16-bit	16-bit	16-bit	8-bit
Maximum Data Rate (bps)	2.5M	2.5M	2.5M	None identified
Media Supported	Broadband coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Unshielded twisted-pair	Optical fiber	Broadband coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare; VINES	NetWare; VINES	NetWare; VINES	NetWare; VINES
Pricing/Support				
Price (\$)	See comments	575	See comments	295
Date of First Delivery	None identified	1990	1990	1984
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Internal active hub connector; contact vendor for pricing information.	—	Internal active hub connector; contact vendor for pricing information.	—

Vendor	Network Interface Corp.	Network Interface Corp.	NetWorth, Inc.	NetWorth, Inc.
Product	PcARC/50	PcARC/F2	EtherNext 16-Bit NIC	EtherNext 8-bit NIC
Characteristics				
LANs Supported	Arcnet	Arcnet	Ethernet; Starlan	Ethernet; Starlan
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC
Bus Size	8-bit	8-bit	16-bit	8-bit
Maximum Data Rate (bps)	2.5M	2.5M	10M	10M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Optical fiber	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	NetWare; VINES	NetWare; VINES	NetWare; OS/2 LAN Manager	NetWare; OS/2 LAN Manager
Pricing/Support				
Price (\$)	295	1,495	399	349
Date of First Delivery	1984	None identified	June 1989	June 1989
Standard Warranty	2 years	2 years	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer	Dealer
Comments	—	—	EtherNext is a 10BASE-T LAN.	EtherNext is a 10BASE-T LAN.

Vendor	NetWorth, Inc.	NetWorth, Inc.	Novell, Inc.	Novell, Inc.
Product	EtherNext Micro Channel	EtherNext for Macintosh II	EtherPort SE/30L	EtherPort SE/30
Characteristics LANs Supported	Ethernet; Starlan	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	NuBus	SE/30	SE/30
Bus Size Maximum Data Rate (bps)	16-bit 10M	32-bit 10M	None identified 10M	None identified 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare; OS/2 LAN Manager	EtherTalk/AppleTalk; NetWare	3+ /3+ Open; AppleTalk, TCP/IP, DECnet; NetWare; PC LAN Program; TOPS; Tapestry; VINES	3+ /3+ Open; AppleTalk, TCP/IP, DECnet; NetWare; PC LAN Program; TOPS; Tapestry; VINES
Pricing/Support Price (\$)	449	449	645	595
Date of First Delivery Standard Warranty	November 1989 1 year	March 1990 1 year	1988 1 year	1988 1 year
Service Supplied by	Dealer	Dealer	Dealer; third party; vendor	Dealer; third party; vendor
Comments	EtherNext is a 10BASE-T LAN.	EtherNext is a 10BASE-T LAN.	—	—

Vendor	Novell, Inc.	Novell, Inc.	Novell, Inc.	Novell, Inc.
Product	EtherPort III	EtherPort II	EtherPort SEL	EtherPort SE
Characteristics LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	NuBus	NuBus	NuBus	SE
Bus Size Maximum Data Rate (bps)	None identified 10M	None identified 10M	None identified 10M	None identified 10M
Media Supported	Shielded twisted-pair; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	3+ /3+ Open; AppleTalk, TCP/IP, DECnet; NetWare; PC LAN Program; TOPS; Tapestry; VINES	3+ /3+ Open; AppleTalk, TCP/IP, DECnet; NetWare; PC LAN Program; TOPS; Tapestry; VINES	3+ /3+ Open; AppleTalk, TCP/IP, DECnet; NetWare; PC LAN Program; TOPS; Tapestry; VINES	3+ /3+ Open; AppleTalk, TCP/IP, DECnet; NetWare; PC LAN Program; TOPS; Tapestry; VINES
Pricing/Support Price (\$)	645	595	645	595
Date of First Delivery Standard Warranty	1988 1 year	1987 1 year	1988 1 year	1987 1 year
Service Supplied by	Dealer; third party; vendor			
Comments	—	—	—	—

Vendor	Novell, Inc.	Novell, Inc.	Novell, Inc.	Novell, Inc.
Product	NE/2	NE/2-32	NE1000	NE2000
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	MCA	AT (ISA)	AT (ISA)
Bus Size Maximum Data Rate (bps)	16-bit 10M	32-bit 10M	8-bit 10M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial			
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare
Pricing/Support				
Price (\$)	495	995	395	495
Date of First Delivery Standard Warranty	March 1990 3 years	December 1989 3 years	March 1990 3 years	March 1990 3 years
Service Supplied by	Third party	Third party	Third party	Third party
Comments	—	—	—	—

Vendor	Novell, Inc.	NTI Group, Inc.	NTI Group, Inc.	NTI Group, Inc.
Product	NE3200	NTI 1001/DP	NTI 1001/DP-T	NTI 1002/DP-16
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	EISA	PC	PC	AT (ISA)
Bus Size Maximum Data Rate (bps)	32-bit 10M	8-bit 10M	8-bit 10M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Un- shielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare	NetWare; PC LAN Program; TCP/IP; Tapestry	NetWare; PC LAN Program; TCP/IP; Tapestry	NetWare; PC LAN Program; TCP/IP; Tapestry
Pricing/Support				
Price (\$)	1,295	400	400	400
Date of First Delivery Standard Warranty	April 1990 3 years	1988 90 days	1989 90 days	1989 90 days
Service Supplied by	Third party	Vendor	Vendor	Vendor
Comments	32-bit EISA Bus Master inter- face.	Ethernet co-processor; 32K data buffer.	IEEE 802.3 10BASE-T compati- ble.	16-bit co-processor for 16-bit data transfers; 32K buffer RAM.

Vendor	NTI Group, Inc.	NTI Group, Inc.	Olicom USA	Olicom USA
Product	NTI 1002/DP-16T	NTI 1002/DP-FO	OC-3112 Token-Ring Network PC/AT Adapter	OC-3114 ISA 16/4 Adapter
Characteristics LANs Supported	Ethernet	Ethernet	Token-Ring	Token-Ring
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	MCA
Bus Size Maximum Data Rate (bps)	16-bit 10M	16-bit 10M	16-bit 4M	16-bit; 8-bit 16M; 4M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Optical fiber	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	NetWare; PC LAN Program; TCP/IP; Tapestry	NetWare; TCP/IP; Tapestry	3+/3+ Open; NetWare; OS/2 LAN Manager; PC LAN Program	3+/3+ Open; NetWare; OS/2 LAN Manager; PC LAN Program
Pricing/Support Price (\$)	400	550	645	895
Date of First Delivery Standard Warranty	1989 90 days	1990 90 days	April 1990 1 year	April 1990 1 year
Service Supplied by	Vendor	Vendor	Dealer	Dealer
Comments	16-bit Ethernet co-processor featuring 16-bit data transfers, 32Kbytes of RAM, & IEEE 802.3 10BASE-T compatibility.	16-bit Ethernet co-processor; 16-bit data transfers; 32K buffer RAM; fiber optics output.	Fully IBM Token-Ring Network compatible and meets the IEEE 802.5 standard requirements; can be mixed freely with IBM adapters on a Token-Ring network; the Olicom adapters transfer data at 460K/sec. versus 360K/sec. with IBM adapters.	IEEE standards 802.5 & 802.2; on-board 128K of memory; supports over 260 nodes & has a data transfer speed of 1845K versus IBM at 685K; mix freely with IBM adapters.
Vendor	Olicom USA	Olicom USA	Olicom USA	Olicom USA
Product	OC-3120 Token-Ring Network PC/XT Adapter	OC-3126 Token-Ring Network PC/MC Adapter	OC-3128 MC 16/4 Adapter	OC-3132 EISA 16/4 Adapter
Characteristics LANs Supported	Token-Ring	Token-Ring	Token-Ring	Token-Ring
Microcomputer Bus Supported	PC	MCA	MCA	EISA
Bus Size Maximum Data Rate (bps)	8-bit 4M	16-bit 4M	16-bit 16M; 4M	16-bit 16M; 4M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	3+/3+ Open; NetWare; OS/2 LAN Manager; PC LAN Program	3+/3+ Open; NetWare; OS/2 LAN Manager; PC LAN Program	3+/3+ Open; NetWare	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program
Pricing/Support Price (\$)	645	925	925	950
Date of First Delivery Standard Warranty	April 1990 1 year	April 1990 1 year	April 1990 1 year	April 1990 1 year
Service Supplied by	Dealer	Dealer	Dealer	Dealer
Comments	Fully IBM Token-Ring Network compatible & meets the IEEE 802.5 standard requirements; can be mixed freely with IBM adapters in a Token-Ring Network. Olicom Adapters transfer data at 460K/sec. versus IBM at 360K/sec.	Fully IBM Token-Ring Network compatible & meets the IEEE 802.5 standard requirements; can be mixed freely with IBM adapters. Has been designed as bus master delivering 460K/sec. versus 340K/sec. for IBM adapters.	IEEE standards 802.5 & 802.2; on-board memory of 128K; mix freely with IBM Adapters; data transfer rate of 1845K versus 685K for IBM; supports over 260 nodes.	IEEE standards 802.5 & 802.2; on board 128K of memory; mix freely with IBM Adapters; data transfer at 1845K versus IBM at 685K; over 260 nodes.

Vendor	Optical Data Systems, Inc.			
Product	ODS 272	ODS 273	ODS 472	ODS 872-EISA
Characteristics				
LANs Supported	Ethernet	Ethernet	10BASE-T; Ethernet	Token-Ring
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC	EISA
Bus Size	8-bit	8-bit	8-bit	32-bit
Maximum Data Rate (bps)	10M	10M	10M	16M
Media Supported	Standard Ethernet coaxial; Unshielded twisted-pair	Optical fiber	Standard Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	495	1,095	425	940
Date of First Delivery	January 1990	January 1990	None identified	October 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Optical Data Systems, Inc.	Optical Data Systems, Inc.	Optical Data Systems, Inc.	Performance Technology
Product	ODS 872-ISA	ODS 872-MC	ODS 873-ISA, MC, EISA	RIM 1A
Characteristics				
LANs Supported	Token-Ring	Token-Ring	Token-Ring	Arcnet; Ethernet
Microcomputer Bus Supported	AT (ISA); PC	MCA	AT (ISA); EISA; MCA; PC	AT
Bus Size	16-bit; 8-bit	16-bit	16-bit; 32-bit; 8-bit	16-bit; 8-bit
Maximum Data Rate (bps)	16M	16M	16M	2.5M
Media Supported	Shielded twisted-pair	Shielded twisted-pair	Optical fiber	Shielded twisted-pair; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	10Net; 3+ /3+ Open; NetWare; PC LAN Program; PowerLan; VINES
Pricing/Support				
Price (\$)	849	895	1,195	169, max. price is 595
Date of First Delivery	October 1990	October 1990	October 1990	1987
Standard Warranty	1 year	1 year	1 year	90 days
Service Supplied by	Vendor	Vendor	Vendor	None identified
Comments	—	—	—	—

Vendor	Performance Technology	Performance Technology	Performance Technology	Performance Technology
Product	RIM II	RIM III	WD8003	WD8013
Characteristics				
LANs Supported	Arcnet; Ethernet	Arcnet; Ethernet	Arcnet; Ethernet	Arcnet; Ethernet
Microcomputer Bus Supported	AT	AT	AT	AT
Bus Size Maximum Data Rate (bps)	16-bit; 8-bit 2.5M	16-bit; 8-bit 2.5M	16-bit; 8-bit 2.5M	16-bit; 8-bit 2.5M
Media Supported	Shielded twisted-pair; Thin Ethernet coaxial; Unshielded twisted-pair			
Operating Systems Supported	10Net; 3+/3+ Open; NetWare; PC LAN Program; PowerLan; VINES			
Pricing/Support				
Price (\$)	169, max. price is 595			
Date of First Delivery	1987	1987	1987	1987
Standard Warranty	90 days	90 days	90 days	90 days
Service Supplied by	None identified	None identified	None identified	None identified
Comments	—	—	—	—

Vendor	Plexcom, Inc.	Plexcom, Inc.	Proteon, Inc.	Proteon, Inc.
Product	8082-16	8082-8	ProNET 4/16 p1390	ProNET 4/16 p1890
Characteristics				
LANs Supported	Ethernet	Ethernet	Token-Ring	Token-Ring
Microcomputer Bus Supported	AT (ISA)	PC	AT (ISA); PC	MCA
Bus Size Maximum Data Rate (bps)	16-bit 10M	8-bit 10M	16-bit 16M; 4M	16-bit 16M; 4M
Media Supported	Standard Ethernet coaxial; Un- shielded twisted-pair	Standard Ethernet coaxial; Un- shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair; requires external UTP media filter
Operating Systems Supported	NetWare; VINES	NetWare; VINES	NetWare; OS/2 LAN Manager; VINES	IBM Networking Software; Net- Ware; OS/2 LAN Manager; VINES
Pricing/Support				
Price (\$)	499	349	895	850
Date of First Delivery	May 1990	January 1990	February 1990	October 1990
Standard Warranty	90 days	90 days	1 year	Lifetime
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Supports XNS, DECnet, TCP/ IP.	Supports XNS, DECnet, TCP/ IP	Bus Master technology maxi- mizes the network's data trans- fer capability, preventing RAM Cram or CPU utilization drain.	Features Proteon's bus master implementing for exceptional data transfer capability.

Vendor	Proteon, Inc.	Proteon, Inc.	Proteon, Inc.	Proteon, Inc.
Product	ProNET 4/16 p1990	ProNET4 p1342	ProNET4 p1346 BusMaster	ProNET4 p1347 BusMaster
Characteristics				
LANs Supported	Token-Ring	Token-Ring	Token-Ring	Token-Ring
Microcomputer Bus Supported	EISA	AT (ISA); PC	AT (ISA)	AT (ISA)
Bus Size	32-bit	8-bit	16-bit	16-bit
Maximum Data Rate (bps)	16M; 4M	4M	4M	4M
Media Supported	Shielded twisted-pair; Un-shielded twisted-pair; on-board UTP media filter	Shielded twisted-pair; Un-shielded twisted-pair	Shielded twisted-pair; Un-shielded twisted-pair	Standard Ethernet coaxial; Un-shielded twisted-pair
Operating Systems Supported	IBM Networking Software; NetWare; OS/2 LAN Manager; VINES	NetWare; OS/2 LAN Manager	FTP PC/TCP; IBM Networking Software; NetWare; OS/2 LAN Manager; VINES	FTP PC/TCP; IBM Networking Software; NetWare; OS/2 LAN Manager; VINES
Pricing/Support				
Price (\$)	1,195	495	550	650
Date of First Delivery	February 1990	May 1986	July 1989	July 1989
Standard Warranty	Lifetime	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	None identified
Comments	On-board UTP media filter.	Features on-board UTP media filter for UTP lobe connections; workstation NIC.	Features on-board UTP media filter and is upgradable to accommodate file server network connections; workstation NIC.	On-board UTP media filter; file server NIC.

Vendor	Proteon, Inc.	PureData Ltd.	PureData Ltd.	PureData Ltd.
Product	ProNET4 p1840 BusMaster	PDI507	PDI508Plus	PDI508Plus-F
Characteristics				
LANs Supported	Token-Ring	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	MCA	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC
Bus Size	16-bit	16-bit	8-bit	8-bit
Maximum Data Rate (bps)	4M	2.5M	2.5M	2.5M
Media Supported	Shielded twisted-pair; Un-shielded twisted-pair	Broadband coaxial; Shielded twisted-pair; Unshielded twisted-pair	Broadband coaxial	Optical fiber
Operating Systems Supported	FTP PC/TCP; IBM Networking Software; NetWare; OS/2 LAN Manager; VINES	3+ /3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	750	199	265	595
Date of First Delivery	May 1988	June 1989	March 1988	March 1988
Standard Warranty	1 year	5 years	5 years	5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Features Proteon bus master implementation for data transfer capabilities in MicroChannel bus architecture; external UTP media filter is required for UTP lobe connections.	Arcnet interface card with coax and UTP options in bus or star wiring, for a 4-in-1 solution; LEDs monitor system and network activity.	Software-configurable Arcnet workstation card; LEDs monitor network and system activity.	Software configurable Arcnet workstation card; LEDs monitor network and system activity.

Vendor	PureData Ltd.	PureData Ltd.	PureData Ltd.	PureData Ltd.
Product	PDI508Plus-T	PDI516Plus	PDI516Plus-F	PDI516Plus-T
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size Maximum Data Rate (bps)	8-bit 2.5M	16-bit 2.5M	16-bit 2.5M	16-bit 2.5M
Media Supported	Unshielded twisted-pair	Baseband coaxial	Optical fiber	Unshielded twisted-pair
Operating Systems Supported	3+/3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+/3+ Open; CBIS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	NetWare; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; PC-NFS; VINES
Pricing/Support				
Price (\$)	450	450	995	450
Date of First Delivery	March 1989	March 1989	March 1989	June 1988
Standard Warranty	5 years	5 years	5 years	5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Software configurable Arcnet workstation card; LEDs monitor network and system activity.	Software configurable Arcnet fileserver and workstation card; LEDs monitor network and system activity.	Software configurable Arcnet fileserver and workstation card with auto-configurable drives; LEDs monitor system and network activity.	High-performance, software configurable Arcnet file server and workstation card; LEDs monitor network and system activity.
Vendor	PureData Ltd.	PureData Ltd.	PureData Ltd.	PureData Ltd.
Product	PDI8023	PDI8023-16	PDI8023-16T	PDI8023-16T1
Characteristics				
LANs Supported	10BASE-T; Ethernet	10BASE-T; Ethernet	10BASE-T; Ethernet	10BASE-T; Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA); EISA	AT (ISA); EISA	AT (ISA); EISA
Bus Size Maximum Data Rate (bps)	8-bit 10M	16-bit 10M	16-bit 10M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	None identified
Operating Systems Supported	3+/3+ Open; NDIS; NETBIOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+/3+ Open; Any NetBIOS; NDIS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; TCP/IP; VINES	3+/3+ Open; Any NetBIOS; NDIS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; TCP/IP; VINES	3+/3+ Open; NDIS; NETBIOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; TCP/IP; VINES
Pricing/Support				
Price (\$)	295	375	495	395
Date of First Delivery	October 1989	October 1989	June 1990	None identified
Standard Warranty	5 years	5 years	5 years	5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Software-configurable Ethernet workstation card with auto-configurable drivers; supports all three wiring types with optional 10BASE-T module.	Software configurable Ethernet fileserver and workstation card with auto-configuring drivers; supports all three wiring types with optional 10BASE-T module.	Software configurable Ethernet fileserver workstation card with auto-configuring drivers; supports all three wiring types and 10BASE-T.	Software configurable Ethernet fileserver and workstation card with auto-configuring drivers; supports 10BASE-T wiring.

Vendor	PureData Ltd.	PureData Ltd.	PureData Ltd.	PureData Ltd.
Product	PDI8023-T	PDI8023-T1	PDI8025	PDI8025-16-4/16
Characteristics				
LANs Supported	10BASE-T; Ethernet	10BASE-T; Ethernet	Token-Ring	Token-Ring
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	AT (ISA)	AT (ISA)
Bus Size Maximum Data Rate (bps)	8-bit 10M	8-bit 10M	16-bit 4M	16-bit 16M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Unshielded twisted-pair	IBM Type 1,2,3,9	IBM Type 1,2,3,9
Operating Systems Supported	3+/3+ Open; Any NetBIOS; CBIS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; TCP/IP; VINES	3+/3+ Open; Any NetBIOS; NDIS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; TCP/IP; VINES	NetWare; PC LAN Program; VINES	NetWare; PC LAN Program; VINES
Pricing/Support				
Price (\$)	395	345	695	See comments
Date of First Delivery Standard Warranty	June 1990 5 years	None identified 5 years	March 1989 5 years	December 1990 5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Software configurable Ethernet workstation card with auto-configuring drivers; supports all three wiring types and 10BASE-T.	Software configurable Ethernet workstation card with auto-configuring drivers; supports 10BASE-T wiring.	Token-ring bus master adapter for AT and 386 file servers and workstation; LEDs monitor network and system activity; monitoring facility assists in troubleshooting.	High-performance, software-configurable, Token-Ring adapter for AT, 386 file servers & workstation; LEDs monitor network & system activity; comprehensive monitoring facilities; built-in media filter for Type 3 cable; contact vendor for pricing.
Vendor	PureData Ltd.	PureData Ltd.	PureData Ltd.	PureData Ltd.
Product	PDI8025-4/16	PDT508	PDT8023	PDuC508Plus
Characteristics				
LANs Supported	Token-Ring	Arcnet	10BASE-T; Ethernet	Arcnet
Microcomputer Bus Supported	AT (ISA); PC	Toshiba Laptop	Toshiba Laptop	MCA
Bus Size Maximum Data Rate (bps)	16-bit 10M	8-bit 2.5M	8-bit 10M	8-bit 2.5M
Media Supported	IBM Type 1,2,3,9	Broadband coaxial	Thin Ethernet coaxial	Broadband coaxial
Operating Systems Supported	NetWare; PC LAN Program; VINES	3+/3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	NetWare; Network OS; PC LAN Program; VINES	3+/3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	See comments	495	595	450
Date of First Delivery Standard Warranty	December 1990 5 years	September 1987 5 years	October 1989 5 years	September 1988 5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Contact vendor for pricing information.	High performance Arcnet interface card to Toshiba T1XXX, T31XX and T5100.	Software configuration Ethernet workstation card with auto-configuring drivers; supports all three wiring types with optional 10BASE-T module; supports the Toshiba T1XXX, T3100, and T5100.	Software configurable Micro Channel Arcnet file server and workstation card, with auto-configurable drivers; LEDs monitor network and system activity.

Vendor	PureData Ltd.	PureData Ltd.	PureData Ltd.	PureData Ltd.
Product	PDuC508Plus-F	PDuC8023	PDuC8023-T	PDuC8025
Characteristics				
LANs Supported	Arcnet	Ethernet	10BASE-T; Ethernet	Token-Ring
Microcomputer Bus Supported	MCA	MCA	MCA	MCA
Bus Size	8-bit	16-bit	16-bit	16-bit
Maximum Data Rate (bps)	2.5M	10M	10M	4M
Media Supported	Optical fiber	Thin Ethernet coaxial	Unshielded twisted-pair	IBM Type 1,2,3,9
Operating Systems Supported	3+ /3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; Any NetBIOS; NDIS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; TCP/IP; VINES	3+ /3+ Open; Any NetBIOS; NDIS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; TCP/IP; VINES	NetWare; PC LAN Program; VINES
Pricing/Support				
Price (\$)	995	445	475	695
Date of First Delivery	September 1988	June 1990	November 1990	December 1989
Standard Warranty	5 years	5 years	5 years	5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Software configurable Micro Channel Arcnet fileserver and workstation card with auto-configurable drivers; LEDs monitor and system activity.	Software configurable Ethernet card for Micro Channel fileserver and workstations with auto-configuring drivers.	Software configurable Ethernet card for Micro Channel fileserver and workstations with auto-configuring drivers; supports 10BASE-T.	High-perform., soft.-config., Token-Ring adapter for Microchannel fileserver/workstn.; LEDs monitor ntwk./system activity; comprehensive monitoring facilities aid in troubleshooting; built-in media filter for Type 3.
Vendor	PureData Ltd.	Quantum Software Systems, Ltd.	Racal InterLan	Racal InterLan
Product	PDuC8025-4/16	QNX Networking Board	ES3210	NI6510
Characteristics				
LANs Supported	Token-Ring	Arcnet; Proprietary	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	AT (ISA)	EISA	AT (ISA)
Bus Size	16-bit	None identified	32-bit	16-bit
Maximum Data Rate (bps)	16M	2.5M	10M	10M
Media Supported	IBM Type 1,2,3,9	Modified baseband	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	NetWare; PC LAN Program; VINES	QNX	NetWare; OS/2 LAN Manager; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; VINES
Pricing/Support				
Price (\$)	See comments	295	995	375
Date of First Delivery	December 1990	None identified	November 1989	September 1989
Standard Warranty	5 years	1 year	Lifetime	Lifetime
Service Supplied by	Vendor	Vendor	Dealer; vendor	Vendor
Comments	Software-configurable Token-Ring bus master adapter for Microchannel fileserver & wkstn.; LEDs monitor network & system activity; built-in media filter; contact vendor for pricing information.	—	Includes diagnostics, NetWare 386 SUR, NDIS LAN Manager OS/2 server.	Includes diagnostics, NetWare 286 WS/SUR & MacUAP, NetWare 386 ODI/WS & Server, NDIS DOS, NDIS OS/2, PC/TCP, DECnet 2.1/2.2/3.0; STREAMS drivers available.

Vendor	Racal InterLan	Racal InterLan	Racal InterLan	Racal InterLan
Product	NI9210	NIA310	NP621-286	NP621-386
Characteristics				
LANs Supported	10BASE-T; Ethernet	10BASE-T; AppleTalk; Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	NuBus	AT (ISA)	AT (ISA)
Bus Size Maximum Data Rate (bps)	16-bit 10M	32-bit 10M	16-bit 10M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; VINES	A/UX 2.0; AppleTalk; Macintosh Finder 6.X; NCSA Telnet	SCO Xenix/286	SCO Xenix/386
Pricing/Support				
Price (\$)	495	495	890	1,090
Date of First Delivery Standard Warranty	January 1987 Lifetime	November 1988 Lifetime	February 1988 90 days	April 1988 90 days
Service Supplied by	Dealer; vendor	Vendor	Dealer; vendor	Dealer; vendor
Comments	Includes diagnostics, NetWare 286 WS/SUR & MacUAP, NetWare 386 SUR, NDIS DOS, NDIS OS/2, PC/TCP, PC-NFS, 3+, DECnet 2.1/2.0.	Includes AppleTalk Phase I/II, NCSA Telnet, Etherscope (protocol analyzer), & pocket monitor.	TCP/IP and Xenix-Net networking for SCO Xenix/286.	TCP/IP and Xenix-Net networking for SCO Xenix/386.
Vendor	Racal InterLan	Racal InterLan	Racal InterLan	Racal InterLan
Product	NP622A	NP622I	NP622S	PK-NI5210-JTR, PK-NI6510-JTR, PK-ES3210-JTR
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); EISA	AT (ISA)	AT (ISA)	AT (ISA); EISA
Bus Size Maximum Data Rate (bps)	16-bit 10M	16-bit 10M	16-bit 10M	16-bit; 32-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	AT&T UNIX System V 3.2	ISC UNIX	SCO Open Desktop; SCO UNIX	AT&T UNIX; ISC UNIX; SCO Xenix
Pricing/Support				
Price (\$)	1,090	1,090	1,090	295-995
Date of First Delivery Standard Warranty	October 1987 90 days	December 1987 90 days	October 1990 90 days	April 1988 1 year
Service Supplied by	Dealer; vendor	Vendor	Dealer; vendor	Dealer; vendor
Comments	TCP/IP networking for AT&T UNIX System V 3.2.	TCP/IP networking for ISC UNIX.	TCP/IP for SCO UNIX and Open Desktop.	—

Vendor	Racore Computer Products, Inc.	Racore Computer Products, Inc.	Racore Computer Products, Inc.	Racore Computer Products, Inc.
Product	M 8110	M 8111	M 8112	M 8113
Characteristics				
LANs Supported	Token-Ring	Token-Ring	Token-Ring	Token-Ring
Microcomputer Bus Supported	AT (ISA)	MCA	PC	AT (ISA)
Bus Size	16-bit	16-bit	8-bit	16-bit
Maximum Data Rate (bps)	4M	4M	4M	16M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program
Pricing/Support				
Price (\$)	569	569	469	845
Date of First Delivery	January 1987	January 1989	April 1988; January 1989	October 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—
Vendor	Racore Computer Products, Inc.	Racore Computer Products, Inc.	Samsung Informations Systems America, Inc.	Sitka Corp.
Product	M 8114	M 8115	SE2100	FlashCard
Characteristics				
LANs Supported	Token-Ring	Token-Ring	Ethernet	AppleTalk
Microcomputer Bus Supported	MCA	PC	AT (ISA)	AT (ISA); EISA; PC
Bus Size	16-bit	8-bit	16-bit	8-bit
Maximum Data Rate (bps)	16M	16M	10M	770K
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program	NetWare	AppleShare; TOPS
Pricing/Support				
Price (\$)	845	745	245	239
Date of First Delivery	October 1990	October 1990	May 1990	September 1986
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Dealer; third party; vendor	Dealer; vendor
Comments	—	—	Memory-mapped; 16KB shared memory transfers; has both BNC female or 15-pin D-shell connectors; rear mount switches for addressing and LED display indicators; Novell-certified remote boot PROM; supports 802.3.	—

Vendor	Sitka Corp.	Sitka Corp.	Solid Technologies	Solid Technologies
Product	FlashCard MC	FlashCard Toshiba	E1000-16	E1000-8
Characteristics				
LANs Supported	AppleTalk	AppleTalk	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	Toshiba Laptop	AT (ISA)	AT (ISA); PC
Bus Size Maximum Data Rate (bps)	8-bit 770K	8-bit 770K	16-bit 10M	8-bit 10M
Media Supported	Shielded twisted-pair; Un- shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	AppleShare; TOPS	AppleShare; TOPS	NetWare; PC LAN Program; Solid LAN OS	NetWare; PC LAN Program; Solid LAN OS
Pricing/Support				
Price (\$)	329	329	399	399
Date of First Delivery	April 1990	June 1990	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Vendor	Vendor
Comments	—	—	Includes operating system and cable; free technical support.	Includes operating system, T- connection, and cable; free technical support.
Vendor	Solid Technologies	Solid Technologies	Solid Technologies	Solid Technologies
Product	E1000-M	F200	F300	F300-M
Characteristics				
LANs Supported	Ethernet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	MCA	AT (ISA); PC	AT (ISA); PC	MCA
Bus Size Maximum Data Rate (bps)	16-bit 10M	8-bit 1.8M	16-bit 3M	16-bit 3M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Un- shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair
Operating Systems Supported	NetWare; PC LAN Program; Solid LAN OS	NetWare; PC LAN Program; Solid LAN OS	NetWare; PC LAN Program; Solid LAN OS	NetWare; PC LAN Program; Solid LAN OS
Pricing/Support				
Price (\$)	499	249	349	499
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Includes operating system, T- connection, and cable; free technical support.	Includes operating system and cable; free technical support.	Includes operating system and cable; free technical support.	Includes operating system and cable; free technical support.

Vendor	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.
Product	ARCNET-LC100	ARCNET-PC130	ARCNET-PC130E	ARCNET-PC270E
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	All laptop PCs	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size Maximum Data Rate (bps)	None identified 2.5M	8-bit 2.5M	8-bit 2.5M	8-bit 2.5M
Media Supported	RG-62/U coaxial; Unshielded twisted-pair	RG-62/U coaxial	RG-62/U coaxial	Unshielded twisted-pair
Operating Systems Supported	NetWare	LAN Manager; NetWare; PC LAN Program; Tapestry; VINES	LAN Manager; NetWare; PC LAN Program; Tapestry; VINES	LAN Manager; NetWare; PC LAN Program; Tapestry; VINES
Pricing/Support				
Price (\$)	595	245	295	295
Date of First Delivery	December 1989	1989	1989	1989
Standard Warranty	2 years unlimited	2 years unlimited	2 years unlimited	2 years unlimited
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	Provides parallel port connection for laptop PCs; features external diagnostic LEDs node ID, media and topology switches, NetWare drivers.	Half-slot, surface-mount technology board designed for star topology.	Half-slot, surface-mount technology board designed for star topology or bus topology; features external diagnostic LEDs and node ID switches.	Half-slot, surface-mount technology board designed for star or daisy-chain topology; features external diagnostic LEDs and node ID switches.
Vendor	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.
Product	ARCNET-PC330	ARCNET-PC550FS	ARCNET-PC550WS	ARCNET-PS110
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	MCA
Bus Size Maximum Data Rate (bps)	8-bit 2.5M	16-bit 2.5M	16-bit 2.5M	16-bit 2.5M
Media Supported	Optical fiber	Unshielded twisted-pair	Unshielded twisted-pair	RG-62/U coaxial
Operating Systems Supported	LAN Manager; NetWare; PC LAN Program; Tapestry; VINES	NetWare	NetWare	LAN Manager; NetWare; PC LAN Program; Tapestry; VINES
Pricing/Support				
Price (\$)	525	695	495	595
Date of First Delivery	1989	1989	1989	1987
Standard Warranty	2 years unlimited	2 years unlimited	2 years unlimited	2 years unlimited
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	Half-slot board designed for star networks; features external diagnostic LEDs and mode ID switches.	File server board designed for star or daisy-chain networks; features nodal priority (patented); 16-bit wide data bus; dual-ported RAM and high-speed interface.	Workstation board designed for star or daisy-chain networks; features 16-bit wide data bus; dual-ported RAM and high-speed interface.	Surface-mount technology board designed for star topology; features drivers for NetWare

Vendor	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.
Product	ARCNET-PS210	ARCNET-PS500FS	ARCNET-PS500WS	ARCNET-T100
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	MCA	AT (ISA)	AT (ISA)	Toshiba laptop
Bus Size	16-bit	16-bit	16-bit	None identified
Maximum Data Rate (bps)	2.5M	2.5M	2.5M	2.5M
Media Supported	RG-62/U coaxial	RG-62/U coaxial	RG-62/U coaxial	RG-62/U coaxial
Operating Systems Supported	LAN Manager; NetWare; PC LAN Program; Tapestry; VINES	NetWare	NetWare	LAN Manager; NetWare; PC LAN Program; Tapestry; VINES
Pricing/Support				
Price (\$)	595	695	495	595
Date of First Delivery	1989	1988	1988	1989
Standard Warranty	2 years unlimited	2 years unlimited	2 years unlimited	2 years unlimited
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	Surface-mount technology board designed for star topology, features drivers for NetWare.	File server board designed for star or bus networks; features nodal priority (patented); 16-bit wide data bus; dual-ported RAM and high-speed interface.	Workstation board designed for star or bus networks features a 16-bit wide data bus; dual-ported RAM and high-speed interface; drivers for NetWare.	Includes power switch.
Vendor	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.
Product	ARCNET-T250	Arcnet EISA 3200	NB210	NB250
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	Toshiba laptop	EISA	NuBus	NuBus
Bus Size	None identified	16-bit	16-bit	16-bit
Maximum Data Rate (bps)	2.5M	2.5M	2.5M	2.5M
Media Supported	Unshielded twisted-pair	Baseband coaxial	Baseband coaxial	Baseband coaxial
Operating Systems Supported	LAN Manager; NetWare; PC LAN Program; Tapestry; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; PC LAN Program; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	595	995	495	495
Date of First Delivery	1989	None identified	None identified	None identified
Standard Warranty	2 years unlimited	90 days	90 days	90 days
Service Supplied by	Dealer; third party; vendor	Dealer	Dealer	Dealer
Comments	Includes power switch.	—	—	—

Vendor	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.
Product	SE100	SE250	SMC3008	SMC3008 TP
Characteristics				
LANs Supported	Arcnet	Arcnet	Ethernet	Ethernet
Microcomputer Bus Supported	SE	SE	AT (ISA); PC	AT (ISA); EISA; PC
Bus Size Maximum Data Rate (bps)	16-bit 2.5M	16-bit 2.5M	8-bit 10M	8-bit 10M
Media Supported	Baseband coaxial	Baseband coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	495	495	295	325
Date of First Delivery	None identified	None identified	September 1990	September 1990
Standard Warranty	90 days	90 days	90 days	90 days
Service Supplied by	Dealer	Dealer	Dealer	Dealer
Comments	—	—	—	—

Vendor	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.
Product	SMC3016	SMC3016 TP	SMC3016 TP/MC	SMC3016/MC
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); EISA	AT (ISA); EISA	MCA	MCA
Bus Size Maximum Data Rate (bps)	16-bit 10M	16-bit 10M	16-bit 10M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair	Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	395	395	495	450
Date of First Delivery	September 1990	September 1990	September 1990	September 1990
Standard Warranty	90 days	90 days	90 days	90 days
Service Supplied by	Dealer	Dealer	Dealer	Dealer
Comments	—	—	—	—

Vendor	TeleVideo Systems, Inc.	TeleVideo Systems, Inc.	TeleVideo Systems, Inc.	Thirdware Computer Products
Product	TE100	TE200	TE300	ARC-160ZS/B
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Arcnet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	EISA	AT (ISA); EISA
Bus Size	8-bit	16-bit	32-bit	16-bit
Maximum Data Rate (bps)	10M	10M	10M	2.5M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	RG 62 coaxial
Operating Systems Supported	NetWare	NetWare	NetWare	NetWare; RX-Net
Pricing/Support				
Price (\$)	283	385	573	219
Date of First Delivery	December 1990	December 1990	January 1991	1990
Standard Warranty	1 year	1 year	1 year	5 years
Service Supplied by	Vendor	Vendor	Vendor	None identified
Comments	—	—	—	16-bit Arcnet card based on the SMC 90C66 single chip solution.

