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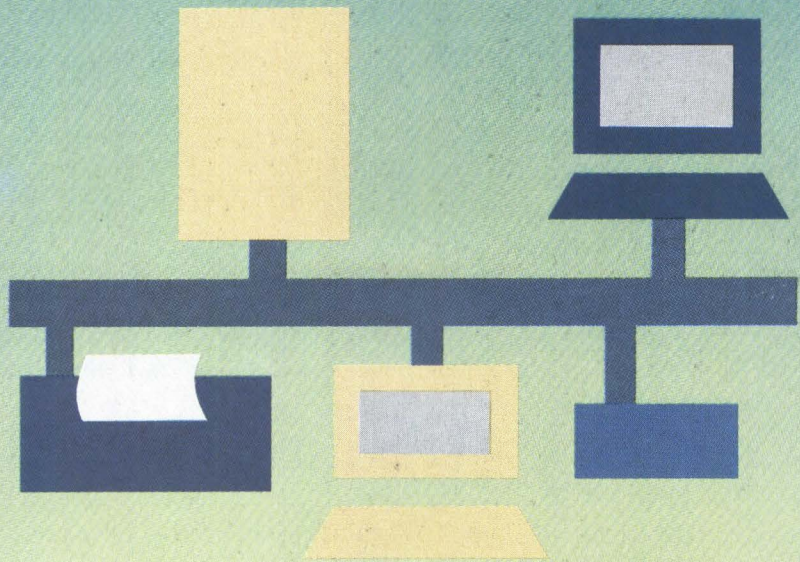
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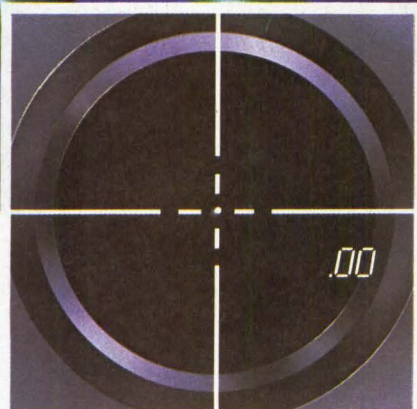


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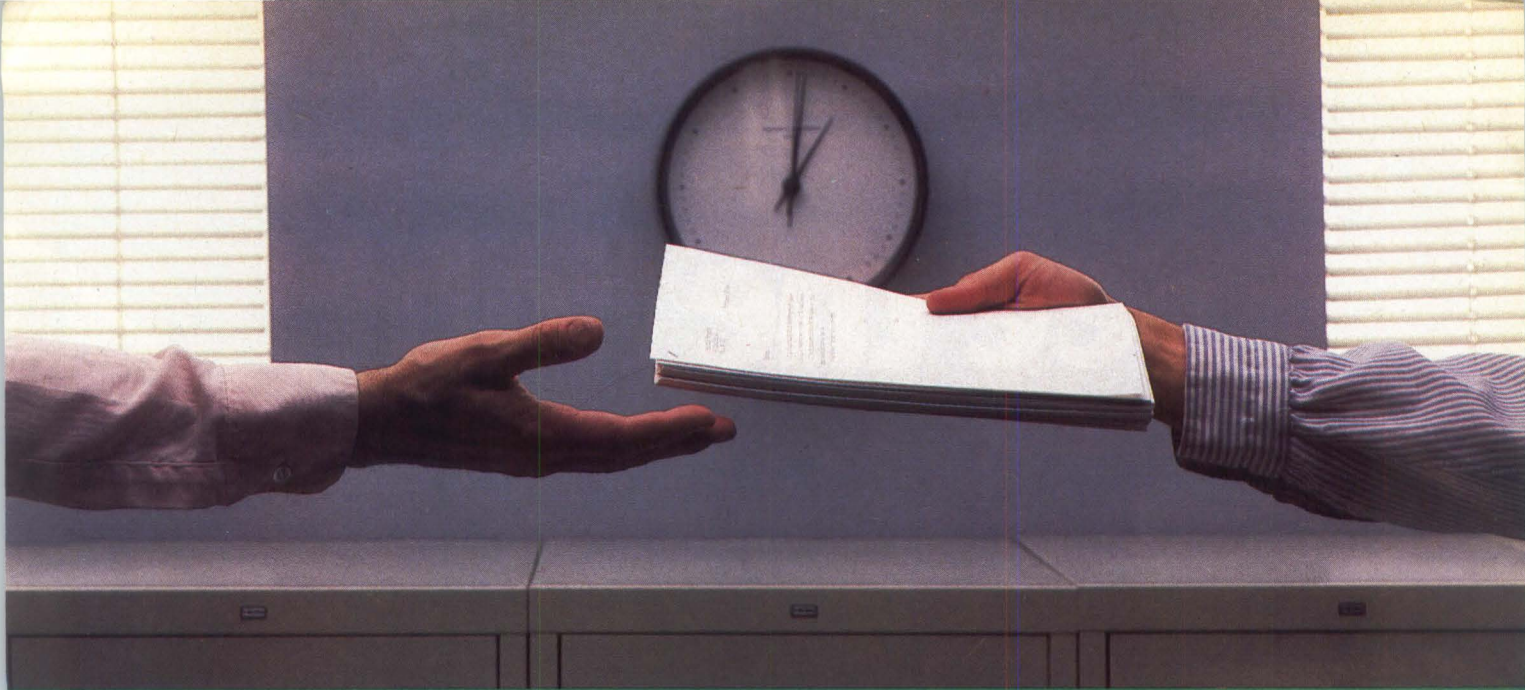
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Communications Handbook

Mini-Micro Systems

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VOL. XIX NO. 3 FEBRUARY 14, 1986

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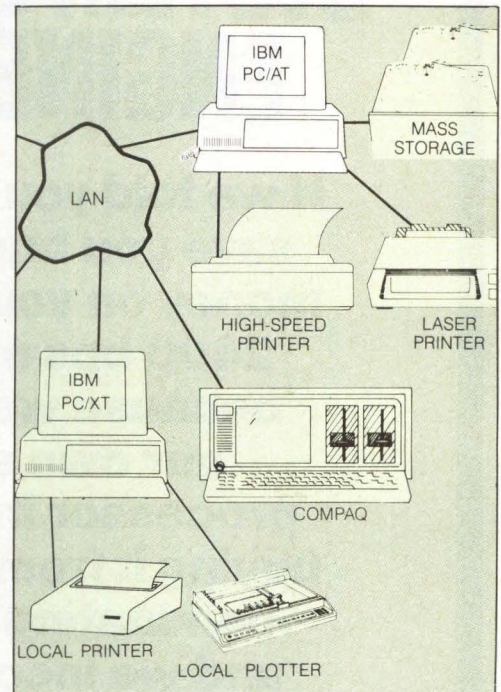
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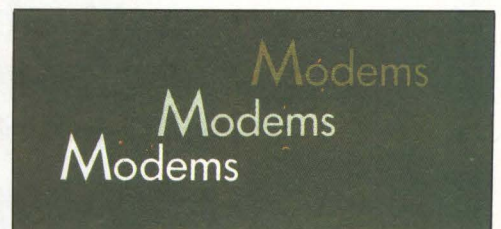
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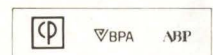
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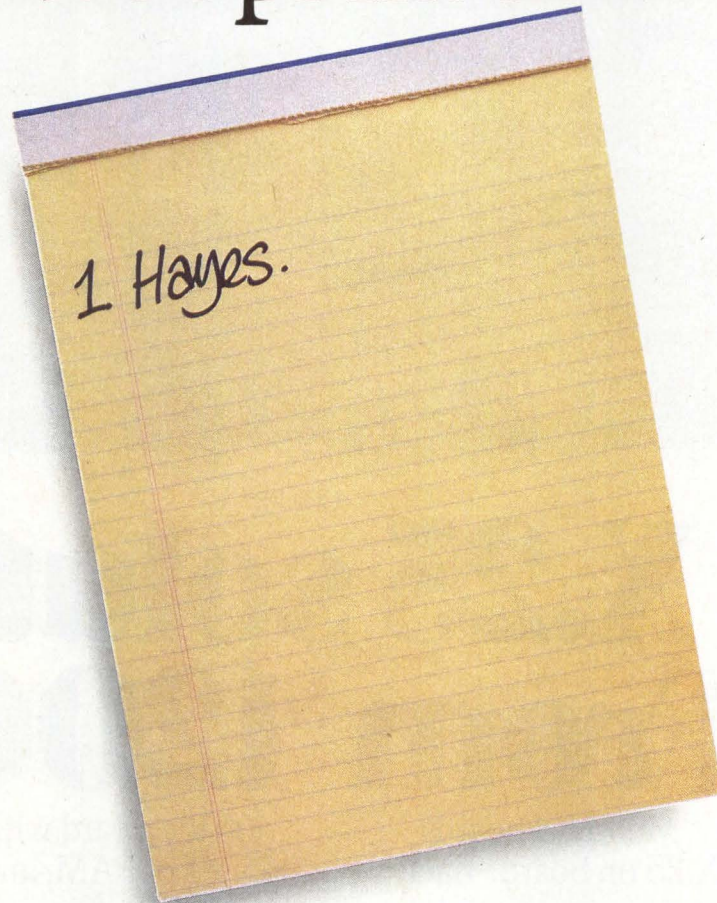
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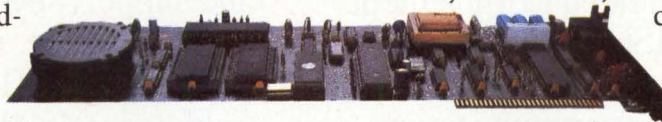
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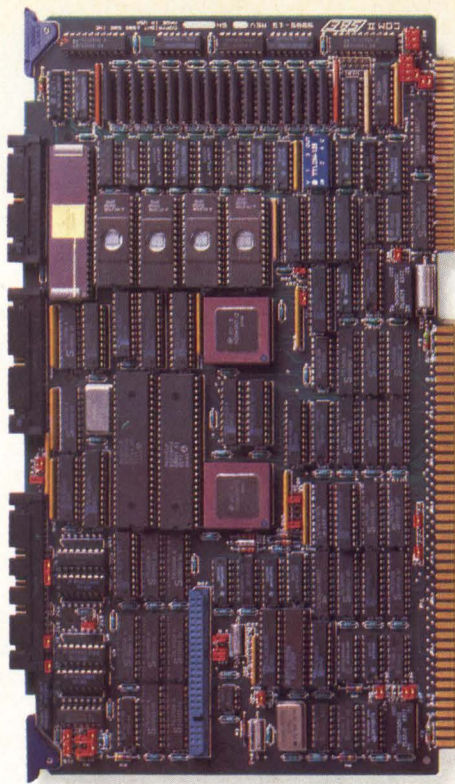
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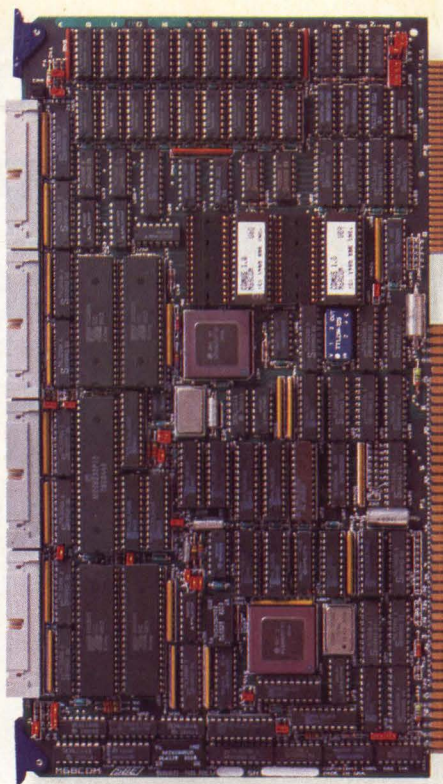
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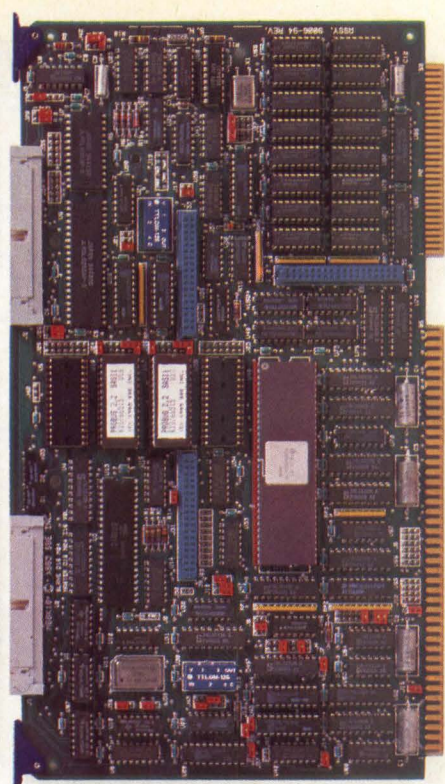
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This edition of the *Communications Handbook* contains three Product Guides beginning on Page 25. Each Product Guide contains price and specification information, arranged alphabetically by company name. These tables are based on mail- and telephone-survey information.

Accompanying each vendor's name is the mailing address, telephone number and a circle number with which you may request additional information using the reader-service card located at the end of the *Handbook*.

At the end of each Product Guide is a list of vendors that did not respond to our survey. Accompanying each name is the company's mailing address and telephone number.

To check product prices or specifications:

- Turn to the appropriate product category using the colored tabs

- Find the appropriate product table

- Find the alphabetically listed vendor.

To select a product:

- Turn to the appropriate product category using the colored tabs

- Find the appropriate product table

- Study the product offerings

- Use the address information found with the company name to contact the vendor.

To comment on the *Communications Handbook*, or to suggest future product coverage or entries, contact the Editor-in-Chief, *Mini-Micro Systems, Communications Handbook*, Cahners Publishing Co., 275 Washington St., Newton, Mass. 02158-1630.

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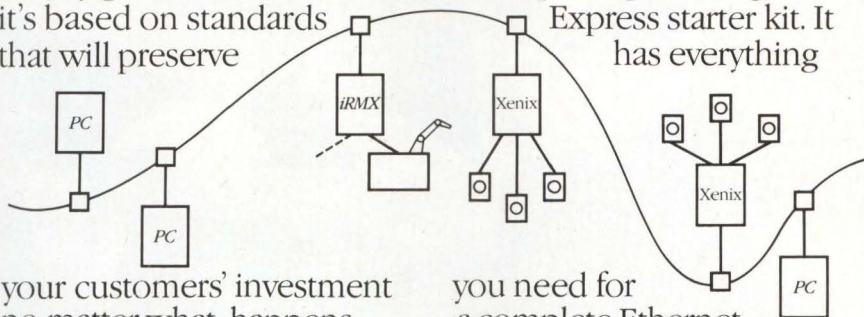
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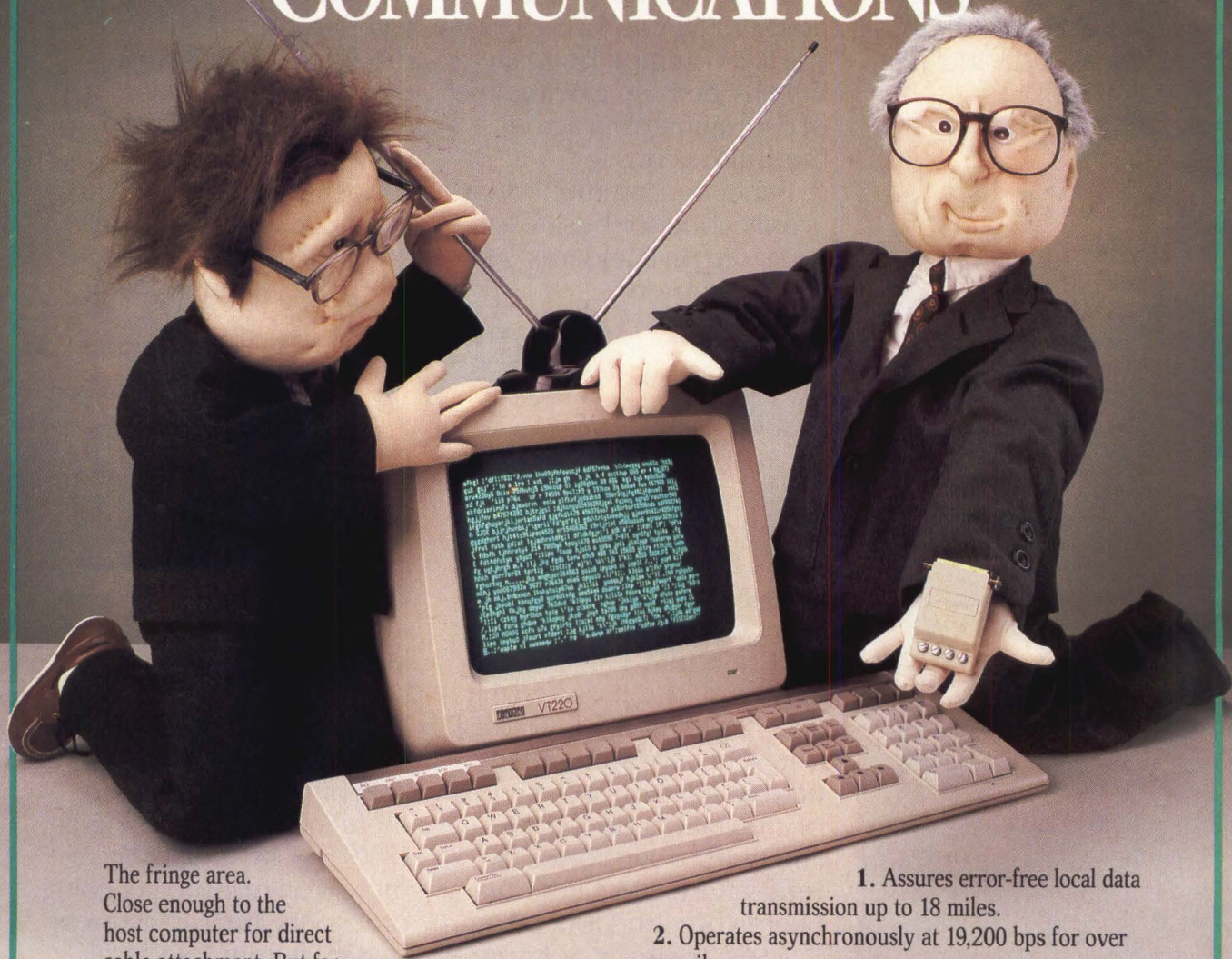
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SOFTWARE DRIVERS CONTROL PRINTERS

A sophisticated approach to device software allows networked PCs to share printers

Steve Bostwick, Local Data Inc.

Local area networks are emerging as the standard method of linking system resources in an automated-office or software-development environment. However, LANs suffer from inconsistencies in handling network resources such as printers. And, although several solutions exist, not a great deal of attention has been paid to the system software that runs on the individual components of the network.

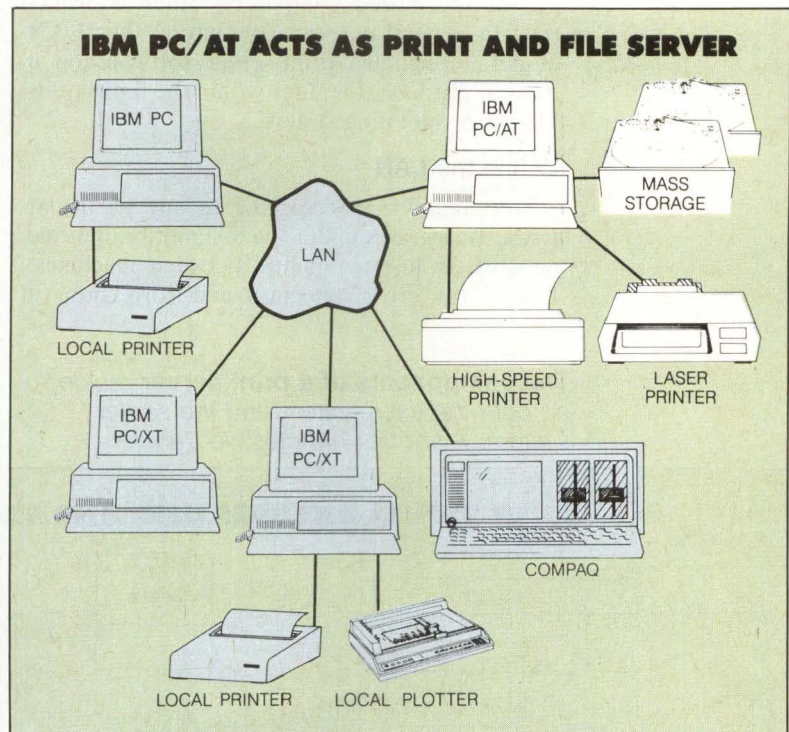
This article describes a hypothetical LAN with print-serving capabilities that solves most networking software problems. This LAN limits integration techniques to IBM Corp. PC machines. But, with modifications, you can apply these techniques to systems using UNIX or, for that matter, any LAN system.

Map the basic topology

In the LAN model, the individual PCs are intelligent processing stations, each with its own, limited, mass storage. Some units attach locally to dedicated peripheral devices, such as printers, plotters and tape drives.

In addition to their own peripherals, each PC has access via the LAN to network peripherals attached to the network-server system—in this case, a PC/AT. This setup adds the significantly greater mass storage of the server system to the PC's own local storage. Furthermore, the printers are either high-speed (several hundred lines per minute) or of high quality such as that provided by laser printers.

File servers contain parts of the network system software that control access to the server system's mass storage. The programs that control the server system's printers, and the necessary hardware, are collectively called print serv-



A typical IBM PC-based network consists of individual PCs acting as intelligent workstations. Each PC can possess local resources, such as rigid disk drives or printers, or, in the case of the IBM PC/AT, act as both a print and a file server.

ers. Implementing a print server on a PC system is a complex process, but not insurmountable.

The goal of setting up a network system is to make the server system's peripherals appear to the user system as though they are its own. However, this requires modification to the user's

The programs that control the server system's printers are called print servers.

operating system. Fortunately, the PC's disk operating system (DOS) allows for such modifications. For instance, you can install a software print-intercept routine in the user system so that all print requests are intercepted, examined, and—if they are to be printed remotely—passed through the network to the server system and its printer. The user system processes all other print requests in a normal fashion.

When the server system receives print requests, it directs them to the print server. The print-server function requires two pieces of code. One piece intercepts and formats print data from the user machine, then transmits it to either a temporary file or to the other piece of code, which decodes and prints the data on the server machine.

On some networks, print servers involve the use of specialized computers; other networks rely on general-purpose computers. Our LAN model implements print-server software on a general-purpose computer within the limits of its MS-DOS operating system.

Define the LAN

Our model is not specific to any particular LAN. It operates under the assumption that the network is just a pipeline between machines. Except for error detection and correction, it

never modifies the data going through it. This condition means, however, that you cannot take advantage of certain features. For instance, station identification might be available on a network implementation, but it is not used in this model; instead, a source identifier is placed into each record.

Create the print-server system

Part of the server installed on the user system consists of a spooler. This collection of software programs intercepts and examines all print requests destined for the logical device (denoted by lpt1:, lpt2:, etc.). The print-request data to be routed over the network is written to a temporary disk file. Data for all other printers is passed on to the PC's basic input/output system print routine.

The spooler consists of three programs:

SPINTCPT: the resident print-intercept routine

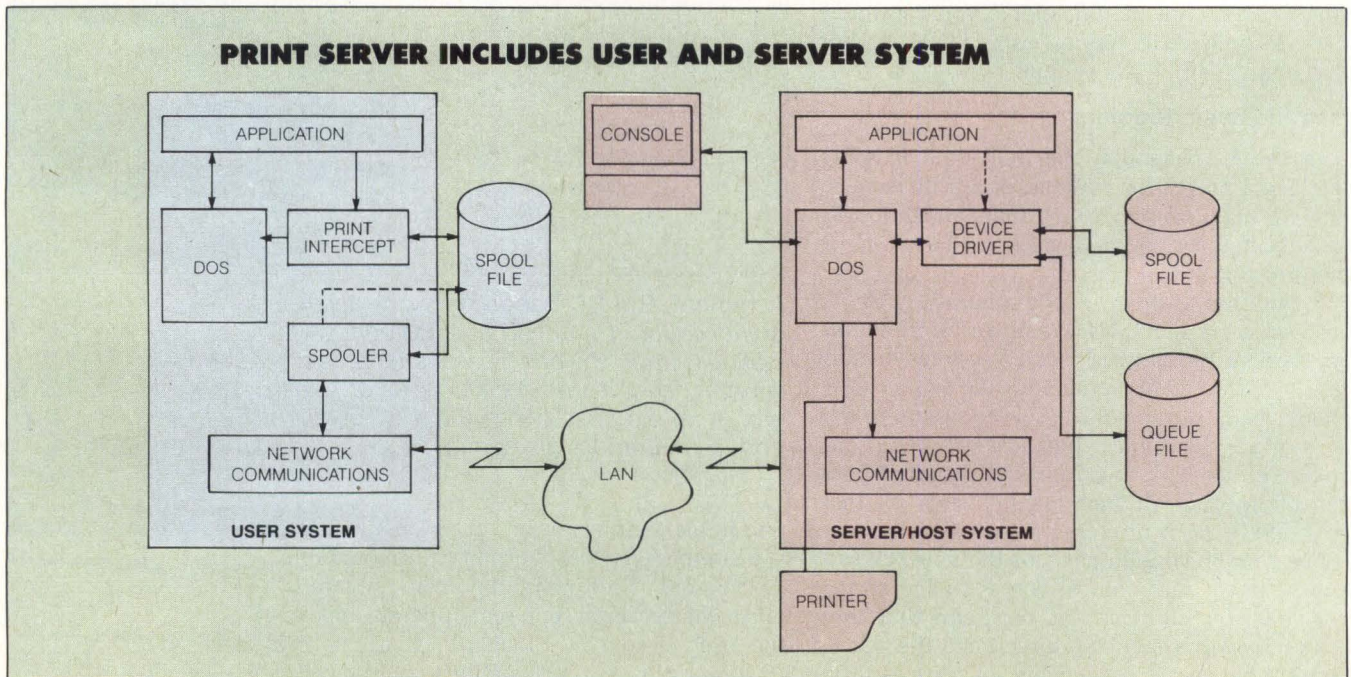
SPOOL: an application program that controls the spool process and writes to the temporary file

DESPOOL: an application program that sends collected print data to the server.

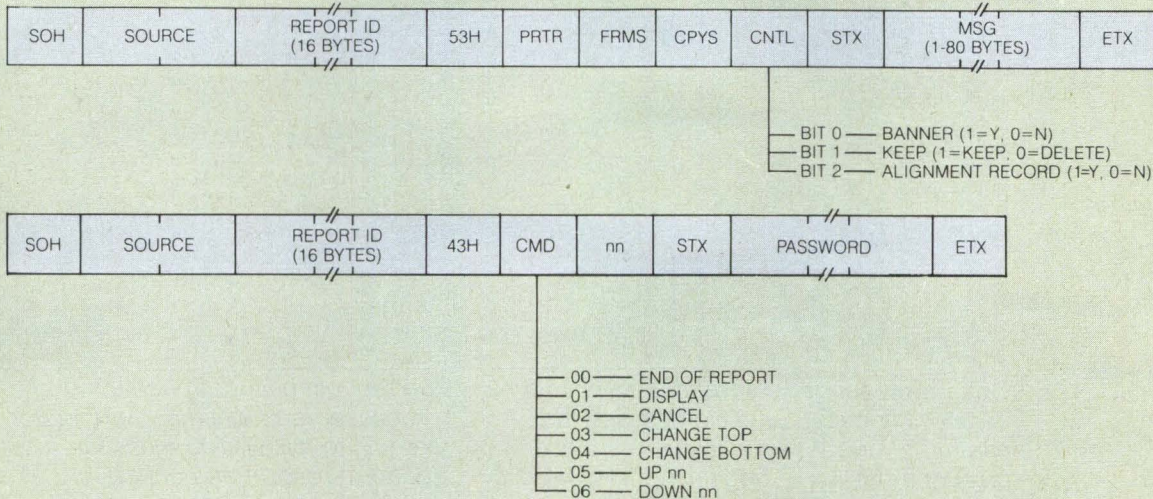
The spool program is the control center for the user side of the print server. It allows you to specify information about the data to be printed

The components of a print server reside on both the user system and the server system. A spooler handles file transfers to

and from the network. In addition, the system contains the necessary device drivers and network communications routines.



SHIPPING A FILE REQUIRES HEADER AND COMMAND FORMATS



Shipping a file to the server requires a header block (top) to define the source of the file, the report identification and the printer destination. The command for-

mat (bottom) establishes the proper link and handles varied tasks, such as passwords for a secured check printer.

and to request the status of data already sent to the server. It also allows you to send existing print files (those not made through the spool process) to the server. The despool program automatically sends previously collected spool data to the server.

You invoke the spool program by entering:
 SPOOL lptn:/switch.../switch//
 or
 SPOOL pathname/switch.../switch//.

The first variation causes all data destined for lptn: to be intercepted and spooled onto the temporary disk file. The process continues until another spool command, or a despool command, is issued. In either case, the program cancels the current data intercept and transmits the spooled data via the network to the server system.

The second variation of the spool command causes an existing file, such as the print file from a compilation, to be sent directly to the server. The file is specified by a standard DOS pathname and may contain wildcard specifications. If more than one file meets this naming requirement, each file is sent to the server individually. Thus, the information specified by the /switches is sent at the beginning of each file, just as if each had been sent separately.

The /switches modify file printing and request server status. They may have the following values:

/COPIES=nn: prints nn copies of the document. (Default is nn=1.)

/FORMS=nn: prints the document on form number nn. (If the requested form is different from the one in the printer, the system notifies the printer operator to change the forms. The meaning of nn is up to you: nn=1 could mean one-part forms, 2 could mean two-part forms, etc. This value can also be used to command a printer to change pitch or to switch fonts in a laser printer. Default is nn=0.)