Vendor	Thirdware Computer Products	Thirdware Computer Products	Thirdware Computer Products	Thomas-Conrad Corp.
Product	ARC-800S/B/TW	ETN-1000	ETN-2000	TC3042 100Mbps TCNS Adapter/XT
Characteristics				
LANs Supported	Arcnet	Ethernet	Ethernet	100M Token-Passing (TCNS)
Microcomputer Bus Supported	AT (ISA); EISA; PC	AT (ISA); EISA; PC	AT (ISA); EISA	AT (ISA)
Bus Size	8-bit	8-bit	16-bit	16-bit
Maximum Data Rate (bps)	2.5M	10M	10M	100M
Media Supported	RG 62 coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	LANtastic; Standard Ethernet coaxial; TCP/IP; Thin Ethernet coaxial	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	NetWare; RX-Net	LANtastic; NetWare; TCP/IP	None identified	3+/3+ Open; NetWare; OS/2 LAN Manager; PC LAN Program
Pricing/Support				
Price (\$)	179	199	299	995
Date of First Delivery	1989	1989	1989	September 1990
Standard Warranty	5 years	5 years	5 years	2 years
Service Supplied by	None identified	None identified	None identified	Vendor
Comments	8-bit Arcnet network interface card based on SMC 90C65 chip set single chip solution.	Fully NE-1000 compatible, uses standard drivers.	Fully Novell NE-2000 compatible.	—

Vendor	Thomas-Conrad Corp.	Thomas-Conrad Corp.	Thomas-Conrad Corp.	Thomas-Conrad Corp.
Product	TC3045 100Mbps TCNS Adapter/AT	TC3047 100Mbps TCNS Adapter/EISA	TC4035 Token-Ring Adapter/AT	TC4045 16/4 Token Ring Adapter/AT
Characteristics				
LANs Supported	100M Token-Passing (TCNS)	100M Token-Passing (TCNS)	Token-Ring	Token-Ring
Microcomputer Bus Supported	AT (ISA)	EISA	AT (ISA); EISA; PC	AT (ISA); EISA; PC
Bus Size	16-bit	32-bit	16-bit	16-bit
Maximum Data Rate (bps)	100M	100M	4M	4M
Media Supported	Optical fiber	Optical fiber	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	LANtastic; NetWare; OS/2 LAN Manager; PowerLan; VINES	LANtastic; NetWare; PowerLan; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program
Pricing/Support				
Price (\$)	1,495	1,725	595	849
Date of First Delivery	September 1990	September 1990	January 1990	September 1990
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	Toll-free technical support.

Vendor	Thomas-Conrad Corp.	Thomas-Conrad Corp.	Thomas-Conrad Corp.	Thomas-Conrad Corp.
Product	TC4046 16/4 Token Ring Adapter/MC	TC6046-ARC-Card/MC	TC6142 ARC-Card/CE	TC6145 ARC-Card/AT
Characteristics				
LANs Supported	Token-Ring	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	MCA	MCA	AT (ISA)	AT (ISA)
Bus Size	16-bit	16-bit	8-bit	8-bit
Maximum Data Rate (bps)	4M	2.5M	2.5M	2.5M
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; PC LAN Program	LANtastic; NetWare; OS/2 LAN Manager; PowerLan; VINES	AppleTalk; NetWare	LANtastic; NetWare; OS/2 LAN Manager; PowerLan; VINES
Pricing/Support				
Price (\$)	875	395, max. price is 595	199, max. price is 395	379, max. price is 550
Date of First Delivery	September 1990	December 1987	1985	September 1990
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Thomas-Conrad Corp.	Thomas-Conrad Corp.	Thomas-Conrad Corp.	3Com Corp.
Product	TC6842 ARC-Card/NB	TC6843 ARC-Card/SE	TC6844 ARC-Card/SE30	EtherLink 16 3C507
Characteristics				
LANs Supported	AppleTalk; Arcnet	AppleTalk; Arcnet	AppleTalk; Arcnet	Ethernet
Microcomputer Bus Supported	NuBus	SE	SE/30	AT (ISA); EISA
Bus Size Maximum Data Rate (bps)	32-bit 2.5M	16-bit 2.5M	32-bit 2.5M	16-bit 10M
Media Supported	Optical fiber; Standard Ethernet coaxial	Optical fiber; Standard Ethernet coaxial	Optical fiber; Standard Ethernet coaxial	AUI; Thin Ethernet coaxial
Operating Systems Supported	AppleTalk; NetWare	AppleTalk; NetWare	AppleTalk; NetWare	3+ /3+ Open; NetWare; OS/2 LAN Manager; VINES
Pricing/Support				
Price (\$)	495, max. price is 895	445, max. price is 845	495, max. price is 895	445
Date of First Delivery	May 1990	May 1990	May 1990	1990
Standard Warranty	2 years	2 years	2 years	Lifetime
Service Supplied by	Vendor	Vendor	Vendor	Dealer; vendor
Comments	—	—	—	—

Vendor	3Com Corp.	3Com Corp.	3Com Corp.	3Com Corp.
Product	EtherLink II 3C503	EtherLink II-TP 3C503-TP	EtherLink Plus 3C505B	EtherLink/MC 3C523
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); EISA; PC	AT (ISA); EISA; PC	AT (ISA); EISA; PC	MCA
Bus Size Maximum Data Rate (bps)	8-bit 10M	8-bit 10M	16-bit; 8-bit 10M	16-bit 10M
Media Supported	AUI; Thin Ethernet coaxial	AUI; Shielded twisted-pair; Un- shielded twisted-pair	AUI; Thin Ethernet coaxial	AUI; Thin Ethernet coaxial
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; VINES	3+ /3+ Open; NetWare; OS/2 LAN Server; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; VINES
Pricing/Support				
Price (\$)	295	445	895	425
Date of First Delivery	1986	1990	1985	1987
Standard Warranty	Lifetime	Lifetime	Lifetime	Lifetime
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	—	Compatible also with SynOptics LattisNet (pre-standard 10BASE-T) and AT&T StarLAN 10.	Features 80186 processor and 82586 coprocessor on the board. Includes 256KB RAM for downloadable protocols and packet buffering.	—

Vendor	3Com Corp.	3Com Corp.	3Com Corp.	3Com Corp.
Product	EtherLink/MC-TP 3C523-TP	EtherLink/NB 3C543	EtherLink/SE 3C563	TokenLink 3C603
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Token-Ring
Microcomputer Bus Supported	MCA	NuBus	SE	AT (ISA); EISA; PC
Bus Size Maximum Data Rate (bps)	16-bit 10M	32-bit 10M	32-bit 10M	16-bit; 8-bit 4M
Media Supported	AUI; Shielded twisted-pair; Unshielded twisted-pair	AUI; Thin Ethernet coaxial	AUI; Thin Ethernet coaxial	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; VINES	3+/3+ Open; AppleShare; NetWare; OS/2 LAN Manager; VINES	3+/3+ Open; AppleShare; NetWare; OS/2 LAN Manager; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program
Pricing/Support				
Price (\$)	495	595	495	595
Date of First Delivery	1990	July 1988	1989	1987
Standard Warranty	Lifetime	Lifetime	Lifetime	Lifetime
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Compatible also with SynOptics LattisNet (pre-standard 10BASE-T), and AT&T StarLAN 10.	Ethernet/NB diver is written to Apple's Ethernet application interface; any application written to the Ethertalk API is compatible.	—	Features on board type 3 media filter.
Vendor	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.
Product	LanCard/A* AT	LanCard/A* AT TP	LanCard/A* MC	LanCard/A* PC
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	PC	PC	MCA	PC
Bus Size Maximum Data Rate (bps)	16-bit 2.5M	16-bit 2.5M	8-bit 2.5M	8-bit 2.5M
Media Supported	Baseband coaxial	Baseband coaxial; Unshielded twisted-pair	Baseband coaxial	Baseband coaxial
Operating Systems Supported	NetWare; OS/2 Requestor	NetWare; OS/2 Requestor	NetWare; OS/2 Requestor	NetWare; OS/2 Requestor
Pricing/Support				
Price (\$)	375	385	495	150
Date of First Delivery	April 1989	April 1990	November 1987	September 1985
Standard Warranty	Lifetime	Lifetime	Lifetime	Lifetime
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.
Product	LanCard/A* PC TP	LanCard/A*AT H12	LanCard/A*MC H12	LanCard/A*PC H12
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	PC	PC	MCA	PC
Bus Size	8-bit	16-bit	8-bit	8-bit
Maximum Data Rate (bps)	2.5M	2.5M	2.5M	2.5M
Media Supported	Baseband coaxial; Unshielded twisted-pair	Broadband coaxial	Baseband coaxial	Baseband coaxial
Operating Systems Supported	NetWare; OS/2 Requestor	NetWare; OS/2 Requestor	NetWare; OS/2 Requestor	NetWare; OS/2 Requestor
Pricing/Support				
Price (\$)	245	425	695	325
Date of First Delivery	April 1990	1990	1990	1990
Standard Warranty	Lifetime	Lifetime	Lifetime	Lifetime
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.
Product	LanCard/E* 1000	LanCard/E* AT	LanCard/E* MC	LanCard/E* PC 10BT
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	PC	AT (ISA); PC
Bus Size	8-bit	16-bit	16-bit	8-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair
Operating Systems Supported	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+/3+ Open; Decnet-DOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; Sun PC NFS; VINES	3+/3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	275	425	445	395
Date of First Delivery	1990	April 1988	September 1988	April 1990
Standard Warranty	Lifetime	Lifetime	Lifetime	Lifetime
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.
Product	LanCard/E* STAR8	LanCard/E*2000	LanCard/E*AT LTP	LanCard/E*MCLTP
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	PC	MCA
Bus Size Maximum Data Rate (bps)	8-bit 10M	16-bit 10M	16-bit 10M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	NetWare	3+ /3+ Open; Decnet-DOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; Sun PC NFS; VINES	3+ /3+ Open; Decnet-DOS; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; Sun PC NFS; VINES
Pricing/Support				
Price (\$)	285	350	595	595
Date of First Delivery	November 1989	1990	1990	1990
Standard Warranty	Lifetime	Lifetime	Lifetime	Lifetime
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.	Tiara Computer Systems, Inc.	Top Microsystems
Product	LanCard/E*PC LTP	LanCard/T*AT	LanCard/T*PC	TA-10
Characteristics				
LANs Supported	Ethernet	NETBIOS; Token-Ring	NETBIOS; Token-Ring	Arcnet; Ethernet
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size Maximum Data Rate (bps)	8-bit 10M	16-bit 4M	8-bit 4M	None identified 1M; 16M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	NetWare; PC LAN Program	NetWare; PC LAN Program	NetWare; VINES
Pricing/Support				
Price (\$)	395	795	595	295-695
Date of First Delivery	1990	1990	1990	June 1989
Standard Warranty	Lifetime	2 years	2 years	None identified
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Top Microsystems	Top Microsystems	Top Microsystems	Top Microsystems
Product	TA-20	TA-30	TA-40	TA-50
Characteristics LANs Supported	Arcnet; Ethernet	Arcnet; Ethernet	Arcnet; Ethernet	Arcnet; Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA)	AT (ISA)
Bus Size Maximum Data Rate (bps)	None identified 1M; 16M	None identified 1M; 16M	None identified 1M; 16M	None identified 1M; 16M
Media Supported	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	NetWare; VINES	NetWare; VINES	NetWare; VINES	NetWare; VINES
Pricing/Support Price (\$)	295-695	295-695	295-695	295-695
Date of First Delivery Standard Warranty	June 1989 None identified	June 1989 None identified	June 1989 None identified	June 1989 None identified
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Top Microsystems	Top Microsystems	Top Microsystems	Torus Systems, Inc.
Product	TA-60	TE-1000	TE-2000	Ethernet Plus
Characteristics LANs Supported	Arcnet; Ethernet	Arcnet; Ethernet	Arcnet; Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT	AT (ISA); PC
Bus Size Maximum Data Rate (bps)	None identified 1M; 16M	None identified 1M; 16M	None identified 1M; 16M	8-bit 10M
Media Supported	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare; VINES	NetWare; VINES	NetWare; VINES	Tapestry
Pricing/Support Price (\$)	295-695	295-695	295-695	395
Date of First Delivery Standard Warranty	June 1989 None identified	June 1989 None identified	June 1989 None identified	None identified None identified
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Torus Systems, Inc.	Toshiba America Information Systems, Inc.	Tri-Data Corp.	Tri-Data Corp.
Product	Ethernet Plus MCA	Toshiba LAN Card for Ethernet	LanWay TR 16/4	LanWay E-10T
Characteristics				
LANs Supported	Ethernet	Ethernet	Token-Ring	Ethernet
Microcomputer Bus Supported	MCA	Toshiba Laptop	NuBus; SE/30	NuBus; SE/30
Bus Size	8-bit	None identified	32-bit	32-bit
Maximum Data Rate (bps)	10M	10M	16M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair; requires external transceiver	Shielded twisted-pair	Thin Ethernet coaxial
Operating Systems Supported	Tapestry	3+ /3+ Open; NetWare	None identified	None identified
Pricing/Support				
Price (\$)	425	699	895	895
Date of First Delivery	None identified	None identified	August 1990	November 1990
Standard Warranty	None identified	1 year	120 days	120 days
Service Supplied by	Vendor	None identified	Vendor	Vendor
Comments	—	Designed for use with Toshiba's portable PC and desktop PC exclusively.	—	—

Vendor	Tri-Data Corp.	TRW	Ungermann-Bass, Inc.	Ungermann-Bass, Inc.
Product	LanWay PC TR 16/4	PC2001	3270 NIUpc	Access/MC
Characteristics				
LANs Supported	Token-Ring	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA); EISA; MCA	AT (ISA); PC	AT (ISA)	MCA
Bus Size	16-bit; 32-bit	16-bit; 8-bit	16-bit	16-bit
Maximum Data Rate (bps)	16M	10M	10M	10M
Media Supported	Shielded twisted-pair	Broadband coaxial; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Broadband coaxial; Standard Ethernet coaxial	Standard Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server	NetWare; PC LAN Program; TCP/IP; Tapestry	NDIS; NetWare; OS/2 LAN Manager	NDIS; NetWare; OS/2 LAN Manager
Pricing/Support				
Price (\$)	895	670	995	545
Date of First Delivery	February 1991	November 1987	January 1987	December 1990
Standard Warranty	120 days	90 days	90 days	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	28K of PC RAM.	80186 processor with 256K RAM.	—

Vendor	Ungermann-Bass, Inc.	Ungermann-Bass, Inc.	Ungermann-Bass, Inc.	Ungermann-Bass, Inc.
Product	Access/PC-16	Access/PC-8	NIUpc/EOTP	NIUps
Characteristics LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	AT (ISA)	PC	AT (ISA)	MCA
Bus Size Maximum Data Rate (bps)	16-bit 10M	8-bit 10M	16-bit 10M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Unshielded twisted-pair	Unshielded twisted-pair	Broadband coaxial; Standard Ethernet coaxial
Operating Systems Supported	NDIS; NetWare; OS/2 LAN Manager	NDIS; NetWare; OS/2 LAN Manager	NDIS; NetWare; OS/2 LAN Manager	NDIS; NetWare; OS/2 LAN Manager
Pricing/Support Price (\$)	545	395	1,095	1,095
Date of First Delivery Standard Warranty	December 1990 90 days	September 1990 90 days	July 1990 90 days	January 1989 90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	80186 processor with 512K RAM.	80186 processor with 512K RAM.

Vendor	Ungermann-Bass, Inc.	Ungermann-Bass, Inc.	Ungermann-Bass, Inc.	Univation Inc.
Product	NIUps/EOTP	NIUps/TR	Personal NIU/TR	Lifelink Ethernet Card
Characteristics LANs Supported	Ethernet	Token-Ring	Token-Ring	Ethernet
Microcomputer Bus Supported	MCA	MCA	AT (ISA)	AT (ISA)
Bus Size Maximum Data Rate (bps)	16-bit 10M	16-bit 4M	16-bit 4M	None identified 10M
Media Supported	Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Standard Ethernet coaxial
Operating Systems Supported	NDIS; NetWare; OS/2 LAN Manager	NetWare; OS/2 LAN Manager	NetWare; OS/2 LAN Manager	NetWare; TCP/IP
Pricing/Support Price (\$)	1,095	1,095	695	395
Date of First Delivery Standard Warranty	July 1990 90 days	April 1989 90 days	January 1988 90 days	January 1987 1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	80186 processor with 512K RAM.	80186 processor with 256K RAM.	Integrates Novell's Advanced Netware and TCP/IP.

Vendor	Univation Inc.	US Sage	Wang Laboratories, Inc.	Wang Laboratories, Inc.
Product	MAC/DOS 286sx	MainLAN Ethernet	8023-10/PC2	8023-MC
Characteristics				
LANs Supported	AppleTalk; Arcnet; DECnet; Ethernet; LANtastic; Starlan; Token-Ring	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	SE	AT (ISA); EISA; MCA; PC; PS/1	AT (ISA); EISA	MCA
Bus Size Maximum Data Rate (bps)	None identified 1M	16-bit; 8-bit 10M	16-bit 10M	16-bit 10M
Media Supported	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	3+ /3+ Open; NetWare; PC LAN Program; TOPS	MainLAN; NetWare	3+ /3+ Open; NetWare; VINES	3+ /3+ Open; NetWare; VINES
Pricing/Support				
Price (\$)	1,595	199, max. price is 249	895	495
Date of First Delivery	January 1989	October 1990	April 1988	August 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	MS-DOS co-processor card for the Macintosh computer; 1M on-board memory; parallel port; serial port; support for Apple's FDHD Superdrive.	\$199 for 8-bit version; \$249 for 16-bit version.	384K on board memory.	—
Vendor	Wang Laboratories, Inc.	Wang Laboratories, Inc.	Wang Laboratories, Inc.	Wang Laboratories, Inc.
Product	8023-PC2/A	8023-PC2/TP	8025-PC2/16	8025-PC2/A
Characteristics				
LANs Supported	Ethernet	Ethernet	Token-Ring	Token-Ring
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	AT (ISA); EISA	AT (ISA); EISA
Bus Size Maximum Data Rate (bps)	16-bit 10M	16-bit 10M	16-bit 16M	16-bit 4M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair	Shielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare	3+ /3+ Open; NetWare; VINES	3+ /3+ Open; NetWare; VINES	3+ /3+ Open; NetWare; VINES
Pricing/Support				
Price (\$)	345	445	945	595
Date of First Delivery	April 1988	June 1990	June 1990	December 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	—	—

Vendor	Watlan, Inc.	Watlan, Inc.	Watlan, Inc.	Western Digital Corp.
Product	Watstar/A2	Watstar/E10	Watstar/p10	EtherCard Plus 16
Characteristics				
LANs Supported	Arcnet	Ethernet	ProNET-10; Token-Ring	Ethernet
Microcomputer Bus Supported	AT (ISA); MCA; PC	AT (ISA); MCA; PC	AT (ISA); MCA; PC	AT (ISA); EISA; PC
Bus Size	16-bit; 8-bit	16-bit; 8-bit	16-bit; 8-bit	16-bit
Maximum Data Rate (bps)	2.5M	10M	10M	10M
Media Supported	RG 62 coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Microwave Links; Optical fiber; Shielded twisted-pair; Twinax; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	Watstar/A2	Watstar/pc	Watstar/pc	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; UNIX/Zenix; VINES
Pricing/Support				
Price (\$)	2,250	4,995	4,995	349
Date of First Delivery	None identified	None identified	None identified	September 1989
Standard Warranty	1 year	1 year	1 year	5 years
Service Supplied by	Third party; vendor	Third party; vendor	None identified	Dealer; vendor
Comments	Intended for small workgroups (up to 30 nodes); bridges at Watstar server enable integration of these networks to systems with up to 40,000 nodes; includes network services and utilities.	Intended for multi-purpose Ethernet systems; bridges at Watstar servers provide connectivity to large-scale systems; includes network services and utilities.	Includes utilities and security functions; supports high capacity(4GB) network servers and over 200,000 user IDs; bridged to other Watstar LANS via Watstar servers; services include account manager, diagnostics, E-mail.	—
Vendor	Western Digital Corp.	Western Digital Corp.	Western Digital Corp.	Western Digital Corp.
Product	EtherCard Plus/A	EtherCard Plus TP	EtherCard Plus 10T/A	EtherCard Plus 10T
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	AT (ISA); PC	MCA	AT (ISA); PC
Bus Size	16-bit	8-bit	16-bit	8-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; UNIX/Zenix; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; UNIX/Zenix; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	399	499	399	349
Date of First Delivery	June 1988	June 1987	February 1990	February 1990
Standard Warranty	5 years	5 years	5 years	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	—	SynOptics LattisNet compatible.	—	—

Vendor	Western Digital Corp.	Western Digital Corp.	Western Digital Corp.	Western Digital Corp.
Product	EtherCard Plus	TokenCard	TokenCard WS	TokenCard Master
Characteristics				
LANs Supported	Ethernet	Token-Ring	Token-Ring	Token-Ring
Microcomputer Bus Supported	AT (ISA); PC	AT (ISA); PC	AT (ISA); PC	AT (ISA); EISA
Bus Size	8-bit	8-bit	8-bit	16-bit
Maximum Data Rate (bps)	10M	4M	4M	4M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; UNIX/Zenix; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; VINES
Pricing/Support				
Price (\$)	249	599	499	649
Date of First Delivery	June 1987	March 1989	March 1989	March 1989
Standard Warranty	5 years	5 years	5 years	5 years
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	With ROM socket.	With 128K of RAM.	For workstations with RAM sockets.	For 16-bit AT bus with 128K of RAM.

Vendor	Xinetron	Xinetron	Xinetron	Xinetron
Product	Xi-211	Xi-212	Xi-221	Xi-222
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Microcomputer Bus Supported	AT (ISA); PC	PC	AT (ISA)	AT (ISA)
Bus Size	8-bit	8-bit	16-bit	16-bit
Maximum Data Rate (bps)	2.5M	2.5M	2.5M	2.5M
Media Supported	Baseband coaxial	Shielded twisted-pair	Baseband coaxial	Shielded twisted-pair
Operating Systems Supported	CBIS; LANtastic; NetWare; OS/2 LAN Manager; OS/2 LAN Server; VINES	CBIS; LANtastic; NetWare; OS/2 LAN Manager; OS/2 LAN Server; VINES	CBIS; LANtastic; NetWare; OS/2 LAN Manager; OS/2 LAN Server; VINES	CBIS; LANtastic; NetWare; OS/2 LAN Manager; OS/2 LAN Server; VINES
Pricing/Support				
Price (\$)	79	79	119	119
Date of First Delivery	February 1987	May 1988	May 1987	May 1988
Standard Warranty	3 years	3 years	3 years	3 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Novell boot ROM included; Bus or Star topology; Turbo driver support.	Novell boot ROM included; Bus or Star topology.	Novell boot ROM included; Bus or Star topology.	Novell boot ROM included; Bus or Star topology.

Vendor	Xinetron	Xinetron	Xinetron	Xinetron
Product	Xi-301	Xi-321	Xi-401	Xi-421
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	PC	AT (ISA)	PC	AT (ISA)
Bus Size	8-bit	16-bit	8-bit	16-bit
Maximum Data Rate (bps)	10M	10M	10M	10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair	Unshielded twisted-pair
Operating Systems Supported	NetWare; VINES	NetWare; VINES	NetWare	NetWare
Pricing/Support				
Price (\$)	139	165	189	229
Date of First Delivery	March 1987	March 1987	None identified	None identified
Standard Warranty	3 years	3 years	3 years	3 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Novell boot ROM included; supports TCP/IP, UNIX; Novell NE-1000 compatible.	Novell boot ROM included; supports TCP/IP, UNIX; Novell NE-2000 compatible.	10 Base-T compliant; supports TCP/IP, UNIX.	10 Base-T compliant; supports TCP/IP, UNIX.
Vendor	Xircom	Xircom	Xircom	Xylogics, Inc.
Product	PAO2B6/PAO2BT	PEIOB2/PEIOBT/PEIOBX	PTO4B3/PTO4BT	CV3890/CV4890
Characteristics				
LANs Supported	Arcnet	Ethernet	Token-Ring	FDDI
Microcomputer Bus Supported	AT (ISA); EISA; MCA; PC	AT (ISA); EISA; MCA; PC	AT (ISA); EISA; MCA; PC	VME
Bus Size	8-bit	8-bit	8-bit	32-bit
Maximum Data Rate (bps)	2.5M	10M	4M	100M
Media Supported	Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Optical fiber
Operating Systems Supported	LANTastic; NetWare	3+ /3+ Open; LANTastic; NetWare; OS/2 LAN Manager; OS/2 LAN Server® LAN Program; VINES	3+ /3+ Open; LANTastic; NetWare; OS/2 LAN Manager; OS/2 LAN Server® LAN Program; VINES	UNIX
Pricing/Support				
Price (\$)	395	595	845	See comments
Date of First Delivery	April 1989	April 1989	October 1989	October 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	External adapters that allow PCs to connect to LAN without using any internal slots; connects externally through parallel port of PC.	External adapters that allow PCs to connect to a LAN without using any internal slots; connects externally through parallel port of PC.	External adapters that allow PCs to connect to a LAN without using any internal slots; connects externally through parallel port of PC.	High performance FDDI controller for VMEbus systems. CV3890 Supports a single attachment to an FDDI network. CV4890 provides dual attachment for fault-tolerant networks; contact vendor for pricing information.

Vendor	YamaTech Connectivity Solutions	YamaTech Connectivity Solutions	YamaTech Connectivity Solutions	YamaTech Connectivity Solutions
Product	Turbo Arcom 8-bit	Turbo Arcom 16-bit	Turbo Arcom MicroChannel PS	Turbo Ethercom 16-bit
Characteristics				
LANs Supported	Arcnet	Arcnet	Arcnet	Ethernet; Starlan
Microcomputer Bus Supported	AT (ISA)	AT (ISA)	MCA	AT
Bus Size Maximum Data Rate (bps)	16-bit 2.5M	16-bit 2.5M	16-bit 2.5M	16-bit 10M
Media Supported	Optical fiber; RG-62 coaxial; Shielded twisted-pair	Optical fiber; RG-62 coaxial; Shielded twisted-pair	Optical fiber; RG-62 coaxial; Shielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	NetWare; VINES	NetWare; VINES	NetWare; VINES	NetWare; PC LAN Program; Tapestry; VINES
Pricing/Support				
Price (\$)	See comments	See comments	See comments	See comments
Date of First Delivery Standard Warranty	March 1985 1 year	March 1985 1 year	March 1985 1 year	January 1989 1 year
Service Supplied by	Third party	Third party	Third party	Third party
Comments	Contact vendor for pricing information.	Contact vendor for pricing information.	Contact vendor for pricing information.	Compatibility through specially designed modules with the latest 10BASE-T draft standard; contact vendor for pricing information.
Vendor	YamaTech Connectivity Solutions	YamaTech Connectivity Solutions	YamaTech Connectivity Solutions	YamaTech Connectivity Solutions
Product	Turbo Ethercom Apple Macintosh	Turbo Ethercom 8-bit	Turbo Ethercom MicroChannel PS	Turbo Token Ring 8-bit
Characteristics				
LANs Supported	Ethernet; Starlan	Ethernet; Starlan	Ethernet; Starlan	Token-Ring
Microcomputer Bus Supported	SE	AT	MCA	AT
Bus Size Maximum Data Rate (bps)	8-bit 10M	8-bit 10M	16-bit; 8-bit 10M	16-bit 16M; 4M
Media Supported	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair
Operating Systems Supported	NetWare; PC LAN Program; Tapestry; VINES			
Pricing/Support				
Price (\$)	See comments	See comments	See comments	See comments
Date of First Delivery Standard Warranty	January 1989 1 year	January 1989 1 year	January 1989 1 year	June 1990 1 year
Service Supplied by	Third party	Third party	Third party	Third party
Comments	Compatibility through specially designed modules with the latest 10BASE-T draft standard; contact vendor for pricing information.	Compatibility through specially designed modules with the latest 10BASE-T draft standard; contact vendor for pricing information.	Compatibility through specially designed modules with the latest 10BASE-T draft standard; contact vendor for pricing information.	Also supported will be operating systems such as LAN Manager, OS/2, and UNIX; contact vendor for pricing information.

Vendor	YamaTech Connectivity Solutions	YamaTech Connectivity Solutions	Zenith Electronics Corp.	Zenith Electronics Corp.
Product	Turbo Token Ring 16-bit	Turbo Token Ring MicroChannel PS	LAN10E-AT	LAN10E-EBT
Characteristics LANs Supported	Token-Ring	Token-Ring	Ethernet	Ethernet
Microcomputer Bus Supported	AT	MCA	AT (ISA)	PC
Bus Size Maximum Data Rate (bps)	16-bit 16M; 4M	16-bit 10M; 4M	16-bit 10M	8-bit 10M
Media Supported	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Operating Systems Supported	NetWare; PC LAN Program; Tapestry; VINES	NetWare; PC LAN Program; Tapestry; VINES	3+ /3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager	NetWare
Pricing/Support Price (\$)	See comments	See comments	399	495
Date of First Delivery Standard Warranty	June 1990 1 year	June 1990 1 year	None identified 1 year	None identified 1 year
Service Supplied by	Third party	Third party	Vendor	Vendor
Comments	Also supported will be operating systems such as LAN Manager, OS/2, and UNIX; contact vendor for pricing information.	Also supported will be operating systems such as LAN Manager, OS/2, and UNIX; contact vendor for pricing information.	Other operating system software supported; SUN NFS, DECnet-DOS.	For use in Diskless Workstations.

Vendor	Zenith Electronics Corp.	Zenith Electronics Corp.	Zenith Electronics Corp.	Zenith Electronics Corp.
Product	LAN10E-MC	LAN10E-XT	LAN10FPC	LAN10TMC
Characteristics LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	MCA	PC	PC	MCA
Bus Size Maximum Data Rate (bps)	16-bit 10M	8-bit 10M	8-bit 10M	16-bit 10M
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber	Standard Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	3+ /3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager	3+ /3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager	3+ /3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager	3+ /3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager
Pricing/Support Price (\$)	495	299	895	495
Date of First Delivery Standard Warranty	None identified 1 year	None identified 1 year	None identified 1 year	None identified 1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Other operating system software supported; SUN NFS, DECnet-DOS.	Other operating system software supported; SUN NES, DECnet-DOS.	Other operating system software supported; SUN NFS, DECnet-DOS.	Operating system software supported SUN NFS, DECnet-DOS; 802.3 10Base-T.

Vendor	Zenith Electronics Corp.	Zenith Electronics Corp.	Zenith Electronics Corp.	Zenith Electronics Corp.
Product	LAN10TPC	LAN4000AT	LAN4000C	LAN4000MC
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Microcomputer Bus Supported	PC	AT (ISA)	PC	MCA
Bus Size	8-bit	16-bit	8-bit	16-bit
Maximum Data Rate (bps)	10M	4M	4M	4M
Media Supported	Standard Ethernet coaxial; Un-shielded twisted-pair	Broadband coaxial	Broadband coaxial	Broadband coaxial
Operating Systems Supported	3+ /3+ Open; Any NetBIOS; NetWare; OS/2 LAN Manager	Decnet-DOS; NetWare; TCP/IP	Decnet-DOS; NetWare; TCP/IP	Decnet-DOS; NetWare; TCP/IP
Pricing/Support				
Price (\$)	395	995	895	995
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Operating systems software supported includes SUN NFS, DECnet-DOS; 802.3 10 BASE-T.	—	—	—

Vendor	Zenith Electronics Corp.	Zenith Electronics Corp.	Zenith Electronics Corp.	Zenith Electronics Corp.
Product	LAN4TR-AT	LAN4TR-PC	LAN4TR-S	LAN500C
Characteristics				
LANs Supported	Token-Ring	Token-Ring	Token-Ring	Ethernet
Microcomputer Bus Supported	AT (ISA)	PC	PC	PC
Bus Size	16-bit	8-bit	8-bit	8-bit
Maximum Data Rate (bps)	4M	4M	4M	500K
Media Supported	Shielded twisted-pair; Un-shielded twisted-pair	Shielded twisted-pair; Un-shielded twisted-pair	Shielded twisted-pair; Un-shielded twisted-pair	Broadband coaxial
Operating Systems Supported	3+ /3+ Open; NetWare; OS/2 LAN Manager; PC LAN Program; TCP/IP	3+ /3+ Open; NetWare; OS/2 LAN Manager; OS/2 LAN Server; PC LAN Program; TCP/IP	3+ /3+ Open; NetWare; OS/2 LAN Manager; PC LAN Program; TCP/IP	NetWare; TCP/IP
Pricing/Support				
Price (\$)	649	499	599	695
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	—	For use in network servers.	—

Vendor	Zenith Electronics Corp.	Zytec Systems	Zytec Systems	Zytec Systems
Product	LAN500MC	815 Custom	816 Arcnet	817 Ethernet
Characteristics				
LANs Supported	Ethernet	Proprietary	Arcnet	Ethernet
Microcomputer Bus Supported	MCA	AT (ISA); EISA; PC	AT (ISA); EISA; PC	AT (ISA); EISA; PC
Bus Size	16-bit	8-bit	16-bit; 8-bit	16-bit
Maximum Data Rate (bps)	500K	1M	2.5M	10M
Media Supported	Broadband coaxial	Unshielded twisted-pair	Broadband coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Operating Systems Supported	Decnet-DOS; NetWare; TCP/IP	3+ /3+ Open; Any NetBIOS; NetWare; PC LAN Program; VINES	3+ /3+ Open; Any NetBIOS O/S; NetWare; PC LAN Program; VINES	3+ /3+ Open; Any NetBIOS O/S; NetWare; PC LAN Program; VINES
Pricing/Support				
Price (\$)	895	199	299	349
Date of First Delivery	None identified	1988	Third Quarter, 1990	First Quarter, 1991
Standard Warranty	1 year	Lifetime limited to original end user	Lifetime limited to original end user	Lifetime limited to original end user
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	—	Starter kit (2 boards, accessories, and free trial/pc 250-user operating system) sells for \$399.00.	Starter kit (2 boards, accessories, and free trial/pc 250-user NetBIOS operating system) sells for \$599.00.	10 BASE-T compliant; starter kit (2 boards, accessories, and free trial/pc 250-user NETBIOS operating system) sells for \$699.00.

Wiring Centers Comparison Column Entry Descriptions

Wiring centers are hubs that provide basic connectivity functions. Most wiring centers include concentrators, host modules, retiming modules, multistation access units (MAUs), and repeaters.

Vendor and Model. This entry lists the manufacturer and exact model number or name of each device.

Characteristics

Type of Device. Generally, the basic types of devices in a wiring center are hub/concentrators, multistation access units (MAUs), and multiport repeaters. A *concentrator* connects circuits that are not all in use at once to a smaller group of circuits. A multistation access unit (MAU) acts as the hub in a token-ring network. When MAUs are linked together, they form a ring, which makes faults easier to

isolate and repair. A *multiport repeater* transparently links users on diverse Ethernet segments.

LANs Supported. Vendors selected Ethernet, Starlan, Arcnet, AppleTalk, Token-Ring, or other. *Ethernet* is a baseband carrier sense, multiple access with collision detection (CSMA/CD) network that uses a linear bus topology and operates at 10M bps. *Starlan* uses a star topology with central hubs and operates at 1M or 10M bps. *Arcnet* is a baseband LAN that uses a ring or bus topology, runs at 2.5M bps, and also uses a token-passing access method. *AppleTalk* supports bus, star, or ring topologies, depending on the network interface card used. *Token-Ring* refers to a LAN designed with a ring topology, running at speeds of 4M or 16M bps, using the token-passing technique.

Media Supported. The various types of media supported by wiring centers include standard Ethernet coaxial, thin Ethernet coaxial, broadband coaxial, shielded twisted pair, unshielded twisted pair, optical fiber, and other. *Standard Ethernet coaxial cable* can serve as the backbone medium for LANs, primarily in enterprise-wide installations. *Thin Ethernet coaxial cable* is used mainly in office environments. *Broadband coaxial cable* can carry many signals at a time, each signal occupying a different frequency band on the cable. *Shielded twisted pair* refers to two insulated wires twisted together and covered with an outer sheath. *Unshielded twisted pair* refers to two insulated wires twisted together without outer protection. *Optical fiber*, which transmits digital signals as pulses of light, comes in single-mode and multimode arrangements, providing varying bandwidths and transmission speeds.

Number of Connections Supported. This entry enabled vendors to indicate the highest number

of connections supported by their wiring centers.

Intelligent Features. Some of the features programmed into equipment include *network management reporting*, *disabling malfunctioning nodes*, and *automatically wrapping the ring on a cable fault*. In this space, vendors could also insert any other intelligent features incorporated into their products.

Pricing/Support

Price. The basic price of the unit, excluding any options, is noted here.

Date of First Delivery. This entry lists the date when the vendor first delivered the product to market.

Standard Warranty. Vendors indicated the length of the warranties offered with their products.

Service Supplied by. The vendor usually offers service on an on-site or factory repair/return basis. In some cases, a dealer of third party provides service.