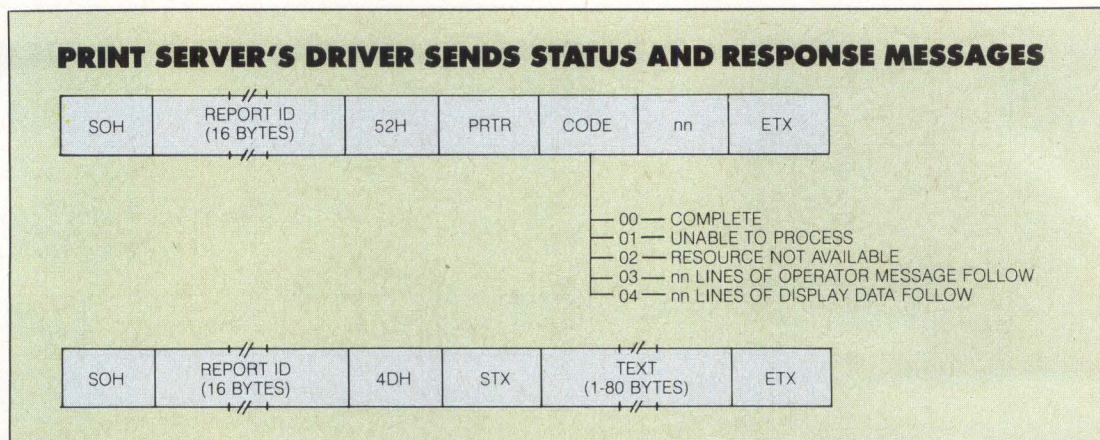
/PRINTER=n: specifies the printer on the server system that will print the report. (The n is 1 for lpt1:, 2 for lpt2:, etc.; default is n=1.)

/ID="text:" identifies the report while it is in the server system. (The text field can be up to 16 characters long and contain any character except double quotes, which are used to enclose the text field. The ID is printed on the banner page that separates printed documents. If not otherwise indicated, the default is the file name—when one is specified—or a number made up of the date and time.)

/TABS=nn: specifies tab spacing (Default is nn=8.)

/BANNER=y/n: specifies whether a banner page is to be printed before the document is printed. (These banners separate and identify documents printed by the spooler. Values of y for yes and n for no are valid. Default is y.)

/ALIGN=y/n: specifies whether an alignment record is included in the file. (If present, the alignment record must actually be the first page of the document, which must always end



Once a message is sent to the print server, the associated driver processes the command and sends a status response (top) to the IBM PC originating the request. This response tells the originator whether

the request has been accepted and can be processed and whether an operator message is to follow. The message response (bottom) reports on queuing or any special function preestablished in the network.

with a form feed (0CH). The server allows the printer operator to repeatedly print this page when aligning the forms. Default is n.)

/DISP=k/d: specifies the disposition of the spool file after it has been shipped to the server. (Enter k for keep and d for delete. Files marked delete are discarded after despooling. Where a filename is specified, the default is k; otherwise, the default is d.)

/MSG="text:" specifies a message to be sent to the printer operator before printing the document. (The text field can be up to 80 characters long and contain any character except double quotes. The text field, though, must be enclosed in double quotes. The default is no message.)

/CMD=command: sends instructions to the print server to retrieve the status of the server or to modify a specific document in the print queue. The valid commands within the last subheading are:

DISPLAY: shows the current status of all the documents in the print queue.

CANCEL ("ID"): cancels printing of a specifically identified report. (The ID is specified within the /ID field and must be enclosed in parentheses and double quotes. The ID is optional. If omitted, the current spool command is reset and the spooled data is discarded. To change the position of the report in the print queue, proceed as follows:

```
TOP
CHANGE("ID",BOTTOM)
UP n
DOWN n.
```

The report ID must be present and enclosed in

double quotes. One of the four options must also be present. The top command places the report at the first position in the queue; the bottom command puts it at the last position in the queue. Commands UP and DOWN move the report up or down n positions in the queue. (If omitted, n defaults to 1.)

Special commands need approval

Commands that cancel or change the queue position of reports require an authorizing password. Although our server does not address this level of security, some provision has been made to accommodate passwords in control blocks.

When a report is ready for shipment to the server, the spooled file is opened and transmitted via the network to the server. A header block is written at the head of the report data. In short, this block is assembled from information specified by the /switches on the spool command or from their default values. Two formats of the header block exist: the first is for reports, the second, for commands.

Each format begins with a start-of-header (SOH) character, a hexadecimal 01 (01H) followed by a 2-byte source ID and a binary number with the most significant byte first. This ID specifies the user system that is originating the request. The number is set when the spooler system is installed on the user machine. Next comes the ID field that identifies the report. The two formats are identical up to this point. The header type field is a 53H for report data or a 43H for command request.

The remaining fields in the report data header have the following functions:

The spool program is the control center for the user side of the print server.

PRTR: the printer to receive the report,
 FRMS: the forms number,
 CPYS: the number of copies to make,
 TABS: tabs spacing,
 CNTL: control flags. (The meaning for the bits are as follows:

- bit 0, banner (1=y,0=n)
- bit 1, keep (1=keep,0=delete)
- bit 2, alignment record (1=yes, 0=no.)

STX: start-of-text character (02H), (Present only if an optional message to the operator follows.)

MSG: message to the operator,

ETX: end-of-text character (03H). (Always terminates a header.)

The command format (43H) fields have the following meanings:

CMD: the command to be executed; the bits of which have the following values:

- 00, end of report
- 01, display queue data
- 02, cancel report specified in ID field
- 03, change specified report to top of queue
- 04, change specified report to bottom of queue
- 05, move specified report up nn positions in queue
- 06, move specified report down nn positions in queue
- nn, the number used in conjunction with the move commands;

STX: start-of-text character (02H); (Present only if an optional password follows.)

PSWD: the optional command password.

When our model server system receives data from the network, it writes the data to a device driver installed in the server system. This driver is called PSERV:. It is always running, receiving and printing data, even if the server system is running another job. That is, it's running in the background, as opposed to the foreground.

When a data header is received, a file is created with a name made from the sequential number and the source field of the header block. The header block is held in memory; the header and report data are written to the open file. Also, there must be enough room in memory to hold one header from each user on the network, plus one for the server systems' DOS session. In addition, there have to be sufficient handles—points for the files to grab onto—for each of these files. (The number of handles is set by using the FILES= entry of the CONFIG.SYS file.) When the report data has been written to the data file, the file is closed and an entry is added to the print queue. This queue is maintained in memory and on a disk file.

As the report data is written to the server spool file, the number of lines and pages are counted. In order to count pages, the file must use form feeds to separate pages.

The data placed on the queue for each entry consists of:

SOURCE: source system identification,

ID: the ID field from the header,

PAGES: the number of pages in the report,

LINES: the number of lines in the report,

FILENAME: the name of the file containing the report data,

PRNTR: printer to receive data,

COPIES: number of copies to make,

NCOPY: number of copies printed,

FORMS: form number for this report,

STATUS: a flag byte that indicates the status of the current job:

- bit 00, print complete
- bit 01, print canceled
- bit 02, print suspended
- bit 07, printing.

When the driver has processed the data-header block and its associated data, or the command block, the driver sends a response to the user system originating the request.

There are two types of response formats—the status-response format and the message format. Each begins with an SOH character (01H) followed by a 16-byte ID field, which identifies the report. The next byte in the record identifies the format, with 52H signifying a status response and 4DH signifying a message format.

The remaining fields of the response format have the following functions:

PRTR: the printer on which the report is to be printed;

CODE: the response status code:

- 0, requested function complete
- 1, unable to process
- 2, resource not available
- 3, nn lines of operator message follow
- 4, nn lines of display follow
- nn, the number associated with code 3 or 4;

ETX: end-of-text character (03H), which terminates a response.

The message format response follows the 4DH type code with the following commands:

STX: start-of-text character (02H), which indicates the start of the message field;

TEXT: any of one to 80 characters except ETX;

ETX: end-of-text character (03H), which terminates a response.

In an actual implementation of our model print server, the device driver, PSERV:, also manages the printing of the reports queued on

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disk. In order to print the reports in the background, the following basic steps must be taken: (1.) Modify the counter responsible for the system tick to produce interrupts more frequently than the default. This increase in frequency depends upon the speed and number of printers being supported. It is suggested that an increase of 256 times be used to simplify Step 2.

(2.) Create a timer-interrupt handler to check the print buffer for characters to be printed, check the status of the target printer and, if the target printer is ready, print the character. Also, the timer must count the number of times it is called until the speed-up factor (from Step 1) is reached. When enough faster-timer interrupts have been received to equal one former tick, the default timer-interrupt routine is called to service any programs depending on the old frequency.

In our demonstration software, the printing function is contained in the control-application program, PCNTL, and will not run in the background. When PCNTL is invoked, status information and the control screen is displayed, as is all the information in the queue file. The names of 16 reports are displayed and the arrow keys can be used to scroll the screen to show other reports that may be in the queue.

The 25th line gives server status; the 24th line is used to enter commands. The available commands are:

START: starts the server and begins printing the first report in the queue;

STOP: stops the server, but continues printing any report in progress;

SUSPEND: suspends printing the report in progress;

RESTART nn [AT P=m] [AT L=m]: restarts report nn; (The optional AT clauses start printing at page m or line m.)

REALIGN: reprints alignment page for currently printing report;

BACKSPACE [P=m] [L=m]: backs up m pages or lines;

SKIP [P=m] [L=m]: skips forward m pages or lines;

DELETE ALL, nn or nn-mm: deletes print requests from the queue. (Deletions can be of all reports; a specific report, nn; or a range of reports, nn-mm.)

The spooler-collection function in the user machine is a resident interrupt handler. The receiving program in the server machine is a device driver. Both functions are independent and can reside in the same machine. Our demonstration program runs in one machine. To run both programs on one machine requires modifying the spool program to write directly to

PSERV:, rather than to the network.

The spooling process in the user system is initiated by the spool program. Commands are passed to the resident print-intercept program, which intercepts all print destined for a designated printer and writes it to disk. To assure that print requests are not missed, the intercept routine traps data at the BIOS level. The intercept routine, using INT17H, examines all print requests. Those for the designated printer are spooled; all others are passed on to the normal BIOS routine.

The print-intercept routine, SPINTCPT, is run only once (usually in the AUTOEXEC.BAT file). When it runs, it initializes the spooling process and then returns to DOS, while remaining resident. The first function it performs is saving the address of the standard BIOS print-interrupt handler and replacing it with one of its own. The following code accomplishes this:

```
MOV AH,35H           ;gets interrupt
                    ;vector function
MOV AL,17H          ;prints interrupt
INT 21H             ;executes function
MOV PINTSAV,BX     ;saves old handler
                    ;address
MOV PINTSAV+2,ES   ;
MOV AH,25H         ;sets interrupt
                    ;vector function
MOV AL,17H         ;prints interrupt
MOV DX,OFFSET PINT ;address of new
                    ;print handler
INT 21H            ;executes function.
```

After the execution of this code, all print requests go to the interrupt handler, PINT, which examines the DX register. This register contains a 0, 1 or 2 to indicate the request-specified printer (lpt1:, lpt2:, etc.). If the spooler is active and DX matches the spooling device set by the control function, the byte is written to disk. Otherwise, the byte is passed to the standard print-interrupt handler at PINTSAV.

The spool program controls the print interceptor via a special control interrupt, which establishes communication between SPOOL and SPINTCPT. Interrupts in the range of 60H to 67H are reserved for user-software interrupts. We chose to use interrupt 67H for controlling SPINTCPT. This interrupt is installed by:

```
MOV AH,25H         ;sets interrupt
                    ;vector function
MOV AL,67H        ;for control interrupt
MOV DX,OFFSET CINT ;address of control
                    ;handler
INT 21H           ;executes function.
```

After CINT is installed, the spool program can pass commands by formatting a block of data with the desired switch settings, loading the

DOS uses drivers to provide standard, consistent interfaces between a user program and the system hardware.

address of that block into DX and issuing an INT 67H instruction. Then, CINT processes the command block and begins processing the instructions.

Install print-server device driver

PSERV: is a standard DOS device driver that you can install by including

DEVICE=PSERV.SYS in the CONFIG.SYS file.

DOS uses drivers to provide standard, consistent interfaces between a user program and the system hardware. There are two types of device drivers—character and block. Character devices handle serial character I/O.

DOS comes with standard character device drivers like CON, AUX and PRN. Block devices are disk drives or similar devices identified only by a letter.

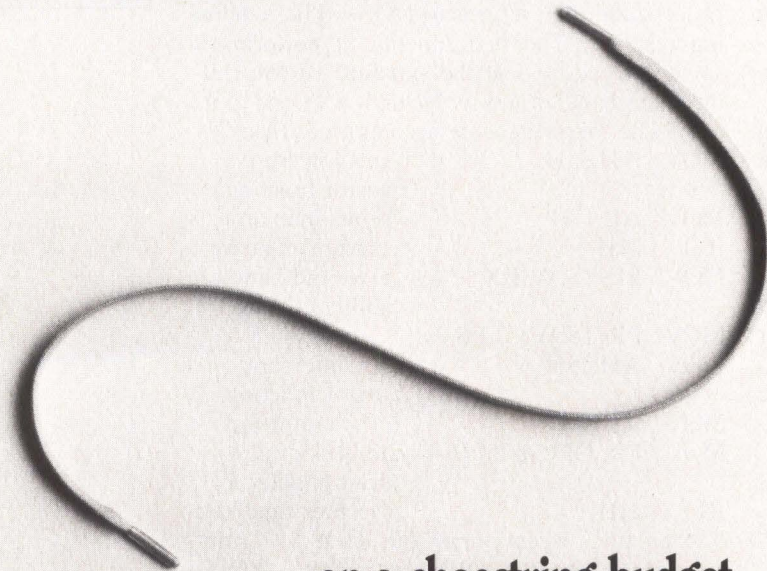
Character devices, on the other hand, are identified by name. Programs can open these devices to perform I/O. Character devices provide the following functions: READ; IOCTL READ; INPUT (READ); NON-DESTRUCTIVE INPUT; NO WAIT; INPUT STATUS; INPUT FLUSH; OUTPUT (WRITE); OUTPUT STATUS; OUTPUT FLUSH; IOCTL OUTPUT.

The IOCTL (I/O control) functions allow the program using the driver to exercise control or read status from the device without using the standard read and write channels. The operator-printer-control program, PCNTL, uses IOCTL to control the printing process. The I/O control for devices is provided by DOS function 44H.

Data is passed to PSERV: using normal DOS I/O functions. The entire data stream, including report headers, is passed to the device driver. The driver writes the reports to individual disk files using temporary names. It also builds the report queue. (The queue, like the printing of reports, is controlled through IOCTL calls.)

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Steve Bostwick, a group manager with Local Data Inc., Torrance, Calif., designs protocol converters and local area network-to-IBM Corp. coaxial-device connections.

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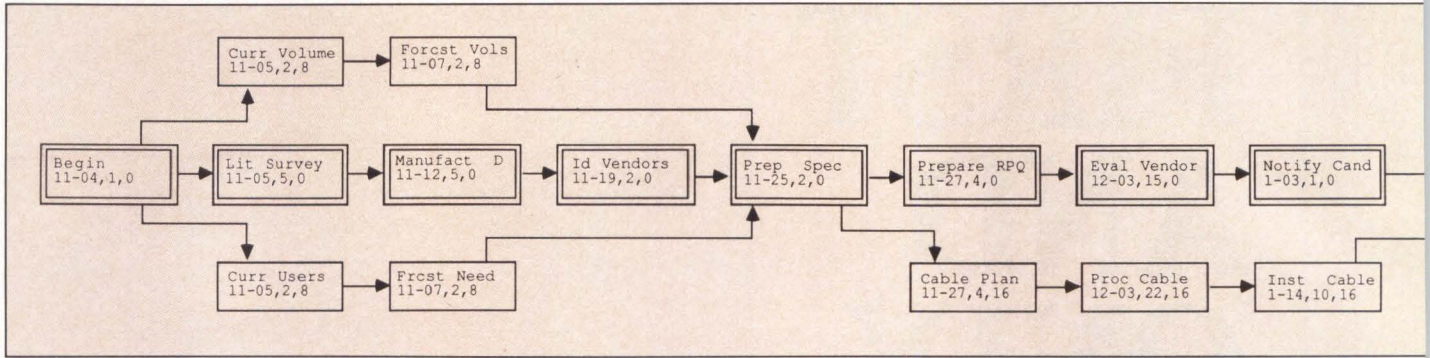


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SOFTWARE HELPS SOLVE LAN-SELECTION PUZZLE

Software management tools can help you save money, time and effort in planning your local area network

Steve Bostwick, Local Data Inc.

The technical decisions and trade-offs involved in choosing, buying and implementing a local area network can make even the most experienced system integrator shudder. And yet, for reasons of overall plant efficiency, corporate managers usually have to direct engineers and programmers on how and when to allocate resources and manpower in LAN selection and installation. However, software management tools can now help the executive fit the pieces of the LAN-procurement puzzle into the right place at the right time.

Many of these tools, which have been used for years on mainframe computers, are now available on personal microcomputers. One such tool, which is especially useful for procuring and installing a LAN, is a critical path management (CPM) program. To demonstrate a hypothetical LAN setup, we used software that is part of a package from Applied Business Technology Corp., New York, called Project Manager Workbench. This package is particularly well-suited for our example because, in addition to CPM, it produces resource-loading spreadsheets, reports for managing costs and schedules and project schedules such as Gantt charts.

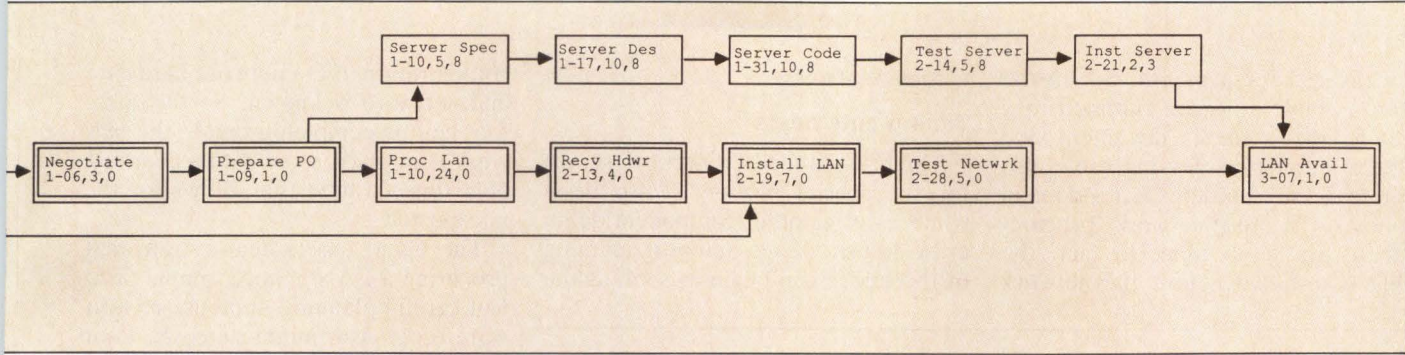
Consider the following network example. The company procuring the LAN is a moderate-size

manufacturing company that needs about 60 nodes around its plant and corporate offices. The nodes consist of peripherals and terminals in the corporate computing center, programmers' offices, management offices, manufacturing floor and warehouse. And, an unusual plotter requiring special software further complicates the company's chore.

The tasks shown on the accompanying charts typify the steps necessary in procuring a moderate-size LAN system. Horizontal bars indicate the dates allotted for a task. The letter C before a bar warns that a task lies on the "critical path." Changes to this part of the schedule will ultimately delay the project. The scheduling program also accounts for holidays (the H's in the calendar bar at the top of the chart), enabling efficient manpower utilization.

A project of this size might cost over \$100,000 and shouldn't be undertaken without serious preparation. The Project Manager Workbench estimates that manpower alone will cost over \$15,000. The first task involves surveying available network hardware and software. Parallel with this task, the system-engineering staff must study the current and future network needs in terms of users and volumes. This information is needed to prepare a network-requirements specification.

The requirements specification is used to write

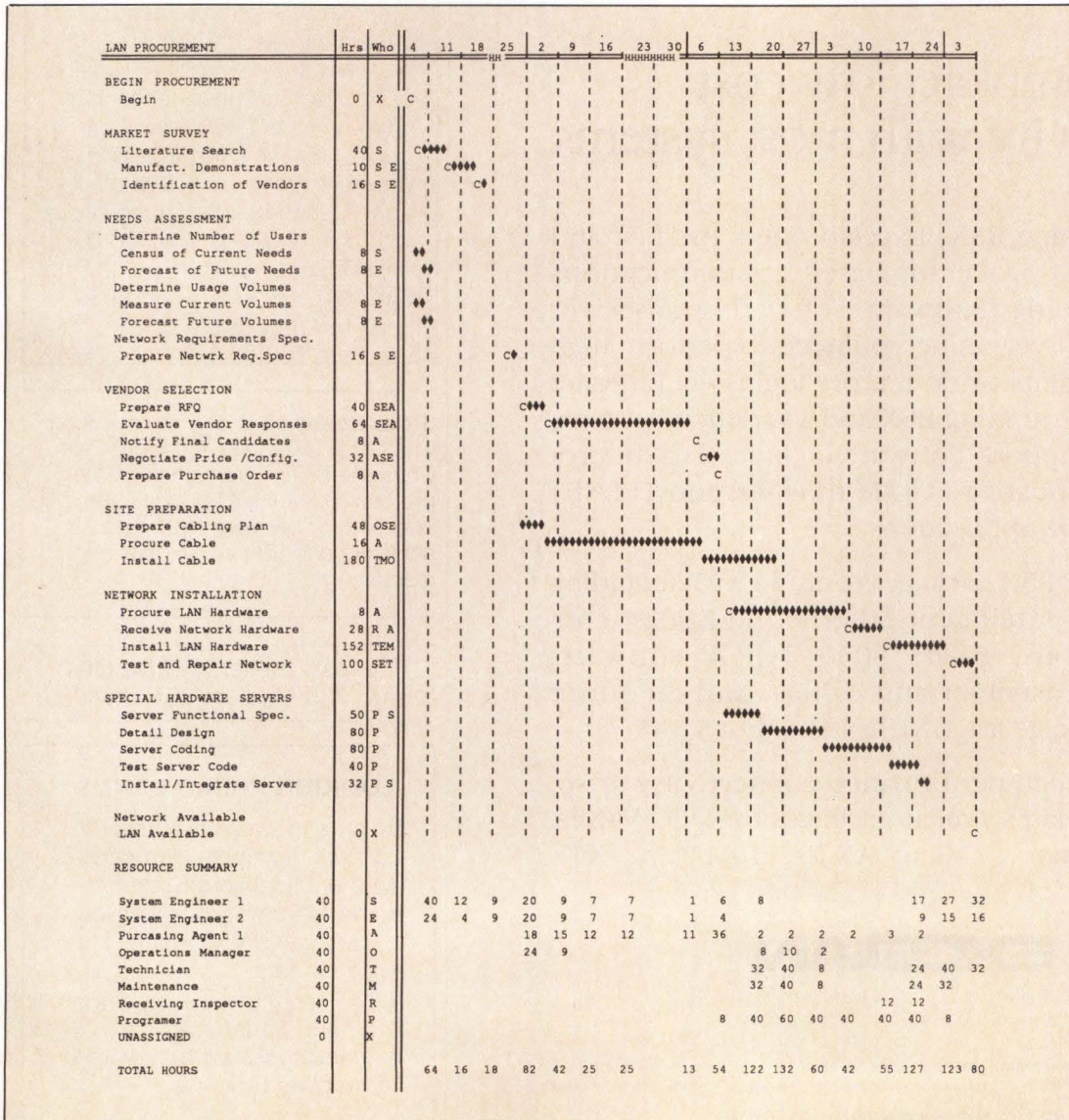


a request for quotation (RFQ). This is sent to the vendors identified in the industry survey. Responses are evaluated, and negotiations are entered into with the candidate vendors. When

haggling is completed, a purchase order is cut and the order is placed.

But problems remain. Although the network components ordered are available, they will not

This critical path chart for LAN procurement is one of several Gantt charts that can be created through the Project Manager Workbench. Numbers give a task's start date and days to completion and identify how long any given task can be delayed. (Zero delay time indicates the task lies within the "critical path.")



This Gantt chart enables the tracking and adjustment of the day-to-day resource management of a LAN-procurement project. Specific personnel and their required hours, as well as holiday schedules and "critical path" (C) tasks, are properly noted.

be delivered for a month. So, in the interim, cable runs are outlined in a network-requirements document and cable is purchased. Buying cable also requires a long lead time but is done in tandem with the network procurement, wasting no time. In fact, the cable is installed before the network

hardware arrives.

Timing cuts costs

The preparation of a network server for the special plotter is also done while awaiting other component deliveries. In fact, design and programming of the server can begin as soon as the

configuration of the network hardware and software is known. So this task, too, can be completed before the network is in place, even with a comfortable time cushion that allows for the unexpected.

The Gantt charts demonstrate that procuring a LAN is not a simple task. But careful planning—and use of software tools—can minimize costs. Poor planning can cause these costs to expand faster than the network itself. □

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Steve Bostwick is a group manager with Local Data Inc., Torrance, Calif., where he heads projects to create protocol converters and establish connectivity between local area networks and IBM Corp. coaxial devices.

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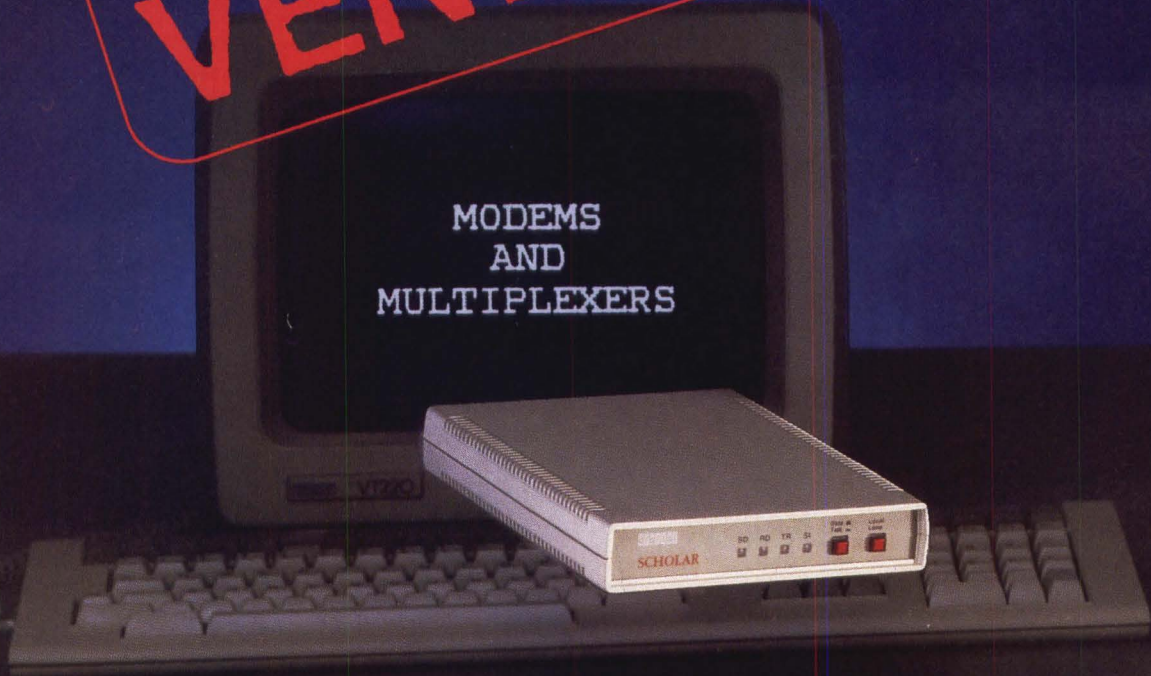
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| AJ 1212-AD1/ AJ 1212-AD2 | 1200 | | full duplex | asynch,synch | auto dial, auto answer | | 595/ 695(Q1) | Bell 103, 113, 212A compatible; AJ 1212-AD2 is an intelligent modem |
| AJ 1222 | 0-300, 600, 1200 | | full duplex | asynch/synch | manual orig./ auto answer | | | CCITT V.21, V.22 compatible |
| AJ DATA Modem 24 series | 1200, 2400 | DPSK | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback | | rackmount, compatible with Bell 212, CCITT V.22 bis |
| APPLE COMPUTER INC. CIRCLE 203 20525 Mariani Ave., Cupertino, CA 95014, (408) 996-1010 | | | | | | | | |
| Apple Personal Modem | 1200 | | full duplex | asynch | auto dial/ auto answer | | 399(Q1) | |
| ASHER TECHNOLOGIES CIRCLE 204 1009 Mansell Rd., Roswell, GA 30076, (404) 993-4590 | | | | | | | | |
| Dataview 25 | 1200 | FSK, PSK | half, full duplex | asynch | auto dial/ auto answer | local and remote digital loopback, self-test | 495(Q1); 297(Q100) | includes CROSSTALK software; board-level modem plugs into Dataview 25, Bell 103, 212A compatible |
| Quadmodem II 1200 | 1200 | FSK, PSK | half, full duplex | asynch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 495(Q1); 248(Q100) | includes CROSSTALK software; board-level modem plugs into IBM PC/XT/AT; compatible with Bell 103, 212A, CCITT V.22 |
| Quadmodem II 2400 | 2400 | FSK, PSK, DPSK | half, full duplex | asynch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 795(Q1); 358(Q100) | includes CROSSTALK software; board-level modem plugs into IBM PC/XT/AT; compatible with Bell 103, 212A, CCITT V.22 |
| AST RESEARCH INC. CIRCLE 205 2121 Alton Ave., Irvine, CA 92714, (714) 863-1333 | | | | | | | | |
| AST-201C | 2400 | DPSK | half, full duplex | synch | manual orig./ auto answer | self-test | 705(Q1) | Bell 201 compatible |

Modems

MODEMS

| Company Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|--|-----------------|-------------------|-------------------|-----------------|-----------------------------|--|-----------|---|
| AST-208 A/B | 4800 | DPSK | half, full duplex | synch | manual orig./ auto answer | self-test | 1,470(Q1) | Bell 208 compatible |
| Reach! | 300, 1200 | FSK, DPSK | half, full duplex | asynch | auto dial/ auto answer | remote digital loopback, self-test | 549(Q1) | includes CROSSTALK XVI software; board-level modem plugs into IBM PC family and compatibles; compatible with Bell 103, 113, 212A, Hayes |
| AT&T One Speedwell Ave., Morristown, NJ 07960, (800) 247-1212 | | | | | | | | CIRCLE 206 |
| 2212C/FDX | 300, 1200 | FSK, PSK | full duplex | asynch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 549(Q1) | Bell 212A compatible |
| 2224/FDX | 300, 1200, 2400 | FSK, PSK | full duplex | asynch/ synch | auto dial/ auto answer | local and remote digital and analog loopback, remote digital loopback, self-test | 999(Q1) | Bell 212A compatible |
| BYTCOM INC. 2169 Francisco Blvd., Suite H4, San Rafael, CA 94901, (800) 227-3254 | | | | | | | | CIRCLE 207 |
| 24/12EC | | FSK, DPSK, QAM | full duplex | asynch/ synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 595(Q1) | board-level modem plugs into IBM computers and compatibles; error checking; compatible with Bell 103, 113J, CCITT V.22 bis |
| 212AD | 1200 | FSK, DPSK | full duplex | asynch/ synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 495(Q1) | board-level modem plugs into IBM computers and compatibles; Bell 212A compatible |
| CARTERPHONE COMMUNICATIONS CORP. 1341 W. Mockingbird Lane, Suite 1100 West, Dallas, TX 75247, (800) 527-1169 | | | | | | | | CIRCLE 208 |
| ADCoMM 96/48 | up to 19.2K | | full duplex | asynch | auto dial/ auto answer | | 1,995(Q) | Bell 103 compatible, supports an independent secondary statistically multiplexed printer channel |
| CASE COMMUNICATIONS INC. 2120 Industrial Pkwy., Silver Spring, MD 20904-1999, (301) 622-2121 | | | | | | | | CIRCLE 209 |
| R48FP | 4800 | QAM | half, full duplex | synch | manual orig./ manual answer | local digital and analog loopback, remote digital loopback, self-test | 1,495(Q1) | CCITT V.24 compatible |
| R212A | 300-1200 | | full duplex | asynch/ synch | auto dial/ auto answer | local and remote digital loopback | 699(Q1) | Bell compatible |
| Executive 212 | 300-1200 | FSK, PSK | full duplex | asynch | auto dial/ auto answer | | 599(Q1) | Bell compatible |
| CERMETEK MICROELECTRONICS INC. 1308 Borregas Ave., Sunnyvale, CA 94088, (408) 752-5000 | | | | | | | | CIRCLE 210 |
| Cermetek 1200 | 110, 300, 1200 | FSK, PSK | half, full duplex | asynch/ synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 494(Q1) | compatible with Bell 103, 212A, Hayes |

A modem by any other name could very well be ours.