Comments. In this space, vendors listed special characteristics of their products, such as additional capabilities, features, or software not covered in the column.

Vendor	Allied Telesis Inc.	Allied Telesis Inc.	Allied Telesis Inc.	Allied Telesis Inc.
Product	CentreCOM AT-3008T	CentreCOM AT-3000 Series	CentreCOM AT-1600	CentreCOM AT-5000
Characteristics				
Type of Device	Multiport repeater	Multiport repeater	MAU	Hub/concentrator
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Media Supported	Standard Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	9	9	16	16
Intelligent Features	Disables malfunctioning nodes	Disables malfunctioning nodes	None identified	Disables malfunctioning nodes
Pricing/Support				
Price (\$)	See comments	845	660	1,540
Date of First Delivery	December 1990	October 1989	July 1988	March 1989
Standard Warranty	1 year	1 year	1 year; 2 years	1 year on enclosure and power
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Contact vendor for pricing information; 8 ports supporting unshielded twisted pair, one AUI for external transceiver.	Family of multiport repeaters, ranging from 2 to 9 ports supporting all IEEE 802.3 media; entry-level price.	Modular expansion; entry-level price.	Modular expansion; entry-level price.

Vendor	Allied Telesis Inc.	Andrew Corp.	Andrew Corp.	Andrew Corp.
Product	CentreCOM AT-810	MAU 8224	MAU 8228	MAU 8229
Characteristics				
Type of Device	MAU	MAU	MAU	MAU
LANs Supported	Ethernet	Token-Ring	Token-Ring	Token-Ring
Media Supported	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair
Number of Connections Supported	8	4	8	8
Intelligent Features	None identified	None identified	None identified	Automatically wraps ring on cable fault
Pricing/Support				
Price (\$)	945	395	595	1,495
Date of First Delivery	March 1990	April 1988	April 1988	September 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Vendor	Vendor	Vendor
Comments				

Vendor	Andrew Corp.	Andrew Corp.	Andrew Corp.	Andrew Corp.
Product	MAU 9224	MAU 9228	MAUj/8504	MAUj/8508
Characteristics				
Type of Device	MAU	MAU	MAU	MAU
LANs Supported	Token-Ring	Token-Ring	Token-Ring	Token-Ring
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Number of Connections Supported	4	8	4	8
Intelligent Features	None identified	None identified	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data
Pricing/Support				
Price (\$)	595	795	695	895
Date of First Delivery	April 1988	None identified	September 1990	September 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Extends token-ring lobe distances up to 1000 feet on UTP and 2000 feet on STP.			8-port satellite MAU.

Vendor	Andrew Corp.	Andrew Corp.	Artel Communications Corp.	Artisoft, Inc.
Product	MAUj/8516	MAUj/8600	EXL (Ethernet Accelerator)	LANtastic Hub
Characteristics				
Type of Device	MAU	MAU	Hub/concentrator	Hub/concentrator; multiport repeater
LANs Supported	Token-Ring	Token-Ring	Ethernet; FiberWay	LANtastic
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial	Shielded twisted-pair; Unshielded twisted-pair
Number of Connections Supported	16	16	8	None identified
Intelligent Features	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Provides in-band and out of band network mgmt; Reports network management data	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	None identified
Pricing/Support				
Price (\$)	1,295	3,595	12,900	495
Date of First Delivery	September 1990	October 1990	January 1988	June 1988
Standard Warranty	1 year	1 year	30 days	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	16-port intelligent satellite MAU.		Provides direct connection for up to eight 802.3 Ethernet devices to the FiberWay fiber optic backbone network.	

Vendor	AT&T	AT&T	BICC Data Networks, Inc.	BICC Data Networks, Inc.
Product	Starlan 10 Network Fiber Hub	Starlan Network Hub Unit	1125 Multiport ThinNet Repeater	1126 Fiber Optic Multiport Repeater
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Multiport repeater	Multiport repeater
LANs Supported	Starlan	Starlan	Ethernet	Ethernet
Media Supported	Optical fiber	Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	8	11	8	8
Intelligent Features	None identified	None identified	Automatic partitioning of faulty segments	Automatic partitioning of faulty segments
Pricing/Support				
Price (\$)	2,395	625	2,195	3,995
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	None identified	None identified	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments			Provides six BNC ports for thin Ethernet connection and two AUI ports for connection to other media full implementation of IEEE 802.3 repeater specification supports maximum network size.	Provides seven fiber optic ports and one AUI port for connection to other media, fiber optic ports can be SMA or ST type connectors, full implementation of IEEE 802.3 repeater specification supports max network size.

Vendor	BICC Data Networks, Inc.	BICC Data Networks, Inc.	Cabletron Systems, Inc.	Cabletron Systems, Inc.
Product	EtherConnect System/10	EtherConnect System/4	MMAC Series	MRX
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Hub/concentrator; multiport repeater	Hub/concentrator; multiport repeater
LANs Supported	Ethernet	Ethernet	Ethernet; FDDI; Token-Ring	Ethernet
Media Supported	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	80	80	51, maximum 171	14
Intelligent Features	Disables malfunctioning nodes; Reports network management data	Disables malfunctioning nodes; Reports network management data	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	Control & monitor via local/remote network mgmt.; Disables malfunctioning nodes; Reports network management data
Pricing/Support				
Price (\$)	3,335	2,540	150, max. price is 600	1,400
Date of First Delivery	March 1989	March 1990	June 1988	None identified
Standard Warranty	1 year	1 year	90 days	90 days
Service Supplied by	Vendor	Vendor	Third party; vendor	Third party; vendor
Comments	Supports all standard Ethernet media, including 10-Base-T unshielded twisted-pair, optional network management provides comprehensive monitoring and control capabilities, optional dual power supply and repeater logic on each media line card.	Supports all standard Ethernet media, including 10Base-T unshielded twisted-pair, optional network management provide comprehensive monitoring and control capabilities, repeater login on each media line card.	Control & monitor via local/remote management. Price shown is per port.	

Vendor	Cabletron Systems, Inc.	Cabletron Systems, Inc.	Chipcom Corp.	Chipcom Corp.
Product	MRXI	MiniMMAC	ONline System Concentrator	ORnet Star Coupler
Characteristics				
Type of Device	Hub/concentrator; multiport repeater	Hub/concentrator; multiport repeater	Hub/concentrator	Hub/concentrator
LANs Supported	Ethernet	Ethernet	Ethernet; FDDI; Token-Ring	Ethernet
Media Supported	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Optical fiber
Number of Connections Supported	14	13	128; 64	14; 8
Intelligent Features	Control & monitor via local/remote network mgmt.; Disables malfunctioning nodes; Reports network management data	Control & monitor via local/remote network mgmt.; Disables malfunctioning nodes; Reports network management data	Disables malfunctioning nodes; Reports network management data; fault-tolerance-link, power supply; tri channel arch. supp. up to 3 logical networks	See comments
Pricing/Support				
Price (\$)	2,200	995	4,450	4,150, max. price is 5,950
Date of First Delivery	None identified	January 1990	May 1990	May 1988
Standard Warranty	90 days	90 days	1 year	1 year
Service Supplied by	Third party; vendor	Third party; vendor	Vendor	Vendor
Comments		Includes repeater and power supply.	Online Fiber Module-\$1,800 (4 ports); Online Twisted Pair Module-\$1,600 (8 ports); Online Ethernet Network Mgt Module-\$1,950.	2 km point-to-point distance; no repeaters required; full internal diagnostics; IEEE 802.3/Ethernet V2.0; link redundancy; optional backup power supply.

Vendor	Codenoll Technology Corp.	Codenoll Technology Corp.	Codenoll Technology Corp.	Codenoll Technology Corp.
Product	CodeNet-4300 MultiStar	CodeStar 2004	CodeStar 2007	CodeStar 2008
Characteristics				
Type of Device	Multiport repeater	Hub/concentrator	Hub/concentrator	Hub/concentrator
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Media Supported	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair; plastic optical fiber	Optical fiber	Optical fiber	Optical fiber
Number of Connections Supported	15	4	7	8
Intelligent Features	Disables malfunctioning nodes; reconnects node when fault is cleared	None identified	None identified	None identified
Pricing/Support				
Price (\$)	1,295	1,295	1,195	2,495
Date of First Delivery	January 1989	January 1985	January 1987	January 1985
Standard Warranty	90 days	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Modular multiport repeater that provides a flexible, central platform for multi-segment, multi-media Ethernet networks; can be configured with up to 15 modules of any type and in any combination and is expand. to allow direct connec. of up to 45 segments.	Passive star couplers which provide a means for implementing a fiber optic Ethernet network in a passive configuration; CodeStars containing either 4, 8, or 16 ports are available for use with 50/125 um, 62.5/125 um, or 100/140 um fiber.	Passive fiber optic star coupler which provides a means for implementing a fiber optic Ethernet network in a passive configuration; supports a max distance of 500 m to end nodes over 100/140 um fiber.	Passive star couplers which provide a means for implementing a fiber optic Ethernet network in a passive configuration; CodeStars containing either 4, 8, or 16 ports are available for use with 50/125 um, 62.5/125 um, or 100/140 um fiber.

Vendor	Codenoll Technology Corp.	Codenoll Technology Corp.	Codenoll Technology Corp.	Commtext Inc.
Product	CodeStar 2016	CodeStar 2019	CodeStar 2032	Cx-80 Access Unit
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Hub/concentrator	Hub/concentrator
LANs Supported	Ethernet	Ethernet	Ethernet	Proprietary
Media Supported	Optical fiber	Optical fiber	Optical fiber	Unshielded twisted-pair
Number of Connections Supported	16	19	32	64
Intelligent Features	None identified	None identified	None identified	Disables malfunctioning nodes; Reports network management data
Pricing/Support				
Price (\$)	4,395	2,195	8,495	See comments
Date of First Delivery	January 1985	January 1987	January 1985	1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Passive star couplers which provide a means for implementing a fiber optic Ethernet network in a passive configuration; CodeStar containing either 4, 8, or 16 ports are available for use with 50/125 um, 62.5/125 um or 100/140 um fiber.	Passive fiber optic star coupler which provides a means for implementing a fiber optic Ethernet network is a passive configuration; supports a maximum distance of 500 m to end nodes over 100/140 um fiber.	Passive star couplers which provide a means for implementing a fiber optic Ethernet network in a passive configuration; CodeStars containing either 4, 8, or 16 ports are available for use with 50/125 um, 62.5/125 um, or 100/140 um fiber.	Contact vendor for pricing information; central controller for commtext star topology multi-media LAN; allows connected PCs to access Novell LAN data, ISDN networks, and full motion video/audio resources.
Vendor	Datapoint Corp.	Datatec Industries	Datatec Industries	Datatec Industries
Product	9497	Autoshunt 16	Autoshunt 32	Autoshunt 64
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Hub/concentrator	Hub/concentrator
LANs Supported	Arcnet	IBM SDLC Store Loop	IBM SDLC Store Loop	IBM SDLC Store Loop
Media Supported	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair	Shielded twisted-pair	Shielded twisted-pair
Number of Connections Supported	None identified	16	32	64, maximum 128
Intelligent Features	Disables malfunctioning nodes; Reports network management data	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data
Pricing/Support				
Price (\$)	See comments	2,100	5,185	6,205
Date of First Delivery	January 1985	None identified	None identified	None identified
Standard Warranty	30 days	1 year	1 year	1 year
Service Supplied by	Third party	Third party; vendor	Third party; vendor	Third party; vendor
Comments	Contact vendor for pricing information.	Quantity discounts available.	Quantity discounts available.	Quantity discounts available.

Vendor	Datatec Industries	Datatec Industries	David Systems	David Systems
Product	Autoshunt 8	Token Ring MAU Model 8	BNC-MAU	ExpressNet 12-Slot Concentrator
Characteristics				
Type of Device	Hub/concentrator	MAU	MAU	Hub/concentrator
LANs Supported	IBM SDLC Store Loop	Token-Ring	Ethernet	Ethernet
Media Supported	Shielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Unshielded twisted-pair
Number of Connections Supported	8	8	1	132
Intelligent Features	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	Disables malfunctioning nodes; Reports network management data	Disables malfunctioning nodes	Built-in diagnostics; Disables malfunctioning nodes; Reports network management data
Pricing/Support				
Price (\$)	1,150	795	495	1,500
Date of First Delivery	None identified	None identified	October 1990	May 1990
Standard Warranty	1 year	1 year	2 years	2 years
Service Supplied by	Third party; vendor	Vendor	Vendor	Vendor
Comments	Quantity discounts available.			Price covers concentrator; requires plug in modules to operate; fully loaded unit (132 10Base-T ports) approx \$156 per port.

Vendor	David Systems	David Systems	David Systems	David Systems
Product	ExpressNet 5-Slot Concentrator	ExpressNet Hub	TP-MAU	VolksNet Hub
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	MAU	Hub/concentrator
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Media Supported	Unshielded twisted-pair	Unshielded twisted-pair	Standard Ethernet coaxial; Unshielded twisted-pair	Unshielded twisted-pair
Number of Connections Supported	48	12	1	12
Intelligent Features	Built-in diagnostics; Disables malfunctioning nodes; Reports network management data	Built-in diagnostics; Disables malfunctioning nodes; Reports network management data	Disables malfunctioning nodes	Disables malfunctioning nodes; Reports network management data
Pricing/Support				
Price (\$)	1,200	1,795	149	1,199
Date of First Delivery	April 1990	December 1989	December 1989	February 1990
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Price covers concentrator; requires plug-in modules to operate; fully loaded unit (48 10Base-T Ports) approx. \$189.50 per port.			

Vendor	Digital Communications Associates, Inc.	Digital Communications Associates, Inc.	Digital Communications Associates, Inc.	Digital Equipment Corp.
Product	10M Fiber Hub	10M Twisted Pair Concentrator	1M Fiber Hub M 250	DEMPR/DECRepeater 350
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Hub/concentrator	Multiport repeater
LANs Supported	Starlan	Ethernet; Starlan	Fiber Optic; Starlan	Ethernet
Media Supported	Optical fiber	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	8	None identified	8	None identified
Intelligent Features	None identified	Disables malfunctioning nodes; Link, status, jabber and collision detection; Reports network management data	None identified	Disables malfunctioning nodes
Pricing/Support				
Price (\$)	2,595	2,200	1,995	2,200, max. price is 2,900
Date of First Delivery	June 1989	July 1990	June 1988	None identified
Standard Warranty	1 year	1 year	1 year	90 days
Service Supplied by	Vendor	Dealer; vendor	Dealer; vendor	Vendor
Comments		Allows connectivity to twisted pair, coax, and fiber optic media on one network.		

Vendor	Fibermux Corp.	Gandalf Data, Inc.	Gateway Communications, Inc.	General Technology, Inc.
Product	FX6600	Access Hub	G/EtherTwist Hub	GT16A-SMAU
Characteristics				
Type of Device	MAU; hub/concentrator; multiport repeater	Hub/concentrator	Hub/concentrator	MAU
LANs Supported	Apollo Domain; AppleTalk; Ethernet; Starlan; Token-Ring	Ethernet	Ethernet	Token-Ring
Media Supported	Apollo Domain Coax; Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Unshielded twisted-pair	Shielded twisted-pair
Number of Connections Supported	100	120	11	8
Intelligent Features	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Operates on Unix or DOS platforms; Reports network management data; Supports SNMP management	Reports network management data	Detects network collisions; Disables malfunctioning nodes	Automatically wraps ring on cable fault; Indicates which ring segment failed via LEDs
Pricing/Support				
Price (\$)	158, max. price is 415	1,295	1,995, max. price is 3,195	699, max. price is 1,499
Date of First Delivery	March 1990	None identified	February 1990	November 1988
Standard Warranty	1 year	None identified	1 year	1 year
Service Supplied by	Vendor	Vendor	Dealer	Vendor
Comments	Price shown is per port; supports up to four Ethernets and 10 token rings in the same hub; 2-, 4-, and 10-slot versions are available; networking management is optional.	Set of three products: Access Hub12 is a 12 port 10Base-T compliant Hub; Access Hub48 is a wiring center for up to 48 devices, allowing a mix of coax, twisted pair & fiber wiring; & Access Hub120 is a wiring center for connectivity for 120 devices.	10BASE-T compatible.	For 4M or 16M bps token-ring networks.

Vendor	General Technology, Inc.	General Technology, Inc.	General Technology, Inc.	General Technology, Inc.
Product	GT16B(L)	GT16N-SMAU	GT4A-SMAU	GT4R-SMAU
Characteristics Type of Device	MAU	MAU	MAU	MAU
LANs Supported	Token-Ring	Token-Ring	Token-Ring	Token-Ring
Media Supported	Shielded twisted-pair	Optical fiber; Shielded twisted-pair	Unshielded twisted-pair	Unshielded twisted-pair
Number of Connections Supported Intelligent Features	None identified (L) Option provides Line Powered Lobe LED	31 Automatically wraps ring on cable fault; Disables malfunctioning nodes; Provides real-time graphic displays of network; Provides trouble tickets and reports	8 Automatically wraps ring on cable fault; Indicates which ring cable is defective; Indicates which ring segment failed via LEDs	8 Automatically wraps ring on cable fault; Extended range-up to 1025 feet per lobe/ring; Indicates which ring segment failed via LEDs
Pricing/Support Price (\$)	465, max. price is 485	1,099, max. price is 1,899	495	625
Date of First Delivery Standard Warranty Service Supplied by	September 1990 1 year Vendor	September 1990 1 year Vendor	November 1988 1 year Vendor	November 1988 1 year Vendor
Comments	Start-up MAU for small user.	Smart-View (Copyright) Network Management Software is supplied with unit; demo disk is available for review; includes built-in fiber optic ring ports.	For 4M bps token-ring networks.	For 4M bps token-ring networks.

Vendor	IMC Networks Corp.	IMC Networks Corp.	International Business Machines Corp. (IBM)	Interphase Corp.
Product	PCnic Basket	TP MAU	8228 Multistation Access Unit	fiberHub 800 FDDI Concentrator
Characteristics Type of Device	Multiport repeater	MAU	MAU	Hub/concentrator
LANs Supported	Ethernet	Ethernet	Token-Ring	FDDI
Media Supported	75 Ohm & 93 Ohm coaxial; Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	AUI; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair
Number of Connections Supported Intelligent Features	1, maximum 10 Disables malfunctioning nodes; functions as repeater	None identified LEDs indicating link integrity, transmit, receive	8 Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	8 Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data
Pricing/Support Price (\$)	995	See comments	748	20,000
Date of First Delivery Standard Warranty Service Supplied by	October 1989 2 years Dealer; vendor	Fourth Quarter, 1990 2 years Dealer; vendor	1985 None identified Dealer; vendor	1991 1 year Dealer; vendor
Comments	Optionally supports 75 Ohm (PC/Net, G/Net) and 93 Ohm (ARCnet, IBM 3270) coaxial cabling when used in conjunction with PCnic family of coaxial network interface cards; all cabling impedences may be mixed in a single Basket.	Contact vendor for pricing information.		Price shown is base.

Vendor	Lancast/Casat Technology	Lancast/Casat Technology	Lanmaster	Lanmaster
Product	ENT-4360	ETP-4380	LMA-1600	LMA-400
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator; multiport repeater	Hub/concentrator	Hub/concentrator
LANs Supported	Ethernet	Ethernet	Arcnet	Arcnet
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Unshielded twisted-pair	Baseband coaxial; Optical fiber; Unshielded twisted-pair	Baseband coaxial; Optical fiber; Unshielded twisted-pair
Number of Connections Supported	13	11	16	4
Intelligent Features	None identified	None identified	Disables malfunctioning nodes; Reports network management data	Disables malfunctioning nodes; Reports network management data
Pricing/Support				
Price (\$)	1,495	1,595	895	395
Date of First Delivery	None identified	None identified	September 1988	September 1988
Standard Warranty	3 years	3 years	2 years	2 years
Service Supplied by	Vendor	Vendor	Dealer; vendor	Dealer; vendor
Comments	LED functionality as follows: AUI, transmit, receive, load, partition, collision system; power, SQE UTP ports; transmit, receive, power, partition, collision.	LED functionality as follows: AUI; transmit, receive, power, partition & collision system; power, jam, first in first out & AMU lock up. UTP ports; transmit, receive, link, partition, collision.		Lanmaster active hubs are custom configured with a combination of coax and twisted-pair ports; includes in-line surge protection.

Vendor	Lanmaster	LANNET Data Communications, Inc.	LANNET Data Communications, Inc.	LANNET Data Communications, Inc.
Product	LMA-800	LER-A	LER-B	LET-18
Characteristics				
Type of Device	Hub/concentrator	Multiport repeater	Multiport repeater	Hub/concentrator
LANs Supported	Arcnet	Ethernet	Ethernet	AppleTalk; Ethernet; Token-Ring
Media Supported	Baseband coaxial; Optical fiber; Unshielded twisted-pair	Standard Ethernet coaxial	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	8	2	11	72
Intelligent Features	Disables malfunctioning nodes; Reports network management data	Disables malfunctioning nodes; diagnostics	Disables malfunctioning nodes; diagnostics	Auto learning of hubs & modules; Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data; Video image of hub
Pricing/Support				
Price (\$)	495	1,195	2,495	2,000
Date of First Delivery	September 1988	July 1990	November 1990	October 1988
Standard Warranty	2 years	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Lanmaster active hubs are custom configured with a combination of coax and twisted-pair ports.			Modular 18-slot enclosure.

Vendor	LANNET Data Communications, Inc.	LANNET Data Communications, Inc.	Lantana Technology	Lantana Technology
Product	LET-3	LET-36	Aster/H4A-C	Aster/H4A-TP
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Hub/concentrator	Hub/concentrator
LANs Supported	AppleTalk; Ethernet; Token-Ring	AppleTalk; Ethernet; FDDI; Token-Ring	Arcnet	Arcnet
Media Supported	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Broadband coaxial	Shielded twisted-pair; Unshielded twisted-pair
Number of Connections Supported	12	18, maximum 36	4	4
Intelligent Features	Auto learning of hubs & modules; Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data; Video image of hub	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data; Video image of hub; auto-learning of hubs, modules, ports	None identified	None identified
Pricing/Support Price (\$)	900	See comments	195	195
Date of First Delivery	January 1990	August 1990	August 1988	November 1990
Standard Warranty	1 year	1 year	2 years	2 years
Service Supplied by	Dealer; vendor	Vendor	Vendor	Vendor
Comments		Contact vendor for pricing information; supports multiple LANs; 36 half-size slots or 18 full-size slots.	Active hub.	Active hub.

Vendor	Lantana Technology	Lantana Technology	Lantana Technology	Lantana Technology
Product	Aster/H8A	Cypress/M8228	Cypress/M8228D	Tamarix/R1125
Characteristics				
Type of Device	Hub/concentrator	MAU	MAU	Multiport repeater
LANs Supported	Arcnet	Token-Ring	Token-Ring	Ethernet
Media Supported	Broadband coaxial; Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	IBM Type 1	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	4	8	8	8
Intelligent Features	None identified	None identified	None identified	None identified
Pricing/Support Price (\$)	595	595.00	695	2,695
Date of First Delivery	August 1988	June 1990	June 1990	August 1988
Standard Warranty	2 years	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Expandable to 20 connections.			

Vendor	Madge Networks, Inc.	Madge Networks, Inc.	Netcor, Inc.	Netcor, Inc.
Product	8-station Ringhub	Local Ringhub	NC-208	NC-208F
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Multiport repeater	Multiport repeater
LANs Supported	Token-Ring	Token-Ring	None identified	Ethernet
Media Supported	Shielded twisted-pair	Shielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	8	4	10	None identified
Intelligent Features	None identified	None identified	Disables malfunctioning nodes	Automatically wraps ring on cable fault
Pricing/Support				
Price (\$)	715	450	2,495	3,995
Date of First Delivery	None identified	None identified	May 1990	September 1990
Standard Warranty	5 years	5 years	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Vendor	Vendor
Comments	Passive unit; eliminates the need to install a power supply on an uninterruptable power supply in each wiring closet; built-in reset button.	Connects to an existing cable outlet of an MAU; up to 3 local ringhubs can be daisy-chained to add up to 10 nodes to a single MAU connection; can also function as a standalone unit.		

Vendor	Netcor, Inc.	Netcor, Inc.	Netcor, Inc.	Netcor, Inc.
Product	NC-500	NC-500B (2)	NC-500B (4)	NC-500F
Characteristics				
Type of Device	Multiport repeater	Multiport repeater	Multiport repeater	Multiport repeater
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Media Supported	Standard Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber; Standard Ethernet coaxial
Number of Connections Supported	4	2	4	4
Intelligent Features	Disables malfunctioning nodes	Disables malfunctioning nodes	Disables malfunctioning nodes	Disables malfunctioning nodes
Pricing/Support				
Price (\$)	1,450	990	1,650	1,950
Date of First Delivery	June 1989	September 1989	September 1989	June 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments				

Vendor	Netcor, Inc.	Netcor, Inc.	NetWorth, Inc.	NetWorth, Inc.
Product	NC-500FB	NC-80	EtherNext Series 4000 Department Command Center	EtherNext Series 4000 Network Command Center
Characteristics				
Type of Device	Multipoint repeater	MAU	Hub/concentrator	Hub/concentrator
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet; Starlan
Media Supported	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	4	8	1024	1024
Intelligent Features	Disables malfunctioning nodes	LEDs monitor & diagnose colli- sions; data transmit and receive	Automatic paging; Automati- cally wraps ring on cable fault; Disables malfunctioning nodes; On board statistical display; Re- ports network management data	Automatic paging; Automati- cally wraps ring on cable fault; Disables malfunctioning nodes; On board statistical display; Re- ports network management data
Pricing/Support				
Price (\$)	2,150	900	995	1,295
Date of First Delivery	September 1989	March 1983	November 1990	November 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Dealer	Dealer
Comments		Return to factory or 800 number technical support.	10Base-T LAN system; the de- partment command center is a three-slot chassis that houses 10Base-T Host modules and network management modules.	10Base-T LAN system; the net- work command center is a six- slot chassis that houses 10Base-T host modules and network management modules.
Vendor	NetWorth, Inc.	Nevada Western	Niwot Networks	Olicom USA
Product	EtherNext Workgroup Hubs	NEV*LAN4	LARC/MM	OC-3625 Multistation Access Unit
Characteristics				
Type of Device	Hub/concentrator	MAU	Link	MAU
LANs Supported	10BASE-T; Ethernet	Token-Ring	Arcnet	Token-Ring
Media Supported	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Un- shielded twisted-pair	Optical fiber	Shielded twisted-pair; Un- shielded twisted-pair
Number of Connections Supported	1024	16	2	8
Intelligent Features	Automatically wraps ring on ca- ble fault; Disables malfuncion- ing nodes; Reports network management data	LEDs	None identified	Reset while network active
Pricing/Support				
Price (\$)	1,995, max. price is 2,395	1,000	1,495	925
Date of First Delivery	June 1989	April 1989	September 1990	April 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer	Vendor	Vendor	Dealer
Comments	Ethernex is a 10Base-T LAN.	Supports shielded twisted-pair cabling with data connectors, unshielded twisted-pair with RJ11 or RJ45 jacks.	Long haul Arcnet Link, can con- nect ARCnet node up to 6k (3.75 miles, twice as far as previously possible); input either coax or twisted-pair, output 62.5/125 or 50/125 fiber optic cable; light- ning and EMI (electromagnetic interference) protection.	Can be used in network to con- nect IBM & compatibles; certi- fied to be IBM compatible & meets IEEE 802.5 standard re- quirements; can be mixed freely with IBM & other IBM wire con- centrators & can be daisy- chained to create larger net- works.

Vendor	Olicom USA	Optical Data Systems, Inc.	Optical Data Systems, Inc.	Optical Data Systems, Inc.
Product	OC-3630 Dual Station Access Unit	ODS 1041	ODS 240	ODS 251
Characteristics				
Type of Device	DAU	Hub/concentrator	Hub/concentrator	Multiport repeater
LANs Supported	Token-Ring	FDDI	Ethernet	Ethernet
Media Supported	Shielded twisted-pair; Unshielded twisted-pair	Optical fiber	Optical fiber	Optical fiber; Standard Ethernet coaxial
Number of Connections Supported	2	18	16	16
Intelligent Features	No external power supply required	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data; redundant power	Reports network management data; SNMP agent	Reports network management data; SNMP agent; network control module
Pricing/Support				
Price (\$)	450	See comments	6,900	2,695
Date of First Delivery	April 1990	Second Quarter, 1991	January 1989	May 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer	Vendor	Vendor	Vendor
Comments	Used to connect IBM or compatibles to the network; can be daisy-chained; expands number of workstations without changing topology of the main ring and requires no re-wiring of the network.	Contact vendor for pricing information; single mode to multi-mode FDDI optic converter available now.	Tempest 16-port Ethernet star.	Collision avert feature.

Vendor	Optical Data Systems, Inc.	Optical Data Systems, Inc.	Optical Data Systems, Inc.	Optical Data Systems, Inc.
Product	ODS 290/293	ODS 291	ODS 461	ODS 8228
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Hub/concentrator	MAU
LANs Supported	Ethernet; FDDI; Token-Ring	Ethernet	Ethernet	Token-Ring
Media Supported	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Number of Connections Supported	96	48	16	8
Intelligent Features	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data; SNMP agent; load sharing; redundant power	Disables malfunctioning nodes; Reports network management data; SNMP agent; network management card	Disables malfunctioning nodes; Reports network management data; SNMP agent	Insertion LEDs
Pricing/Support				
Price (\$)	4,595	3,995	3,495	795
Date of First Delivery	May 1990	May 1990	August 1990	August 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	ODS 293 multi-segment chassis; 12 slot chassis; full bandwidth bridge card; collision avert feature; FOIRL-support.	5 slot chassis; collision avert feature; FOIRL support.	10Base-T compatible.	Passive MAU.

Vendor	Optical Data Systems, Inc.	Optical Data Systems, Inc.	Plexcom, Inc.	Proteon, Inc.
Product	ODS 841	ODS 861	Plexnet Multi-Media LAN Concentrator	Series 70 Intelligent Wire Center
Characteristics				
Type of Device	MAU	MAU	MAU; hub/concentrator; modular system; multiport repeater	MAU
LANs Supported	Token-Ring	Token-Ring	AppleTalk; Ethernet; FDDI; Token-Ring	ProNET-10; Token-Ring
Media Supported	Optical fiber	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair
Number of Connections Supported	16	16	See comments	8
Intelligent Features	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data; internal NetView Reporting option; internal bridge option	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data; available w/ NetView Reporting option	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Opt. SNMP network management; Reports network management data	Disables malfunctioning nodes; Reports network management data
Pricing/Support				
Price (\$)	4,995	3,995	80, max price is 150	1,295
Date of First Delivery	June 1990	August 1990	March 1988	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Out-of-Band Management option; In-Band SNMP Management option.	Out-of-Band Management available; In-Band SNMP Management available.	196 connections (Ethernet); 168 (Token-Ring); 224 (AppleTalk); prices shown per port.	Out-band management isolates faults to isolate & correct faults even when network is down, speeding recovery time.

Vendor	Proteon, Inc.	PureData Ltd.	PureData Ltd.	PureData Ltd.
Product	Series 70 WorkGroup Wire Center	PDC 504A	PDC 504A-F	PDC 504A-T
Characteristics				
Type of Device	MAU	Hub/concentrator	Hub/concentrator	Hub/concentrator
LANs Supported	Token-Ring	Arcnet	Arcnet	Arcnet
Media Supported	Unshielded twisted-pair	Broadband coaxial	Optical fiber	Unshielded twisted-pair
Number of Connections Supported	4	4	4	4
Intelligent Features	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	Diagnostic LEDs	Diagnostic LEDs	Diagnostic LEDs
Pricing/Support				
Price (\$)	495	395	2,250	450
Date of First Delivery	None identified	October 1986	October 1986	October 1986
Standard Warranty	1 year	5 years	5 years	5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Expands a Series 70 Wire Center's networking support from 8 to 32 workstations.	4-port active hub; front panel-mounted activity LEDs and writable/erasable ID pads for each node connection; 110/220 V options.	4-port active hub; front panel-mounted activity LEDs and writable/erasable ID pads for each node connection; 110/220 V options.	4-port active hub; front panel-mounted activity LEDs and writable/erasable ID pads for each node connection; 110/220 V options.

Vendor	PureData Ltd.	PureData Ltd.	PureData Ltd.	PureData Ltd.
Product	PDC 504P	PDC 508A	PDC 508A-T	PDC 520A
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Hub/concentrator	Hub/concentrator
LANs Supported	Arcnet	Arcnet	Arcnet	Arcnet
Media Supported	Broadband coaxial	Broadband coaxial	Unshielded twisted-pair	Broadband coaxial
Number of Connections Supported	4	8	8	20
Intelligent Features	None identified	Diagnostic LEDs	Diagnostic LEDs	Diagnostic LEDs
Pricing/Support				
Price (\$)	75	495	495	1,099
Date of First Delivery	October 1986	October 1986	October 1986	September 1987
Standard Warranty	5 years	5 years	5 years	5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	4-port passive hub with coax cable connectors; includes 93ohm terminator.	8-port active hub; front panel-mounted activity LEDs and writable/erasable ID pads for each node connection; 110/220 V options.	8-port active hub; front panel-mounted activity LEDs and writable/erasable ID pads for each node connection; 110/220 V options.	20-port active hub; front panel-mounted activity LEDs and writable/erasable ID pads for each node connection; designed to fit industry-standard 19" racks, comes equipped with handles and works as a shelf for 4- and 8-port hubs; 120/240 V options.
Vendor	PureData Ltd.	PureData Ltd.	PureData Ltd.	PureData Ltd.
Product	PDC 520A-T	PDC 8025A	PDC 8025P	PDC 8025P-T16
Characteristics				
Type of Device	Hub/concentrator	MAU	MAU	MAU
LANs Supported	Arcnet	Token-Ring	Token-Ring	Token-Ring
Media Supported	Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Unshielded twisted-pair
Number of Connections Supported	20	8	8	16
Intelligent Features	Diagnostic LEDs	Automatically wraps ring on cable fault; Diagnostic LEDs; Disables malfunctioning nodes	Automatically wraps ring on cable fault; Diagnostic LEDs; Disables malfunctioning nodes	Automatically wraps ring on cable fault; Diagnostic LEDs; Disables malfunctioning nodes
Pricing/Support				
Price (\$)	1,099	795	695	995
Date of First Delivery	September 1987	September 1987	December 1989	December 1989
Standard Warranty	5 years	5 years	5 years	5 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	20-port active hub; front panel mounted activity LEDs and writable/erasable ID pads for each node connection designed to fit industry-standard 19" racks; comes equipped with handles and works as a shelf for a 4 and 8 port hubs; 120/240 volt options.	8-port active MAU with IBM data connectors fully compatible with the IBM 8228 and comes equipped with LEDs for each port connection.	8-port passive MAU with IBM data connectors; fully compatible with the IBM 8228 and comes equipped with LEDs for each port connection; 1.75" high, using only one industry-standard 19" rack unit.	16-port passive MAU for UTP type 3 wiring; fully compatible with the IBM 8228 and comes equipped with LEDs for each port connection 1.75" high using only one industry-standard 19" rack unit; has switchable RJ11 receptacles for connecting nodes.

Vendor	Racal InterLan	Racal InterLan	Ship Star Assoc.	Standard Microsystems Corp.
Product	INX5000-12C/F	INX5000-3C/F	HR 8023	4-Port Active Hub for Fiber Optic
Characteristics				
Type of Device	Hub/concentrator	Network terminal server	Head end remodulator	Hub/concentrator
LANs Supported	Ethernet	Ethernet	Ethernet	Arcnet
Media Supported	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; async ports	Broadband coaxial	Optical fiber
Number of Connections Supported	156	None identified	2	4
Intelligent Features	Disables malfunctioning nodes; Dual LAT/TCP protocol support; Print and macro servers supported; Reports network management data	Reports network management data	Reports network management data	None identified
Pricing/Support				
Price (\$)	210	240	3,815, max. price is 4,045	1,295
Date of First Delivery	December 1990	December 1990	June 1989	None identified
Standard Warranty	1 year	1 year	1 year	90 days
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Vendor	Dealer
Comments	Modular chassis for providing twisted pair Ethernet and dual protocol terminal service; 12-slot and 3-slot chassis are available; price listed is per port.	Price listed is per port.	Meets IEEE 802.3 - 10Broad36 Standard.	

Vendor	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.
Product	Coax Active Hub-03	Coax Intelligent Hub	Coax Internal 4 Port Hub	SMC3508
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Hub/concentrator	Hub/concentrator
LANs Supported	Arcnet	Arcnet	Arcnet	Ethernet
Media Supported	Baseband coaxial	Baseband coaxial	Baseband coaxial	Thin Ethernet coaxial
Number of Connections Supported	8	8	4	8
Intelligent Features	None identified	Reports network management data	None identified	Reports network management data
Pricing/Support				
Price (\$)	549	749	295	2,395, max. price is 2,950
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	90 days	90 days	90 days	90 days
Service Supplied by	Dealer	Dealer	Dealer	Dealer
Comments				Price varies depending on connector selected for 9th port (interconnect port) 4 models available: AUI, BNC, RJ-45, Fiber ST.