Fujitsu modems are sold under many different labels, but they all have one feature in common: outstanding Fujitsu quality. That's why Fujitsu has been a major OEM modem manufacturer for many years.

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FUJITSU

FUJITSU AMERICA, INC.
DATA PRODUCTS DIVISION
3055 ORCHARD DRIVE
SAN JOSE, CA 95134
(408) 946-8777

CIRCLE NO. 14 ON INQUIRY CARD

The VME BUS and OS-9:

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Modularity. Flexibility. High Performance. Future growth. These are probably the prime reasons you chose the VME bus. Why not use the same criteria when selecting your system software? That's why you should take a look at Microware's OS-9/68000 Operating System—it's the perfect match for the VME bus.

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And that's just the beginning of the story. OS-9 gives you a complete UNIX-application compatible environment. It is multitasking, real time, and extremely fast. And if you're still not impressed, consider that a complete OS-9 executive and I/O driver package typically fits in less than 24K of RAM or ROM.

Software tools abound for OS-9, including outstanding Microware C, Basic, Fortran, and Pascal compilers. In addition, cross C compilers and cross assemblers are available for VAX systems under Unix or VMS. You can also plug in other advanced options, such as the GSS-DRIVERS™ Virtual Device Interface for industry-standard graphics support, or the OS-9 Network File Manager for high level, hardware-independent networking.

Designed for the most demanding OEM requirements, OS-9's performance and reliability has been proven in an incredible variety of applications. There's nothing like a track record as proof: to date, over 200 OEMs have shipped more than 100,000 OS-9-based systems.

Ask your VME system supplier about OS-9. Or you can install and evaluate OS-9 on **your own** custom system with a reasonably priced Microware PortPak™. Contact Microware today. We'll send you complete information about OS-9 and a list of quality manufacturers who offer off-the-shelf VME/OS-9 packages.



MICROWARE.

Microware Systems Corporation

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Phone 515-224-1929 • Telex 910-520-2535

Microware Japan, Ltd.

41-19 Honcho 4-Chome, Funabashi City • Chiba 273,
Japan • Phone 0474-22-1747 • Telex 298-3472

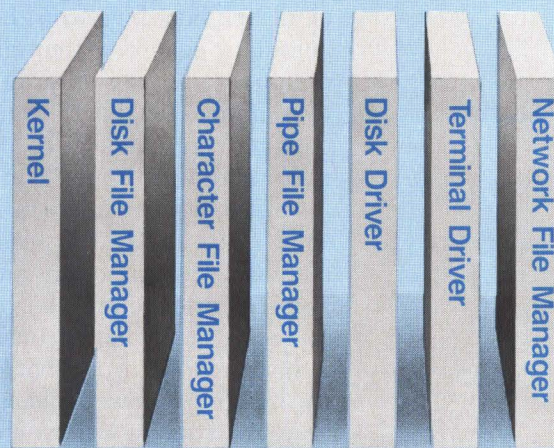
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Telex: 76129 microma s
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Phone: 056-862724

Vivaway, Ltd.
36-38 John Street, Luton
Bedfordshire LU1 2JE
England
Telex: 825115
Phone: 0582-423425

Microprocessor Consultants, Ltd.
16 Bandera Avenue
Waga Waga, 2650
NSW Australia
Phone: (069) 312331



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CIRCLE NO. 28 ON INQUIRY CARD

Modems

MODEMS

| Company Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|-----------------------|-----------------|-------------------|-------------------|-----------------|---------------------------|---|-----------------|---|
| Cermetek 1200 SPC | 110, 300, 1200 | FSK, PSK | half, full duplex | asynch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 495(Q1) | board-level modem plugs into IBM PC; compatible with Bell 103, 212A, Hayes; includes CROSSTALK XVI software |
| Cermetek 2400/2400 EP | 300, 1200, 2400 | FSK, QAM | half, full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 745/ 795(Q1) | compatible with Bell 103, 212A, CCITT V.22, V.22 bis; error checking |

CODEX CORP.

20 Cabot Blvd., Mansfield, MA 02178, (617) 364-2000

CIRCLE 211

| | | | | | | | | |
|-----------|------------------|-------------------|-------------|--------------|------------------------------|--|-----------------|--|
| 2206 | 4800, 7200, 9600 | half, full duplex | | synch | manual orig./ auto answer | local and remote, digital and analog loopback, self-test | 1,995(Q1) | CCITT V.29 compatible |
| 2215 | 0-1200 | FSK | half duplex | asynch | auto dial/ auto answer | local analog loopback, self-test | 495(Q1) | Bell 202S compatible |
| 2232 | 1200, 2400 | QAM | full duplex | asynch/synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 745(Q1) | compatible with Bell 212A, CCITT V.22 bis |
| 2271/2272 | 1200 | PSK | full duplex | asynch | auto dial, auto answer | local and remote, digital and analog loopback, self-test | 395/ 475(Q1) | 2271 is a board-level modem that plugs into IBM PC/XT/AT and compatibles; both are Bell 103, 212A compatible |

CLEO SOFTWARE (DIV. OF PHONE 1 INC.)

1639 N. Alpine Rd., Rockford, IL 61107, (800) 233-CLEO

CIRCLE 212

| | | | | | | | | |
|-----------|------|------|-------------------|-------|---------------------------|--|-----------------------------------|---|
| SYNCmodem | 2400 | DPSK | half, full duplex | synch | auto dial/ auto answer | | 895-1,395 (Q1); 450-720 (Q100) | board-level modem plugs into IBM PC/XT/AT; CLEO emulation software available; compatible with Bell 201C, CCITT V.26 bis |
|-----------|------|------|-------------------|-------|---------------------------|--|-----------------------------------|---|

COMDATA

7900 N. Nagle Ave., Morton Grove, IL 60053, (312) 470-9600

CIRCLE 213

| | | | | | | | | |
|-----------|------------|------|-------------------|--------------|------------------------------|--|-----------------------|---|
| 224E2-42 | 1200, 2400 | | half, full duplex | asynch/synch | manual orig./ auto answer | local and remote, digital and analog loopback, self-test | 587(Q1); 537(Q100) | standalone or rackmount, Bell 212A compatible |
| 312E2-422 | 1200 | DPSK | half, full duplex | asynch | manual orig./ auto answer | local and remote, digital and analog loopback, self-test | 297(Q1); 267(Q100) | Bell 212A compatible |
| P212A | 1200 | DPSK | half, full duplex | asynch/synch | manual orig./ auto answer | local and remote, digital and analog loopback, self-test | 437(Q1); 397(Q100) | standalone or rackmount, Bell 212A compatible |

COMDESIGN INC.

751 S. Kellogg Ave., Goleta, CA 93117, (805) 964-9852

CIRCLE 214

| | | | | | | | | |
|---------|-----------|-----------|-------------------|-------|--|--|-----------|--|
| CM-4800 | 2400-4800 | DPSK | half, full duplex | synch | | local and remote, digital and analog loopback, self-test | 1,395(Q1) | compatible with CCITT V.24, V.27 bis, V.28, V.52, V.54; automatic line resynchronization |
| CM-9600 | 4800-9600 | DPSK, QAM | half, full duplex | synch | | local and remote, digital and analog loopback, self-test | 1,750(Q1) | compatible with CCITT V.24, V.28, V.29, V.52, V.54; automatic line resynchronization |

Modems

MODEMS

| Company Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|--|---------------------|---------------------------|----------------------|-----------------|---------------------------|---|---|---|
| COMPUTER COMMUNICATIONS SPECIALISTS INC. 6683 Jimmy Carter Blvd., Norcross, GA 30071, (404) 441-3114 | | | | | | | | CIRCLE 215 |
| AUDIOMODEM/ AUDIOMODEM II | 1200 | FSK | half duplex | asynch | auto dial/ auto answer | local digital and analog loopback, self-test | 2,895/5, 995(Q1) | voice response to inputs from touch-tone telephones or hand-held terminals |
| CONCORD DATA SYSTEMS INC. 303 Bear Hill Rd., Waltham, MA 02154, (617) 890-1394 | | | | | | | | CIRCLE 216 |
| 224 PC Card | 300, 1200, 2400 | FSK, PSK, DPSK, QAM | full duplex | asynch/synch | auto dial/ auto answer | local and remote digital loopback, self-test | 695(Q1) | compatible with Bell 103, 212A, CCITT V.22 bis; board-level modem plugs into IBM PC bus; MNP error protection |
| 224 Trispeed | 300, 1200, 2400 | FSK, PSK, DPSK, QAM | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 795(Q1) | compatible with Bell 103, 212A, CCITT V.22 bis; board-level modem plugs into Concord Data Systems RM16, VA 1680 nest |
| SERIES II | 300, 1200, 2400 | FSK, PSK, DPSK, QAM | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 745(Q1) | compatible with Bell 103, 212A, CCITT V.22 bis; MNP error protection |
| CTS FABRI-TEK INC. (DATACOMM PRODUCTS DIV.) 6900 Shady Oak Rd., Eden Prairie, MN 55344, (612) 941-9100 | | | | | | | | CIRCLE 217 |
| 212AHC | 1200 | FSK, DPSK | full duplex | asynch | auto dial/ auto answer | local analog loopback, remote digital loopback, self-test | 395(Q1) | compatible with Bell 212A, Hayes |
| 2424AD | 300, 1200, 2400 | FSK, DPSK QAM | full duplex | asynch/synch | auto dial/ auto answer | local digital analog loopback, remote digital loopback, self-test | 495(Q1); 395(Q100) | compatible with Bell 212A, CCITT V.22; board-level modem plugs into TTL version |
| Half-Pak 12 | 1200 | FSK, DPSK | full duplex | asynch | auto dial/ auto answer | local analog loopback, remote digital loopback, self-test | 395(Q1) | compatible with Bell 212A, Hayes; board-level modem plugs into IBM computers |
| DATA COMM FOR BUSINESS INC. 4 Henson Place, Champaign, IL 61820, (217) 352-3207 | | | | | | | | CIRCLE 218 |
| PL4.8 Plus/PL9.6 Plus/PL14.4 Plus | 4800/ 9600/14.4K | QAM | full duplex | synch | | local and remote, digital and analog loopback | 1,600/2,000/ 3,300(Q1); 1,360/1,700/ 2,805(Q100) | CCITT V.27 compatible, point-to-point/CCITT V.29 compatible, point-to-point |
| DATA RACE INC. 5839 Sebastian Place, San Antonio, TX 78249, (512) 692-3909 | | | | | | | | CIRCLE 219 |
| RACE I/RACE II | 9600 | DPSK | full duplex | asynch | auto dial/ auto answer | self-test | 1,995/ 2,495(Q1) | Bell 103 compatible, error correction, Race II statistically multiplexes a second independent printer channel |
| DATAGRAM CORP. 11 Main St., E. Greenwich, RI 02818, (800) 235-5030 | | | | | | | | CIRCLE 220 |
| DCE-224 | 2400 | FSK, PSK, QAM | half, full duplex | asynch/synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 795(Q1) | Bell 224 compatible |
| DCE-4800 | 4800 | QAM | full duplex | synch | | local and remote, digital and analog loopback, self-test | 1,395(Q1) | CCITT V.29 bis/ter compatible |

Modems

MODEMS

| Company Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|--|----------------------|----------------------|----------------------|-----------------|------------------------|---|--------------------------|--|
| DCE-9600 | 9600 | QAM | full duplex | synch | | local and remote, digital and analog loopback, self-test | 1,495(Q1) | CCITT V.29 bit/ter compatible |
| DATALINK READY INC. | | | | | | | | |
| P.O. Box 2169, Melbourne, FL 32902-2169, (305) 676-0500 | | | | | | | | |
| CIRCLE 221 | | | | | | | | |
| 208 AB | 2400, 4800 | DPSK | half, full duplex | synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 1,725(Q1); 1,560 (Q100) | Bell 201C, 208A/B compatible |
| Ark 24K | 300, 600, 1200, 2400 | FSK, DPSK, QAM | half, full duplex | asynch/synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 595(Q1); 439(Q100) | compatible with Bell 103, 212A CCITT V.22, V.22 bis; board-level modem plugs into IBM PC; ARQ error correction |
| Ark 24K Plus | 300, 600, 1200, 2400 | FSK, DPSK, QAM | half, full duplex | asynch/synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 795(Q1); 540(Q100) | compatible with Bell 103, 212A CCITT V.22, V.22 bis; board-level modem plugs into IBM PC; ARQ error correction |
| DATEC INC. | | | | | | | | |
| P.O. Box 13568, Research Triangle Park, NC 27709-3568 (919) 544-6433 | | | | | | | | |
| CIRCLE 222 | | | | | | | | |
| 212SA | 1200 | DPSK | half, full duplex | asynch/synch | auto dial/ auto answer | local analog loopback, self-test | 495(Q1) | Bell 103, 113, 212A compatible |
| 212SC | 1200 | DPSK | half, full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, self-test | 550(Q1) | Bell 103, 113, 212A compatible; battery back-up |
| 224KT | 2400 | DPSK | half, full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 895(Q1) | Bell 103, 113, 212A, CCITT V.22, V.22 bis compatible |
| DECATEK INC. | | | | | | | | |
| P.O. Box 569, Stone Mountain, GA 30086-0569, (404) 493-7273 | | | | | | | | |
| CIRCLE 223 | | | | | | | | |
| ZIPmodem | 9600 | QAM | half duplex | synch | auto dial/ auto answer | self-test | 2,995 (Q1); 1,995 (Q100) | board-level modem plugs into IBM PC/AT and features a SNA/SDLC protocol converter; CCITT V.27, V.29 compatible; includes communications software |
| DIGITAL COMMUNICATIONS ASSOCIATES INC. (DCA) | | | | | | | | |
| 1000 Alderman Dr., Alpharetta, GA 30201, (404) 442-4000 | | | | | | | | |
| CIRCLE 224 | | | | | | | | |
| DCA 911 | 2400 | PSK, QAM | full duplex | asynch/synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 795(Q1) | compatible with Bell 212A, CCITT V.22, V.22 bis; error correction |
| DCA 920 | 4800 | PSK | half, full duplex | synch | | local and remote, digital and analog loopback, self-test | 1,495(Q1) | CCITT V.27 bis/ter compatible, LCD display, eye pattern generator |
| Irma's Fastlink | 10K | FSK, DPSK | full duplex | asynch | auto dial/ auto answer | self-test | 2,395(Q1) | Bell 103, 212A, compatible; includes CROSSTALK software; board-level modem plugs into IBM PC |

Modems

MODEMS

| Company | Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|--|--------------------------|-----------------------------------|-------------------|-------------------|-----------------|------------------------------|---|---------------------------|---|
| DIGITAL EQUIPMENT CORP. | | | | | | | | | |
| 200 Baker Ave., Concord, MA 01742, (617) 264-1420 | | | | | | | | | |
| | DF12 | 300, 1200 | FSK, QDPSK | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 665(Q1) | Bell 103J, 212A compatible |
| | DF224 | 300, 1200, 2400 | FSK, DPSK, QAM | full duplex | asynch/synch | auto dial/ auto answer | local analog loopback, remote digital loopback, self-test | 795(Q1) | compatible with Bell 103J, 212A, CCITT V.22, V.22 bis |
| ELECTRONIC VAULTS INC. | | | | | | | | | |
| 12347-E Sunrise Valley Dr., Reston, VA 22091, (703) 620-3900 | | | | | | | | | |
| | Fastcomm 1296 I | 300, 1200, 4800, 7200, 9600 | QAM | half, full duplex | asynch | auto dial/ auto answer | | 995(Q1) | compatible with Bell 103, 212A, CCITT V.29; board-level modem plugs into IBM PC and compatibles |
| | Fastcomm 2496 I | 300, 1200, 2400, 4800, 7200, 9600 | QAM | half, full duplex | asynch | auto dial/ auto answer | | 1,095(Q1) | compatible with Bell 103, 212A, CCITT V.22 bis, V.29; board-level modem plugs into IBM PC and compatibles; error detection |
| | Upta 96 I | 4800, 7200, 9600 | QAM | half duplex | asynch | auto dial/ auto answer | | 895(Q1) | CCITT V.29 compatible; board-level modem plugs into IBM PC and compatibles; error detection |
| FUJITSU AMERICA INC. (DATA PRODUCTS DIV.) | | | | | | | | | |
| 3055 Orchard Dr., San Jose, CA 95134, (408) 946-8777 | | | | | | | | | |
| | M1915L | 2400, 4800 | PSK | full duplex | synch | | | | CCITT V.27 compatible |
| | M1921L | 4800, 7200, 9600 | QAM | full duplex | synch | | | | CCITT V.29 compatible; opt. 4 channel (TDM) multiplexer |
| | M1935D | 1200, 2400 | PSK, QAM | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | | Bell 212A, CCITT V.22, V.22 bis compatible |
| GAMMALINK | | | | | | | | | |
| 2452 Embarcadero Way, Palo Alto, CA 94303, (415) 856-7421 | | | | | | | | | |
| | GammaComm/ GammaModem | 4800, 7200, 9600 | QAM | half duplex | synch | auto dial/ auto answer | local and remote digital loopback, self-test | 1,995(Q1); 1,495(Q100) | CCITT V.27, V.29 compatible; board-level modem plugs into IBM PC/AT; includes communications software; GammaModem is standalone model |
| GANDALF DATA INC. | | | | | | | | | |
| 1020 S. Noel, Wheeling, IL 60090, (312) 541-6060 | | | | | | | | | |
| | Access Series 24S | 300, 1200, 2400 | FSK, DPSK, QAM | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 650(Q1) | compatible with Bell 103, 212A, CCITT V.22, V.22 bis |
| | Access Series 208 | 4800 | DPSK | half, full duplex | synch | manual orig./ auto answer | local digital and analog loopback, remote digital loopback, self-test | 1,300- 1,450(Q1) | Bell 208 A/B compatible; point-to-point; rackmount |

CIRCLE 225

CIRCLE 226

CIRCLE 227

CIRCLE 228

CIRCLE 229

Modems

| Company | Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|---------------|-------|-----------------|-------------------|-------------------|-----------------|---------------------------|---|----------|-------------------------------|
| Access Series | 212 | 300, 1200 | FSK, PSK | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 545(Q1) | Bell 103, 113, 212 compatible |

GENERAL DATACOMM INDUSTRIES INC.
Rt. 63, Middlebury, CT 06762, (203) 574-1118

CIRCLE 230

| | | | | | | | | |
|--------------------------|---|------|--------------------------------------|----------------------------|--|---|---------------------|---|
| DC 201C-K/ DC 201-7 | 1200, 1800, 2400/ 1200, 2400 | DPSK | half duplex/ half, full duplex | asynch, synch/ synch | auto dial, auto answer/ manual orig., auto answer | local digital and analog loopback, remote analog loopback, self-test/local and remote, digital and analog loopback, self-test | 795/745(Q1) | Bell compatible/Bell, CCITT V.26 compatible |
| DC 2400ASM/ DC 201C | 1200, 1800, 2400/ 1200, 2000, 2400 | DPSK | full duplex/ half, full duplex | asynch, synch/ synch | manual orig., auto answer | local digital and analog loopback, remote analog loopback, self-test/local and remote, digital and analog loopback, self-test | 825/995(Q1) | Bell, CCITT V.26 compatible |
| DC 9600 QPS/ DC 14400 | 4800, 7200, 9600/1200, 9600, 14.4K | QAM | full duplex/ half, full duplex | synch | manual orig., auto answer | local digital and analog loopback, self-test/local and remote, digital and analog loopback, self-test | 1,675/ 5,995(Q1) | CCITT V.29 compatible |

HALCYON COMMUNICATIONS INC.
2121 Zanker Rd., San Jose, CA 95131, (408) 293-9970

CIRCLE 231

| | | | | | | | | |
|------|------------|----------|----------------------|--------------|---------------------------|--|-----------|---|
| H424 | 1200, 2400 | PSK, QAM | full duplex | asynch/synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 530(Q1) | Bell 212A, CCITT V.22 bis, Hayes compatible |
| H448 | 4800 | PSK | half, full duplex | synch | | local and remote, digital and analog loopback, self-test | 1,295(Q1) | CCITT V.27 bis/ter compatible |
| H496 | 9600 | QAM | full duplex | synch | | local and remote, digital and analog loopback, self-test | 1,495(Q1) | CCITT V.29 compatible; board-level modem plugs into four channel, synch TDM |

HAYES MICROCOMPUTER PRODUCTS INC.
P.O. Box 105203, Atlanta, GA 30848, (404) 449-8791

CIRCLE 232

| | | | | | | | | |
|---------------------|----------------------|--------------|----------------------|--------------|---------------------------|---|---------|--|
| Smartmodem 1200 | 0-300, 1200 | DPSK, FSK | half, full duplex | asynch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 599(Q1) | Bell 103, 212A, CCITT V.22 compatible |
| Smartmodem 1200B | 0-300, 1200 | FSK, DPSK | half, full duplex | asynch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 499(Q1) | Bell 103, 212A, CCITT V.22 compatible; board-level modem plugs into IBM PC; includes Smartcom II communications software |
| Smartmodem 2400 | 0-300, 1200, 2400 | FSK, DPSK | half, full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 899(Q1) | Bell 103, 212A, CCITT V.22 compatible |

INCOMM DATA SYSTEMS INC.
115 N. Wolf Rd., Wheeling, IL 60090, (312) 459-8881

CIRCLE 233

| | | | | | | | | |
|----------|------------|----------|----------------------|--------------|---------------------------|---|---------|-------------------------------------|
| 2400 FDx | 1200, 2400 | PSK, QAM | half, full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 699(Q1) | Bell 212, CCITT V.22 bis compatible |
|----------|------------|----------|----------------------|--------------|---------------------------|---|---------|-------------------------------------|

MODEMS

Modems

MODEMS

| Company Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|---------------|----------------------|-------------------|-------------------|-----------------|---------------------------|--|----------|---|
| PC1200 | 0-300, 1200 | FSK, PSK | half, full duplex | asynch | auto dial/ auto answer | local analog loopback | 399(Q1) | Bell 103, 212A compatible; board-level modem plugs into IBM PC/XT |
| Turbo 2400S | 300, 600, 1200, 2400 | FSK, PSK | half, full duplex | asynch/synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 699(Q1) | Bell 103, 212, CCITT V.22, V.22 bis, V.23 compatible |

INFOTRON SYSTEMS CORP.

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

CIRCLE 234

| | | | | | | | | |
|------------|------------------|----------|-------------|--------------|-------------|--|--|-------------------------------|
| DL 96/V.29 | 4800, 7200, 9600 | QAM | full duplex | synch | | local and remote, digital and analog loopback, self-test | | |
| DL 201C | 2400 | PSK | full duplex | synch | | local digital and analog loopback, self-test | | Bell 201C compatible |
| DL 212B | 1200 | FSK, PSK | full duplex | asynch/synch | auto answer | local and remote, digital and analog loopback, self-test | | Bell 103, 113, 212 compatible |

LEXICON CORP.

1541 N.W. 65th Ave., Ft. Lauderdale, FL 33313, (305) 792-4400

CIRCLE 235

| | | | | | | | | |
|---------|------|-----|-------------|--------|--------------|--|---------|----------------------|
| LEX-15 | 1200 | FSK | half duplex | asynch | manual orig. | | 325(Q1) | Bell 202S compatible |
| LEX-15B | 1200 | FSK | half duplex | asynch | manual orig. | | 395(Q1) | Bell 202S compatible |

MICOM SYSTEMS INC.

4100 Los Angeles Ave., P.O. Box 8100, Simi Valley, CA 93063, (805) 583-8600

CIRCLE 236

| | | | | | | | | |
|-------|------------|-----------|-------------|--------------|------------------------------|---|---------|---|
| M3024 | 1200, 2400 | DPSK, QAM | full duplex | asynch/synch | manual orig./ auto answer | local digital and analog loopback, remote digital loopback, self-test | 685(Q1) | Bell 212, CCITT V.22 bis compatible; alternate voice/data operation |
| M3212 | 300, 1200 | FSK, DPSK | full duplex | asynch/synch | manual orig./ auto answer | local digital and analog loopback, self-test | 445(Q1) | Bell 103, 212 compatible; rackmount available |
| M3224 | 1200, 2400 | DPSK, QAM | full duplex | asynch/synch | manual orig./ auto answer | local digital and analog loopback, remote digital loopback, self-test | 660(Q1) | Bell 212, CCITT V.22 compatible; rackmount available |

MICROCOM

1400A Providence Hwy., Norwood, MA 02062, (617) 762-9310

CIRCLE 237

| | | | | | | | | |
|---------|--|----------------|-------------------|--------------|---------------------------|---|---------|---|
| SX/2400 | | FSK, DPSK, QAM | half, full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 999(Q1) | Bell 212, CCITT V.22 compatible; MNP error correction; standalone or rackmount |
| ZX/2400 | | FSK, DPSK, QAM | half, full duplex | asynch | auto dial/ auto answer | local analog loopback, remote digital and analog loopback, self-test | 999(Q1) | Bell 212, CCITT V.22, Hayes compatible; MNP error correction; standalone or rackmount |

MULTI-TECH SYSTEMS INC.

82 Second Ave. S.E., New Brighton, MN 55112, (612) 631-3550

CIRCLE 238

| | | | | | | | | |
|-----------------|-----------------|---------------|-------------------|--------------|---------------------------|--|---------|---|
| MultiModem 224E | 300, 1200, 2400 | FSK, PSK, QAM | half, full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback | 895(Q1) | compatible with Bell 103, 212A, CCITT V.22 bis, Hayes Smartmodem 1200; MNP error correction |
|-----------------|-----------------|---------------|-------------------|--------------|---------------------------|--|---------|---|

Modems

MODEMS

| Company Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|-------------------|-----------------|-------------------|-------------------|-----------------|---------------------------|---|----------|---|
| MultiModem 224 PC | 300, 1200, 2400 | FSK, PSK, QAM | full duplex | asynch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 795(Q1) | compatible with Bell 103, 113, 212A, CCITT V.22 bis; includes MultiCom PC s ofware |
| MT224AD | 300, 1200, 2400 | FSK, DPSK, QAM | half, full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback | 895(Q1) | compatible with Bell 103, 113, 212A, CCITT V.22 bis, Hayes Smartmodem 1200; rackmount available |

NCR COMTEN INC.

2700 Snelling Ave. North, St. Paul, MN 55113, (612) 638-7777

CIRCLE 239

| | | | | | | | | |
|-----------|------|------|-------------|-------|-------------|--|---------------------------|--|
| 7164-100C | 4800 | DPSK | full duplex | synch | | local analog loopback and remote digital loopback, self-test | 2,995(Q1); 2,067(Q100) | IBM 3834-1, 3864-1, 3868-2 compatible; point-to-point; rackmount available |
| 7164-200C | 4800 | DPSK | half duplex | synch | auto answer | local analog loopback and remote digital loopback, self-test | 3,195(Q1); 2,205(Q100) | IBM 3864-2 compatible; rackmount available |
| 7165-C | 9600 | QAM | full duplex | synch | | local analog loopback and remote digital loopback, self-test | 3,995(Q1); 2,757(Q100) | IBM 3865-1, 3865-2, 3868-3, 3868-4 compatible; rackmount available |

NEC AMERICA INC.

110 Rio Robles, San Jose, CA 95134, (408) 433-1250

CIRCLE 240

| | | | | | | | | |
|-------------|-----------------|---------------|-------------|--------------|------------------------------|---|---------|---------------------------------------|
| DSP 2430 II | 300, 1200, 2400 | FSK, PSK, QAM | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 795(Q1) | Bell 212AR, CCITT V.22 bis compatible |
| N201CR | 2400 | DPSK | half duplex | synch | manual orig./ auto answer | local digital and analog loopback, self-test | 845(Q1) | Bell 201C, 201CR compatible |
| N212BR | 300, 1200 | FSK, PSK | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 795(Q1) | Bell 212AR compatible |

NOKIA-KINEX CO.

6950 Bryan Dairy Rd., Largo, FL 33543, (813) 541-6406

CIRCLE 241

| | | | | | | | | |
|----------|------------|------|-------------------|-------|------------------------------|---|---------------------|--------------------------------------|
| 24/201C | 1200, 2400 | DPSK | half, full duplex | synch | manual orig./ auto answer | local digital and analog loopback, remote digital loopback, self-test | 695(Q1) | Bell 201C, CCITT V.26 bis compatible |
| 48/27 | 4800 | DPSK | half, full duplex | synch | manual orig./ auto answer | local digital and analog loopback, remote digital loopback, self-test | 1,650(Q1) | CCITT V.27 compatible |
| 48/208AB | 4800 | DPSK | half, full duplex | synch | manual orig./ auto answer | local digital and analog loopback, remote digital loopback, self-test | 1,365- 1,875(Q1) | Bell 208A/B compatible |

NOVATION INC.