Vendor	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.	Standard Microsystems Corp.
Product	SMC3508 TP	SMC3508F	Twisted Pair Active Hub-03	Twisted Pair Intelligent Hub
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Hub/concentrator	Hub/concentrator
LANs Supported	Ethernet	Ethernet	Arcnet	Arcnet
Media Supported	Unshielded twisted-pair	Optical fiber	Unshielded twisted-pair	Unshielded twisted-pair
Number of Connections Supported	8	8	8	8
Intelligent Features	Reports network management data	Reports network management data	None identified	Reports network management data
Pricing/Support				
Price (\$)	1,195, max. price is 1,750	3,395, max. price is 3,950	695	895
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	90 days	90 days	90 days	90 days
Service Supplied by	Dealer	Dealer	Dealer	Dealer
Comments	Price varies depending on connector selected for 9th part (interconnect port) 4 models available; AUI, BNC, RJ-45, Fiber ST.			

Vendor	Standard Microsystems Corp.	Standard Microsystems Corp.	Star-Tek, Inc.	Star-Tek, Inc.
Product	Twisted Pair Internal 4 Port Hub	Type 1/Type 2 Active Hub	820-1	820-2
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Multiport repeater	Multiport repeater
LANs Supported	Arcnet	Arcnet	Token-Ring	Token-Ring
Media Supported	Unshielded twisted-pair	Shielded twisted-pair	Optical fiber; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair
Number of Connections Supported	4	8	None identified	None identified
Intelligent Features	None identified	None identified	None identified	None identified
Pricing/Support				
Price (\$)	345	950	1,100	1,100
Date of First Delivery	None identified	None identified	January 1990	January 1990
Standard Warranty	90 days	90 days	1 year	1 year
Service Supplied by	Dealer	Dealer	Vendor	Vendor
Comments				

Vendor	Star-Tek, Inc.	Star-Tek, Inc.	Star-Tek, Inc.	SynOptics Communications, Inc.
Product	828-5	828-6	828-7	10BASE-T Area Concentrator 2310-02
Characteristics				
Type of Device	MAU	MAU	MAU	Hub/concentrator
LANs Supported	Token-Ring	Token-Ring	Token-Ring	Ethernet
Media Supported	Shielded twisted-pair	Unshielded twisted-pair	Unshielded twisted-pair	Standard Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	8	8	8	36
Intelligent Features	None identified	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Logs network statistics; Reports network management data
Pricing/Support				
Price (\$)	1,297	1,227	2,200	See comments
Date of First Delivery	November 1989	September 1989	September 1990	October 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Dealer; third party; vendor
Comments		Supports 16M or 4M on UTP-100 meters/lobe.	Active MAU with retiming for 16M or 4M-supports 100 meters/lobe.	Contact vendor for pricing information.

Vendor	SynOptics Communications, Inc.	SynOptics Communications, Inc.	SynOptics Communications, Inc.	3Com Corp.
Product	10BASE-T Area Concentrator 2310-01	Department Concentrator 3030	Premises Concentrator 3000	Multiconnect
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator; multiport repeater	Hub/concentrator; multiport repeater	Multiport repeater
LANs Supported	Ethernet	Ethernet; FDDI; Token-Ring	Ethernet; FDDI; Token-Ring	Ethernet
Media Supported	Standard Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	36	36	132	45
Intelligent Features	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Logs network statistics; Reports network management data	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Reports network management data	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Logs network statistics; Reports network management data	Disables malfunctioning nodes
Pricing/Support				
Price (\$)	347	See comments	350	1,295.00
Date of First Delivery	October 1990	May 1989	May 1989	August 1987
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Third party; vendor	Dealer
Comments	Price includes network management; price shown is per port.	Contact vendor for pricing information.	Price shown is per port.	15 module slots; can accommodate a mix of thin Ethernet, thick, 10BASE-T, plus Starlan10 of Lattisnet; 10BASE-T module is \$595.

Vendor	Transition Engineering	Ungermann-Bass, Inc.	Wang Laboratories, Inc.	Wang Laboratories, Inc.
Product	H-10BT-12	Access/One	8023-ADPTR	8023-Hubbox
Characteristics				
Type of Device	Multiport repeater	Intelligent hub	MAU	Hub/concentrator
LANs Supported	Ethernet	AppleTalk; Ethernet; FDDI; Token-Ring	Ethernet	Ethernet
Media Supported	Unshielded twisted-pair	Broadband coaxial; Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Broadband coaxial; Standard Ethernet coaxial	Optical fiber; Standard Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	12	220	8	18
Intelligent Features	Disables malfunctioning nodes	Automatically wraps ring on cable fault; Disables malfunctioning nodes; Power Supply; Reports network management data; Temperature	None identified	None identified
Pricing/Support				
Price (\$)	1,299	200, max. price is 350	3,500	1,725
Date of First Delivery	October 1990	None identified	November 1990	November 1990
Standard Warranty	1 year	90 days	90 days	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	12 UTP and 1 AUI connection.	Price shown is per connection.		Price shown is for 6 nodes.

Vendor	Wang Laboratories, Inc.	Wang Laboratories, Inc.	Wang Laboratories, Inc.	Xinetron
Product	8023-MPR	8023-REPTR-AUI	8023-Repeater-M	Xi-10T2
Characteristics				
Type of Device	Multiport repeater	Multiport repeater	Multiport repeater	Hub/concentrator
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Thin Ethernet coaxial; Unshielded twisted-pair
Number of Connections Supported	None identified	2	None identified	None identified
Intelligent Features	None identified	None identified	None identified	None identified
Pricing/Support				
Price (\$)	3,000	1,600	2,900	149
Date of First Delivery	November 1990	November 1990	November 1990	October 1990
Standard Warranty	90 days	90 days	90 days	3 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments				Links 10Base-T twisted-pair to thin coaxial cabling on Ethernet networks.

Vendor	Xinetron	Xinetron	Xinetron	Xinetron
Product	Xi-10T8	Xi-2T2	Xi-2T4/2A4	Xi-2T8/2A8
Characteristics				
Type of Device	Hub/concentrator	Hub/concentrator	Hub/concentrator	Hub/concentrator
LANs Supported	Ethernet	Arcnet	Arcnet	Arcnet
Media Supported	Unshielded twisted-pair	Baseband coaxial; Shielded twisted-pair	Baseband coaxial; Shielded twisted-pair	Baseband coaxial; Shielded twisted-pair
Number of Connections Supported	8	2	4	8
Intelligent Features	Diagnostic LEDs	None identified	Diagnostic LEDs	Diagnostic LEDs
Pricing/Support				
Price (\$)	349	99	99	229
Date of First Delivery	October 1990	April 1989	March 1988	January 1988
Standard Warranty	3 years	3 years	3 years	3 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments		Links twisted-pair to coaxial cabling or Arcnet networks.		

Vendor	Zenith Electronics Corp.	Zenith Electronics Corp.	Zytec Systems
Product	Enterprise Exchange C18	Enterprise Exchange C3	815 Custom Hub
Characteristics			
Type of Device	Hub/concentrator	Hub/concentrator	Hub/concentrator; multiport repeater
LANs Supported	Ethernet; Token-Ring	Ethernet	Proprietary
Media Supported	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Unshielded twisted-pair
Number of Connections Supported	72	12	250
Intelligent Features	Opt. redundant operation mode; Reports network management data; auto part. of netwk upon detec. of cable shorts	Automatically wraps ring on cable fault; Opt. redundant operation mode; Reports network management data; auto part. of netwk upon detec. of cable shorts	Disables malfunctioning nodes
Pricing/Support			
Price (\$)	2,190	990	499
Date of First Delivery	None identified	None identified	1989
Standard Warranty	1 year	1 year	Lifetime limited to original
Service Supplied by	Vendor	Vendor	Vendor
Comments	Modular network hub supports up to 18 separate modules. Ethernet (including 10 Baset) and Token-Ring interface modules are available, along with repeater and transceiver modules.	Modular network hub supports up to 3 separate modules. Ethernet (including 10Baset) and Token-Ring interface modules are available, along with repeater and transceiver modules.	

Diskless Workstations Comparison Column Entry Descriptions

Diskless workstations are designed for use on a local area network. They differ from conventional PCs in that they contain no disk drives; they are dependent on a network file server for data storage. Our survey form provided each vendor with a number of possible choices for each parameter listed. There was also space to write in a specific answer when the proper choices for that vendor were not listed.

Vendor and Model. This entry lists the manufacturer and exact model number or name of each device.

Characteristics

Processor. The processor controls the basic functions of the workstation. The most popular processors in use today are the

Intel 80286 and 80386; some newer machines use the 80486. Also available are Intel's older 80186 or 8088, Motorola's 68000 and 68020, and NEC's V20 and V40.

Minimum Memory, Bytes.

This entry indicates the amount of random access memory resident in the workstation.

Number of Expansion Slots. Like conventional PCs, most diskless workstations offer expansion slots for the attachment of interface boards and peripherals. A network interface card usually must be installed in one of the expansion slots in order for the workstation to operate over the network.

Network Interface Card Included. An answer here

indicates that the workstation is supplied with a network interface card. The most common network interface cards are Ethernet, Arcnet, and token-ring. Many vendors offer a choice of more than one interface card.

Network Interface Card Required (third party). An answer here indicates that the workstation is not supplied with a network interface card; that card must be obtained from a third party.

Monitor Included. A yes answer here indicates that the standard package includes a monitor. Many diskless workstations do not come with a monitor; the user must supply one.

Video Card Included. Although many diskless workstations do not include a monitor, most will include a video card to support a monitor. Video card options include CGA (Color Graphics Adapter), EGA (Enhanced Graphics Adapter), HGA (Hercules Graphics Adapter), VGA

(Video Graphics Array), and monochrome.

Keyboard Included. Most (but not all) diskless workstations include a keyboard as part of the standard package.

Pricing/Support Price (\$). For many buyers, the main attraction of diskless workstations is their low price.

Date of First Delivery. This entry tells how long the product has been commercially available.

Standard Warranty. Warranties offered differ from vendor to vendor. Many offer one-year warranties; some offer less.

Service Supplied by. Increasingly, many products are serviced by the dealer or via a third-party service arrangement.

Comments. This entry includes space for any features, functions, or products not covered by the entries above.

Vendor	Advanced Digital Corp.	American Mitac Corp.	American Mitac Corp.	American Research Corp.
Product	Personal Network Station & Powerlite	MI212	MI316S	LAN station 286
Characteristics				
Processor	80286; 80386; 8088	80286	80386SX	80286
Minimum Memory (bytes)	1M	1M	1M	1M
No. Expansion Slots Included	4	2	2	2
Network Interface Card Included	No	No	No	Arcnet; Ethernet
Network Interface Card Required	Arcnet; Ethernet	No; optional	No; optional	No
Monitor Included	No	No	No	Yes
Video Card Included	VGA	None identified	None identified	VGA
Keyboard Included	Yes	Yes	Yes	Yes
Pricing/Support				
Price (\$)	1,600	1,295	1,645	1,585
Date of First Delivery	1988	None identified	None identified	None identified
Standard Warranty	1 year	1 year	1 year	None identified
Service Supplied By	Dealer; vendor	Third party	Third party	None identified
Comments		Bell Atlantic service 1 yr onsite.	Bell Atlantic service 1 yr onsite.	

Vendor	AST Research Inc.	Bethel Computer	Cubix Corp.	Cubix Corp.
Product	Bravo/286 1	286-12 D	ComBridge/ComCube Systems	QL1000 Series
Characteristics				
Processor	80286	80286; 80386; 8088	80286; 80386	NEC V40
Minimum Memory (bytes)	512K	640K	1M	640K
No. Expansion Slots Included	4	4	2	None identified
Network Interface Card Included	No	Arcnet; Ethernet	Arcnet; Ethernet; Token-Ring	Bus interface included
Network Interface Card Required	Yes	Optional	No	No
Monitor Included	No	Yes	No	No
Video Card Included	None identified	CGA; EGA; VGA; monochrome	CGA	Monochrome
Keyboard Included	Yes	Yes	No	No
Pricing/Support				
Price (\$)	995	475	9,995, max. price is 24,995	645, max. price is 1,695
Date of First Delivery	December 1988	None identified	November 1990	1987
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied By	Dealer; vendor	Vendor	Vendor	Vendor
Comments			Dedicated asynec communications systems for LANs featuring 16 dial-in and dial-out lines.	Built-in terminal emulations.

Vendor	Cubix Corp.	Cubix Corp.	Daedalus Group	Datamedia Corp.
Product	QL2000 Series	QL3000 Series	EL-286	NETmate/SX16 386/16-00
Characteristics				
Processor	80286	80386	80286	80386SX
Minimum Memory (bytes)	1M	1M	512K	2M
No. Expansion Slots Included	None identified	None identified	1	3
Network Interface Card Included	Bus Interface included	Bus Interface included	Arcnet; Ethernet; Token-Ring	No
Network Interface Card Required	No	No	No	Ethernet
Monitor Included	No	No	No	No
Video Card Included	VGA	VGA	CGA; EGA; Monochrome; VGA	VGA
Keyboard Included	No	No	Yes	Yes
Pricing/Support				
Price (\$)	1,295, max. price is 2,100	1,795, max. price is 2,595	995	2,295
Date of First Delivery	1988	November 1990	None identified	June 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied By	Vendor	Vendor	Vendor	Vendor
Comments		Optional on-board SCST controller.	Small desk footprint - 2" in height x 13" wide x 10" deep. fanless design insures quiet operation; detached keyboard conforms to DIN specifications.	

Vendor	Datamedia Corp.	Datamedia Corp.	Datamedia Corp.	Datapoint Corp.
Product	NETmate/dx25 386/25-00	NETmate/dx33 386/33-00	NETmate/dx425 486/25-00	722X
Characteristics				
Processor	80386	80386	80486	80386
Minimum Memory (bytes)	2M	None identified	4M	2M
No. Expansion Slots Included	3	3	3	2
Network Interface Card Included	No	No	No	Ethernet
Network Interface Card Required	Ethernet	Ethernet	Ethernet	No
Monitor Included	No	No	No	No
Video Card Included	VGA	VGA	VGA	Monochrome; VGA
Keyboard Included	Yes	Yes	Yes	Yes
Pricing/Support				
Price (\$)	3,995	5,195	7,695	See comments
Date of First Delivery	August 1990	August 1990	August 1990	June 1989
Standard Warranty	1 year	1 year	1 year	30 days
Service Supplied By	Vendor	Vendor	Vendor	Third party
Comments				80386-based systems available in 16MHz or 25MHz and can be upgraded to 8MB or 16MB of memory; standard with Arcnet interface card; supports 2 serial ports, 1 parallel printer port, 1 PS/2 compatible mouse port; contact vendor for pricing info.

Vendor	Digital Equipment Corp.	DTK Computer, Inc.	DTK Computer, Inc.	Earth Computer Technologies
Product	VT1300 DECwindows Terminal	TECH-1260B	TECH-1260V	Earthstation IIIa
Characteristics				
Processor	VT1300	80286	80286	80386
Minimum Memory (bytes)	2M	1M	1M	1M
No. Expansion Slots Included	2	5	5	0
Network Interface Card Included	Ethernet	No	No	Arcnet
Network Interface Card Required	No	None identified	None identified	No
Monitor Included	Yes	No	No	No
Video Card Included	Monochrome; VGA	Monochrome	Monochrome	VGA
Keyboard Included	Yes	None identified	None identified	Yes
Pricing/Support				
Price (\$)	See comments	625	525	1,890
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	90 days	1 year	1 year	1 year
Service Supplied By	Vendor	Dealer	Dealer	Vendor
Comments	Contact vendor for pricing information.	Built-in FDD/HDD.	Built-in FDD.	Price shown is base.

Vendor	Earth Computer Technologies	Earth Computer Technologies	Earth Computer Technologies	Earth Computer Technologies
Product	Earthstation IIIe	Earthstation IIII	Earthstation IIa	Earthstation IIe
Characteristics				
Processor	80386	80386	NEC V40	80286
Minimum Memory (bytes)	1M	1M	1M	1M
No. Expansion Slots Included	0	0	0	0
Network Interface Card Included	Ethernet	Token-Ring	Arcnet	Ethernet
Network Interface Card Required	No	No	No	No
Monitor Included	No	No	No	No
Video Card Included	VGA	VGA	CGA	VGA
Keyboard Included	Yes	Yes	Yes	Yes
Pricing/Support				
Price (\$)	1,990	2,190	945	1,295
Date of First Delivery	None identified	None identified	None identified	None identified
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied By	Vendor	Vendor	Vendor	Vendor
Comments	Price shown is base.			

Vendor	Earth Computer Technologies	EXZEL Corp.	International Communications Equipment	JC Information Systems
Product	Earthstation le	EasyNetwork Workstation	Triton-SX	5180-400
Characteristics				
Processor	NECV40	80286	80286; 80386	80286
Minimum Memory (bytes)	768K	1M	1M	512K
No. Expansion Slots Included	0	3	2	5
Network Interface Card Included	Ethernet	Arcnet; Ethernet; Standard EasyNetwork	Arcnet; Ethernet	No
Network Interface Card Required	No	No	No	Arcnet; Ethernet
Monitor Included	No	Yes	No	No
Video Card Included	CGA	HGA; Monochrome; VGA	VGA	None identified
Keyboard Included	Yes	Yes	Yes	Yes
Pricing/Support				
Price (\$)	825	500, max. price is 1,149	2,199	595
Date of First Delivery	None identified	None identified	March 1990	October 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied By	Vendor	Vendor	Vendor	Dealer
Comments		\$500 price is for basic unit including monochrome monitor and keyboard, other prices with Starter Kits include a built-in network card and network card for server computer, cable, and networking software.		Available in 12, 16, & 20MHz; expanded memory hardware onboard; BIOS shadow standard utility software supplied.

Vendor	JC Information Systems	JC Information Systems	JC Information Systems	JC Information Systems
Product	5186-400	5188-400	5190-400	5191-400
Characteristics				
Processor	80286	80286	80386	80386
Minimum Memory (bytes)	512K	512K	1M	1M
No. Expansion Slots Included	5	5	5	5
Network Interface Card Included	No	No	No	No
Network Interface Card Required	Arcnet; Ethernet	Arcnet; Ethernet	Arcnet; Ethernet	Arcnet; Ethernet
Monitor Included	No	No	No	No
Video Card Included	None identified	None identified	None identified	None identified
Keyboard Included	Yes	Yes	Yes	Yes
Pricing/Support				
Price (\$)	645	745	1,095	1,245
Date of First Delivery	October 1988	October 1988	September 1989	September 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied By	Dealer	Dealer	Dealer	Dealer
Comments	Available in 12, 16, & 20MHz; expanded memory hardware onboard; BIOS shadow standard utility software supplied.	Available in 12, 16, & 20MHz; expanded memory hardware onboard; BIOS shadow standard utility software supplied.		

Vendor	JC Information Systems	Kimtron Corp.	Lancer Research	Lanmaster
Product	5197-400	Satellite	200/300 Series	LMW 212 286
Characteristics				
Processor	80386	80286; 80386; NEC V20; NEC V40	80286; 80386	80286
Minimum Memory (bytes)	512K	640K	1M	512K
No. Expansion Slots Included	5	3	5	2; 3
Network Interface Card Included	No	No	Arcnet; Ethernet	No
Network Interface Card Required	Arcnet; Ethernet	Arcnet; Ethernet; Token-Ring	No	Arcnet; Ethernet; Token-Ring
Monitor Included	No	No	No	No
Video Card Included	None identified	CGA; VGA	Monochrome; VGA	None identified
Keyboard Included	Yes	Yes	Yes	No
Pricing/Support				
Price (\$)	895	See comments	780, max. price is 2,000	999
Date of First Delivery	November 1989	October 1988	October 1990	September 1988
Standard Warranty	1 year	1 year	1 year	2 years
Service Supplied By	Dealer	Third party; vendor	Dealer; vendor	Dealer; vendor
Comments	16MHz utility diag. and expanded memory driver software included; memory above 1M extended or expanded software to load NW above 640K supplied.	Contact vendor for pricing information.		Can be used with or without disk drives.

Vendor	Lanmaster	Lanmaster	Lanmaster	Lanmaster
Product	LMW 220 286	LMW 316 386 SX	LMW 320 386	LMW 325 386
Characteristics				
Processor	80286	80386; 80386SX	80386; 80386SX	80386; 80386SX
Minimum Memory (bytes)	512K	1M	1M	1M
No. Expansion Slots Included	2; 3	8	8	8
Network Interface Card Included	No	No	No	No
Network Interface Card Required	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring
Monitor Included	No	No	No	No
Video Card Included	None identified	None identified	None identified	None identified
Keyboard Included	No	No	No	No
Pricing/Support				
Price (\$)	1,649	1,896	2,605	2,929
Date of First Delivery	September 1988	September 1988	September 1988	September 1988
Standard Warranty	2 years	2 years	2 years	2 years
Service Supplied By	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Can be used with or without disk drives.			

Vendor	Liberty Electronics	Netcom Research, Inc.	Netcom Research, Inc.	Netcom Research, Inc.
Product	Network Station	1612A	1612E	810A
Characteristics				
Processor	80286; 80386	80286	80286	NEC V20
Minimum Memory (bytes)	512K	1M	1M	704K
No. Expansion Slots Included	4	0	0	0
Network Interface Card Included	Ethernet	Arcnet	Ethernet	Arcnet
Network Interface Card Required	No	No	No	No
Monitor Included	Yes	No	No	No
Video Card Included	None identified	CGA; EGA; HGA; VGA; mono-chrome	CGA; EGA; HGA; VGA; mono-chrome	CGA; monochrome
Keyboard Included	Yes	No	No	No
Pricing/Support				
Price (\$)	2,000	1,382	1,535	See comments
Date of First Delivery	December 1990	January 1990	December 1989	March 1989
Standard Warranty	1 year	2 years	2 years	2 years
Service Supplied By	Third party	None identified	Vendor	Dealer
Comments				Contact vendor for pricing information

Vendor	The Network Connection	Racore Computer Products, Inc.	Racore Computer Products, Inc.	Racore Computer Products, Inc.
Product	Triumph Workstations	M 8720	M 8730	M 8760
Characteristics				
Processor	80286; 80386; 80486	80286	80286	80286
Minimum Memory (bytes)	1M	512K	512K	512K
No. Expansion Slots Included	4	2	2	2
Network Interface Card Included	Arcnet; Ethernet; Token-Ring	No	No	No
Network Interface Card Required	No	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring
Monitor Included	Yes	No	No	No
Video Card Included	Monochrome; VGA	None identified	None identified	None identified
Keyboard Included	Yes	No	No	No
Pricing/Support				
Price (\$)	See comments	979	1,179	1,279
Date of First Delivery	None identified	January 1988	January 1988	January 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied By	Third party; vendor	Vendor	Vendor	Vendor
Comments	Guaranteed 24-hour replacement; contact vendor for pricing information.	0 wait state; expandable to 2M bytes of RAM; 10MHz.	0 wait state; expandable to 2M bytes of RAM; 12.5 MHz.	Expandable to 4M bytes of RAM; 12MHz.

Vendor	Racore Computer Products, Inc.	Racore Computer Products, Inc.	Racore Computer Products, Inc.	Samsung Informations Systems America, Inc.
Product	M 8780	M 8860	M 8880	PCTerminal/286
Characteristics				
Processor	80286	80286	80286	80286
Minimum Memory (bytes)	512K	512K	512K	640K
No. Expansion Slots Included	2	4	4	4
Network Interface Card Included	No	No	No	Ethernet
Network Interface Card Required	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring	No
Monitor Included	No	No	No	No
Video Card Included	None identified	None identified	None identified	None identified
Keyboard Included	No	No	No	Yes
Pricing/Support				
Price (\$)	1,779	1,579	1,979	859
Date of First Delivery	January 1988	January 1988	January 1988	1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied By	Vendor	Vendor	Vendor	Dealer; third party; vendor
Comments	Expandable to 4M bytes of RAM; 20MHz.	Expandable to 4M bytes of RAM; 12MHz.	Expandable to 4M bytes of RAM; 20MHz.	12MHz, Novell co-labelled, expandable to 1MB memory; built-in FDC and MGA controllers; has a Novell remote boot PROM; supports 2 3.5-inch or 1 5.25-inch disk drive; 100 percent NetWare-compatible.

Vendor	Samsung Informations Systems America, Inc.	Solid Technologies	Solid Technologies	Sun Microsystems, Inc.
Product	PCTerminal/386SX	286-12 LAN Station	386-SX LAN Station	SPARCstation IPC
Characteristics				
Processor	80386SX	80286	80386	SPARC
Minimum Memory (bytes)	2M	1M	1M	8M
No. Expansion Slots Included	4	4	4	2
Network Interface Card Included	Ethernet	No	No	Ethernet
Network Interface Card Required	No	Yes; Solid LAN network cards	Yes; Solid LAN network cards	No
Monitor Included	No	No	No	Yes
Video Card Included	None identified	Monochrome	Monochrome	None identified
Keyboard Included	Yes	Yes	Yes	Yes
Pricing/Support				
Price (\$)	1,295	456	786	8,995
Date of First Delivery	1990	None identified	None identified	July 1990
Standard Warranty	1 year	1 year	1 year	90 days
Service Supplied By	Dealer; third party; vendor	Vendor	Vendor	Dealer; vendor
Comments	Expandable to 8MB, has Novell remote boot PROM, Samsung Advanced NetWare BIOS, supports 2 3.5-inch or 1 5.25-inch disk drive; 100 percent Novell certified NetWare-compatible.	Designed for use as a diskless workstation in a Solid local area network; VGA interface & monitors are also available.	Designed for use as a diskless workstation in a Solid local area network; VGA interface & monitors are also available.	

Vendor	Sun Microsystems, Inc.	TeleVideo Systems, Inc.	TeleVideo Systems, Inc.	3Com Corp.
Product	SPARCstation SLC	TS2X TeleStation	TS5X TeleStation	3Station/2E
Characteristics				
Processor	SUN SPARC	80286	80386	80286
Minimum Memory (bytes)	8M	1M	1M	1M
No. Expansion Slots Included	0	1	2	0
Network Interface Card Included	Ethernet	No	No	Ethernet
Network Interface Card Required	No	Ethernet	Ethernet	No
Monitor Included	Yes	Yes	No	None identified
Video Card Included	None identified	VGA	VGA	CGA; EGA; Monochrome; VGA
Keyboard Included	Yes	Yes	Yes	None identified
Pricing/Support				
Price (\$)	4,995	1,140	1,725	2,195
Date of First Delivery	May 1990	June 1989	June 1990	May 1989
Standard Warranty	90 days	1 year	1 year	1 year
Service Supplied By	Dealer; vendor	Third party	Third party	Dealer
Comments		Installed Ethernet card optional.	Installed Ethernet card optional	Utilizes a 10 MHz 80286 processor and is expandable up to 5MB of memory. It can also be upgraded with 80287 coprocessor. Standard features include 2 serial, 1 parallel, network (ethernet) ports EGA, VGA, CGA, monochrome & Hercules.

Vendor	3Com Corp.	Top Microsystems	Wyse Technology, Inc.	Xinetron
Product	3Station/2X	TW-286	The Networker WY-212	Xi-286-DLA
Characteristics				
Processor	80286	80286; 80386	80286	80286
Minimum Memory (bytes)	3M	512K	1M	1M
No. Expansion Slots Included	0	5	1	2
Network Interface Card Included	Ethernet	Arcnet; Ethernet	No	Arcnet
Network Interface Card Required	No	Token-Ring	Arcnet; Ethernet; Token-Ring	No
Monitor Included	No	Yes	Yes	No
Video Card Included	CGA; EGA; Monochrome; VGA	EGA; VGA	VGA	HGA
Keyboard Included	Yes	Yes	Yes	No
Pricing/Support				
Price (\$)	3,495	850	1,799	699
Date of First Delivery	May 1989	September 1989	January 1989	February 1990
Standard Warranty	1 year	1 year	1 year	3 years
Service Supplied By	Dealer	Vendor	Vendor	Vendor
Comments	Has a 12MHz 80286 processor and built-in LIM 4.0 EMS memory manager. In addition, it includes a 80287 coprocessor, targeted to memory intensive DOS applications which require LIM 4.0 EMS memory.			Novell boot ROM included; diskette/IDE hard drive controller included; 2 serial, 1 parallel port; coax or twisted pair; 1-4MB RAM.

Vendor	Xinetron	Xinetron	Xinetron
Product	Xi-286-DLE	Xi-386-DLE	Xi-386SX
Characteristics			
Processor	80286	80386	80386
Minimum Memory (bytes)	1M	1M	1M
No. Expansion Slots Included	2	2	2
Network Interface Card Included	Ethernet	Ethernet	Arcnet; Ethernet
Network Interface Card Required	No	No	No
Monitor Included	No	No	No
Video Card Included	VGA	VGA	VGA
Keyboard Included	No	No	No
Pricing/Support			
Price (\$)	999	1,899	1,299
Date of First Delivery	April 1990	June 1990	October 1990
Standard Warranty	3 years	3 years	3 years
Service Supplied By	Vendor	Vendor	Vendor
Comments			
	Novell boot ROM included; diskette/IDE hard drive controllers included; 2 serial; 1 parallel port 1-4MB RAM.	16-bit Novell Ethernet interface; with boot ROM included; diskette/IDE controller included; 2 serial, 1 parallel port; 1-8MB RAM.	16-bit network interface with Novell boot ROM; diskette/IDE hard drive controllers included; 2 serial, 1 parallel port; 1-4MB RAM.

Bridges

Comparison Column Entry Descriptions

Bridges interconnect networks running the same protocols. They operate at the bottom two layers of the OSI reference model, in particular the Media Access Control (MAC) layer of OSI Layer 2 (Data Link). We have tried to fit each product to the specifications listed, to provide an accurate representation of that product's capabilities. Our survey form provided each vendor with a number of choices for each parameter listed. Space was provided to write in an answer when the proper choices for that vendor were not listed.

Vendor and Model. This entry lists the manufacturer and model number or name of each device.

Characteristics LANs Supported. This lists the LAN technologies with which the bridge will operate. The most popular LAN technologies include Ethernet, Arcnet, token-ring, Starlan, AppleTalk, and FDDI. Bridges that operate with broadband LANs are also available, generally from broadband LAN vendors.

Minimum Memory, Bytes. This entry indicates the amount of random access memory resident in the bridge.

Operation. Bridges can support local and/or remote operation.

Throughput Rate, Packets per Second. When packets of information are sent to a bridge to be transmitted, their intended destination is checked against an internal routing

table. They are then forwarded to their destination. The number of packets per second that is transmitted after this process is indicated here.

Filter Rate, Packets per Second. The address checking and other internal functions performed by a bridge on packets of information are known collectively as filtering. The number of packets per second that a bridge can filter is given here. Note that the filter rate is higher than the throughput rate.

Configuration. Some bridges automatically update their routing tables as devices are added to or deleted from the network. These bridges are designated automatic or learning bridges. Manual bridges require the user to manually update routing tables when devices are added to or deleted from the network.

Media Supported. This provides an indication of the LAN transmission media over which the bridge

can operate. Choices include standard or thin Ethernet (coaxial cable), broadband (CATV coaxial cable), twisted-pair wire, and optical fiber.

Pricing/Support Price (\$). There are a number of different types of bridges on the market. Prices vary accordingly.

Date of First Delivery. This entry tells how long the product has been commercially available.

Standard Warranty. Warranties offered differ from vendor to vendor. Many offer one-year warranties; some offer less.

Service Supplied by. Increasingly, products are serviced by the dealer or via a third-party service arrangement.

Comments. This entry includes space for any features, functions, or products not covered by the entries above.

Vendor	Advanced Computer Communications	Advanced Computer Communications	ALANTEC	Allen-Bradley Co., Inc.
Product	Series 2000	Series 4000	1033 MLS	ISO Bridge
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Arcnet; Ethernet; MAP
Minimum Memory (bytes)	None identified	None identified	None identified	512K
Operation	Local	Remote	Local	None identified
Throughput Rate (packets/sec.)	12,500	10,000	None identified	7,500
Filter Rate (packets/sec.)	20,000	6,000	None identified	15,000
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Fractional T1; Optical fiber; Standard Ethernet coaxial; Synchronous Serial; T1; Thin Ethernet coaxial	Broadband coaxial
Pricing/Support				
Price (\$)	3,250	5,500	20,000	See comments
Date of First Delivery	September 1990	March 1989	July 1989	1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Third party; vendor	Third party; vendor	Vendor	Vendor
Comments	Can be configured as bridge only, IP router, bridge/router.	Can be configured as bridge only, multiprotocol.	Combines high-performance architecture with sophisticated traffic and path control software, to inter-connect up to 10 Ethernet networks and reduce congestion in work-station networks; price shown is 8-port configuration.	Contact vendor for pricing information.
Vendor	Allied Telesis Inc.	Allied Telesis Inc.	Andrew Corp.	Andrew Corp.
Product	CentreCOM AT-6800	CentreCOM AT-7000	Bridgeport/7404	Bridgeport/7404/16
Characteristics				
LANs Supported	Ethernet	Ethernet	Token-Ring	Token-Ring
Minimum Memory (bytes)	512K	None identified	768K	1.15M
Operation	Local	Remote	Local	Local
Throughput Rate (packets/sec.)	12,500	8,000	850	None identified
Filter Rate (packets/sec.)	25,000	14,800	None identified	None identified
Configuration	Automatic (learning bridge); Manual	Automatic (learning bridge)	Source routing	Source routing
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair
Pricing/Support				
Price (\$)	2,450	4,950	3,995	3,595
Date of First Delivery	October 1990	April 1989	June 1989	July 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	SNMP manageable bridge.		4MB IBM compatible source routing, rack mounted token-ring local bridge; manages attached rings; reports to IBM LAN Manager; supports fail-safe redundant networks; supports Andrew worldwide single point bridge management.	16MB to 4MB IBM compatible rack mounted token-ring local bridge; manages attached rings; reports to IBM LAN Manager; supports fail safe redundant networks; works with Andrew world wide single point bridge management.

Vendor	Andrew Corp.	Andrew Corp.	Andrew Corp.	Applitek Corp.
Product	Bridgeport/7412	Bridgeport/7412/16	Bridgeport/7606	NI10/E Ethernet Bridge
Characteristics				
LANs Supported	Token-Ring	Token-Ring	Token-Ring	Ethernet; UniLAN
Minimum Memory (bytes)	640K	1.024M	1.5M	None identified
Operation	Remote	Remote	Local	Local; Remote
Throughput Rate (packets/sec.)	850	None identified	None identified	None identified
Filter Rate (packets/sec.)	None identified	None identified	None identified	None identified
Configuration	Source routing	Source routing	Source routing	Automatic (learning bridge); Manual
Media Supported	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Broadband coaxial; Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial
Pricing/Support				
Price (\$)	4,995	5,595	4,995	13,750
Date of First Delivery	October 1990	July 1990	November 1990	1985
Standard Warranty	1 year	1 year	1 year	90 days
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Vendor
Comments	4MB source routing, IBM compatible rack mounted token-ring remote bridge; supports fail safe, load sharing parallel networks; reports to IBM LAN Manager; supports Andrew single point world wide bridge management.	16MB IBM compatible, rack mounted source routing, token-ring remote bridge reports to IBM LAN Manager; supports fail-safe, load sharing, parallel networks; works with Andrew world wide single point bridge management.	4/16MB, selectable, IBM compatible, rack mounted, source routing token-ring bridge; reports to IBM LAN Manager; supports early token release and address filtering; supports fail safe load sharing parallel network connections.	Provides connectivity between IEEE 802.3 or Ethernet subnets utilizing standard CATV broadband backbones; transparent to higher layer protocols and connects Ethernet subnets up to 35 miles away.
Vendor	Artel Communications Corp.	Artel Communications Corp.	AT&T	AT&T
Product	802.3 Bridge	T1/E1 Transport	10:10 Bridge	1:10 Bridge
Characteristics				
LANs Supported	Ethernet; FiberWay	T1/E1 Devices	Ethernet; Starlan	Ethernet; Starlan
Minimum Memory (bytes)	None identified	None identified	192K	192K
Operation	Local	Local	Local	Local; Remote
Throughput Rate (packets/sec.)	14,600	14,600	813	813
Filter Rate (packets/sec.)	126,000	126,000	1,800	1,800
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Optical fiber; Standard Ethernet coaxial	Optical fiber; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Pricing/Support				
Price (\$)	22,250	13,000	5,950	4,500
Date of First Delivery	January 1988	February 1990	September 1988	None identified
Standard Warranty	30 days	30 days	90 days	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Supports one 802.3/Ethernet LAN connection to the FiberWay fiber optic backbone network.	Supports up to 12 T1 (1.544M) or 8E1 (2.048M) devices for bridging to the FiberWay fiber optic backbone network; supports LAN distribution for video conferencing and video surveillance, etc.		Bridges Starlan (1M bps) and Starlan 10 networks.

Vendor	BICC Data Networks, Inc.	BICC Data Networks, Inc.	BICC Data Networks, Inc.	BICC Data Networks, Inc.
Product	1400 Primary Local Bridge	1410 Managed Bridge	1420 FDDI/802.3 Managed Bridge	1435 Remote Bridge
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet; FDDI	Ethernet
Minimum Memory (bytes)	512K	512K	512K	512K
Operation	Local	Local	Local	Remote
Throughput Rate (packets/sec.)	13,000	13,600	14,000	700
Filter Rate (packets/sec.)	17,100	21,800	54,000	7,000
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Pricing/Support				
Price (\$)	2,195	3,995	22,500	5,495
Date of First Delivery	April 1988	January 1989	October 1990	October 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Locally connects two IEEE 802.3/Ethernet networks; filters packets for reduced traffic congestion; protocol independent.	Local bridge managed through on-board management panel or remotely managed via ISOView Network Manager; filters packets reducing traffic congestion; protocol independent.	Transparent FDDI/802.3 managed bridge; local management controlled on-board or remotely by IOSView Network Manager; features include LED status display, security, and closed user groups.	Supports one or two RS-232, V.35, RS-449, or X.21 WAN links; spanning Tree, triangulation, and adaptive routing at speeds to 128Kbps.
Vendor	Cabletron Systems, Inc.	Cabletron Systems, Inc.	Cabletron Systems, Inc.	Cabletron Systems, Inc.
Product	IRBM	NB20E	NB25E	NB30
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Archnet; Ethernet
Minimum Memory (bytes)	1M	512K	512K	2M
Operation	Local	Remote	Local	Remote
Throughput Rate (packets/sec.)	21,000	8,000	11,600	2,900
Filter Rate (packets/sec.)	8,000	15,000	28,000	10,000
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Broadband coaxial; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Pricing/Support				
Price (\$)	See comments	2,995	5,495	17,000
Date of First Delivery	December 1989	June 1989	June 1989	November 1990
Standard Warranty	90 days	90 days	90 days	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Contact vendor for pricing information. Control & monitor via local/remote management.	Control and monitor via remote management.	Control and monitor via local/remote management.	Control and monitor via local/remote management; price shown is per pair.

Vendor	Cabletron Systems, Inc.	CASE/Datatel, Inc.	CBIS, Inc.	Chipcom Corp.
Product	NB35	6445/A	Network OS Plus Bridging	Ethermodem III Bridge
Characteristics				
LANs Supported	Ethernet	AppleTalk; Ethernet	Arcnet; BUSS; Cluster; Ethernet; Starlan; Token-Ring	Ethernet
Minimum Memory (bytes)	1M	1M	128K	512K
Operation	Remote	Local	Local	Local
Throughput Rate (packets/sec.)	2,900	15,000	None identified	13,404
Filter Rate (packets/sec.)	10,000	30,000	None identified	24,200
Configuration	Automatic (learning bridge)	Automatic (learning bridge), manual	Manual	Automatic (learning bridge)
Media Supported	Broadband coaxial; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial	Broadband coaxial; Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Broadband coaxial; Standard Ethernet coaxial; Thin Ethernet coaxial
Pricing/Support				
Price (\$)	22,995	12,000	See comments	8,950
Date of First Delivery	December 1989	December 1988	None identified	April 1988
Standard Warranty	90 days	1 year	120 days	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Control and monitor via local/remote management; price shown is per pair.	Supports both local and remote ports.	Free technical phone support; software only; supports NET-BIOS; contact vendor for pricing information.	Available for 12MH and 18MH networks.

Vendor	Chipcom Corp.	Chipcom Corp.	Codex Corp.	Concord Communications, Inc.
Product	Marathon Bridge	Midnight Bridge	EtherSpan Bridge	Series 4200
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet; Token Bus; Token-Ring
Minimum Memory (bytes)	512K	512K	None identified	None identified
Operation	Local	Local	Remote	Local
Throughput Rate (packets/sec.)	7,500	10,000	4,000	None identified
Filter Rate (packets/sec.)	15,000	20,000	15,000	None identified
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Broadband coaxial; Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber; Standard Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Broadband coaxial; Carrier-band; Standard Ethernet coaxial
Pricing/Support				
Price (\$)	9,950	2,950, max. price is 3,950	12,000	10,900
Date of First Delivery	November 1988	April 1990	April 1990	August 1988
Standard Warranty	1 year	1 year	1 year	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	IEEE 802.3-to-802.4 bridge.	All IEEE 802.3: AUI-AUI bridge \$2,950; AUI-Fiber bridge \$3,450 (ST connector); Fiber-Fiber bridge \$3,950 (ST connectors); AUI-Fiber bridge \$3,450 (SMA connector); Fiber-Fiber bridge \$3,950 (SMA connector).		Provides TokenBus backbone bridging for Ethernet subnets; offers up to 25 miles in distance and up to three 10Mbps channels.

Vendor	CrossComm Corp.	CrossComm Corp.	CrossComm Corp.	CrossComm Corp.
Product	HSB-EE	HSB-ELL	HSB-ETT	HSB-RR
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Token-Ring
Minimum Memory (bytes)	None identified	512K	None identified	512K
Operation	Local	Remote	Remote	Local
Throughput Rate (packets/sec.)	14,500	2,000	7,200	2,300
Filter Rate (packets/sec.)	30,000	15,000	15,000	93,000
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair
Pricing/Support				
Price (\$)	4,395	5,995	7,995	6,500
Date of First Delivery	October 1989	August 1990	August 1990	May 1990
Standard Warranty	90 days	90 days	90 days	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments			Free form text provided by the vendor for this product.	Supports IEEE 802.1D, source routing, and new source routing transparent (SRT) standard.
Vendor	Cryptall Communications Corp.	Cryptall Communications Corp.	Cryptall Communications Corp.	Cryptall Communications Corp.
Product	3000CB Compression Bridge	3000FT1 Fractional T1 Bridge	3000MB Microwave Bridge	3000T1 T1 Bridge
Characteristics				
LANs Supported	Ethernet; Token-Ring	Ethernet; Token-Ring	Ethernet; Token-Ring	Ethernet
Minimum Memory (bytes)	2.5M	512K	512K	512K
Operation	Remote	Remote	Remote	Remote
Throughput Rate (packets/sec.)	None identified	None identified	None identified	None identified
Filter Rate (packets/sec.)	14,880	14,880	14,880	14,880
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Pricing/Support				
Price (\$)	8,500	5,500	8,000	7,500
Date of First Delivery	February 1990	June 1989	June 1989	June 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	For WAN link speeds of 64K offers 4:1 data compression I.E. over 256K throughput over 64K line; optional DES encryption & ANSI X9.17 key management; auto-dial redundant link; spanning tree, extensive diagnostic capabilities includ. non-invasive loopback.	For WAN links through 768K, optional DES Encryption and ANSI X9.17 key management; auto dial redundant link; spanning tree, extensive diagnostic capabilities including non-invasive loopbacks.	Ethernet to Microwave bridge with lvp/p analog interface. Offers full duplex 10M throughput. Distance only limited to Microwave range, i.e. 15 miles or more with repeaters. Spanning tree auto-redundant link & extensive network diagnostics.	For WAN links through 2.048M bps optional DES encryption and ANSI X9.17 key management; auto dial redundant link; spanning tree, extensive diagnostic capabilities including non-invasive loopbacks.

Vendor	Cryptall Communications Corp.	Cryptall Communications Corp.	Cryptall Communications Corp.	Cryptall Communications Corp.
Product	3000UB Unlimited Bridge	4000CB-2 Multiport Compression Bridge	4000CB-4 Multiport Compression Bridge	4000FT1-2 Fractional T1 Multiport Bridge
Characteristics				
LANs Supported	Ethernet; Token-Ring	Ethernet	Ethernet	Ethernet
Minimum Memory (bytes)	512K	2.5M	2.5M	512K
Operation	Remote	Remote	Remote	Remote
Throughput Rate (packets/sec.)	None identified	None identified	None identified	None identified
Filter Rate (packets/sec.)	14,880	14,880	14,880	14,880
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Pricing/Support				
Price (\$)	8,500	12,000	16,000.00	8,000
Date of First Delivery	June 1990	None identified	None identified	August 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	High performance, distance unlimited bridge with wide area network link for operation at all data rates through 10M. Spanning tree, auto redundant link and extensive network diagnostics including non-invasive loopbacks.	For WAN link speeds of 64K offers 4:1 data compression i.e. over 256K throughput over 64K line; optional DES Encryption and ANSI X9.17 key management; auto-dial redundant link; spanning tree, extensive diagnostic capabilities incl. non-invasive loopback.	For WAN link speeds of 64K offers 4:1 data compression i.e. over 256K throughput over 65K line; optional DES Encryption & ANSI X9.17 key management; auto-dial redundant link; spanning tree, extensive diagnostic capabilities incl. non-invasive loopback	For WAN links through 768K, optional DES Encryption & ANSI X9.17 key management; auto-dial redundant link; spanning tree, extensive diagnostic capabilities incl. non-invasive loopbacks; load sharing for multiport.
Vendor	Cryptall Communications Corp.	Cryptall Communications Corp.	Cryptall Communications Corp.	Cryptall Communications Corp.
Product	4000FT1-4 Fractional Multiport Bridge	4000MB-2 Microwave Multiport Bridge	4000T1-2 Multiport Bridge	4000T1-4 T1 Multiport Bridge
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Minimum Memory (bytes)	512K	512K	512K	512K
Operation	Remote	Remote	Remote	Remote
Throughput Rate (packets/sec.)	None identified	None identified	None identified	None identified
Filter Rate (packets/sec.)	14,880	14,880	14,880	14,880
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Pricing/Support				
Price (\$)	10,000	11,000	10,500	13,000
Date of First Delivery	August 1990	September 1990	September 1990	September 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	For WAN links through 768K, optional DES Encryption and ANSI X9.17 key management; auto-dial redundant link; spanning tree, extensive diagnostic capabilities incl. non-invasive loopbacks; load sharing for multiport.	Ethernet to Microwave bridge with lvp/p analog interface; offers full duplex 10M throughput; distance only limited to Microwave range, i.e. 15 miles or more with repeaters; spanning tree, auto redundant link & extensive network diagnostics.	For WAN links through 2.048M, optional DES Encryption and ANSI X.9.17 key management; auto dial redundant link; spanning tree, extensive diagnostics capabilities incl. non-invasive loopbacks and load sharing.	For WAN links through 2.048M, optional DES Encryption & ANSI X9.17 key management; auto dial redundant link; spanning tree, extensive diagnostics capabilities incl. non-invasive loopbacks and load sharing.

Vendor	Cryptall Communications Corp.	Cryptall Communications Corp.	Datapoint Corp.	Dayna Communications, Inc.
Product	4000T2-2 T2 Multiport Bridge	4000UB-2 Unlimited Multiport Bridge	PowerBridge II	EtherPrint
Characteristics				
LANs Supported	Ethernet	Ethernet	Arcnet; Ethernet; Token-Ring	Ethernet
Minimum Memory (bytes)	512K	512K	1M	None identified
Operation	Remote	Remote	Local	None identified
Throughput Rate (packets/sec.)	None identified	None identified	None identified	None identified
Filter Rate (packets/sec.)	14,880	14,880	None identified	None identified
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Manual	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Broadband coaxial; Optical fiber; RG 62 coaxial; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Pricing/Support				
Price (\$)	17,000	12,000.00	See comments	499
Date of First Delivery	September 1990	September 1990	June 1990	June 1990
Standard Warranty	1 year	1 year	30 days	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Vendor	Vendor
Comments	Includes a T2 DSU interface at 6.312M; can be used with T2 services, T2 microwave, or be multiplexed into a T3 (44M) data channel with an M13 multiplexer; can transport 100% active traffic in most interactive environments	High performance, distance unlimited bridge with wide area network link for operation at all data rates through 10M; spanning, auto redundant link & extensive network diagnostics incl. non-invasive loopbacks and load sharing.	Complaint NETBIOS required; contact vendor for pricing information.	Converts LocalTalk to Ethernet.
Vendor	Develcon Electronics Ltd.	Develcon Electronics Ltd.	Digital Communications Associates, Inc.	Digital Communications Associates, Inc.
Product	INB 1000 Series	INB 2000 Series	10NET Plus LAN Bridge	10NET Plus RS-232/NetBIOS Bridge
Characteristics				
LANs Supported	Ethernet	Token-Ring	Ethernet; Starlan	Arcnet; Ethernet; Starlan; Token-Ring
Minimum Memory (bytes)	Does Not Apply	Does Not Apply	512K	512K
Operation	Local; Remote	Local; Remote	Local	Local
Throughput Rate (packets/sec.)	None identified	None identified	1,404	None identified
Filter Rate (packets/sec.)	11,000	20,000	3,226	None identified
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Pricing/Support				
Price (\$)	6,000	8,800	595	249
Date of First Delivery	None identified	None identified	June 1989	July 1990
Standard Warranty	None identified	None identified	30 days	30 days
Service Supplied by	Vendor	Vendor	Dealer; vendor	Dealer; vendor
Comments	Compatible with INB 2000 Token Ring Bridging System.	Supports 4 and 16Mbps Token Ring; compatible with INB 1000 Ethernet Bridging System allowing Ethernet and Token Ring to coexist and share communications facilities and network management.	Provides connectivity to different speed 10NET Networks.	Connects similar and dissimilar networks; also provides remote connectivity.

Vendor	Digital Equipment Corp.	Digital Equipment Corp.	Dupont Electronics	Fairchild Data Corp.
Product	DECbridge 500	LANBridge	ELB-010 Ethernet Local Bridge Module	LBR8323
Characteristics				
LANs Supported	Ethernet; FDDI	Ethernet; FDDI	Ethernet	Ethernet
Minimum Memory (bytes)	640K	640K	512K	None identified
Operation	Local; Remote	Local; Remote	Local	None identified
Throughput Rate (packets/sec.)	None identified	None identified	8,000	14,000
Filter Rate (packets/sec.)	None identified	None identified	10,000	25,000
Configuration	Automatic (learning bridge); Manual	Automatic (learning bridge); Manual	Automatic (learning bridge)	None identified
Media Supported	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber; Shielded twisted- pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Un- shielded twisted-pair	Broadband coaxial; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Pricing/Support				
Price (\$)	See comments	5,500, max. price is 9,500	2,995	6,995
Date of First Delivery	None identified	None identified	November 1990	None identified
Standard Warranty	90 days	90 days	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Contact vendor for pricing infor- mation.	Available as LANBridge 150 and LANBridge 200.	Uses the Spanning Tree Proto- col to resolve multiple connec- tions between segments and establish redundant paths to guard against failure of the pri- mary link. Also may be used in conjunction with DuPont's En- hanced Management Software (LBS-010).	
Vendor	FiberCom, Inc.	Fibermux Corp.	Fibronics International Inc.	Halley Systems, Inc.
Product	RingMaster 7200	FX709	FX8210 FDDI Bridge	ConnectLAN 300
Characteristics				
LANs Supported	Ethernet; FDDI; Token-Ring	Ethernet	FDDI	Token-Ring
Minimum Memory (bytes)	5M	640K	256K	640K
Operation	Local	Local	Local	Local; Remote
Throughput Rate (packets/sec.)	20,000	12,500	500,000	None identified
Filter Rate (packets/sec.)	50,000	14,000	10,000	90,000
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Optical fiber; Shielded twisted- pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Un- shielded twisted-pair; Broad- band Coaxial	RS-449; Standard Ethernet co- axial	Optical fiber	Shielded twisted-pair
Pricing/Support				
Price (\$)	15,000	9,500	18,000	6,995, max. price is 11,500
Date of First Delivery	September 1990	May 1990	None identified	September 1990
Standard Warranty	1 year	1 year	90 days	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Multiport transparent bridge supports Ethernet and token- ring in any mixture up to 4 sub- networks; SNMP manageable; supports IEEE 802.1d incl. spanning tree.	Ethernet-to-RS449 bridge de- signed for use in encrypted- data applications with RG en- cryption gear; it can also be used with the FX103 RS449- fiber converter for remote bridg- ing applications.		ConnectLAN 300 is a family of high-performance Token Ring bridge products capable of in- terconnecting local or geographically-dispersed 16/ 4Mbps Token Ring/IEEE 802.5 Local Area Networks.

Vendor	Hayes Microcomputer Products, Inc.	Hewlett-Packard Co.	Hewlett-Packard Co.	IN-Net Corp.
Product	InterBridge V2.0	28673A	28674A	FiberTalk 5000 802.3/802.5 Bridge
Characteristics LANs Supported	AppleTalk; LocalTalk	Ethernet; Starlan	Ethernet; Starlan	DECnet; Ethernet; FDDI; Token-Ring
Minimum Memory (bytes) Operation Throughput Rate (packets/sec.)	512K Local; Remote None identified	512K Local 14,880	512K Remote 14,880	None identified None identified 100,000
Filter Rate (packets/sec.)	None identified	29,760	29,760	None identified
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial
Pricing/Support Price (\$)	799	4,999	3,999	22,000
Date of First Delivery Standard Warranty Service Supplied by	January 1986 2 years Vendor	September 1990 1 year Vendor	September 1990 1 year Vendor	1990 1 year Vendor
Comments	Supports AppleTalk Phase 2; InterBridge 1.0 for AppleTalk Phase 1 networks is also available.	Unshielded twisted-pair and optical fiber require a transceiver.	Unshielded twisted-pair and optical fiber require a transceiver.	Throughput rate pertains to FDDI portion.

Vendor	Infotron Systems Corp.	Interlink Computer Sciences, Inc.	International Business Machines Corp. (IBM)	International Business Machines Corp. (IBM)
Product	LAN Span 200	SNS/B320	8209 LAN Bridge	IBM Token Ring Bridge Program 2.1
Characteristics LANs Supported	Ethernet	Ethernet; Token-Ring	Ethernet; Token-Ring	Token-Ring
Minimum Memory (bytes) Operation Throughput Rate (packets/sec.)	2M Remote 3,600	1M Remote 5,000	128K Local 3,000	300K Local, remote 1,750
Filter Rate (packets/sec.)	15,000	12,000	10,000	20,000
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial; Using external transceiver & cable	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair
Pricing/Support Price (\$)	10,430	6,950	7,200	1,595
Date of First Delivery Standard Warranty Service Supplied by	December 1988 90 days Vendor	March 1990 1 year Dealer; third party; vendor	October 1989 1 year Vendor	July 1989 90 days Vendor
Comments	LAN Span 200 is a multi-link, protocol-transparent, routing bridge; it supports up to 4 WAN links and provides automatic reconfiguration/rerouting and traffic load balancing.	Provides SNMP management with centralized support through each bridge.	Provides connectivity between Version 2/802.3 and token-ring networks.	Enables communication between devices connected to different LAN segments.

Vendor	LANEX Corp.	LANNET Data Communications, Inc.	Lantana Technology	Lantana Technology
Product	REM 8023 Remote Bridge	1ELB	CYPRESS/B7404	CYPRESS/B7412
Characteristics				
LANs Supported	Ethernet	Ethernet	Token-Ring	Token-Ring
Minimum Memory (bytes)	1M	None identified	None identified	None identified
Operation	Remote	Local	Local	Remote
Throughput Rate (packets/sec.)	2,200	7,500	None identified	None identified
Filter Rate (packets/sec.)	15,000	14,000	None identified	None identified
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge); Manual	Automatic (learning bridge); Manual
Media Supported	DSU/CSU; Standard Ethernet coaxial; Thin Ethernet coaxial; dial/dedicated; satellite	Standard Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair	Shielded twisted-pair; Unshielded twisted-pair
Pricing/Support				
Price (\$)	5,995	2,495	4,995	5,995
Date of First Delivery	1988	January 1991	June 1990	June 1990
Standard Warranty	None identified	1 year	1 year	1 year
Service Supplied by	Vendor	Dealer; vendor	Vendor	Vendor
Comments	T1 DSU/CSU is \$995.	Module for Lannet's wiring hub.		

Vendor	Lantana Technology	Maco Networks, Inc.	Microcom, Inc.	Microcom, Inc.
Product	TAMARIX/B1400	LANFrame PSP	MLB/5500 ISDN Remote Bridge	MLB/6000 Local/Remote T1 Bridge
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet; Token-Ring	Ethernet; Token-Ring
Minimum Memory (bytes)	512K	640K	512K	512K
Operation	Local	Local	Remote	Remote
Throughput Rate (packets/sec.)	13,000	15,000	1,000	4,000
Filter Rate (packets/sec.)	17,100	15,000	None identified	None identified
Configuration	Automatic (learning bridge); Manual	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Optical fiber; Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Pricing/Support				
Price (\$)	3,695	See comments	9,200	9,000
Date of First Delivery	August 1988	None identified	May 1990	May 1989
Standard Warranty	1 year	None identified	90 days	90 days
Service Supplied by	Vendor	Vendor	Dealer; vendor	Vendor
Comments		Contact vendor for pricing information.	Price is for turnkey system.	Price is for turnkey system.

Vendor	Microcom, Inc.	NCR Corp.	NCR Corp.	Netronix
Product	MLB/6500 X.25 Bridge	ONS 3320	ONS 3445	EtherMaster 100
Characteristics LANs Supported	Ethernet; Token-Ring	AppleTalk; Ethernet; FDDI; Starlan; Token-Ring	AppleTalk; Ethernet; FDDI; Starlan; Token-Ring	Ethernet
Minimum Memory (bytes) Operation	512K	8M	8M	None identified
Throughput Rate (packets/sec.)	Remote 4,000	Local; Remote 9,281	Local; Remote 27,843	Local 12,500
Filter Rate (packets/sec.)	None identified	16,515	49,545	25,000
Configuration	Automatic (learning bridge)	Automatic (learning bridge); Manual	Automatic (learning bridge); Manual	Automatic (learning bridge)
Media Supported	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Broadband coaxial; Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Broadband coaxial; Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial
Pricing/Support Price (\$)	9,700	1,125	1,000	See comments
Date of First Delivery	May 1990	April 1991	April 1991	October 1989
Standard Warranty	90 days	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Vendor	Vendor	Vendor
Comments	Price is for turnkey system.	Routing is an orderable feature on an ONS system; in general, ONS 3320s range from \$20,000 to \$60,000 for a fully configured system.	Routing is an orderable feature on an ONS system; in general, ONS 3445s range from \$35,000 to \$150,000 for a fully configured system.	SNMP agent for NetView Management and Netronix Network Management; contact vendor for pricing information.

Vendor	Netronix	Netronix	Netronix	Netronix
Product	EtherMaster 200	TokenMaster 100 Bridge	TokenMaster 200	TokenMaster 400
Characteristics LANs Supported	Broadband; Ethernet	Token-Ring	Broadband; Token-Ring	Token-Ring
Minimum Memory (bytes) Operation	None identified	None identified	None identified	512K
Throughput Rate (packets/sec.)	Local None identified	Local 1,650	Local 1,150	Remote None identified
Filter Rate (packets/sec.)	25,000	153; 16,000,000; 38,400; 4,000,000; 600	153,600; 16,000,000; 38,400	None identified
Configuration	Automatic (learning bridge)	None identified	Source routing	None identified
Media Supported	Broadband coaxial; Standard Ethernet coaxial; Thin Ethernet coaxial	IBM Type 1; IBM Type 3; Shielded twisted-pair; Unshielded twisted-pair	Broadband coaxial; Shielded twisted-pair; Unshielded twisted-pair	IBM Type 1; IBM Type 3; Shielded twisted-pair; Unshielded twisted-pair
Pricing/Support Price (\$)	See comments	See comments	See comments	See comments
Date of First Delivery	October 1989	October 1989	October 1989	November 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	SNMP network management and Netronix Bridge Management; frequency agile; contact vendor for pricing information.	Supports IBM source routing, LAN manager, and Netview; 4Mbps and 16Mbps token ring supports Netronix Bridge Management; interoperability with IBM bridges; contact vendor for pricing information.	Supports IBM Source Routing, LAN Manager, and Netview; supports 4Mbps and 6Mbps token ring, Netronix Bridge Management and IBM bridges; contact vendor for pricing information.	Supports IBM source routing, IBM LANmanage, and NETview; supports 4M and 16M bps token-ring, Netronix Bridge Management available in addition to LANmanager; complete interoperability with IBM Bridges. Contact vendor for pricing information.

Vendor	Network Resources Corp.	Optical Data Systems, Inc.	Optical Data Systems, Inc.	Performance Technology
Product	MultiGate Bridge	ODS 2009, 2010	ODS 8008	POWERBridge II
Characteristics				
LANs Supported	AppleTalk; Ethernet	Ethernet	Token-Ring	Any NETBIOS LAN
Minimum Memory (bytes)	None identified	1M	1M	100K
Operation	Local	Local	Local	Local
Throughput Rate (packets/sec.)	None identified	14,800	None identified	None identified
Filter Rate (packets/sec.)	None identified	14,800	None identified	Does not apply
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	None identified
Media Supported	Broadband coaxial; Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Shielded twisted-pair; Unshielded twisted-pair	Any NETBIOS LAN
Pricing/Support				
Price (\$)	2,495	3,650	8,270	495
Date of First Delivery	None identified	September 1990	November 1990	None identified
Standard Warranty	None identified	1 year	1 year	Does not apply
Service Supplied by	Vendor	Vendor	Vendor	Dealer
Comments		2009: 400 address table; 2010: 4096 address table; full bandwidth simultaneous both directions.		Software-only product; NETBIOS bridge; runs as TSR in a PC; takes approx. 100K bytes.

Vendor	Persoft, Inc.	Plexcom, Inc.	Racal InterLan	Racal InterLan
Product	Intersect 1.0a	8029	INX400 Series Local Bridge	INX400 Series Remote Bridge
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Minimum Memory (bytes)	256K	256K	896K	None identified
Operation	Local	Local	Local	Remote
Throughput Rate (packets/sec.)	8,000	12,500	12,000	8,000
Filter Rate (packets/sec.)	22,000	25,000	23,000	14,880
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Optical fiber; Standard Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Pricing/Support				
Price (\$)	1,495	3,095	3,195	10,400, max. price is 14,900
Date of First Delivery	September 1990	June 1989	January 1991	January 1991
Standard Warranty	30 days	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	802.3 Media Access Control Layer Bridge designed for existing PC with 2 Ethernet boards provided; supports 802.1 Spanning Tree and access control using a permanent database.			

Vendor	Racal-Milgo	Raycom Systems, Inc.	Raycom Systems, Inc.	Retix
Product	RACALAN NetExpress	Bridge + Fiber	Bridge + 1.5	2244 Local LAN Bridge
Characteristics				
LANs Supported	Ethernet	Ethernet; Starlan	Ethernet; Starlan	Ethernet; Starlan
Minimum Memory (bytes)	None identified	256K	256K	512K
Operation	Local; Remote	Remote	Remote	Local
Throughput Rate (packets/sec.)	30,000	6,000	3,200	8,400
Filter Rate (packets/sec.)	75,000	16,000	16,000	12,000
Configuration	Automatic (learning bridge)	Automatic (learning bridge), manual	Automatic (learning bridge), manual	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Optical fiber; Standard Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Pricing/Support				
Price (\$)	5,890, max. price is 25,000	5,550	6,975	1,950
Date of First Delivery	October 1990	June 1988	June 1988	March 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Third party; vendor	Third party; vendor	Third party
Comments		Works over standard fibers at 10M bps.		

Vendor	Retix	Retix	Retix	Retix
Product	2265 Local LAN Bridge	4660 Local LAN Bridge	4820 Remote LAN Bridge	4880 High Performance Remote LAN Bridge
Characteristics				
LANs Supported	Ethernet; Starlan	Ethernet	Ethernet	Ethernet
Minimum Memory (bytes)	512K	1M	1M	2M
Operation	Local	Local	Remote	Remote
Throughput Rate (packets/sec.)	8,400	13,650	870	8,000
Filter Rate (packets/sec.)	12,000	29,000	9,000	14,880
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Pricing/Support				
Price (\$)	2,650	3,750	4,950	10,400
Date of First Delivery	March 1988	September 1990	January 1989	January 1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Third party	Third party	Third party	Third party
Comments				

Vendor	The Santa Cruz Operation, Inc.	Ship Star Assoc.	Symicron, Inc.	SynOptics Communications, Inc.
Product	TCP/IP	LB 8323	Symbridge-S	Local Bridge 3323
Characteristics				
LANs Supported	Ethernet; Starlan; Token-Ring	Ethernet	Arcnet; Ethernet; Token-Ring	Ethernet
Minimum Memory (bytes)	2M	None identified	512K	None identified
Operation	Local, remote	Local	Remote	Local
Throughput Rate (packets/sec.)	None identified	14,000	None identified	14,000
Filter Rate (packets/sec.)	None identified	25,000	None identified	29,000
Configuration	Manual	Automatic (learning bridge)	Manual	Automatic (learning bridge)
Media Supported	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial	Broadband coaxial; Standard Ethernet coaxial; Thin Ethernet coaxial	None identified	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair
Pricing/Support				
Price (\$)	695	5,665, max. price is 6,085	2,595	See comments
Date of First Delivery	December 1988	June 1990	May 1990	1990
Standard Warranty	30 days	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments		Meets IEEE 802.3 & IEEE 802.1 Standards.	Comprises X.25 card for PC or PS/2 and software; supports Novell Netware V2.15 revision C or later.	Contact vendor for pricing information.

Vendor	SynOptics Communications, Inc.	3Com Corp.	3Com Corp.	3Com Corp.
Product	Remote Bridge 3356	IB/1	IB/2000	IB/3
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Minimum Memory (bytes)	None identified	1.5M	2.5M	1.5M
Operation	Remote	Local	Local	Remote
Throughput Rate (packets/sec.)	8,000	6,200	9,500	None identified
Filter Rate (packets/sec.)	15,000	17,000	19,200	None identified
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Optical fiber; Shielded twisted-pair; Standard Ethernet coaxial; Thin Ethernet coaxial; Unshielded twisted-pair	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Broadband coaxial; Standard Ethernet coaxial
Pricing/Support				
Price (\$)	See comments	9,100	4,995	7,500
Date of First Delivery	August 1990	1987	March 1989	1987
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Contact vendor for pricing information.			

Vendor	TRW	TRW	TRW	TRW
Product	NB2000-ENEN	NB2000-ENEX	NB2000-ENT1	NB2010
Characteristics				
LANs Supported	Ethernet	Broadband; Ethernet	Ethernet	Ethernet
Minimum Memory (bytes)	None identified	None identified	None identified	None identified
Operation	Local	Local	Remote	Local
Throughput Rate (packets/sec.)	5,000	3,000	2,800	13,000
Filter Rate (packets/sec.)	8,000	8,000	8,000	24,000
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial; Thin Ethernet coaxial	Broadband coaxial; Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial	Standard Ethernet coaxial; Thin Ethernet coaxial
Pricing/Support				
Price (\$)	5,395	5,395	9,640	5,000
Date of First Delivery	None identified	None identified	None identified	February 1990
Standard Warranty	90 days	90 days	90 days	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Supports Ethernet or thin Ethernet (switch-selectable).	Supports Ethernet or thin Ethernet.	Supports Ethernet or thin Ethernet.	Supports Ethernet or thin Ethernet.

Vendor	Ungermann-Bass, Inc.	Ungermann-Bass, Inc.	Ungermann-Bass, Inc.	Ungermann-Bass, Inc.
Product	ASM 5300	ASM-5550	ASM-5560	ASM-6300
Characteristics				
LANs Supported	Ethernet	Token-Ring	Ethernet; FDDI	Ethernet
Minimum Memory (bytes)	1M	1M	1M	1M
Operation	Local	Local	Local	Remote
Throughput Rate (packets/sec.)	6,000	4,500	4,000	7,600
Filter Rate (packets/sec.)	8,000	None identified	9,000	9,000
Configuration	Automatic (learning bridge)	Manual	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Broadband coaxial; Standard Ethernet coaxial	Shielded twisted-pair; Token-Ring; Unshielded twisted-pair	Standard Ethernet coaxial	Broadband coaxial; Standard Ethernet coaxial
Pricing/Support				
Price (\$)	3,950	5,250	25,000	4,195
Date of First Delivery	October 1990	October 1989	October 1989	October 1989
Standard Warranty	90 days	90 days	90 days	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Hot swap bridge card for Access/One.	Hot swap bridge card for Access/One.	Hot swap Ethernet-FDDI bridge for Access/One.	Remote bridge card for Access/One.

Vendor	Ungermann-Bass, Inc.	Ungermann-Bass, Inc.	Vitalink Communications Corp.	Vitalink Communications Corp.
Product	ASM-6500	BR3300	TransLAN 320	TransLAN 350
Characteristics				
LANs Supported	Token-Ring	Ethernet	Ethernet	Ethernet
Minimum Memory (bytes)	1M	512K	1M	2M
Operation	Remote	Local	Remote	Remote
Throughput Rate (packets/sec.)	7,600	6,000	None identified	None identified
Filter Rate (packets/sec.)	None identified	9,000	15,000	15,000
Configuration	Manual	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Shielded twisted-pair; Un-shielded twisted-pair	Broadband coaxial; Standard Ethernet coaxial	Standard Ethernet coaxial	Standard Ethernet coaxial
Pricing/Support				
Price (\$)	5,250	9,450	7,000	16,500
Date of First Delivery	October 1989	January 1988	None identified	None identified
Standard Warranty	90 days	90 days	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments				Upgradable to bridge/router.

Vendor	Vitalink Communications Corp.	Vitalink Communications Corp.	Vitalink Communications Corp.	Wang Laboratories, Inc.
Product	TransLAN III	TransRing 530	TransRing 550	8023-Bridge
Characteristics				
LANs Supported	Ethernet	Token-Ring	Ethernet	Ethernet
Minimum Memory (bytes)	1M	2M	2M	None identified
Operation	Remote	Remote	Remote	Local
Throughput Rate (packets/sec.)	None identified	None identified	None identified	13,600
Filter Rate (packets/sec.)	15,000	20,000	20,000	30,000
Configuration	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)	Automatic (learning bridge)
Media Supported	Standard Ethernet coaxial	IEEE 802.5 interface	IEEE 802.5 interface	Standard Ethernet coaxial
Pricing/Support				
Price (\$)	11,500	9,000	13,500	3,900
Date of First Delivery	None identified	None identified	None identified	December 1990
Standard Warranty	1 year	1 year	1 year	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments		Upgradable to router/ transparent bridge.	Upgradable to router/ transparent bridge.	

Vendor	Wang Laboratories, Inc.
Product	8023-WB5
<hr/>	
Characteristics	
LANs Supported	Broadband; Ethernet
Minimum Memory (bytes)	None identified
Operation	Local
Throughput Rate (packets/sec.)	13,600
Filter Rate (packets/sec.)	30,000
Configuration	Automatic (learning bridge)
Media Supported	Broadband coaxial; Standard Ethernet coaxial

Pricing/Support	
Price (\$)	6,500
Date of First Delivery	December 1990
Standard Warranty	90 days
Service Supplied by	Vendor

Comments

Routers/Brouters Comparison Column Entry Descriptions

Routers interconnect networks in much the same way as bridges. The difference is that routers use more sophisticated software that determines preferred paths. We have tried to fit each product to the specifications listed, to provide an accurate representation of that product's capabilities. Our survey form provided each vendor with a number of choices for each parameter listed. Space was provided to write in an answer when the proper choices for that vendor were not listed. (Please note that some vendors offer products that they call "brouters"—combination bridge/routers. These products are also covered in this section.)

Vendor and Model. This entry lists the manufacturer and model number or name of each device.

Characteristics

LANs Supported. Vendors selected Ethernet, token-ring, Arcnet, Starlan, Appletalk, FDDI, or

Other. Ethernet is a baseband carrier sense multiple access with collision detection (CSMA/CD) network that operates at 10M bps. Token-Ring refers to a LAN designed with a ring topology that uses the token-passing technique. Arcnet is a token-passing network that uses a star or bus topology and runs at 2.5M bps. Starlan is a CSMA star topology LAN that uses unshielded twisted-pair wiring with either 1M bps or 10M bps transmission speed. AppleTalk is Apple's Macintosh networking protocol that can run on most industry-standard networking schemes. FDDI stands for Fiber Distributed Data Interface and can be a 100M bps fiber optic network.

Protocols Supported. A protocol is a set of procedures that establish, maintain, and control communications. Protocols include Transmission Control Protocol/Internet Protocol (TCP/IP), Xerox Network Systems (XNS),

DECnet (Digital Equipment Corp.'s network), Open Systems Interconnection/Connectionless Network Service (OSI/CLNS), Novell's Internetwork Packet Exchange Protocol (IPX), and AppleTalk (Apple Computer).

Routing Protocols Supported. Routing protocols are the rules for directing data message packets from source nodes to destination nodes. The two most widely used are Routing Information Protocol (RIP) and Open Shortest Path First (OSPF).

Wide Area Network Interfaces. A wide area network (WAN) covers hundreds or thousands of miles via lines supplied by a common carrier, usually a telephone company. In this entry, vendors indicated if their products connect with WANs.