20409 Prairie St., Chatsworth, CA 91311, (818) 996-5060

CIRCLE 242

| | | | | | | | | |
|---------------------|--|----------|-------------|--------------|---------------------------|---|--|--|
| 2400 Professional | | FSK, PSK | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | | Bell 103, 212A, CCITT V.22 bis compatible; LCD display |
| Apple Cat II System | | FSK, PSK | full duplex | asynch | auto dial/ auto answer | local digital and analog loopback | | Bell 103, 212A compatible; board-level modem plugs into Apple, S-100 |

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101 The Queensway West, Mississauga, ON L5B 2P7, Canada.
(416) 270-8086. EUROPE, 287 London Road, Newbury, Berkshire
RG13 2QJ, England. (0635) 32125, TLX 848715.

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Modems

MODEMS

| Company | Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|-----------------------------|-------|-----------------|-------------------|-------------------|-----------------|---------------------------|---|----------|--|
| CAT Communication System | | | FSK, PSK | full duplex | asynch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | | Bell 103, 212A, Hayes compatible; board-level modem plugs into IBM; standalone available |

OMNITEL INC.

5415 Randall Place, Fremont, CA 94538, (415) 490-2202

CIRCLE 381

| | | | | | | | | |
|------------|------|------|-------------------|------------------|---------------------------|--|---------|--|
| T1200-PC2R | 1200 | DPSK | half, full duplex | asynch | auto dial/ auto answer | local analog loopback | 349(Q1) | Bell 103A, 212A compatible; CROSSTALK software; half-size board-level modem plugs into IBM PCs |
| T1200-SD1 | 1200 | DPSK | half, full duplex | asynch/ synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback | 349(Q1) | internal power supply; Bell 103A, 212A compatible |
| T2400-PC1R | 2400 | DPSK | half, full duplex | asynch | auto dial/ auto answer | local analog loopback | 449(Q1) | half-size board-level modem plugs into IBM PCs; Bell 103A, 212A, CCITT V.22 bis compatible |

PARADYNE CORP.

8550 Ulmerton Rd., Largo, FL 33540, (813) 530-2000

CIRCLE 243

| | | | | | | | | |
|---------------|----------------------|------|-------------------|------------------|---------------------------|--|-----------------------|--|
| Challenger 24 | 300, 600, 1200, 2400 | DPSK | half, full duplex | asynch/ synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 700(Q1); 620(Q100) | Bell 103, 212, CCITT V.22, V.22 bis compatible |
| FDX 1200 | 300, 600, 1200 | QAM | half, full duplex | asynch/ synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 395(Q1); 375(Q50) | Bell 103, 113, 212A, CCITT V.22 compatible |
| HDX 9600 | 4800, 9600 | QAM | half duplex | synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 2,190(Q1); 1,860(Q50) | Bell 208B compatible |

PEACHTREE TECHNOLOGY INC.

3120 Crossing Park, Norcross, GA 30071, (404) 662-5556

CIRCLE 244

| | | | | | | | | |
|---------|-----------|----------|-------------------|--------|---------------------------|-----------------------------------|--------------------|--|
| P-1200 | 300, 1200 | FSK, PSK | half, full duplex | asynch | auto dial/ auto answer | local digital and analog loopback | 495(Q1); 395(Q100) | Bell 103, 212A compatible; includes CROSSTALK Version 3.6 software |
| P-1200S | 300, 1200 | FSK, PSK | half, full duplex | asynch | auto dial/ auto answer | local digital and analog loopback | 595(Q1); 495(Q100) | Bell 103, 212A compatible; includes CROSSTALK Version 3.6 software |

PRENTICE CORP.

260 Caspian Dr., P.O. Box 3544, Sunnyvale, CA 94088-3544, (408) 734-9810

CIRCLE 245

| | | | | | | | | |
|----------|------|------|-------------------|-------|--------------------------------|--|-----------------|--|
| 9629 | 9600 | QAM | half, full duplex | synch | manual orig./ manual answer | local digital and analog loopback, self-test | 1,595-1,695(Q1) | CCITT V.29 compatible; rackmount or standalone |
| P-201C | 2400 | DPSK | half, full duplex | synch | manual orig./ manual answer | local digital and analog loopback, self-test | 595-695(Q1) | Bell 201B/C compatible; standalone or rackmount |
| P-208A/B | 4800 | DPSK | half, full duplex | synch | manual orig./ auto answer | local digital loopback, self-test | 1,295-1,395(Q1) | Bell 201 B/C compatible; standalone or rackmount |

Modems

MODEMS

| Company | Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|--|---------------------------|---------------------|-------------------|-------------------|---------------------------|---|----------------------------|--|--------------------------|
| PROMETHEUS PRODUCTS INC. | | | | | | | | | |
| 4545 Cushing Pkwy., Fremont, CA 94538, (415) 490-2370 | | | | | | | | | |
| CIRCLE 246 | | | | | | | | | |
| Promodem 1200/ Promodem 1200A | 1200 | PSK | half, full duplex | asynch, synch | auto dial, auto answer | local digital and analog loopback, self-test | 495/ 449(Q1) | Bell 212 compatible/board-level modem plugs into Apple II, IIe, II+; includes word processing software | |
| Promodem 1200B | 1200 | FSK, PSK, DPSK, QAM | half, full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, self-test | 399 (Q1) | Bell 212 compatible; board-level modem plugs into IBM PC and compatibles | |
| Promodem 1200M | | PSK | half, full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, self-test | 549(Q1) | Bell 212 compatible; includes Procom-M communications software | |
| RACAL-MILGO | | | | | | | | | |
| P.O. Box 407044, Ft. Lauderdale, FL 33340-7044, (305) 475-1601 | | | | | | | | | |
| CIRCLE 247 | | | | | | | | | |
| CMS 12 | 1200 | FSK | half, full duplex | asynch/synch | | local and remote, digital and analog loopback, self-test | 1,300(Q1); 1,249 (Q100) | standalone and central site card versions | |
| Mark 48 | 2400, 4800 | DPSK | half, full duplex | synch | | local digital and analog loopback | 1,150(Q1); 956(Q100) | | |
| Omnimode 48 | 2400, 4800 | QAM | half duplex | asynch/synch | auto dial/ auto answer | local and remote digital and analog loopback, self-test | 2,050(Q1); 1,759 (Q100) | | |
| RACAL-VADIC | | | | | | | | | |
| 1525 McCarthy Blvd., Milpitas, CA 95035, (408) 946-2227 | | | | | | | | | |
| CIRCLE 248 | | | | | | | | | |
| 1200PA | 300, 1200 | FSK, PSK | full duplex | asynch/synch | manual orig./ auto answer | local digital and analog loopback, remote digital loopback, self-test | 495(Q1) | Bell 103, 212A compatible; LCD display; MNP error correction | |
| VA212 PAR | 1200 | FSK, DPSK | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 595(Q1); 445(Q100) | Bell 103, 212 compatible; rackmount | |
| VA4224E | 2400 | FSK, QAM | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 695(Q1); 560(Q100) | Bell 103, 212, CCITT V.22 bis compatible; MNP error correction; rackmount | |
| TANDY CORP. | | | | | | | | | |
| 1800 One Tandy Center, Ft. Worth, TX 76102, (817) 390-3100 | | | | | | | | | |
| CIRCLE 249 | | | | | | | | | |
| DC2212 | 300, 1200 | FSK, PSK | full duplex | asynch | auto dial/ auto answer | local analog loopback | 399(Q1) | Bell 212A compatible | |
| TECMAR INC. | | | | | | | | | |
| 6225 Cochran Rd., Solon, OH 44139, (216) 349-0600 | | | | | | | | | |
| CIRCLE 250 | | | | | | | | | |
| Phonegate 2400 | 110, 300, 600, 1200, 2400 | | half, full duplex | asynch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 789(Q1) | Bell 103, 212A, CCITT V.22, V.22 bis, Hayes compatibles; board-level modem plugs into IBM PC and compatibles | |
| TEK-COM CORP. | | | | | | | | | |
| 120 Charcot Ave., San Jose, CA 95131, (800) 621-0854 | | | | | | | | | |
| CIRCLE 251 | | | | | | | | | |
| P212A SA | 300, 1200 | FSK, PSK | full duplex | asynch/synch | manual orig./ auto answer | local digital and analog loopback, remote digital loopback, self-test | 550(Q1); 358(Q100) | Bell 212A compatible | |

Modems

MODEMS

| Company | Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|---------|---------|-----------------|-------------------|-------------------|-----------------|---------------------------|-----------------------|-----------------------|--|
| | TC212AD | 300, 1200 | FSK, DPSK | full duplex | asynch | auto dial/ auto answer | local analog loopback | 359(Q1); 197(Q100) | Bell 212A, Hayes Smartmodem compatible |

TIMEPLEX INC.

400 Chestnut Ridge Rd., Woodcliff Lake, NJ 07675, (201) 930-4600

CIRCLE 252

| | | | | | | | | | |
|--|-----------|------|------|-------------|-------|---------------------------|--|-----------------|-----------------------|
| | AIM 2400 | 2400 | DPSK | full duplex | synch | | local and remote, digital and analog loopback, self-test | 900-1,050(Q1) | Bell 3002 compatible |
| | AIM 4800 | 4800 | DPSK | full duplex | synch | | local and remote, digital and analog loopback, self-test | 1,600-1,850(Q1) | Bell 3002 compatible |
| | V.29 Plus | 9600 | | full duplex | synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 3,175-3,675(Q1) | CCITT V.29 compatible |

TRANSEND CORP.

1887 O'Toole Ave., C209, San Jose, CA 95131, (408) 435-0701

CIRCLE 253

| | | | | | | | | | |
|--|---------|------|--|-------------------|--------|---------------------------|-----------|-----------------------|---|
| | PCM1200 | 1200 | | half, full duplex | asynch | auto dial/ auto answer | self-test | 241(Q1); 159(Q100) | Bell 212A compatible; board-level modem plugs into IBM PC/XT/AT; file transfer software available |
|--|---------|------|--|-------------------|--------|---------------------------|-----------|-----------------------|---|

TRI-DATA

505 E. Middlefield Rd., Mountain View, CA 94043-4082 (415) 969-3700

CIRCLE 254

| | | | | | | | | | |
|--|-----------------|----------------|----------|-------------|--------|---------------------------|--|---------|----------------------|
| | OZ Guardian 533 | 110, 300, 1200 | FSK, PSK | full duplex | asynch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 750(Q1) | Bell 212A compatible |
|--|-----------------|----------------|----------|-------------|--------|---------------------------|--|---------|----------------------|

TYMNET (MCDONNELL DOUGLAS NETWORK SYSTEMS CO.)

2710 Orchard Pkwy., San Jose, CA 95134, (408) 946-4900

CIRCLE 255

| | | | | | | | | | |
|--|-----|------------|-----------|-------------|--------------|------------------------------|--|-----------------------|--------------------------------------|
| | 931 | 1200, 2400 | DPSK, QAM | full duplex | asynch/synch | manual orig./ auto answer | local digital and analog loopback, self-test | 450(Q1); 414(Q100) | Bell 212A, CCITT V.22 bis compatible |
| | 932 | 1200, 2400 | DPSK, QAM | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, self-test | 495(Q1); 455(Q100) | Bell 212A, CCITT V.22 bis compatible |

UNIVERSAL DATA SYSTEMS

5000 Bradford Dr., Huntsville, AL 35805-1953, (205) 837-8100

CIRCLE 256

| | | | | | | | | | |
|--|--------------|-------------------|---------------|-------------------|--------------|--------------------------------|--|---------|---|
| | 202T | 0-1200, 1800 | FSK | half, full duplex | asynch | manual orig./ manual answer | local digital and analog loopback, self-test | 425(Q1) | Bell 202 compatible, anti-streaming |
| | 212A/D | 0-300, 1200 | FSK, PSK | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote analog loopback, self-test | 545(Q1) | Bell 103, 212A compatible |
| | 224A/D | 0-300, 1200, 2400 | FSK, PSK | full duplex | asynch/synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 645(Q1) | Bell 103, 212A, CCITT V.22, V.22 bis compatible |
| | FasTalk 2400 | 0-300, 1200, 2400 | FSK, PSK, QAM | full duplex | synch | auto dial/ auto answer | local and remote, digital and analog loopback, self-test | 625(Q1) | Bell 103, 212A, CCITT V.22, V.22 bis compatible |

Modems

MODEMS

| Company | Model | Data rate (bps) | Modulation method | Transmission mode | Synchronization | Calling mode | Diagnostics | Price \$ | Notes, features, options |
|---|-------------------|-----------------|-------------------|-------------------|-----------------|------------------------|---|--------------------|--|
| US ROBOTICS INC. | | | | | | | | | |
| 8100 N. McCormick Blvd., Skokie, IL 60076, (312) 982-5010 | | | | | | | | | |
| | Courier 2400 | 300, 1200, 2400 | FSK, PSK, QAM | half, full duplex | asynch | auto dial/ auto answer | local and remote analog loopback, self-test | 699(Q1) | Bell 103, 212A, CCITT V.22 bis compatible; standalone |
| | Microlink 2400 | 300, 1200, 2400 | FSK, PSK, QAM | half, full duplex | asynch | auto dial/ auto answer | local and remote analog loopback, self-test | 699(Q1) | Bell 103, 212A, CCITT V.22 bis compatible; board-level modem plugs into IBM PC/XT/AT and compatibles |
| VISIONARY ELECTRONICS INC. | | | | | | | | | |
| 141 Parker Ave., San Francisco, CA 94118, (415) 751-8811 | | | | | | | | | |
| | Visionary 1200 XT | | FSK, PSK | half, full duplex | asynch | auto dial/ auto answer | | 495(Q1); 395(Q100) | Bell 212A, Hayes compatible |
| WESTERN DATACOM | | | | | | | | | |
| 5083 Market St. Youngstown, OH 44512, (216) 788-6583 | | | | | | | | | |
| | 424 Autodial | 300, 1200, 2400 | | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 695(Q1) | |
| | 424 Error Free | 300, 1200, 2400 | | full duplex | asynch/synch | auto dial/ auto answer | local digital and analog loopback, remote digital loopback, self-test | 795(Q1) | Bell 102, 212A, CCITT V.22 bis compatible; MNP error correction |
| | WC200 | | FSK | half, full duplex | asynch | auto dial/ auto answer | local analog loopback, self-test | 495(Q1) | Bell 103, 113, 202, CCITT V.21, V.23 compatible; standalone |

CIRCLE 257

CIRCLE 258

CIRCLE 259

Information was solicited but not received from the following manufacturers:

Bizcomp Corp.
532 Mercury Dr.
Sunnyvale, CA 94086
(408) 733-7800

Develcon Electronics Inc.
856 51st St., East
South Saskatoon
Saskatchewan, S7 KC7, Canada
(306) 933-3300

Northern Telecom Inc.
9705 Data Park
Minneapolis, MN 55343
(612) 932-8000

Ven-Tel Inc.
2342 Walsh Ave.
Santa Clara, CA 95051
(408) 727-5721

Coherent Communications
Systems Corp.
60 Commerce Dr.
Hauppauge, NY 11788
(516) 231-1550