SNMP Network Management. Vendors answered whether they offered network management based on the Simple Network Management Protocol (SNMP).

SNMP Management Stations. Vendors answered whether they support SNMP management stations, which can be user

workstations, virtual consoles, or file server consoles.

Throughput Rate, Packets per Second. This entry refers to the rates at which information is processed or communicated.

Maximum Number of Network Interfaces Supported. Interfaces are the connection points between devices. This entry indicates the highest number of network interfaces supported by the router/brouter.

Pricing/Support Price (\$). The basic price of the unit, excluding any options, is noted here.

Date of First Delivery. The date the vendor first delivered the product to market.

Standard Warranty. Vendors indicated the length of their warranties.

Serviced Supplied by. The vendor usually offers service on an on-site or factory repair/return basis. In some cases, a dealer or third party provides service.

Comments. In this space, vendors listed special characteristics of their products, such as additional capabilities, features, or software not covered in the column.

Vendor	Advanced Computer Communications	Advanced Computer Communications	Allen-Bradley Co., Inc.	Allen-Bradley Co., Inc.
Product	Series 2000	Series 4000	LAN/1	LAN/1-6620-BHA
Characteristics				
LANs Supported	Ethernet	Ethernet	Arcnet	Arcnet
Protocols Supported	TCP/IP	DECnet; IPX; TCP/IP; XNS	Proprietary LAN/1	Proprietary LAN/1
Routing Protocols Supported	RIP	OSPF; RIP	None identified	None identified
Wide Area Network Interface	56K-byte T1 service; DDN X.25; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25	None identified	None identified
SNMP Network Management	Yes	Yes	No	No
SNMP Management Stations	Yes	Yes	No	No
Throughput Rate (packets per second)	12,500	10,000	None identified	None identified
Max. Network Interfaces Supported	See comments	4	256	256
Pricing/Support				
Price (\$)	3,250	5,500	See comments	See comments
Date Available	November 1990	August 1989	1980	1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Third party; vendor	Third party; vendor	Vendor	Vendor
Comments	Unlimited network interfaces supported.		Contact vendor for pricing information.	Contact vendor for pricing information.

Vendor	Apple Computer, Inc.	APT Communications	AT&T	AT&T
Product	AppleTalk Internet Router	ComTalk	StarGROUP Software X.25 Router Program	StarWAN Multi-Protocol Router
Characteristics				
LANs Supported	Arcnet; Ethernet; LocalTalk; Token-Ring	AppleTalk; Ethernet; Token-Ring	Ethernet; Token-Ring	Ethernet
Protocols Supported	AppleTalk	AppleTalk	OSI/CLNS	AppleTalk; DECnet; IPX; OSI/CLNS; TCP/IP; XNS
Routing Protocols Supported	AppleTalk Phase2 RTMP	AppleTalk RTMP/ZIP	None identified	IGRP; RIP
Wide Area Network Interface	None identified	56K-byte T1 service; PDN X.25	56K-byte T1 service; PDN X.25	56K-byte T1 service; PDN X.25
SNMP Network Management	No	Yes	No	No
SNMP Management Stations	No	No	No	No
Throughput Rate (packets per second)	1,000	None identified	None identified	None identified
Max. Network Interfaces Supported	8	7	None identified	None identified
Pricing/Support				
Price (\$)	399	3,250	1,675, max. price is 1,975	12,000
Date Available	None identified	October 1989	March 1989	May 1990
Standard Warranty	90 days	90 days	90 days	90 days
Service Supplied by	Dealer; third party	Vendor	Vendor	Vendor
Comments	Software product that runs in the background of a Macintosh Plus through Macintosh II fx; provides local management display for traffic and statistics.	Available with multiple LAN/WAN port configurations; TCP/IP gateway software included; WAN ports support synchronous 56K bps-1.544M bps lines or X.25 networks.	Software-based router for AT&T StarGroup.	Network management in future releases.

Vendor	CASE/Datatel, Inc.	cisco Systems, Inc.	cisco Systems, Inc.	cisco Systems, Inc.
Product	6440	AGS	AGS +	CGS
Characteristics				
LANs Supported	Ethernet	Ethernet; Token-Ring	Ethernet; FDDI; Token-Ring	Ethernet
Protocols Supported	OSI/CLNS	AppleTalk; DECnet; IPX; OSI; TCP/IP; XNS	AppleTalk; DECnet; IPX; OSI; TCP/IP; XNS	AppleTalk; DECnet; IPX; OSI; TCP/IP; XNS
Routing Protocols Supported	None identified	IGRP; RIP	IGRP; RIP	IGRP; RIP
Wide Area Network Interface	56K-byte T1 service; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25
SNMP Network Management	No	Yes	Yes	Yes
SNMP Management Stations	No	Yes	Yes	Yes
Throughput Rate (packets per second)	None identified	20,000	20,000	20,000
Max. Network Interfaces Supported	8 remote	16	32	4
Pricing/Support				
Price (\$)	2,350	15,000, max. price is 35,000	15,000, max. price is 40,000	8,000, max. price is 12,000
Date Available	December 1988	1986	April 1990	1988
Standard Warranty	1 year	1 year; 90 days	1 year; 90 days	1 year; 90 days
Service Supplied by	Vendor	Third party	Third party	Third party
Comments		Supports routing for all protocols and concurrent bridging. IGRP is cisco's routing protocol which is in use in over 10,000 routers worldwide.	Supports routing for all protocols and concurrent bridging. IGRP is cisco's routing protocol which is in use in over 10,000 routers worldwide.	Supports routing for all protocols and concurrent bridging. IGRP is cisco's routing protocol which is in use in over 10,000 routers worldwide.
Vendor	cisco Systems, Inc.	cisco Systems, Inc.	CMC	Compatible Systems Corp.
Product	IGS	MGS	DRN-3200 Ethernet-to-DDN Router	Ether*Route
Characteristics				
LANs Supported	Ethernet	Ethernet; Token-Ring	DDN; Ethernet	AppleTalk; Ethernet
Protocols Supported	AppleTalk; DECnet; IPX; OSI; TCP/IP; XNS	AppleTalk; DECnet; IPX; OSI; TCP/IP; XNS	TCP/IP	AppleTalk; TCP/IP
Routing Protocols Supported	IGRP; RIP	IGRP; RIP	EGP	RIP; RTMP
Wide Area Network Interface	56K-byte T1 service; DDN X.25; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25	DDN X.25	None identified
SNMP Network Management	Yes	Yes	Yes	No
SNMP Management Stations	Yes	Yes	No	No
Throughput Rate (packets per second)	6,000	20,000	None identified	220
Max. Network Interfaces Supported	2	8	3	3
Pricing/Support				
Price (\$)	4,995	12,500, max. price is 30,000	11,900, max. price is 18,900	1,495, max. price is 1,895
Date Available	November 1990	1987	None identified	November 1990
Standard Warranty	1 year	1 year; 90 days	1 year; 90 days	1 year
Service Supplied by	Third party; vendor	Third party	Vendor	Vendor
Comments	Offers full software support of its high-end routed bridges. At \$4995 the IGS offers routing support for 12 protocols, comes with multiple routine, protocols, and has a \$450 concurrent bridging option. The remote IGS, priced at \$5495 supp. synchronous.	Supports routing for all protocols and concurrent bridging. IGRP is cisco's routing protocol which is in use in over 10,000 routers worldwide.	An Ethernet-to-DDN Router designed to connect Ethernet TCP/IP local area networks to the Defense Data Network (DDN). Comes with two 10MHz microprocessors, 604KB or dynamic RAM and a DDN standard X.25 of 1822 DDN interface.	4 mods avail.: Ether*Route supports thin/thick Ethernet; Ether*Route Twisted Pr supports 10BaseT/thick Ethernet; Ether*Route/TLP supports thin/thick Ethernet with TLP/IP support; Ether*Route/TLP Twisted Pr supports 10BaseT/thick Ethernet with RP/IP supp.

Vendor	CrossComm Corp.	Digital Equipment Corp.	Eicon Technology Corp.	Eicon Technology Corp.
Product	ILAN Internetworking Server	DECrouter 2000	NetBIOS Bridges	NetWare Bridges
Characteristics				
LANs Supported	Ethernet; Starlan; Token-Ring	Ethernet	Arcnet; Ethernet; FDDI; NET-BIOS; Starlan; Token-Ring	Arcnet; Ethernet; FDDI; Starlan; Token-Ring
Protocols Supported	None identified	DECnet	NETBIOS	IPX; SPX
Routing Protocols Supported	None identified	None identified	NETBIOS	Proprietary
Wide Area Network Interface	56K-byte T1 service	56K-byte T1 service; DDN X.25	56K-byte T1 service; DDN X.25; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25
SNMP Network Management	Yes	No	No	No
SNMP Management Stations	None identified	No	No	No
Throughput Rate (packets per second)	Not available	None identified	70	70
Max. Network Interfaces Supported	4	None identified	128	11
Pricing/Support				
Price (\$)	6,000, max. price is 13,000	13,230	See comments	See comments
Date Available	November 1987	None identified	March 1988	August 1987
Standard Warranty	90 days	1 year	1 year	1 year
Service Supplied by	None identified	Vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments			Connect 2 or more remote NetBIOS compat. LANs. Provide transparent LAN-to-LAN connections for access to remote resources; uses an EiconCard to support up to 254 simul. sessions on any NetBIOS compatible LAN. Contact vendor for pricing information.	Contact vendor for pricing information. Connect 2 or more Novell LANs and isolated PCs together over leased lines and X.25 packet switched data networks.
Vendor	Fibermux Corp.	Fibronics International Inc.	Gateway Communications, Inc.	Gateway Communications, Inc.
Product	FX5520Z	FX8310	G/Remote Bridge	G/Remote Bridge 64
Characteristics				
LANs Supported	Ethernet; FDDI	FDDI	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring
Protocols Supported	TCP/IP	TCP/IP	IPX	IPX
Routing Protocols Supported	RIP	None identified	NetWare Core Protocol	NetWare Core Protocol
Wide Area Network Interface	None identified	56K-byte T1 service	DDN X.25; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25
SNMP Network Management	None identified	Yes	No	No
SNMP Management Stations	None identified	No	No	No
Throughput Rate (packets per second)	None identified	None identified	100	250
Max. Network Interfaces Supported	3	2	32	128
Pricing/Support				
Price (\$)	22,000, max. price is 27,000	24,000	2,990	4,495
Date Available	October 1989	None identified	February 1986	April 1989
Standard Warranty	1 year	90 days	1 year	1 year
Service Supplied by	Vendor	Vendor	Dealer	Dealer
Comments	Can be configured as a transparent, translating bridge; the choice is up to the network administrator during bring-up time.		Price shown is for 2 links.	Price shown is for 2 links.

Vendor	General DataComm, Inc.	Halley Systems, Inc.	Halley Systems, Inc.	Hewlett-Packard Co.
Product	MEGA*BRIDGE	ConnectLAN 100	ConnectLAN 200	HP 27270A
Characteristics				
LANs Supported	Ethernet; Starlan; Token-Ring	Ethernet	Token-Ring	Ethernet; Token-Ring
Protocols Supported	DECnet; OSI; TCP/IP; XNS	AppleTalk; DECnet; IPX; OSI; TCP/IP; XNS	AppleTalk; DECnet; IPX; OSI; SNA; TCP/IP; XNS	AppleTalk; DECnet; IPX; TCP/IP; XNS
Routing Protocols Supported	STP	None identified	None identified	RIP
Wide Area Network Interface	56K-byte T1 service	56K-byte T1 service	56K-byte T1 service	56K-byte T1 service; DDN X.25; PDN X.25
SNMP Network Management	Yes	No	No	Yes
SNMP Management Stations	Yes	No	No	Yes
Throughput Rate (packets per second)	7,000	2,300	None identified	None identified
Max. Network Interfaces Supported	4	None identified	None identified	16
Pricing/Support				
Price (\$)	6,000, max. price is 15,000	6,495, max. price is 11,500	6,995, max. price is 11,500	13,000
Date Available	None identified	December 1989	December 1989	July 1990
Standard Warranty	None identified	1 year	1 year	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Transparent to all Ethernet protocols (DecNet, TCP/IP, XNS, OSI, LAT, TOP, etc); all AT&T protocols, NetWare and other standard network layer protocols forwards IBM, 3Com, Novell TCP/IP and other token ring protocols.	A high-performance local and remote bridge/router (Brouter); this device combines both local and remote Ethernet or IEEE 802.3 LANs into a single wide-area network.	A series of high-performance brouter (bridge/router) products capable of interconnecting geographically-dispersed Token Ring/IEEE 802.5 local area networks.	Price shown is for 2-port version.

Vendor	Interlink Computer Sciences, Inc.	Interlink Computer Sciences, Inc.	Mitek OpenConnect Systems, Corp.	NCR Corp.
Product	SNS/BR340	SNS/BR380	OpenConnect/IP Router	ONS 3320
Characteristics				
LANs Supported	Ethernet; Token-Ring	Ethernet; Token-Ring	Ethernet	AppleTalk; Ethernet; FDDI; Starlan; Token-Ring
Protocols Supported	DECnet; IPX; TCP/IP; XNS	DECnet; IPX; TCP/IP; XNS	SNA; TCP/IP	AppleTalk; DECnet; IPX; OSI; SNA; TCP/IP; X.25; XNS
Routing Protocols Supported	RIP	RIP	Transparent routing	ARP; EGP; IP/ICMP; OSI; OSPF; RIP; UDP; XNS Router
Wide Area Network Interface	56K-byte T1 service; DDN X.25; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25
SNMP Network Management	Yes	Yes	Yes	Yes
SNMP Management Stations	Yes	Yes	No	Yes
Throughput Rate (packets per second)	12,000	12,000	None identified	9,281
Max. Network Interfaces Supported	3	8	127	12
Pricing/Support				
Price (\$)	8,400	See comments	2,495	1,125
Date Available	March 1990	March 1990	May 1990	April 1991
Standard Warranty	1 year	1 year	90 days	1 year
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Vendor
Comments		Contact vendor for pricing information.	Software routing for OpenConnect/ Server SNA gateway. Uses SNA as the wide area network.	Routing is an orderable feature on an ONS system; in general, ONS 3320s range from \$20,000 to \$60,000 for a fully configured system.

Vendor	NCR Corp.	Network Resources Corp.	Network Systems Corp.	Newport Systems Solutions, Inc.
Product	ONS 3445	MultiGate 2000	EN Series	LAN2LAN/64
Characteristics				
LANs Supported	AppleTalk; Ethernet; FDDI; Starlan; Token-Ring	Ethernet	AppleTalk; Ethernet; FDDI; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring
Protocols Supported	AppleTalk; DECnet; IPX; OSI; SNA; TCP/IP; X.25; XNS	AppleTalk; TCP/IP	AppleTalk; DECnet; HP Probe; HYPERchannel; IPX; TCP/IP; XNS	IPX
Routing Protocols Supported	ARP; EGP; IP/ICMP; OSI; OSPF; RIP; UDP; XNS Router	RIP; RTMP	OSPF; RIP	None identified
Wide Area Network Interface	56K-byte T1 service; DDN X.25; PDN X.25	None identified	56K-byte T1 service; PDN X.25	56K-byte T1 service
SNMP Network Management	Yes	Yes	Yes	No
SNMP Management Stations	Yes	No	Yes	No
Throughput Rate (packets per second)	27,843	None identified	14,000	None identified
Max. Network Interfaces Supported	57	2	50	4
Pricing/Support				
Price (\$)	1,000	2,395	Not Available	2,695
Date Available	April 1991	May 1989	None identified	September 1988
Standard Warranty	1 year	1 year	90 days	2 years
Service Supplied by	Vendor	Vendor	None identified	None identified
Comments	Routing is an orderable feature on an ONS system; in general, ONS 3445s range from \$35,000 to \$150,000 for a fully configured system.		Offer a family of high-performance bridges & routers for linking & managing LANs & WANs in an enterprise-wide network. Send packets of data to correct destination at very high speeds, & come with network mgmt & security features.	Supports 2 or 4 full duplex ports at speeds from 9.6 to 64 kbps over conventional phone lines, direct digital service or leased lines. Avail. in LSA & MCA config. NetWare 286 & 386 NLM ver. are incl. with every product. Field upgradable.

Vendor	Newport Systems Solutions, Inc.	Newport Systems Solutions, Inc.	Newport Systems Solutions, Inc.	Niwot Networks
Product	LAN2LAN/Compression Router	LAN2LAN/FT1 (fractional T1)	LAN2LAN/Mega	AT/SD
Characteristics				
LANs Supported	Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring
Protocols Supported	IPX	IPX	IPX	IPX
Routing Protocols Supported	None identified	None identified	None identified	None identified
Wide Area Network Interface	56K-byte T1 service	56K-byte T1 service	56K-byte T1 service	None identified
SNMP Network Management	No	No	No	No
SNMP Management Stations	No	No	No	No
Throughput Rate (packets per second)	None identified	None identified	None identified	None identified
Max. Network Interfaces Supported	2	4	2	None identified
Pricing/Support				
Price (\$)	4,195	4,095	5,395.00	3,500
Date Available	October 1990	February 1990	September 1988	November 1990
Standard Warranty	2 years	2 years	2 years	1 year
Service Supplied by	None identified	None identified	None identified	Vendor
Comments	Allows users to increase the throughput of their LAN-to-LAN communications of lines without increasing line speeds or incurring higher line costs. Employs a proprietary compression algorithm which achieves an average ratio of 4:1, data depend.	Supports four full duplex ports at speeds from 9.6 to 768Kbps. Product is upgradeable with compression or to full T1 capacity. Available in both ISA and MCA versions. NetWare 286 and NetWare 386 NLM versions are included with every product.	Supports two full duplex ports at speeds from 9.6Kbps to 2.048Mbps. Aggregate speeds on both ports are limited to a total of 6.176Mbps. All products are available in ISA and MCA versions. NetWare 286 and NetWare 386 NLM versions are included.	A bus master card to eliminate "double-shuffle" on data transfers. Supports full ISDN suite of services. Data rates of 56K to 2.048M (CEPT) clockable from synchronous input.

Vendor	Niwot Networks	Niwot Networks	Niwot Networks	Novell, Inc.
Product	AT/SYNC	AT/T1	AT/T1D	NetWare Async Remote Bridge
Characteristics				
LANs Supported	Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring	Ethernet; Token-Ring; all topologies by NetWare V2.1 or higher
Protocols Supported	IPX	IPX	IPX	IPX
Routing Protocols Supported	None identified	None identified	None identified	RIP
Wide Area Network Interface	None identified	None identified	None identified	Async
SNMP Network Management	No	No	No	No
SNMP Management Stations	No	No	No	No
Throughput Rate (packets per second)	None identified	1544000	None identified	None identified
Max. Network Interfaces Supported	None identified	None identified	None identified	3
Pricing/Support				
Price (\$)	3,500	3,500	3,500	395
Date Available	February 1989	November 1988	December 1990	June 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Dealer; third party; vendor
Comments	Point-to-point synchronous communication link that will clock to the selected line speed from 56K up to and including 2.048M (CEPT).	Point-to-Point T-1 connections. Board does own D4 framing for T1. Can be used on private microwave infrared; private lines without a CSU/DSU or with common carriers (ATT, MCI, etc.) with CSU (no DSU required).	Supports ISDN Primary Rate Service; full T1 and fractional T1; supports D4, ESF framing, and AMI, B825 coding; designed for switched 384, switched 768 service.	Requires Novell WNIM+ or IBM Com1/Com2; supports 9600 - 19.2Kbps with WNIM+ and 2400 with comm port alone.
Vendor	Novell, Inc.	Novell, Inc.	Novell, Inc.	NTI Group, Inc.
Product	NetWare Link/64	NetWare Link/T1	NetWare Link/X.25	NTI 3000 Router
Characteristics				
LANs Supported	All topologies by NetWare V2.1 or higher; Ethernet; Token-Ring	Ethernet; Token-Ring; all topologies by NetWare V2.1 or higher	All topologies by NetWare V2.1 or higher	Desnet; Ethernet
Protocols Supported	IPX; NETBIOS interface	IPX; NETBIOS interface	IPX; X.25	TCP/IP
Routing Protocols Supported	RIP	RIP	RIP	OSPF
Wide Area Network Interface	64K byte; FT1	9600-2.048Mbps T1 service	9600-64Kbps; PDN X.25	56K-byte T1 service; PDN X.25
SNMP Network Management	No	No	No	Yes
SNMP Management Stations	No	No	No	None identified
Throughput Rate (packets per second)	13	320	None identified	None identified
Max. Network Interfaces Supported	3	3	3	None identified
Pricing/Support				
Price (\$)	1,495	3,995	1,750	See comments
Date Available	December 1989	December 1989	December 1989	None identified
Standard Warranty	1 year	1 year	1 year	90 days
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Vendor
Comments	Requires Synchronous/+ Adapter; supports 2 ports per board.	Requires Synchronous/+ Adapter; supports 9600 to 2.048Mbps and 2 ports per board.	Requires Novell X.25 extended Adapter.	Contact vendor for pricing information.

Vendor	Phaser Systems, Inc.	Promptus Communications, Inc.	Proteon, Inc.	Proteon, Inc.
Product	SNA Router 286 & 386	T-1 LanRouter	p4100+	p4200 FDDI Router
Characteristics				
LANs Supported	Ethernet; Token-Ring	AppleTalk; Arcnet; Ethernet; FDDI; Starlan; Token-Ring	AppleTalk; Ethernet; ProNET-10; Token-Ring	Ethernet; FDDI; Token-Ring
Protocols Supported	IPX; SNA/SDLC	IPX	Apollo Domain; AppleTalk; DECnet; IPX; OSI; TCP/IP; XNS	Apollo Domain; AppleTalk; DECnet; IPX; OSI; TCP/IP; XNS
Routing Protocols Supported	None identified	None identified	OSPF	OSPF; RIP
Wide Area Network Interface	56K-byte T1 service	56K-byte T1 service	56K-byte T1 service; DDN X.25; PDN X.25	DDN X.25; PDN X.25
SNMP Network Management	No	No	Yes	Yes
SNMP Management Stations	No	No	None identified	None identified
Throughput Rate (packets per second)	None identified	None identified	5,000	5,000
Max. Network Interfaces Supported	None identified	4	4	14
Pricing/Support				
Price (\$)	See comments	5,900	6,900, max. price is 9,900	7,900, max price is 14,950
Date Available	June 1989	April 1990	January 1989	June 1987
Standard Warranty	None identified	1 year	90 days	90 days
Service Supplied by	Vendor	Dealer	Vendor	Vendor
Comments	Contact vendor for pricing information. Enables Novell Netware LAN's to communicate across established SNA wide area network.	LAN interconnect system for Novell NetWare LANs; built-in DSU/CSU allow direct connection to T1 services, no external equip. required.	Offers 16Mbps backbone capability, source routing and spanning tree bridging.	
Vendor	Retix	The Santa Cruz Operation, Inc.	Shiva	Shiva
Product	4942 Remote Bridge/Router	TCP/IP	NetBridge	TeleBridge
Characteristics				
LANs Supported	Ethernet	Ethernet; FDDI; Token-Ring	AppleTalk	AppleTalk
Protocols Supported	All protocols-bridged/TCP/IP-routed; TCP/IP	TCP/IP	AppleTalk	AppleTalk
Routing Protocols Supported	RIP; STP/Adaptive Routing	RIP	RTMP	RTMP
Wide Area Network Interface	56K-byte T1 service	DDN X.25	None identified	None identified
SNMP Network Management	Yes	Yes	No	No
SNMP Management Stations	Yes	No	No	No
Throughput Rate (packets per second)	8,000	None identified	Does not apply	Does not apply
Max. Network Interfaces Supported	2	None identified	2	2
Pricing/Support				
Price (\$)	10,900	695	499	499
Date Available	November 1990	December 1988	November 1988	January 1989
Standard Warranty	1 year	30 days	1 year	1 year
Service Supplied by	Third party	Vendor	Vendor	Vendor
Comments			Expands the efficiency of AppleTalk networks beyond the normal 32 users and allows large and efficient networks to be built. Combines various small networks into one complete internetwork; splits a saturated network into two.	Acts as a bridge between remote networks; AppleTalk systems, each with a TeleBridge and attached modem, can be linked over phone lines to form one continuous network.

Vendor	SynOptics Communications, Inc.	3Com Corp.	Tri-Data Corp.	Ungermann-Bass, Inc.
Product	3383	BR/2000	MaxWay 500	ASM-7100 MaxTalk
Characteristics				
LANs Supported	Ethernet	Ethernet	AppleTalk; Ethernet; FDDI; Token-Ring	AppleTalk; Ethernet
Protocols Supported	AppleTalk; DECnet; IPX; OSI; TCP/IP; Total of 14 protocols; XNS	OSI/CLNS; TCP/IP; XNS	AppleTalk; IPX; TCP/IP	AppleTalk; TCP/IP
Routing Protocols Supported	IGRP; RIP	None identified	None identified	DDP, ZIP, other AppleTalk protocols
Wide Area Network Interface	None identified	None identified	None identified	None identified
SNMP Network Management	Yes	Yes	Yes	Yes
SNMP Management Stations	Yes	Yes	Yes	None identified
Throughput Rate (packets per second)	6,000	None identified	15,000	Does not apply
Max. Network Interfaces Supported	2	2	6	16
Pricing/Support				
Price (\$)	See comments	5,495	5,495	4,695
Date Available	December 1990	February 1990	June 1990	October 1989
Standard Warranty	1 year	1 year	120 days	90 days
Service Supplied by	Third party; vendor	Third party; vendor	Vendor	Vendor
Comments	Contact vendor for pricing information.			

Vendor	Ungermann-Bass, Inc.	Unisync Inc.	Vitalink Communications Corp.	Vitalink Communications Corp.
Product	BR3000	Unilinc LAN Communication Server	Transpath 530	Transpath 550
Characteristics				
LANs Supported	Ethernet	Ethernet; Token-Ring	Token-Ring	Token-Ring
Protocols Supported	XNS	DECnet; IPX; TCP/IP	TCP/IP	TCP/IP
Routing Protocols Supported	RIP	Proprietary	OSPF	OSPF
Wide Area Network Interface	56K-byte T1 service	56K-byte T1 service; DDN X.25; PDN X.25	56K-byte T1 service	56K-byte T1 service
SNMP Network Management	No	No	Yes	Yes
SNMP Management Stations	No	No	Yes	None identified
Throughput Rate (packets per second)	2,600	200	None identified	None identified
Max. Network Interfaces Supported	1	8	1, 1-8 I/O ports	1, 1-8 I/O ports
Pricing/Support				
Price (\$)	9,700	2,100	9,000	13,000
Date Available	February 1988	None identified	None identified	None identified
Standard Warranty	90 days	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Also comes in bridge configuration.	Can run as part of Unisync's LAN Gateway Server.	Bridge/router.	Bridge/router.

Vendor	Vitalink Communications Corp.	Wellfleet Communications	Wellfleet Communications	Wellfleet Communications
Product	Transpath 350	Concentrator Node	Feeder Node	Link Node
Characteristics				
LANs Supported	Ethernet	AppleTalk; Ethernet; FDDI; Starlan; Token-Ring	AppleTalk; Ethernet; FDDI; Starlan; Token-Ring	AppleTalk; Ethernet; FDDI; Starlan; Token-Ring
Protocols Supported	TCP/IP	AppleTalk; DECnet; IPX; OSI; TCP/IP; X.25; XNS	AppleTalk; DECnet; IPX; OSI; TCP/IP; X.25; XNS	AppleTalk; DECnet; IPX; OSI; TCP/IP; X.25; XNS
Routing Protocols Supported	OSPF	IS-IS 1991; OSPF; RIP	IS-IS 1991; OSPF; RIP	IS-IS 1991; OSPF; RIP
Wide Area Network Interface	56K-byte T1 service	56K-byte T1 service; DDN X.25; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25	56K-byte T1 service; DDN X.25; PDN X.25
SNMP Network Management	Yes	Yes	Yes	Yes
SNMP Management Stations	None identified	Yes	Yes	Yes
Throughput Rate (packets per second)	None identified	14,000	14,000	14,000
Max. Network Interfaces Supported	1, 1-8 I/O ports	26, 52 WAN	26, 52 WAN	26, 52 WAN
Pricing/Support				
Price (\$)	16,500	14,000	8,995, max. price is 10,995	6,330
Date Available	None identified	November 1988	November 1988	November 1988
Standard Warranty	1 year	90 days	90 days	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Bridge/router.			

Vendor	Zenith Electronics Corp.
Product	Galaxy Exchange
Characteristics	
LANs Supported	AppleTalk; Ethernet; Token-Ring
Protocols Supported	AppleTalk; DECnet; IPX; OSI; TCP/IP; XNS
Routing Protocols Supported	Source Routing; Source Routing Transparent; Spanning Tree
Wide Area Network Interface	56K-byte T1 service
SNMP Network Management	Yes
SNMP Management Stations	Yes
Throughput Rate (packets per second)	None identified
Max. Network Interfaces Supported	4
Pricing/Support	
Price (\$)	4,995
Date Available	None identified
Standard Warranty	1 year
Service Supplied by	Vendor
Comments	Interface modules available for Ethernet, Token-Ring, Broadband, T1, and Leased Lines (at additional cost). The Galaxy Exchange is a protocol-transparent system.

Gateways Comparison Column Entry Descriptions

Gateways are the most complex of the internet-working products currently gaining in popularity. Gateways vary from vendor to vendor and model to model, so a wide variety of product types exists. We have tried to fit each product to the specifications listed, to provide an accurate representation of that product's capabilities. Our survey form provided each vendor with a number of possible choices for each parameter listed. There was also a space to write in a specific answer when the proper choices for that vendor were not listed.

Vendor and Model. This entry lists the manufacturer and model number or name of each device.

Characteristics LANs Supported. This entry lists the LAN technologies the gateway will operate with. The most popular LAN technologies include Ethernet, Arcnet, token-ring, Starlan, AppleTalk, and FDDI. There

are also gateways available that operate with broadband LANs; these are generally supplied by broadband LAN vendors.

Protocols Supported. LAN gateways operate at the upper layers of the OSI Reference Model. They accomplish their gateway functions by translating the protocols used on dissimilar LANs. This parameter will tell you exactly which protocols the gateway can translate. Popular protocols include IBM Systems Network Architecture (SNA); X.25 (CCITT's packet-switching protocol); TCP/IP (Transmission Control Protocol/Internet Protocol, a protocol supported and standardized by the Department of Defense); XNS (Xerox Network Services); DECnet (Digital Equipment Corp.'s networking architecture); SDLC (IBM's Synchronous Data Link Control); and HDLC (the International Organization for Standardization's High-level Data Link Control).

Host Systems Supported. Many gateways provide a link between the LAN and a host computer. The most often supported hosts include IBM's 43XX and 30XX mainframe families, IBM's System/34/36/38 and AS/400 minicomputers, and Digital's VAX minicomputers.

Operation. Gateways can support local and/or remote operation.

Gateway Workstation. Many gateways must have a device on the LAN dedicated to the gateway function. Popular gateway workstations include the IBM PC/XT/AT family or IBM compatibles; the IBM PS/2 Models 30, 50, 60, and 80; or the Apple Macintosh. Not all gateways, however, require a dedicated workstation.

Minimum Memory, Bytes. This entry provides the minimum amount of memory, in bytes, that the gateway workstation requires for its operation.

Line Speeds Supported, bps. This entry provides the communication line speeds, in bits per second, that the gateway supports.

API Support. Many LAN gateways require a level of programming to operate effectively. In this

case, the application programming interface (API) supported by the gateway is critical. The most popular APIs are the IBM API, APPC/LU6.2, and DCA IRMA API. Many gateways provide a proprietary API.

Pricing/Support Price (\$). There are a number of gateway types currently on the market providing a wide range of functionality. Likewise, gateways are available in a wide range of prices. The price of a gateway often depends on the configuration, the number of LUs (logical units), or the number of users.

Date of First Delivery. This entry will tell you how long the product has been commercially available.

Standard Warranty. Warranties offered differ from vendor to vendor. Many offer one-year warranties; some offer less.

Service Supplied by. Increasingly, many products are now being serviced by the dealer or via a third-party service arrangement.

Comments. This entry includes space for any features, functions, or products not covered by the entries above.

Vendor	Able Computer Communications	Able Computer Communications	Able Computer Communications	Advanced Digital Corp.
Product	DE250	PL550	RG300	ADNet
Characteristics				
LANs Supported	Ethernet	Ethernet	Lease line	Arcnet; Ethernet
Protocols Supported	TCP/IP	DECnet; LAT	AT&T/Paradyne; Case/Datatel	None identified
Host Systems Supported	UNIX	Digital VAX	Digital VAX	PC
Operation	Local	Local	Remote	Local
Gateway Workstation Supported	UNIX	DECLAT	DEC	IBM PC/XT/AT or compatible; IBM PS/2 Model 30
Minimum Memory (bytes)	2M	2M	512K	128K
Line Speeds Supported (bps)	1M	1M	80K	None identified
API Support	Proprietary API	Proprietary API	Proprietary API	None identified
Pricing/Support				
Price (\$)	6,500	15,750	5,750	395
Date of First Delivery	November 1990	October 1988	December 1987	1989
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Third party; vendor	Third party; vendor	Vendor	Dealer; vendor
Comments	Supports full TCP/IP suite and SNMP network management; provides TCP/IP connection via Ethernet to Able async solutions.	Provides Ethernet connection to Able async connectivity devices.	Provides 2 high speed ports for wide area connectivity, and Ethernet access to CASE/Datatel and AT&T/Paradyne switch networks.	
Vendor	Applitek Corp.	Applitek Corp.	APT Communications	AST Research Inc.
Product	NI10/G-SNA Gateway	NI10/G-X.25 Gateway	ComTalk	AST-5250 Gateway Option
Characteristics				
LANs Supported	UniLAN	UniLAN	AppleTalk; Ethernet; Token-Ring	NETBIOS-compatible LANs
Protocols Supported	SNA	X.25	AppleTalk	NETBIOS interface
Host Systems Supported	IBM 3270 hosts	X.25 hosts	Digital VAX; UNIX; other TCP/IP hosts	IBM AS/400
Operation	Remote	Local; Remote	Local; Remote	Local; Remote
Gateway Workstation Supported	None identified	None identified	Apple Macintosh	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	None identified	None identified	512K	128K
Line Speeds Supported (bps)	19.2K; 9.6K	19.2K; 56K; 64K; 9.6K	1.544M; 19.2K; 56K; 64K; 9.6K	9.6K
API Support	None identified	None identified	Mac TCP or compatible	IBM API
Pricing/Support				
Price (\$)	18,810	18,810	3,250	995
Date of First Delivery	1987	1986	October 1989	1986
Standard Warranty	90 days	90 days	90 days	2 years
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Allows asynchronous terminals and printers connected to a UniLAN to communicate with hosts running SNA; allows IBM PCs to emulate 3270 terminals and utilize the 3270-PC file transfer facility.	Allows connectivity between X.25 hosts over a UniLAN backbone and provides access to Public Data Networks; supports up to 8 19.2Kbps links; gateway contains X.3, X.28, X.29 CCITT PAD facility.	Available with multiple LAN/WAN port configurations; TCP/IP gateway software included; WAN ports support synchronous 56K bps-1.544M bps lines or X.25 networks.	

Vendor	AT&T	AT&T	AT&T	AT&T
Product	Async Gateway Server	NAS Gateway-SBS	Remote PC Gateway	StarGROUP Software Asynchronous Gateway
Characteristics				
LANs Supported	Ethernet; Starlan	Ethernet; Starlan	Ethernet; Starlan	Ethernet; Starlan; Token-Ring
Protocols Supported	IBM async protocols; ISO/OSI	SDLC; SNA	ISO/OSI	ISO
Host Systems Supported	AT&T ISN & System 75/85 modules	SNA mainframes	None identified	None identified
Operation	Remote	Remote	Remote	Local; Remote
Gateway Workstation Supported	AT&T 6380 WGS; IBM PC/XT/AT or compatible; IBM PS/2	AT&T 6380 WGS; IBM PC/XT/AT or compatible; IBM PS/2	AT&T 6386 WGS; IBM PC/XT/AT or compatible; IBM PS/2	AT&T 6386
Minimum Memory (bytes)	256K	256K	256K	4M
Line Speeds Supported (bps)	19.2K	19.2K	9.6K	19.2K; 9.6K
API Support	None identified	None identified	None identified	None identified
Pricing/Support				
Price (\$)	2,595	2,595	1,495	1,275
Date of First Delivery Standard Warranty	None identified 90 days	None identified 90 days	November 1988 90 days	January 1989 30 days
Service Supplied by	Vendor	Vendor	Vendor	Dealer; vendor
Comments	Price shown is for 8 users; 8-16 upgrade-\$1,700; 16-32 upgrade-\$1,000.	Price shown is for 8 users; 8-16 upgrade-\$1,700; 16-32 upgrade-\$1,000.		Provides PC LAN clients with access to asynchronous devices and hosts.

Vendor	AT&T	AT&T	Attachmate Corp.	Avatar Corp.
Product	StarGROUP Software SNA Gateway	StarGROUP Software TCP/IP Access Program	3270 Gateway 1.31	MacMainFrame Coax Gateway
Characteristics				
LANs Supported	Ethernet; Starlan; Token-Ring	Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; NETBIOS-compatible LANs; Starlan; Token-Ring	AppleTalk
Protocols Supported	SNA; X.25	ISO; TCP/IP	BSC, SDLC; SNA	SNA
Host Systems Supported	IBM System/34/36/38	Digital VAX; Sun & T[HP]	IBM 43XX/30XX; IBM AS/400	IBM 43XX/30XX
Operation	Local; Remote	Local; Remote	Local; Remote	Local
Gateway Workstation Supported	AT&T 6386	AT&T 6386/UNIX	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above None identified	Apple Macintosh
Minimum Memory (bytes)	4M	4M	None identified	1M
Line Speeds Supported (bps)	19.2K; 4M; 56K; 9.6K	10M	64K	2.35M
API Support	DCA IRMA	None identified	IBM API	Apple; Proprietary API
Pricing/Support				
Price (\$)	1,695, max. price is 7,795	1,457	425	2,495
Date of First Delivery Standard Warranty	January 1990 30 days	March 1989 30 days	August 1987 90 days	March 1990 1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Vendor	Vendor
Comments	Provides PC LAN clients with access to SNA hosts.	ISO-to-TCP/IP gateway.	Works with Extra! Connectivity Software to provide PC workstations on a LAN with access to an IBM mainframe. Program allows LAN workstations to run up to 4 host sessions each for a total of 128 available	Supports up to 5 host terminal, printer sessions simultaneously. Host graphics emulation available with optional MacMainFrame Graphics application software.

Vendor	Avatar Corp.	Avatar Corp.	CASE/Datatel, Inc.	CASE/Datatel, Inc.
Product	MacMainFrame SDLC Gateway	MacMainFrame Token Ring Gateway	6320	6321
Characteristics				
LANs Supported	AppleTalk; SDLC/SNA	AppleTalk; Token-Ring	AppleTalk; Ethernet	AppleTalk; Ethernet
Protocols Supported	SNA	SNA	DECnet; LAT; SDLC; SNA; TCP/IP; X.25	DECnet; LAT; SDLC; SNA; TCP/IP; X.25
Host Systems Supported	IBM 43XX/30XX	IBM 43XX/30XX	Digital VAX; IBM 43XX/30XX	Digital VAX; IBM 43XX/30XX
Operation	Remote	Local	None identified	None identified
Gateway Workstation Supported	Apple Macintosh	Apple Macintosh	Apple Macintosh; IBM PC/XT/AT or compatible; IBM PS/2	Apple Macintosh; IBM PC/XT/AT or compatible; IBM PS/2
Minimum Memory (bytes)	1M	1M	1M	1M
Line Speeds Supported (bps)	56K	4M	128K; 19.2K; 56K; 64K; 9.6K	128K; 19.2K; 56K; 64K; 9.6K
API Support	Apple; Proprietary API	Apple; Proprietary API	None identified	None identified
Pricing/Support				
Price (\$)	2,495, max. price is 6,495	2,495, max. price is 8,495	8,000	8,000
Date of First Delivery	September 1990	September 1990	December 1988	December 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments			Price shown is base.	Price shown is base.

Vendor	Chi Corp.	Chi Corp.	Chi Corp.	Chi Corp.
Product	GL5200	LinkUp 3270 Coax DFT Gatestation	Linkup 3270 Remote Gatestation	Linkup 3299 Coax Gatestation
Characteristics				
LANs Supported	NETBIOS	Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring
Protocols Supported	UTS; Uniscope	SNA	BSC; NETBIOS interface; SNA	SNA
Host Systems Supported	Unisys 1100; Unisys 2200	Any host with a 3274 or 3174 attached; IBM 43XX/30XX	Any host with remote 3274 or 3174 connect; IBM 43XX/30XX	Any host with a 3274 or 3174 attached; IBM 43XX/30XX
Operation	Local; Remote	Local; Remote	Remote	Local; Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	512K	256K	256K	256K
Line Speeds Supported (bps)	19.2K; 9.6K	None identified	19.2K; 9.6K	None identified
API Support	Proprietary API; Unisys STEP UP/F	DCA IRMA; IBM API; Proprietary API	DCA IRMA; IBM API; Proprietary API	DCA IRMA; IBM API; Proprietary API
Pricing/Support				
Price (\$)	2,195, max. price is 3,395	1,120	2,995	3,345
Date of First Delivery	June 1986	1988	1986	1989
Standard Warranty	90 days	1 year	1 year	1 year
Service Supplied by	Vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Versions available for Novell IPX/SPX and Banyan VINES StreetTalk interface support; 43 and 64 session gateways available.	Windows 3.0 support available.	Emulates a remote 3174 providing 32 terminal sessions for the LAN; 10 session gateway available for \$1,495.00; Windows 3.0 version available.	Windows 3.0 support available.

Vendor	Chi Corp.	Commtext Inc.	Data Interface Systems Corp.	Datapoint Corp.
Product	X.25 Linkup Multi-Protocol Gateway	CX-80 Data Exchange	DI3270	VistaGate
Characteristics				
LANs Supported	Arcnet; Ethernet; Starlan; Token-Ring	Proprietary	Arcnet; Ethernet; NETBIOS LANs; Starlan; Token-Ring	Arcnet; Ethernet; Token-Ring
Protocols Supported	3270/QLLC; DEC/VT; UTS; X.25	SNA; X.25	BSC remote; SDLC; SNA	SNA; TCP/IP; X.25
Host Systems Supported	Digital VAX; IBM 43XX/30XX; Unisys 1100; Unisys 2200	Digital VAX; IBM 43XX/30XX; any asynchronous host	IBM 43XX/30XX; IBM 9370	Digital VAX; IBM 43XX/30XX; IBM System/34/36/38
Operation	Remote	Remote	Local, remote	Local; Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30
Minimum Memory (bytes)	256K; 512K	Does not apply	200K	1M
Line Speeds Supported (bps)	19.2K; 56K; 64K; 9.6K	19.2K; 56K; 64K; 9.6K	19.2K; 56K; 64K; 9.6K	19.2K; 9.6K
API Support	IBM API; Proprietary API	Does not apply	APPC/LU6.2; IBM API; Proprietary API; SERPI	None identified
Pricing/Support				
Price (\$)	6,145	4,950	See comments	See comments
Date of First Delivery	October 1988	1980	January 1985	None identified
Standard Warranty	90 days	90 days	30 days	30 days
Service Supplied by	Vendor	Third party; vendor	Vendor	Vendor
Comments	Supports up to 254 sessions; 8 workstation (32 sessions) also available.	Price shown is base; enables a mix of up to 50 asynch ASCII, coax, and Type-A coax terminals/PCs to access up to 4 IBM, asynch, and X.25 hosts; features keystroke toggle of up to 5 concurrent sessions.	\$1,095-\$4,495 (software); \$240-\$995 (hardware); optimal environment-Novell-AT IPX level; contact vendor for pricing information.	Contact vendor for pricing information.
Vendor	Develcon Electronics Ltd.	Digital Communications Associates, Inc.	Digital Communications Associates, Inc.	Digital Communications Associates, Inc.
Product	ING1064	IRMALAN 802.2 Gateway Server	IRMALAN DFT Gateway Server	IRMALAN SDLC Gateway Server
Characteristics				
LANs Supported	Ethernet	AppleTalk; Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring
Protocols Supported	TCP/IP; X.25	SNA	SNA	SNA
Host Systems Supported	Any host supporting TCP/IP	IBM 43XX/30XX	IBM 43XX/30XX	IBM 43XX/30XX
Operation	Local; Remote	Local	Local	Remote
Gateway Workstation Supported	Standalone System	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	Does not apply	256K; 40K	256K	40K
Line Speeds Supported (bps)	128K	None identified	None identified	19.2K; 56K; 64K; 72K; 9.6K
API Support	None identified	IBM API	DCA IRMA; IBM API	DCA IRMA; IBM API
Pricing/Support				
Price (\$)	12,500	3,495, max. price is 6,995	1,495	1,295, max. price is 6,495
Date of First Delivery	None identified	October 1986	October 1986	October 1986
Standard Warranty	None identified	90 days	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Supports two X.25 interfaces.	Allows access to IBM SNA host through direct access via an IBM 3720, 3725, 3745 communications controller or IBM 3174 control unit; includes gateway and workstation software, file transfer, and API support.	Allows access to IBM SNA hosts; includes gateway coax hardware, gateway software, workstation software, 3287 printer emulation, file transfer and API support.	Allows access to IBM SNA host; includes gateway SDLC hardware, gateway software, workstation software, 3287 printer emulation, file transfer and API support.

Vendor	Digital Communications Associates, Inc.	Digital Communications Associates, Inc.	Digital Equipment Corp.	Eicon Technology Corp.
Product	MACIRMALAN 802.2 Gateway Server	MACIRMALAN SDLC Gateway Server	DEC MicroServer Family	Access/QLLC
Characteristics				
LANs Supported	AppleTalk	AppleTalk	Ethernet	Arcnet; Ethernet; NETBIOS-compatible LANs; Starlan; Token-Ring
Protocols Supported	SNA	SNA	DECnet; OSI; SNA; TCP/IP; X.25	SNA; X.25
Host Systems Supported	IBM 43XX/30XX	IBM 43XX/30XX	Digital VAX	Digital VAX; IBM 43XX/30XX; IBM AS/400
Operation	Local	Remote	Local; Remote	Local; Remote
Gateway Workstation Supported	Apple Macintosh	Apple Macintosh	Dedicated gateway-VAX-based	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	256K	None identified	1M	640K
Line Speeds Supported (bps)	None identified	19.2K; 56K; 72K; 9.6K	1.544M; 56K	128K
API Support	DCA IRMA; Hypercard; IBM API	DCA IRMA; Hypercard; IBM API	None identified	APPC/LU6.2; IBM API; Proprietary API
Pricing/Support				
Price (\$)	3,995, max. price is 5,995	4,995, max. price is 6,495	13,230	1,295, max. price is 4,995
Date of First Delivery	October 1990	August 1990	None identified	1986
Standard Warranty	90 days	1 year	90 days	1 year
Service Supplied by	Vendor	Vendor	Vendor	Dealer; third party; vendor
Comments	Allows AppleTalk LAN access to IBM SNA host; includes gateway software for DOS system, workstation software for Macintosh's, file transfer, and API support.			Integrates 3270 & 5250 with X.25 communication, to communicate to hosts connected to an X.25 packet switched data network; uses an EiconCard to support up to 254 simultaneous sessions on any NetBIOS or N
Vendor	Eicon Technology Corp.	Eicon Technology Corp.	Eicon Technology Corp.	Eicon Technology Corp.
Product	Access/SDLC	Access/TIC	Access/X.25	LAN Router/400
Characteristics				
LANs Supported	Arcnet; Ethernet; NETBIOS-compatible LANs; Starlan; Token-Ring	Arcnet; Ethernet; NETBIOS; Starlan; Token-Ring	Arcnet; Ethernet; NETBIOS-compatible LANs; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring
Protocols Supported	SNA	SNA	X.25	SNA; X.25
Host Systems Supported	IBM 43XX/30XX; IBM AS/400; IBM System/34/36/38	IBM 43XX/30XX; IBM AS/400	ASCII hosts; Digital VAX	IBM AS/400
Operation	Local	Local	Local; Remote	Local; Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	640K	640K	640K	640K
Line Speeds Supported (bps)	128K	16M; 4M	128K	128K
API Support	APPC/LU6.2; IBM API; Proprietary API	APPC/LU6.2; IBM API; Proprietary API	APPC/LU6.2; Proprietary API	APPC/LU6.2; IBM API; Proprietary API
Pricing/Support				
Price (\$)	995, max. price is 3,495	See comments	995, max. price is 2,995	See comments
Date of First Delivery	1986	March 1990	1985	March 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	Connects PCs, PS/2s, and compatibles to a variety of IBM hosts over dedicated or switched SDLC lines; uses an EiconCard to support up to 254 simultaneous sessions on any NETBIOS or NetWare LAN.	Supports background host printing, IND\$FILE file transfer, hot-key between emulation sessions to DOS, full 3270 Information Display System emulation, via EiconCard; contact vendor for pricing information	Connects a variety of non-IBM hosts over X.25 packet switched data networks; uses an EiconCard to support up to 254 simultaneous sessions on any NETBIOS or NetWare LAN.	Supports IBM AS/400 connections over SDLC or X.25 communications lines using EiconCard as the server; supports 128 conversations; contact vendor for pricing information.

Vendor	Frontier Technologies Corp.	Gateway Communications, Inc.	Gateway Communications, Inc.	Gateway Communications, Inc.
Product	AdCom3-II(AT) and Gateway Software	G/Async Gateway	G/Async II Gateway	G/X.25 Gateway
Characteristics				
LANs Supported	Ethernet	Arcnet; Ethernet; NetWare; Token-Ring	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; Token-Ring
Protocols Supported	TCP/IP; X.25	Asynchronous	Asynchronous	X.25
Host Systems Supported	IBM System/34/36/38	Any host supporting async transmission; Digital VAX	None identified	See comments
Operation	Local; Remote	Local; Remote	Local; Remote	Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	386 ISA; IBM PC/XT/AT or compatible; IBM PS/2 Model 30
Minimum Memory (bytes)	128K	256K	26K	256K
Line Speeds Supported (bps)	250K	19.2K	19.2K	19.2K
API Support	None identified	Proprietary API	Proprietary API	Proprietary API
Pricing/Support				
Price (\$)	4,995	1,595	1,595	1,895
Date of First Delivery	None identified	July 1986	April 1989	1985
Standard Warranty	90 days	1 year	1 year	1 year
Service Supplied by	Vendor	Dealer	Dealer	Dealer; vendor
Comments		Price shown is for 4-port version.	Price shown is average; supports third party terminal emulation including Crosstalk, Procomm, EM4010, Ascom IV, and Relay Gold.	Supports terminal emulation for ADDS, Data General, Datapoint, Hazeltine, HP, IBM, NCR, Tandem, Teletype, Honeywell, Zenith, Alpha Micro, and DEC.
Vendor	Gateway Communications, Inc.	Gateway Communications, Inc.	Harris Adacom	Hewlett-Packard Co.
Product	G/X.25 Gateway & Bridge	G/X.25 Gateway 64	9570 Strategy LAN Gateway	HP NS LAN Gateway
Characteristics				
LANs Supported	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; NETBIOS LANs; Token-Ring	Ethernet; Token-Ring	Arcnet; Ethernet; Novell LANs; Omnet; Starlan; Token-Ring
Protocols Supported	X.25	X.25	SNA; TCP/IP; X.25	IPX; TCP/IP
Host Systems Supported	Digital VAX	See comments	IBM 43XX/30XX	HP 3000
Operation	Remote	Remote	Local; Remote	Local
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30	ASCII terminals; IBM PC/XT/AT or compatible; IBM PS/2	Compaq; Hewlett-Packard Vectra
Minimum Memory (bytes)	512K	512K	4M	640K
Line Speeds Supported (bps)	19.2K	56K; 64K	64K	10M
API Support	Proprietary API	Proprietary API	IBM API; Novell IPX	None identified
Pricing/Support				
Price (\$)	2,495	3,445	See comments	4,995
Date of First Delivery	September 1985	November 1989	None identified	September 1989
Standard Warranty	1 year	1 year	1 year	None identified
Service Supplied by	Dealer	Dealer	None identified	Vendor
Comments	Supports terminal emulation of ADDS, Data General, DEC, Hazeltine, Honeywell, IBM, HP, NCR, and Zenith.	Supports terminal emulation of ADDS, Data General, Datapoint, DEC, Esprit, Hazeltine, HP, Honeywell, IBM, NCR, Tandem, TeleVideo, and Zenith.	Contact vendor for pricing information; multiple LAN Gateway to an IBM host supports Ethernet Token Ring LAN.	Provides LAN-to-LAN connectivity between Novell NetWare networks and HP 3000 computers.

Vendor	ICOT	ICOT	ICOT	ICOT
Product	OmniPATH DFT 20 LU Gateway	OmniPATH DFT 40 LU Gateway	OmniPATH DFT 5 LU Gateway	OmniPATH SDLC 128 LU Gateway
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	Ethernet
Protocols Supported	SNA	SNA	SNA	SNA
Host Systems Supported	IBM 43XX/30XX	IBM 43XX/30XX	IBM 43XX/30XX	IBM 43XX/30XX
Operation	Local; Remote	Local; Remote	Local; Remote	Local; Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30			
Minimum Memory (bytes)	256K	256K	256K	256K
Line Speeds Supported (bps)	56K	56K	56K	56K
API Support	IBM API; Proprietary API			
Pricing/Support				
Price (\$)	2,995	3,995	1,695	7,495
Date of First Delivery Standard Warranty	June 1989 1 year	June 1989 1 year	June 1989 1 year	June 1989 1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Workstation software requires only 51K of memory.	Workstation software requires only 51K of memory.	Workstation software requires only 51K of memory.	Workstation software requires only 51KB of memory.

Vendor	ICOT	ICOT	ICOT	ICOT
Product	OmniPATH SDLC 253 LU Gateway	OmniPATH SDLC 32 LU Gateway	OmniPATH Token Ring 128 LU Gateway	OmniPATH Token Ring 253 LU Gateway
Characteristics				
LANs Supported	Ethernet	Ethernet	Token-Ring	Token-Ring
Protocols Supported	SNA	SNA	SNA	SNA
Host Systems Supported	IBM 43XX/30XX	IBM 43XX/30XX	IBM 43XX/30XX	IBM 43XX/30XX
Operation	Local	Local; Remote	Local; Remote	Local; Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30	IBM PC/XT/AT or compatible; IBM PS/2 Model 30	IBM PC/XT/AT or compatible; IBM PS/2 Model 30	IBM PC/XT/AT or compatible; IBM PS/2 Model 30
Minimum Memory (bytes)	256K	256K	256K	256K
Line Speeds Supported (bps)	56K	56K	56K	56K
API Support	IBM API; Proprietary API	IBM API; Proprietary API	IBM API; Proprietary API	IBM API; Proprietary API
Pricing/Support				
Price (\$)	9,995	4,995	7,495	9,995
Date of First Delivery Standard Warranty	June 1989 1 year	June 1989 1 year	March 1990 1 year	March 1990 1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Workstation software requires only 51KB of memory.	Workstation software requires only 51KB of memory.	Workstation software requires only 51K of memory.	Workstation software requires only 51K of memory.

Vendor	ICOT	ICOT	ICOT	IDEAssociates, Inc.
Product	OmniPATH Token Ring 8 LU Gateway	OmniPath SDLC 8 LU Gateway	OmniPath Token Ring 32 LU Gateway	IDEAcomm 5250/Remote
Characteristics				
LANs Supported	Token-Ring	Ethernet	Token-Ring	NETBIOS-compatible LANs
Protocols Supported	SNA	SNA	SNA	SNA
Host Systems Supported	IBM 43XX/30XX	IBM 43XX/30XX	IBM 43XX/30XX	IBM AS/400; IBM System/34/36/38
Operation	Local; Remote	Local; Remote	Local; Remote	Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30	IBM PC/XT/AT or compatible; IBM PS/2 Model 30	IBM PC/XT/AT or compatible; IBM PS/2 Model 30	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	256K	256K	256K	128K
Line Speeds Supported (bps)	56K	56K	56K	19.2K
API Support	IBM API; Proprietary API	IBM API; Proprietary API	IBM API; Proprietary API	None identified
Pricing/Support				
Price (\$)	2,995	2,995	4,995	395
Date of First Delivery	March 1990	June 1989	March 1990	1988
Standard Warranty	1 year		1 year	7 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Workstation software requires only 51K of memory.	Workstation software requires only 51KB of memory.	Workstation software requires only 51K of memory.	Software emulation package that allows an IBM PC to access IBM midrange systems from a remote location via synchronous modem; emulates 3180, 5251-11, 5291, or 5292-1 terminals; requires IDEAcomm 5250/rem
Vendor	IDEAssociates, Inc.	IDEAssociates, Inc.	IN-Net Corp.	Infotron Systems Corp.
Product	IDEAcomm 5251/Gateway AH	IDEAcomm 5251/Gateway Plus	FiberTalk 3000 CBU	Commix 32
Characteristics				
LANs Supported	NETBIOS-compatible LANs	NETBIOS-compatible LANs	Ethernet; FDDI	Ethernet
Protocols Supported	SDLC	Twinax	TCP/IP	LAT; TCP/IP; X.25
Host Systems Supported	IBM AS/400	IBM AS/400; IBM System/34/36/38	IBM 43XX/30XX	Digital VAX; IBM AS/400; UNIX
Operation	Local	Local	Local	Local; Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	Apple Macintosh; IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50	Proprietary platform
Minimum Memory (bytes)	None identified	128K	None identified	Does not apply
Line Speeds Supported (bps)	1.1M	1.1M	100M	19.2K; 56K; 64K; 9.6K
API Support	None identified	None identified	None identified	Does not apply
Pricing/Support				
Price (\$)	1,940	1,295	35,000	7,500
Date of First Delivery	None identified	None identified	1990	March 1989
Standard Warranty	1 year	1 year	1 year	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Allows access to IBM's PC support application on the AS/400; includes IDEAcomm Gateway Adapter Handler software which links any NetBIOS compatible LAN to the AS/400 with full PC support compatibility.	PCs attached to IBM Token Ring or NetBIOS compatible LAN can gain access to S/3X or AS/400; emulates 5251-11, 5291, and 5292-1 terminals, 5256, 5224, 5225, and 5219 printers; requires IDEAcomm 5251/Plus.		Supports up to 60 simultaneous connections at speeds up to 64Kbps and includes XXX PAD capability.

Vendor	Interlink Computer Sciences, Inc.	Interlink Computer Sciences, Inc.	International Business Machines Corp. (IBM)	Jupiter Technology, Inc./Intel Corp.
Product	SNS Network Integration Family	SNS/SNA Gateway	3172 Model 001	Mail View X.400 Gateway
Characteristics LANs Supported	Ethernet	Ethernet	Ethernet; Token Bus; Token-Ring	AppleTalk; Ethernet
Protocols Supported	SNA; TCP/IP	DECnet; SNA	DECnet; MAP 3.0; TCP/IP	OSI; TCP/IP; X.25
Host Systems Supported	Any host supporting TCP/IP; IBM 43XX/30XX	Digital VAX; IBM 43XX/30XX	9370; IBM 43XX/30XX	None identified
Operation	Local; Remote	Local, remote	Local	Local
Gateway Workstation Supported	Does not apply	Does not apply	Not available	IBM PC/XT/AT or compatible
Minimum Memory (bytes)	Does not apply	Does not apply	None identified	640K
Line Speeds Supported (bps)	1.544M; 19.2K; 56K; 64K; 9.6K	19.2K; 56K; 64K; 9.6K	None identified	None identified
API Support	Proprietary API	APPC/LU6.2; DEC	IBM API	None identified
Pricing/Support Price (\$)	42,900	39,500	25,000	49,500
Date of First Delivery Standard Warranty	March 1990 90 days	September 1984 90 days	September 1990 1 year	First Quarter, 1989 1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Price shown is base.	Price shown is base.	Price includes hardware & software; DEC support requires SNS/SNA gateway product from Interlink Computer Sciences on S/370 host.	Includes Mail Integration Services and Gateway Server Software for popular LAN base email systems.
Vendor	McData Corp.	Mitek OpenConnect Systems, Corp.	Multi-Tech Systems, Inc.	National Semiconductor Corp.
Product	6100E	M2030/M2133/M2933/OCS II	MC3270/GCP	LAN Micronode
Characteristics LANs Supported	Ethernet	Ethernet; Token-Ring	NETBIOS LANs	Arcnet; NETBIOS; Starlan; Token-Ring
Protocols Supported	LAT; SNA; TCP/IP	SNA; TCP/IP	SNA	SDLC; SNA; X.25
Host Systems Supported	IBM 43XX/30XX; UNIX	Digital VAX; IBM 43XX/30XX; IBM System/34/36/38	IBM 43XX/30XX	IBM 43XX/30XX
Operation	Local	Local; Remote	Remote	Remote
Gateway Workstation Supported	None identified	IBM PC/XT/AT or compatible; IBM RISC/6000	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above 640K	IBM PC/XT/AT or compatible
Minimum Memory (bytes)	Does not apply	1M	640K	256K
Line Speeds Supported (bps)	None identified	19.2K; 256K; 56K; 64K; 9.6K	9.6K	19.2K
API Support	None identified	APPC/LU6.2; IBM API; NetView - Proprietary API; Proprietary API	IBM API	IBM API
Pricing/Support Price (\$)	23,000	11,400	1,999	2,495
Date of First Delivery Standard Warranty	None identified 13 months	April 1986 90 days	April 1990 2 years	April 1985 1 year
Service Supplied by	Vendor	Dealer; third party; vendor	Vendor	Dealer; third party; vendor
Comments	Provides IBM host access for users on up to 6 Ethernet LANs via LAT terminal servers, TCP/IP terminal servers, and the LinkMaster 4174 Model 44R establishment controller; user workstations supported incl	Price shown is base.		

Vendor	National Semiconductor Corp.	Netlink, Inc.	Network Software Associates, Inc.	Novell, Inc.
Product	QNX Micronode	SNA - Hub	AdaptSNA LAN Gateway	NetWare 5250 Twinax Gateway
Characteristics				
LANs Supported	QNX NET	Token-Ring	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; SPX-compatible LANs; Token-Ring
Protocols Supported	SDLC; SNA	SNA	IPX; NETBIOS interface; SNA; SPX; XNS	SNA
Host Systems Supported	IBM 43XX/30XX	IBM 43XX/30XX; Tandem, Fujitsu	IBM 43XX/30XX	IBM AS/400
Operation	Remote	Remote	Local; Remote	Local
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30	None identified	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above; Systems 866K	IBM PC/XT/AT or compatible; IBM PS/2 Model 30
Minimum Memory (bytes)	256K	None identified	866K	140K
Line Speeds Supported (bps)	19.2K	19.2K; 56K; 64K; 9.6K	16M; 64K	None identified
API Support	Proprietary API	None identified	APPC/LU6.2; IBM API	IBM API
Pricing/Support				
Price (\$)	2,495	8,250, max. price is 11,500	1,495, max. price is 5,995	1,450
Date of First Delivery	April 1986	None identified	January 1989	March 1990
Standard Warranty	1 year	36 months	1 year	1 year
Service Supplied by	Dealer; third party; vendor	Third party; vendor	Vendor	Dealer; third party; vendor
Comments	\$3,495 (16 LUs); \$4,495 (32 LUs).	Optional multihost routing feature enables a token-ring attached device to switch between 1 or more different upstream hosts.		Requires Novell Twinax Adapter or Micro Integration's Micro Channel Twinax Adapter.
Vendor	Novell, Inc.	Novell, Inc.	Novell, Inc.	Novell, Inc.
Product	NetWare Asynchronous Communications Server	NetWare SNA Gateway	NetWare SNA Gateway ELS	NetWare X.25 Gateway
Characteristics				
LANs Supported	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; NetWare LANs; Token-Ring	Arcnet; Ethernet; NetWare LANs; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring
Protocols Supported	Async	IPX; NETBIOS interface; SPX	IPX; NETBIOS interface; SPX	IPX; NETBIOS interface; SPX; X.25
Host Systems Supported	Asynchronous hosts	IBM 43XX/30XX	IBM 43XX/30XX	X.25 hosts
Operation	Local; Remote	Local, remote	Local, remote	Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	256K	232K	238K	256K
Line Speeds Supported (bps)	19.2M; 300	1.2K; 19.2K; 56K; 64K; 9.6K	19.2K; 9.6K	64K
API Support	NASI	APPC/LU6.2; DCA IRMA; IBM API; Proprietary API	APPC/LU6.2; DCA IRMA; IBM API; Proprietary API	INT 14; Proprietary API
Pricing/Support				
Price (\$)	1,495	2,995	595	1,195
Date of First Delivery	March 1987	December 1988	December 1988	June 1988
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor	Dealer; third party; vendor
Comments	Requires the WNIM+ hardware adapter.	Requires one of five hardware adapters depending on connectivity option (coax, coaxmux, synchronous, synchronous high speed, token-ring).	Requires one of two hardware adapters depending on connectivity option (coax, synchronous).	Access to host computer used by async hosts such as CompuServe; requires X.25 Adapter for PC or X.25 Adapter for PS/2.

Vendor	NTI Group, Inc.	ParaData Computer Networks, Inc.	ParaData Computer Networks, Inc.	ParaData Computer Networks, Inc.
Product	NTI 2500 Gateway	HoneyLAN Asynchronous Gateway	HoneyLAN Synchronous Gateway	PACs Plus
Characteristics				
LANs Supported	DES Net; Ethernet	Arcnet; Ethernet; FDDI; NETBIOS-compatible LANs; SPX; Starlan; Token-Ring	Arcnet; Ethernet; FDDI; NETBIOS-compatible LANs; SPX; Starlan; Token-Ring	Arcnet; Ethernet; FDDI; NETBIOS-compatible LANs; SPX; Starlan; Token-Ring
Protocols Supported	HDLC; TCP/IP; X.25	NETBIOS interface; OSI; SPX; TCP/IP; X.25; XNS	NETBIOS interface; OSI; SPX; TCP/IP; X.25; XNS	NETBIOS interface; OSI; SPX; TCP/IP; X.25; XNS
Host Systems Supported	None identified	Any Bull GCOS host	Any Bull GCOS host	Async host or modem; Digital VAX
Operation	Local; Remote	Local; Remote	Local; Remote	Local; Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	1M	256K	256K	256K
Line Speeds Supported (bps)	1.544M; 56K; 64K; 9.6K	19.2K; 38.4K; 9.6K	19.2K; 56K; 9.6K	19.2K; 38.4K; 9.6K
API Support	Proprietary API	NETBIOS; Proprietary API; SPX	NETBIOS; Proprietary API; SPX	NETBIOS; Proprietary API; SPX
Pricing/Support				
Price (\$)	See comments	2,995	2,995, max. price is 4,995	3,795
Date of First Delivery	1990	June 1989	June 1988	February 1990
Standard Warranty	1 year	1 year; 90 days	1 year; 90 days	1 year; 90 days
Service Supplied by	Vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Contact vendor for pricing information.	Connects PC LANs to Bull GCOS systems via standard VIP asynchronous connections.	Connects PC LANs to Bull GCOS systems via standard VIP synchronous connection.	PACs Plus is a dial-out/dial-in asynchronous comm server. It connects PC LANs to asynchronous hosts, connects remote users to LANs, and allows modem sharing for all LAN users. Dial-out and dial-in only v
Vendor	Passport Communications, Inc.	Rabbit Software Corp.	Rabbit Software Corp.	Rabbit Software Corp.
Product	Gateway Exchange	RabbitGATE II SNA	RabbitGATE II DFT/3299	RabbitGATE II DFT
Characteristics				
LANs Supported	Starlan	Arcnet; Ethernet; NETBIOS; Starlan; Token-Ring	Arcnet; Ethernet; NETBIOS; Starlan; Token-Ring	Arcnet; Ethernet; NETBIOS; Starlan; Token-Ring
Protocols Supported	SNA	SDLC; SNA	SNA	SNA
Host Systems Supported	IBM 43XX/30XX	IBM 43XX/30XX	IBM 43XX/30XX	IBM 43XX/30XX
Operation	Remote	Remote	Local; Remote	Local; Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	256K	51K; 85K	180K; 85K	85K; 96K
Line Speeds Supported (bps)	19.2K	64K	19.2K; 56K; 64K; 9.6K	19.2K; 56K; 64K; 9.6K
API Support	IBM API	IBM API; Proprietary API	IBM API; Proprietary API	IBM API; Proprietary API
Pricing/Support				
Price (\$)	1,495, max. price is 1,795	2,395, max. price is 7,995	5,995	1,695
Date of First Delivery	August 1987	1989	1989	1989
Standard Warranty	90 days	1 year	1 year	1 year
Service Supplied by	Vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Integrates both 3270 emulation and multi session 3770 RJE emulation on a NETBIOS network.	Prices shown range from 8-64 sessions; enables workstations on a LAN to access data on an IBM mainframe through a remote connection to a 37X5 or compatible host FEP using SNA.	Price shown is for 40 sessions; enables workstations on a LAN to access data on an IBM mainframe through a 3299 port on a 3X74 controller coaxially connected to the LAN using SNA.	Price shown is for 5 sessions; enables workstations on a LAN to access data on an IBM mainframe through a DFT connection to a 3X74 controller using SNA.

Vendor	Rabbit Software Corp.	Rabbit Software Corp.	Racal InterLan	Racal InterLan
Product	RabbitGATE II BSC	RabbitGATE Token-Ring	TCP Gateway for Netware	TCP Server for Netware
Characteristics	LANs Supported			
	Arcnet; Ethernet; NETBIOS; Novell IPX; Starlan; Token-Ring	Arcnet; Ethernet; NETBIOS; Starlan; Token-Ring	Arcnet; Ethernet; Ethernet TCP/IP backbone; NetWare subnet; Starlan; Token-Ring	Arcnet; Ethernet; Ethernet TCP/IP backbone; NetWare subnet; Starlan; Token-Ring
Protocols Supported	BSC	SNA; Token-Ring (802.2)	TCP/IP	TCP/IP
Host Systems Supported	IBM 43XX/30XX	IBM 43XX/30XX	Any host supporting TCP/IP	Any host supporting TCP/IP
Operation	Remote	Local; Remote	Local	Local
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	DOS workstations; IBM PC/XT/AT or compatible; IBM PS/2	DOS workstations; IBM PC/XT/AT or compatible; IBM PS/2
Minimum Memory (bytes)	51K; 85K	256K; 85K	512K	512K
Line Speeds Supported (bps)	9.6K	16M; 4M	None identified	None identified
API Support	IBM API; Proprietary API	IBM API; Proprietary API	TCP/IP Berkley sockets	TCP/IP Berkley sockets
Pricing/Support	Price (\$)			
	2,395, max. price is 5,995	4,995, max. price is 6,995	3,995	5,995
Date of First Delivery	1989	1990	1986	November 1990
Standard Warranty	1 year	1 year	1 year	1 year
Service Supplied by	Dealer; vendor	Dealer; vendor	Dealer; vendor	Dealer; vendor
Comments	Prices listed range from 8 to 32 sessions; enables workstations on a LAN to access data on an IBM mainframe through a remote connection to a 37x5 or compatible host front-end processor using BSC.	Enables workstations on a LAN to access data on an IBM mainframe which is TIC connected to a token-ring network. Prices listed are for 40, 128 sessions respectively.	Installs in Netware 286 file server allowing Netware DOS client on any Netware subnet type to access TCP/IP hosts on Ethernet; supports Telenet, FTP, SMTP, R-utilities, FTP, and SMTP.	Installed in standalone PC; supports Netware 286 and 386 file servers; provides access to TCP/IP hosts on Ethernet; supports Telenet, FTP, SMTP, R-utilities.
Vendor	Retix	The Santa Cruz Operation, Inc.	Shiva	Shiva
Product	OpenServer 400	uniPath SNA-3270	EtherGate	FastPath
Characteristics	LANs Supported			
	AppleTalk; Arcnet; Ethernet; Starlan; Token-Ring	Ethernet; Starlan; Token-Ring	AppleTalk; Ethernet	AppleTalk; Ethernet
Protocols Supported	OSI; X.25	SNA	AppleTalk; TCP/IP	AppleTalk; DECnet; SNMP; TCP/IP
Host Systems Supported	Digital VAX; IBM 43XX/30XX; IBM System/34/36/38	IBM 43XX/30XX	None identified	None identified
Operation	Local; Remote	Remote	Local; Remote	Local
Gateway Workstation Supported	Apple Macintosh; IBM PC/XT/AT or compatible; IBM PS/2	IBM PC/XT/AT or compatible; IBM PS/2 Models 50 and above	Does not apply	Does not apply
Minimum Memory (bytes)	640K	2M	Does not apply	Does not apply
Line Speeds Supported (bps)	64K	19.2K	19.2K; 56K; 64K; 9.6K	Does not apply
API Support	APIA X.400 Gateway API	Proprietary API	Does not apply	Does not apply
Pricing/Support	Price (\$)			
	4,050, max. price is 6,000	795, max. price is 2,295	2,399	2,795
Date of First Delivery	None identified	November 1986	October 1989	1986
Standard Warranty	90 days	30 days	1 year	1 year
Service Supplied by	Dealer; third party; vendor	Vendor	Vendor	Vendor
Comments	X.400 message handling system; gateway between MHS, SMTP, and PC EMail systems; Gateway and OpenServer 400 support DOS, UNIX, NetWare 386, OS/2, and interface to hosts via Ethernet or X.25.		Has a thick and thin Ethernet port and 2 ports that can be configured for connections to serial devices or LocalTalk networks; allows combinations of local and remote Ethernet/LocalTalk routing, dial-in.	Ethernet/LocalTalk that supports AppleTalk, TCP/IP, and DECnet protocols. Can be used to enhance the performance of LocalTalk networks by connecting them to a high-speed Ethernet backbone.

Vendor	Symciron, Inc.	Symciron, Inc.	TDT Group Inc.	TDT Group Inc.
Product	Syngate-N	Syngate-S	Honeybunch	SIX/25
Characteristics				
LANs Supported	NETBIOS	Arcnet; Ethernet; Token-Ring	Arcnet; Ethernet; NETBIOS; Starlan; Token-Ring	Arcnet; Ethernet; Starlan; Token-Ring
Protocols Supported	OSI; SNA; X.25	OSI; SNA; X.25	SDLC; SNA; X.25	SNA; X.25
Host Systems Supported	Digital VAX; IBM 43XX/30XX	Digital VAX; IBM 43XX/30XX	Honeywell	Digital VAX; IBM 43XX/30XX; IBM System/34/36/38
Operation	Remote	Remote	Local; Remote	Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	512K	512K	640K	512K
Line Speeds Supported (bps)	19.2K; 2.048M; 56K; 64K; 9.6K	19.2K; 2.048M; 56K; 64K; 9.6K	19.2K; 9.6K	24K; 9.6K
API Support	IBM API; Proprietary API	IBM API; Novell NASI; Proprietary API	Proprietary API	Proprietary API
Pricing/Support				
Price (\$)	1,680	1,680	See comments	See comments
Date of First Delivery	June 1989	May 1990	None identified	None identified
Standard Warranty	1 year		90 days	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	X.25 card for PC or PS/2 and gateway software; supports most NetBIOS-based LAN operating systems and 3270 and VT-100 emulation.	X.25 card for PC or PS/2, and gateway software; supports NetWare 2.15 rev.C or later, 3270 and VT-100 terminal emulation and Novell's NASI interface.	Contact vendor for pricing information.	3270 emulation; contact vendor for pricing information.
Vendor	3Com Corp.	3Com Corp.	3Com Corp.	Tri-Data Corp.
Product	3+ Open Maxess	GS/X.25	Maxess	N1000AEX
Characteristics				
LANs Supported	Ethernet	Ethernet	Ethernet	AppleTalk
Protocols Supported	X.25	OSI; TCP/IP; X.25	X.25	SNA
Host Systems Supported	IBM 43XX/30XX	Does not apply	IBM 43XX/30XX	IBM 43XX/30XX
Operation	Local, remote	Remote	Local, remote	Local; Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	Apple Macintosh; IBM PC/XT/AT or compatible
Minimum Memory (bytes)	6M	None identified	100K	512K
Line Speeds Supported (bps)	64K	64K	64K	19.2K
API Support	HLLAPI, APPC/PC	Not applicable	HLLAPI, APPC/PC	None identified
Pricing/Support				
Price (\$)	3,995, max. price is 5,995	6,000	4,995	3,995
Date of First Delivery	March 1989	1985	March 1989	May 1985
Standard Warranty	1 year	1 year	1 year	120 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Supports line speeds of 4M or 16M bps on token-ring LANs.	Software for XNS protocols: \$2,000; software for IP protocols: \$2,000; software for OSI protocols: \$2,000; 90-day warranty software.	Supports line speeds of 4M or 16M bps on token-ring LANs.	Supports up to 16 sessions accessing the host at speeds up to 19.2Kbps via LocalTalk.

Vendor	Tri-Data Corp.	Ungermann-Bass, Inc.	Unisync Inc.	Wall Data Inc.
Product	NetWay 2000	BR7100	Unilinc LAN Gateway Server	Datagate/LAN 3270
Characteristics				
LANs Supported	AppleTalk; Ethernet; FDDI; Token-Ring	Ethernet	Ethernet; Token-Ring	NETBIOS LANs; Token-Ring
Protocols Supported	AppleTalk; IPX; SNA	X.25	Burroughs; DECnet; Honeywell; IBM Bisync; SNA; TCP/IP; Univac; X.25	BSC; SDLC; SNA
Host Systems Supported	IBM 43XX/30XX	None identified	Burroughs; Digital VAX; Honeywell; IBM 43XX/30XX; IBM System/34/36/38; Univac	IBM 43XX/30XX
Operation	Local; Remote	Local	Local; Remote	Remote
Gateway Workstation Supported	Apple Macintosh; IBM PC/XT/AT or compatible; IB PS/2	Apple Macintosh; IBM PC/XT/AT or compatible; IBM PS/2	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	512K	1M	640K	256K
Line Speeds Supported (bps)	19.2K; 56K	64K	1.544M; 19.2K; 56K; 64K; 9.6K	19.2K; 9.6K
API Support	Proprietary API	X.3-X.28, X.29	IBM API; Proprietary API; UNIX Streams	IBM API
Pricing/Support				
Price (\$)	4,995, max. price is 14,995	9,700	1,695	1,595
Date of First Delivery	June 1989	June 1988	November 1990	1986
Standard Warranty	120 days	90 days	1 year	1 year
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments	Utilizes the 10 MIPS SPARC CPU supporting up to 128 sessions, 4 serial ports, LocalTalk, Ethernet, and Token-Ring interface adapters.	Ungermann-Bass X.75 Gateway allows networked PCs, Macintosh, & terminals to communicate to X.75 resources such as Tymenet, Telenet, or X.75-based hosts.	Supports multiple simultaneous terminal emulations to different host vendors (IBM, Burroughs, Honeywell, Univac, DEC); price shown is base.	
Vendor	Wall Data Inc.	Wang Laboratories, Inc.	Wang Laboratories, Inc.	Wang Laboratories, Inc.
Product	Datagate/LAN 5250	OFFICE/DISOSS Gateway	OFFICE/PROFS Gateway	OFFICE/SMTP Gateway
Characteristics				
LANs Supported	NETBIOS LANs	Ethernet	Ethernet	Ethernet
Protocols Supported	SDLC; SNA	SNA; X.25	SNA	TCP/IP
Host Systems Supported	IBM AS/400	IBM 43XX/30XX	IBM 43XX/30XX	Wang VS Systems
Operation	Remote	Remote	Remote	Local; Remote
Gateway Workstation Supported	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above
Minimum Memory (bytes)	256K	None identified	None identified	512K
Line Speeds Supported (bps)	19.2K; 9.6K	19.2K; 56K; 64K; 9.6K	19.2K; 56K; 64K; 9.6K	19.2K; 56K; 64K; 9.6K
API Support	IBM API	APPC/LU6.2	None identified	None identified
Pricing/Support				
Price (\$)	1,595	2,000, max. price is 26,000	6,500, max. price is 36,500	1,500, max. price is 19,500
Date of First Delivery	1987	None identified	1984	August 1989
Standard Warranty	1 year	90 days	90 days	90 days
Service Supplied by	Vendor	Vendor	Vendor	Vendor
Comments		Provides EMail exchange between Wang OFFICE and IBM DISOSS.	Provides EMail gateway between Wang OFFICE and IBM PROFS.	Allows mail interchange and other TCP/IP services (FTP, Telenet) between VS and other TCP/IP hosts.

Vendor	Wang Laboratories, Inc.	Waterloo Microsystems Inc.	Waterloo Microsystems Inc.	Waterloo Microsystems Inc.
Product	OFFICE/X.400 Gateway	PORT Asynchronous Internet Gateway	PORT Backbone Internet Gateway	PORT X.25 Server
Characteristics LANs Supported	Ethernet	Arcnet; Token-Ring	Arcnet; Token-Ring	Arcnet
Protocols Supported	OSI; X.25	X.25	Proprietary	X.25
Host Systems Supported	Wang VS Systems	None identified	None identified	None identified
Operation	Remote	Local	Local	Local
Gateway Workstation Supported	Wang VS Systems	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above 512K	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above 512K	IBM PC/XT/AT or compatible; IBM PS/2 Model 30; IBM PS/2 Models 50 and above 512K
Minimum Memory (bytes)	2M			
Line Speeds Supported (bps)	19.2K; 56K; 64K; 9.6K	24K	Does not apply	64K
API Support	None identified	None identified	None identified	Proprietary API
Pricing/Support Price (\$)	1,350, max. price is 17,550	595	2,995	3,662
Date of First Delivery	July 1989	None identified	None identified	None identified
Standard Warranty	90 days	None identified	None identified	None identified
Service Supplied by	Vendor	Dealer; vendor	Dealer; vendor	Vendor
Comments		Allows the connecting of two or more Waterloo PORT LANs communicate via phone lines.	Allows and Arcnet or Token Ring network to serve as a backbone for internetworking one or more Waterloo PORT LANs.	Allows the Waterloo PORT LAN to communicate with multiple hosts via an X.25 packet-switched network.

User Ratings of LAN Operating Systems

In this report:

Data Analysis	-102
Methodology	-103
Respondent Demographics	-107

Note: Reprints of this User Ratings report or the raw data used to compile the published results may be purchased through Datapro's Reprint Department. For placing orders or further information, call the Reprint Department at (800) DATAPRO or (609) 764-0100, ext. 2723.

Report Highlights

- Consistent with several industry studies, Datapro's survey shows that Novell controls the market for LAN operating systems. Novell garnered 60% of the total number of LAN operating systems used by the network professionals that responded to the survey. IBM finished a distant second with 18%, followed by Digital Equipment (12%), 3Com (11%), Microsoft (8%), Banyan (7%), and Apple (6%).
- In terms of specific operating system versions, Novell NetWare 3.11 proved the most popular with a 21% share of all installations. NetWare 386 (19%), NetWare 2.2 (19%), and Advanced NetWare (14%) are also in heavy use. The most popular non-Novell operating system was IBM OS/2 LAN Server (11%).
- Apple AppleShare received the highest overall satisfaction rating—4.0 on a five-point scale. Digital Equipment PCSA (3.8), Novell NetWare 386 (3.6), and Novell NetWare 3.11 (3.6) also received high marks for overall satisfaction.
- Of the respondents who rated their LAN operating systems, 92% of Apple AppleShare users indicated that they would recommend the operating system to a colleague. Ninety percent of Novell NetWare 3.11 and Advanced NetWare users stated they would recommend those operating systems; 89% of SFT NetWare users would give positive recommendations for that operating system.
- Coaxial cable remains in widespread use, despite current trends toward the use of unshielded twisted-pair (UTP) and fiber cabling. Fifty-eight percent of the respondents are using coax. UTP came in second at 29%, followed by shielded twisted-pair (27%) and fiber (18%).
- Ethernet was the LAN technology of choice for survey respondents—65%

have Ethernet LANs. Token-ring (29%), Arcnet (15%), and LocalTalk (13%) are also in widespread use. By contrast, only 3% of the respondents have implemented FDDI.

- When selecting a LAN operating system, users indicated that they weigh heavily the vendor's reputation/support services, and the LAN OS's workstation support and network management capabilities.

Analysis

Executive Summary

In September 1991, Datapro conducted a nationwide survey among users of LAN operating systems. This study was designed to provide the industry with information on LAN operating systems currently installed and to provide an overall user profile of these systems. Networking professionals reported on the features they look for when selecting a LAN operating system (LAN OS), in addition to the subject areas of acquisition, maintenance, and installation. We also asked the users to rate their operating systems on a number of selection, usage, and service/technical support criteria. This report presents our findings.

The survey supports several other independent industry studies that show Novell with a dominant share of the LAN operating system market. Most of these studies place Novell's share of the market at or around 60%, and Datapro's study indicates that exactly 60% of the survey respondents are using some version of Novell NetWare. A distant second place, IBM is present in

18% of the respondents' installations with OS/2 LAN Server and PC LAN Program. The current (Microsoft) and former (3Com) champions of LAN Manager have a smaller presence. Microsoft's LAN Manager is present in 8% of the installations; 3Com has an 11% response share, but only half of those are using LAN Manager-based 3+Open, while the others run the older 3+ product, based on Microsoft Networks (MS-Net).

Apple's AppleShare received only a 6% share of the total responses, but Apple users are very satisfied with the operating system. AppleShare scored consistently high in the user ratings; its overall satisfaction score of 4.0 (on a five-point scale) was the top score among the eight versions that were broken out for analysis. Digital Equipment showed up in 12% of the respondents' installations with its PCSA and PathWorks products. A relative newcomer, Artisoft, made a strong showing with a 4% share. Artisoft is the current leader in the market for peer-to-peer LAN operating systems, and is growing its business significantly. Another very active vendor, Banyan, has begun to aggressively promote its VINES product; Banyan showed up in 7% of the respondents' sites.

Data Analysis

Current Installations

The network professionals participating in this LAN Operating Systems survey identified a total of 23 vendors whose products are currently in use at their installations. Of those, only 12 vendors were mentioned by at least four respondents. In addition to the eight vendors identified previously, Sun (2%), Sitka (1%), Hewlett-Packard (1%), and Ungermann-Bass (1%) also had operating systems installed.

LAN Operating Systems Evaluated

The network professionals were then asked to indicate the manufacturer and version of the LAN operating system that they would be evaluating for the remainder of the survey. Eight LAN operating systems were judged to have a sufficient number of responses to break out for analysis. These operating systems are:

- Novell NetWare 3.11
- Novell NetWare 386
- Novell NetWare 2.2
- Novell Advanced NetWare
- IBM OS/2 LAN Server
- Novell SFT NetWare
- Digital Equipment PCSA
- Apple AppleShare

For the most part, the respondents who indicated they had these eight operating systems installed also chose to rate them for the remainder of the study.

Manufacturer/ Version	% of Respondents with System Installed	% of Respondents Rating this System
Novell NetWare 3.11	21	14
Novell NetWare 386	19	11
Novell NetWare 2.2	19	10

Manufacturer/ Version	% of Respondents with System Installed	% of Respondents Rating this System
Novell Advanced NetWare	14	9
IBM OS/2 LAN Server	11	6
Novell SFT NetWare	9	5
Digital Equipment PCSA	8	6
Apple AppleShare	6	4

Acquisition, Installation, and Maintenance

Acquisition

Forty percent of the respondents purchased their LAN operating systems from a dealer, reseller, or distributor. Another 37% bought their LAN OSs directly from the vendor. Of the remaining respondents, 11% bought their operating systems from a third-party LAN vendor (e.g., bundled with network interface cards), and 8% purchased the product from a system integrator or VAR (value-added reseller).

Installation

The largest percentage of respondents (25%) indicated that their LAN operating systems have been installed for two to four years. Another 23% stated that their LAN OSs have been installed for one to two years. Meanwhile, 20% indicated that their operating systems have been in place for six months or less, and 16% have been using the product between 7 and 12 months. Of the true veterans, 6% have had their LAN OSs between four and six years, and 5% for more than six years. Four percent were novices, with operating systems in use for less than a month.

The study indicates that the majority of LAN operating systems are being installed by in-house staff; 66% of the respondents indicated that they had done the installation themselves. Of the remaining participants, 18% had used a third-party installer, while 13% enlisted the LAN OS vendor for installation.

Maintenance

The majority (74%) of respondents maintain their LAN OSs themselves. Just 13% use the services of a third-party firm, while only 8% entrust service to the vendor.

Selection Criteria

Using a five-point scale where 5 = "extremely important" and 1 = "not at all important," the network professionals participating in this survey were asked to indicate the level of importance of various criteria when selecting a LAN operating system.

Vendor reputation/support received the highest rating (4.1). This would seemingly be good news for the dominant LAN OS vendors—Novell and IBM—which have the largest LAN OS installed base and a strong service and support organization. However, the user ratings show that Digital Equipment PCSA gained the strongest score for vendor reputation/technical support (4.2), while IBM OS/2 LAN Server scored the lowest (3.6). Novell's scores for this criterion ranged from a low of 3.7 (Advanced NetWare) to a high of 4.1 (NetWare 2.2 and NetWare 3.11).

Workstation support (DOS, OS/2, Macintosh, UNIX, etc.) and network management capabilities each scored

Methodology

The 1991 LAN Operating System study was based on a questionnaire mailed in August 1991 to approximately 2,500 network professionals throughout the United States. These network professionals were chosen at random from the IDG Communications, Inc. LAN database. The following item was excluded from the list: manufacturers of computer-related products.

The survey consisted of a cover letter, three-page questionnaire, a pre-paid business return envelope, and a one dollar bill used as the incentive to respond. A follow-up mailing consisting of a duplicate questionnaire, thank you card, and pre-paid business return envelope was sent to the same respondents approximately one week after the first mailing; no incentive was included in the follow-up mailing.

Respondents were asked to provide information on the manufacturers and versions of the LAN operating systems installed at their location. Respondents who listed multiple manufacturers of LAN operating systems were asked to identify the manufacturer and version they

were planning to evaluate in this study. Respondents were then asked to rate the manufacturer and version on the following criteria:

- Selection/purchase
- Usage
- Service/technical support

By the cut-off date of September 26, 1991 Datapro had received 752 responses, or a 30.1% response rate. Of these, 175 surveys were judged to be invalid and are broken into the following categories: 91 respondents had no LAN operating system installed at their locations; 59 respondents returned incomplete or blank surveys; and 25 respondents identified an invalid manufacturer of their LAN operating systems. The total mailing (2,500) minus invalid responses (175) and undeliverables (46) equals the valid total mailing (2,279). Of the 752 surveys returned, 577 of those are valid responses; this represents a 25% valid response rate. The following would cause a survey to be judged invalid:

- No LAN operating system installed at their location
- No system identified for the rating section

- System identified was not a LAN operating system
- Incomplete questionnaire

The 577 valid questionnaires were coded, and data was entered by Datapro's Marketing Planning Department and then sent to Microtab, Inc. (Atlanta, GA) for data cleaning and tabulation.

The questionnaire listed five manufacturers and 15 versions with a space provided for write-in mentions. Respondents were asked to rate their systems on various attributes using a five-point scale where 5 = Excellent and 1 = Poor. Respondents were also asked to identify the applications they run on the network, what protocols the systems support, and what LAN technologies are used on the LAN operating systems. Of the various manufacturers and versions, the following were judged to have a sufficient number of responses to break out on an individual basis for tabulation purposes:

- Novell Advanced NetWare
- Novell SFT NetWare
- Novell NetWare 386
- Novell NetWare 2.2
- Novell NetWare 3.11
- IBM LAN Server
- Apple AppleShare
- Digital Equipment PCSA

Some of the manufacturers and versions that did not have a sufficient number of responses to break out for cross tabulation include:

- Novell ELS NetWare I and ELS NetWare II
- Microsoft LAN Manager
- 3Com 3+ Open and 3+
- Banyan VINES/286, VINES/386, and VINES/486
- IBM PC LAN Program
- Artisoft LANtastic
- Digital Equipment Pathworks
- Sun NFS
- Ungermann-Bass Net/One LAN Manager
- Hewlett-Packard Office-Share II
- Sitka TOPS

Note: The 1991 LAN operating system user rating survey was mailed to 2,500 persons; there were 577 valid responses. The ratings contained therein may, accordingly, not be statistically valid due to the small number of respondents rating each of the manufacturers surveyed. These survey results are qualitative in nature and should provide insight into user attitudes. However, these results may not be reflective of the overall market for the manufacturers surveyed.

Reproduction or other use of this data may be made only in compliance with the "fair use" provision of the United States Copyright Act of 1976. Any person wishing to use a portion of this survey which exceeds the limits of fair use must obtain the prior written permission of Datapro Information Services Group.

4.0, as did client/server application support. Security features (3.9), internetworking support (3.8), price (3.8), and application development support (3.7) rounded out the selection criteria.

User Ratings

Selection Criteria

Using a five-point scale where 5 = "excellent" and 1 = "poor," respondents were asked to rate their LAN operating system with regard to the eight selection criteria mentioned in the previous section:

- Application development support
- Client/server application support

- Internetworking support
- Network management capabilities
- Price
- Security features
- Vendor reputation/support
- Workstation support

Datapro has examined the results of the user ratings for LAN OSs in two ways. First, we compiled a composite overview based on total responses for all eight selection criteria, and we computed an overall satisfaction rating based on the criteria. Second, we compiled individual ratings for the eight LAN OSs judged to have a sufficient number of responses to break out for analysis.

Table 1. Mean Summary Scores of Selection Criteria

Criteria	All Systems	Novell Advanced NetWare	Novell SFT NetWare	Novell NetWare 386	Novell NetWare 2.2
Application Development Support	3.5	3.3	3.7	3.8	3.6
Client/Server Application Support	3.6	3.4	3.8	3.8	3.5
Internetworking Support	3.6	3.5	3.4	3.8	3.3
Network Management Capabilities	3.5	3.3	3.6	3.8	3.4
Price	3.3	3.0	3.1	3.2	3.2
Security Features	3.6	3.4	3.7	3.8	3.5
Vendor Reputation/Support	3.9	3.7	4.0	4.0	4.1
Workstation Support	3.7	3.4	3.8	3.9	3.6
Overall Satisfaction for Selection Criteria	3.6	3.4	3.6	3.8	3.5

Mean summary table based on a 5-point scale where 5 = "excellent" and 1 = "poor." Mean scores have been rounded to the nearest tenth. Overall satisfaction is computed as the mean score of all selection attributes.

Table 1. Mean Summary Scores of Selection Criteria (Continued)

Criteria	All Systems	Novell NetWare 3.11	IBM OS/2 LAN Server	Apple AppleShare	Digital PCSA
Application Development Support	3.5	3.9	3.3	3.8	3.6
Client/Server Application Support	3.6	3.7	3.2	3.8	4.2
Internetworking Support	3.6	3.7	3.5	4.0	3.8
Network Management Capabilities	3.5	3.6	3.4	3.1	4.0
Price	3.3	3.0	3.2	4.2	3.4
Security Features	3.6	3.9	3.2	3.1	3.9
Vendor Reputation/Support	3.9	4.1	3.6	4.0	4.2
Workstation Support	3.7	3.8	3.3	4.0	3.9
Overall Satisfaction for Selection Criteria	3.6	3.7	3.4	3.8	3.9

Mean summary table based on a 5-point scale where 5 = "excellent" and 1 = "poor." Mean scores have been rounded to the nearest tenth. Overall satisfaction is computed as the mean score of all selection attributes.

The selection criteria overall satisfaction score based on total respondents in the survey is 3.6. Individually, Digital Equipment PCSA rated highest in selection criteria overall satisfaction at 3.9, followed by Apple AppleShare (3.8), and Novell NetWare 386 (3.8). Table 1 details system ratings for individual criterion within the selection criteria category.

Usage Factors

Datapro also asked survey respondents to rate their LAN operating systems on the following six usage factors:

- Documentation
- Ease of installation
- Ease of reconfiguration
- Memory usage (workstation/server)
- Printer sharing
- User interface

Using the five-point scale described above, the usage factors overall satisfaction score based on total respondents for LAN operating systems in the survey is 3.4. Apple's AppleShare received the highest rating of the eight specified products (4.4). Digital Equipment PCSA (3.6), Novell NetWare 3.11 (3.5), and Novell NetWare 386 (3.5) each received high scores. Table 2 provides system ratings for individual criterion within the usage factors category.

Service/Technical Support

The network professionals surveyed were also asked to rate their operating systems with regard to five service/technical support criteria:

- Documentation
- Effectiveness
- Responsiveness
- Service representative
- Troubleshooting

On the five-point scale, the overall satisfaction rating for the service/technical support category based on total respondents for LAN OSs is 3.3. Of the eight products specified, Digital Equipment PCSA scored the highest (3.8). Apple AppleShare (3.7), and Novell NetWare 386 (3.6) also received high scores for service/technical support. Table 3 lists the ratings for individual criterion within the service/technical support category.

Overall Satisfaction

When the ratings for the previous three categories are averaged, Apple AppleShare achieves the highest overall satisfaction rating (4.0), followed by Digital Equipment PCSA (3.8), Novell NetWare 386 (3.6), and Novell NetWare 3.11 (3.6). Overall satisfaction ratings for all eight specified operating systems are found in Figure 1.

Operating System Recommendations

Apple AppleShare users are most satisfied with their LAN operating system. Ninety-two percent of the AppleShare users surveyed said they would recommend that product to a colleague. By contrast, users were least satisfied with IBM OS/2 LAN Server; 20% indicated that they *would not* recommend the product.

Table 2. Mean Summary Scores of Usage Factors

Criteria	All Systems	Novell Advanced NetWare	Novell SFT NetWare	Novell NetWare 386	Novell NetWare 2.2
Documentation	3.3	3.1	3.5	3.6	3.2
Ease of Installation	3.3	2.6	3.0	3.4	3.1
Ease of Reconfiguration	3.3	2.8	2.8	3.4	3.0
Memory Usage	3.3	3.1	3.1	3.3	3.3
Printer Sharing	3.5	3.0	3.0	3.6	3.3
User Interface	3.5	3.4	3.4	3.6	3.3
Overall Satisfaction for Usage Factors	3.4	3.0	3.1	3.5	3.2

Mean summary table based on a 5-point scale where 5 = "excellent" and 1 = "poor." Mean scores have been rounded to the nearest tenth. Overall satisfaction is computed as the mean score of all usage attributes.

Table 2. Mean Summary Scores of Usage Factors (Continued)

Criteria	All Systems	Novell NetWare 3.11	IBM OS/2 LAN Server	Apple AppleShare	Digital PCSA
Documentation	3.3	3.4	3.1	3.8	3.5
Ease of installation	3.3	3.5	3.1	4.7	3.5
Ease of Reconfiguration	3.3	3.5	3.1	4.7	3.6
Memory Usage	3.3	3.6	2.9	4.1	3.4
Printer Sharing	3.5	3.7	3.4	4.5	3.9
User Interface	3.5	3.4	3.3	4.8	3.7
Overall Satisfaction for Usage Factors	3.4	3.5	3.1	4.4	3.6

Mean summary table based on a 5-point scale where 5 = "excellent" and 1 = "poor." Mean scores have been rounded to the nearest tenth. Overall satisfaction is computed as the mean score of all usage attributes.

Manufacturer/ Model	Yes, Would Recommend (%)	No, Would Not Recommend (%)	Unsure or No Answer (%)
Apple AppleShare	92	0	8
Novell NetWare 3.11	90	2	6
Novell Advanced NetWare	90	0	10
Novell SFT NetWare	89	7	4
Novell NetWare 386	87	0	13
Digital Equipment PCSA	83	3	14
Novell NetWare 2.2	73	5	22
IBM OS/2 LAN Server	58	20	22

Operating System Capabilities

Respondents reported on the capabilities of each LAN OS with regard to the following areas of inquiry:

- Number of end-user nodes
- LAN technology
- LAN media used
- Protocol support
- Internetworking
- File server operating systems
- Geographical coverage

End-User Nodes

The size of the networks reported on in this survey varied. The largest percentage of respondents (24%) indicated small networks of ten nodes or less. The percentages decreased as the number of end-user nodes increased, and then increased again for the largest network size identified.

Number of Nodes Connected Respondents (%)

11 to 20	19
21 to 50	19
51 to 100	16
101 to 150	8
151 to 200	2
More than 200	12

Likewise, the size of networks based on the eight specified LAN OSs varies widely with no pattern emerging. The study indicated that Novell NetWare 2.2 has the largest percentage of small networks; 34% of NetWare 2.2 users have ten nodes or less. The largest percentage of Apple AppleShare users (32%) indicated networks between 11 and 20 nodes. Twenty-five percent of Novell Advanced NetWare users have networks in the 51-to-100 node range, while another 25% are in the 11-to-20 node range. Digital Equipment PCSA has a similar breakdown: 25% in the 51-to-100 range, 20% in the 11-to-20 range. Digital Equipment PCSA also has 22% in the more than 200 range.

LAN Technology

The vast majority (65%) of the respondents in this survey are using Ethernet as their LAN technology. Token-ring ranks a distant second with 29%. Many of the users have more than one LAN technology at their LAN OS installation.

Table 3. Mean Summary Scores of Service/Technical Support

Criteria	All Systems	Novell Advanced NetWare	Novell SFT NetWare	Novell NetWare 386	Novell NetWare 2.2
Documentation	3.3	3.0	3.0	3.6	3.1
Effectiveness	3.4	3.2	3.2	3.6	3.1
Responsiveness	3.3	2.9	3.2	3.6	3.2
Service Representative	3.3	2.8	3.1	3.5	3.0
Troubleshooting	3.2	2.7	3.1	3.6	3.0
Overall Satisfaction for Service/Technical Support	3.3	2.9	3.1	3.6	3.1

Mean summary table based on a 5-point scale where 5 = "excellent" and 1 = "poor." Mean scores have been rounded to the nearest tenth. Overall satisfaction is computed as the mean score of all service/technical support attributes.

Table 3. Mean Summary Scores of Service/Technical Support (Continued)

Criteria	All Systems	Novell NetWare 3.11	IBM OS/2 LAN Server	Apple AppleShare	Digital PCSA
Documentation	3.3	3.4	3.1	3.9	3.7
Effectiveness	3.4	3.5	3.3	4.0	3.7
Responsiveness	3.3	3.4	3.3	3.6	3.8
Service Representative	3.3	3.3	3.3	3.4	3.9
Troubleshooting	3.2	3.2	3.2	3.6	3.9
Overall Satisfaction for Service/Technical Support	3.3	3.4	3.2	3.7	3.8

Mean summary table based on a 5-point scale where 5 = "excellent" and 1 = "poor." Mean scores have been rounded to the nearest tenth. Overall satisfaction is computed as the mean score of all service/technical support attributes.

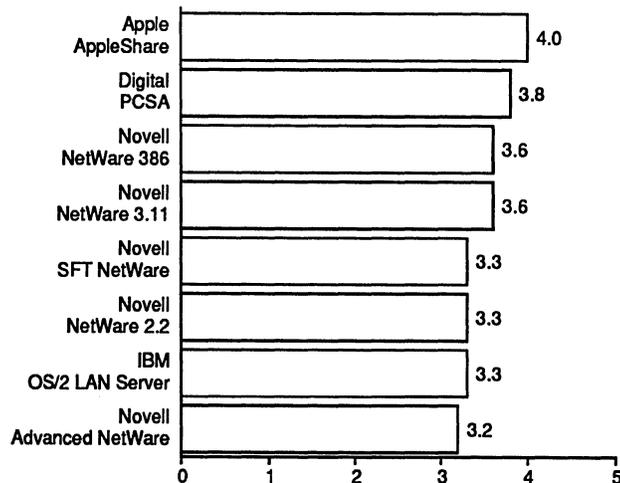
LAN Technology	Respondents (%)
Ethernet	65
Token-Ring	29
Arcnet	15
LocalTalk	13
FDDI	3
Broadband	1

LAN Media

Despite the current industry trend toward the use of unshielded twisted-pair (UTP) wire, the survey shows that the majority of the respondents (58%) are still running their LANs over coaxial cable. Meanwhile, optical fiber, the LAN medium of the future, has a low penetration (18%) in the sites studied. As with LAN technology, many of these users have mixed media over which their networks operate.

LAN Media	Respondents (%)
Coaxial Cable	58
Unshielded Twisted-Pair	29
Shielded Twisted-Pair	27
Optical Fiber	18

Figure 1.
Overall Satisfaction



Using a five-point scale where 5 = "excellent" and 1 = "poor," respondents to this survey were asked to rate their LAN operating systems.

Interestingly, optical fiber had its largest penetration (31%) in IBM OS/2 LAN Server and Digital Equipment PCSA (31%) sites. As could be expected, shielded twisted-pair (STP) also had its largest penetration (44%) in OS/2 LAN Server sites, given IBM's past reliance on that media for its Token-Ring Network. UTP showed up the most (64%) in AppleShare networks. Coaxial cable was strong with all versions of NetWare, particularly SFT NetWare (78%), and it was also expectedly strong in Digital Equipment PCSA sites (78%).

Protocol Support

Despite the dominance of Novell NetWare in this study, NETBIOS showed up in more installations (47%) than IPX/SPX (36%). TCP/IP also made a strong showing (31%).

Protocol Supported	Respondents (%)
NETBIOS	47
IPX/SPX	36
TCP/IP	31
AppleTalk	19
DECnet	5
LAT	2
XNS	1
Other	2

Internetworking

Respondents were asked whether they currently had internetworking devices (bridges, routers, gateways) installed, or if they had plans to install them. Fifty-one percent indicated that they already had some form of internetworking device on their network. Surprisingly, 22% said that they do not have any internetworking devices installed and that they have no plans to install them in the future.

Status	Respondents (%)
Installed now	51
Plan to Install within 6-12 Months	19
Plan to Install within 12-18 Months	4
Plan to Install within 18-24 Months	2
Plan to Install in more than 24 Months	2
No Plans to Install	22

Respondents were also asked to specify the type of internetwork connection they have or plan to install.

Connection Type	Respondents (%)
LAN-to-LAN	65
LAN-to-WAN	38

File Server Operating System

As expected, DOS is the dominant operating system in use on the network file server, with 80% of all installations. UNIX made a strong showing, appearing in 21% of all installations. Many installations run multiple file server operating systems.

Operating System	Respondents (%)
DOS	80
OS/2	22
UNIX	21
VMS	19
AppleShare	5
NetWare	1
Other	2

OS/2 is most prevalent in networks using IBM OS/2 LAN Server, as can be expected. UNIX showed up most in Digital Equipment PCSI (25%) and Novell NetWare 3.11 (24%) networks. DOS was dominant for all versions of NetWare, ranging from a low of 89% (NetWare 386) to a high of 97% (NetWare 2.2).

Geographical Coverage

Most users' LANs (61%) are contained within a single building. The majority of the remainder (22%) have networks that span two or more buildings in a campus environment.

Coverage Area	Respondents (%)
Single Building	61
Multiple Buildings within Campus	22
Within the U.S. or Canada	8
One Metropolitan Area	6
Outside of North America	3

Operating System Applications

LANs are used for a variety of applications. Most of the major LAN operating systems on the market today support the full range of applications that users desire. The respondents to this survey chose word processing (82%) most frequently. Database management is a key application for most (74%) users. Spreadsheets (70%) are also in use on most of the respondents' networks.

Application	Respondents (%)
Word Processing	82
Database Management	74
Spreadsheets	70
Communication Gateways	59
Application Development	51
Accounting/Billing/Order Processing	44
Desktop Publishing	43
Financial/Budgeting	41
Presentation Graphics	41
Inventory Management	30
Sales Management	18
Engineering	4

Respondent Demographics

Type of Industry

Respondents to the LAN Operating Systems survey represent a variety of industries. In total, network professionals employed in 19 industries participated in this survey. The largest percentage of respondents came from the government (19%). Manufacturing firms (excluding those that make computers and/or communications products) made up 14% of the total response.

Industry	Respondents (%)
Government	19
Manufacturers (Excluding Computers and Communications)	14
Business/Professional Services/Consulting	11
Education	10
VARs/Distributors of Computers and Communications Products	6
Wholesale/Retail Trade	5
Health Care	5
Manufacturers of Computers and Communications Products	4
Transportation/Utilities	4
Agriculture/Mining/Construction	3
Banking	3
Insurance	3
Finance	2
Publishing	2
Communications Carriers/Interconnects	1
Research & Development	1
Engineering	1
Real Estate	1
Non-Profit Organizations	1
Other	2
Not Specified	2

Number of Employees

Respondents were asked how many people were employed at their location and in their entire company.

No. of Employees	Respondents' Location (%)	Respondents' Entire Company (%)
Under 100	37	18
100 to 249	19	10
250 to 499	14	9
500 to 999	9	8
1,000 to 2,499	11	10
2,500 to 4,999	5	9
5,000 to 9,999	2	7
10,000 or More	1	26
No Answer	1	5

Sales Volume

Due to the large number of government and education respondents, 22% of those responding to this survey indicated that they are non-profit organizations. The next largest percentage (17%) indicated annual sales of \$1 billion or more, while another 16% showed sales under \$10 million per year.

Annual Sales	Respondents (%)
Non-Profit	22
Under \$10 Million	16
\$10 to \$24.9 Million	10
\$25 to \$49.9 Million	6
\$50 to \$99.9 Million	5
\$100 to \$249.9 Million	5
\$250 to \$499.9 Million	5
\$500 Million to Under \$1 Billion	7
Over \$1 Billion	17
No Answer	7

Budget for LAN Expenditures

The respondents were asked to provide their 1991 budget for LAN-related expenditures, as well as their estimated budget for 1992.

Budget	Respondents' 1991 (%)	Respondents' Estimated 1992 (%)
Under \$10,000	24	18
\$10,000 to \$49,999	24	24
\$50,000 to \$99,999	13	14
\$100,000 to \$249,999	11	14
\$250,000 to \$499,999	7	7
\$500,000 to Under \$1 Million	5	4
\$1 Million to \$4.9 Million	5	5
\$5 Million or More	2	4
No Answer	8	10

Despite the recessionary economy, these numbers show a slight increase in local area network spending for 1992. Those with the largest budgets (\$5 million and up) showed an increase from 2% to 4% of all respondents. Government budgets are among the highest. The average government LAN budget for 1991 was \$706,000; the average rose to \$787,400 for 1992. This compares to a 1991 LAN budget of \$387,800 for all respondents, which increased to \$484,200 for 1992. ■