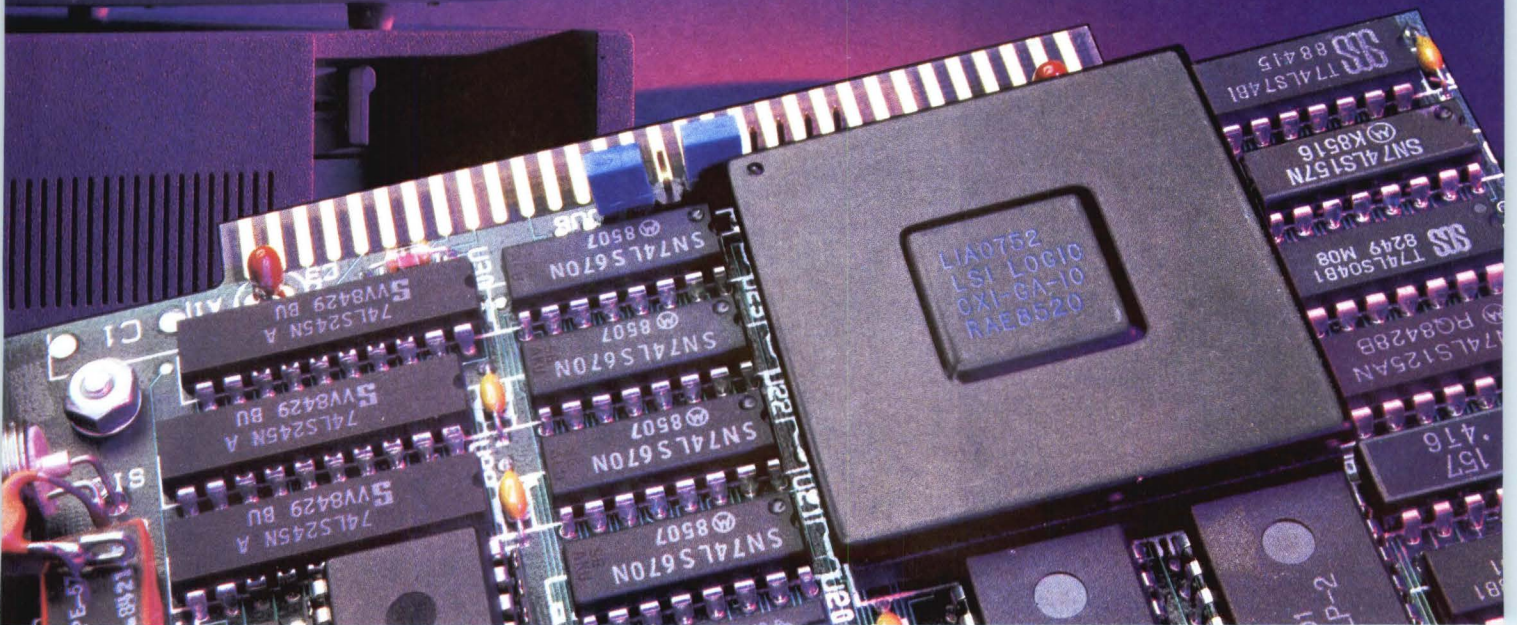
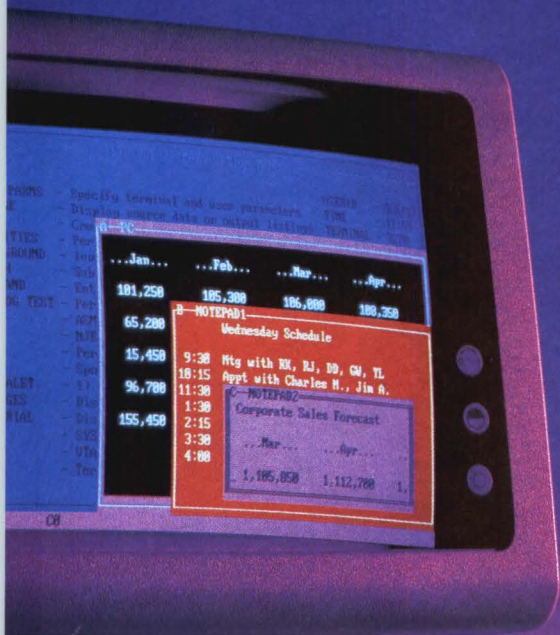
IBM Corp.
900 King St.
Rye Brook, NY 10573
(914) 934-4839

Penril Data Comm
207 Perry Parkway
Gaithersburg, MD 20877
(301) 921-8600

Wolfdata Inc.
187 Billerica Rd.
Chelmsford, MA 01824
(617) 250-1500

Databit Inc.
110 Ricefield Lane
Hauppauge, NY 11788
(516) 435-4000

More micro-to-mainframe answers



A message from CXI regarding micro-to-mainframe communications

How do you effectively integrate PCs into your corporate information network? That's the question facing most MIS departments today.

PC users want to communicate and share data with the mainframe. They want to be assured they can expand their computing capability as their needs grow.

To answer these demands, MIS staffs must develop a plan. A micro-to-mainframe strategy, if you will. In developing your strategy, you'll want to look for better ways to move information without disrupting the system you already have in place.

That's why at CXI, we believe the best micro-to-mainframe products are the ones that can fit your strategy. Rather than your strategy having to fit the products.

So we design and manufacture our connections to be easily adaptable and expandable. They're also the only products to provide a consistent application program interface across the entire product line.

These solutions are based on many industry firsts from CXI:

- The first gate-array chip developed for 3270 terminal emulation.
- The first interface board to offer multiple host sessions.
- The first IRMA-compatible products.
- The first support of IBM's 3270 PC Application Program Interface
- The first support of all major micro-to-mainframe software.

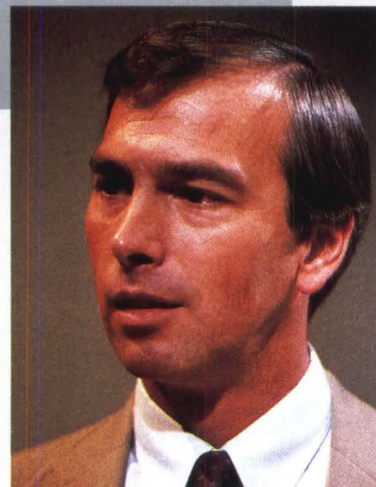
On the following pages, we will discuss our products in detail. And although you may not need every product we make, you'll get a good idea of what we can provide.

In a word — answers. Intelligent answers to the problems facing your network now. And ways to be prepared for changes in the future.

Charles P. Morel
Chairman



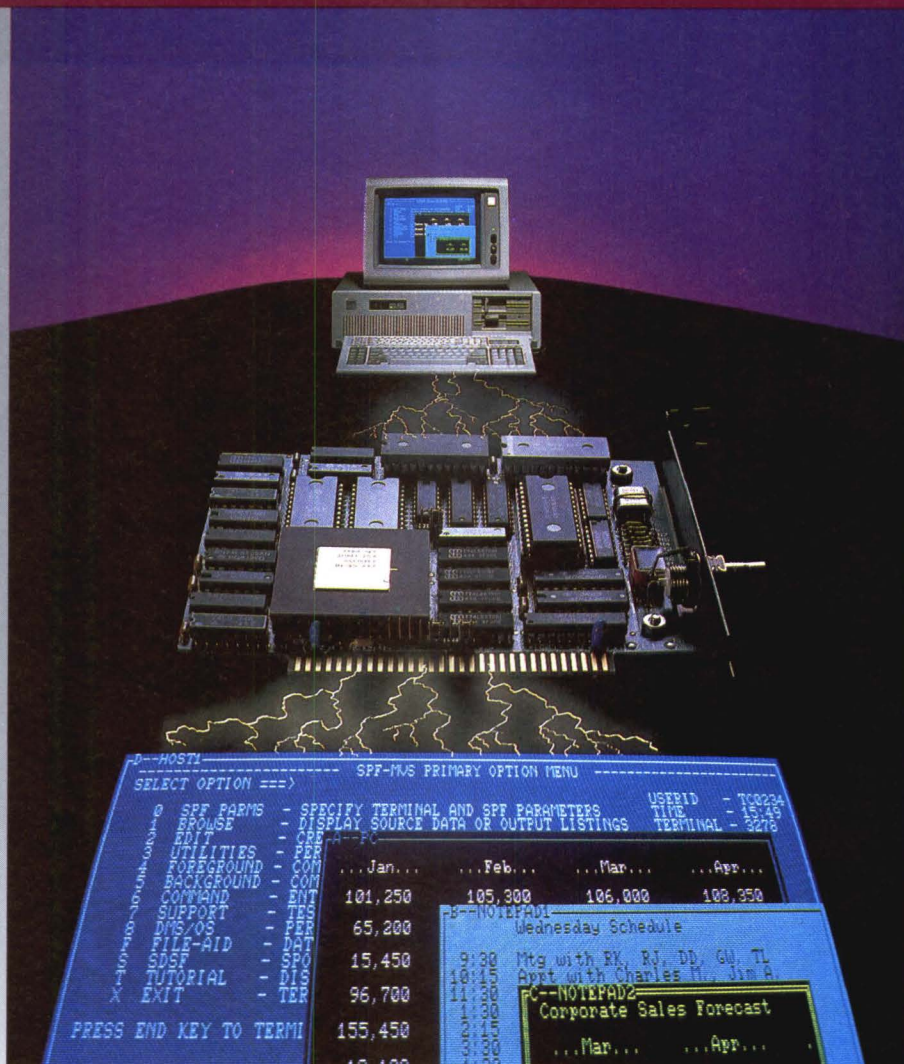
Louis C. Cole
President



Micro-to-mainframe answers

CXI offers many excellent micro-to-mainframe answers to meet your networking needs. You can expand your network capability easily and efficiently.

- PCOX products emulate IBM® 3278/79 terminals, 3279-S3G terminals, 3270 PCs, 3287 printers, 3274 controllers, and 5251 terminals.
- Our products connect your PC to the mainframe via coaxial cable, twinaxial cable or synchronous modem.
- PCOX products work with all major micro-to-mainframe application software.
- PCOX products work with all IBM PCs, XTs, ATs and compatibles.
- PCOX products have the same user presentation and application interface.
- Product upgrades are provided on diskette.

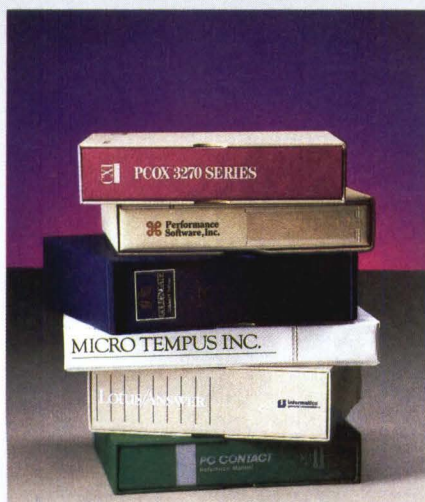


CXI's PCOX/PLUS connections allow users to simultaneously view one host session, one PC session and two notepads.

Connect your PC to your host with PCOX coaxial connections

With CXI's PCOX/STANDARD™ and PCOX/PLUS™, you can get immediate access to mainframe data. These coaxial connections offer users exceptional value.

- Exact IBM 3278/79 terminal emulation for use of mainframe applications and operating systems.
- File transfer software to upload and download data.
- Windowing software to simultaneously view one host session, one PC session and two notepads.
- A software migration path to full 3270 PC functionality.
- IRMA™ compatibility to allow you to use existing micro-to-mainframe software from companies such as Cullinet, Informatics, and McCormack & Dodge.



With three Application Program Interfaces to choose from — IBM, IRMA and PCOX — CXI products work with all major micro-to-mainframe software.

Multiple host sessions provide printer support & file transfer

The PCOX/3270 PC™ coaxial connection provides full IBM 3270 PC emulation on the IBM PC you already have. It also provides additional features unique to CXI.

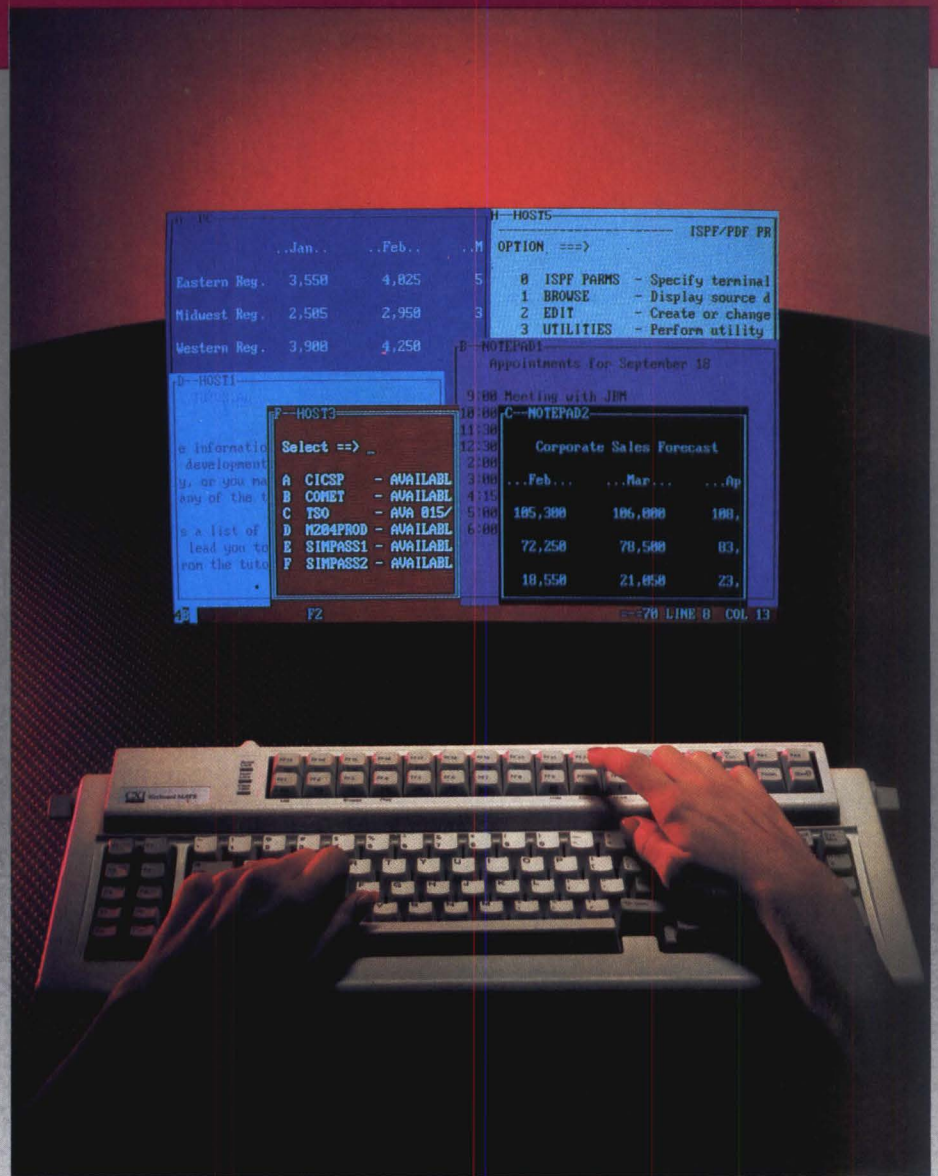
Now you can:

- Access up to five host sessions concurrently for such on-line applications as electronic mail, file transfer and host databases.
- Attach local printers by using any number of the five host sessions for 3287 printer emulation.
- View a PC session and mainframe data simultaneously while using two notepads to record and manipulate information.
- Use the IBM 3270 PC Application Program Interface for your micro-to-mainframe software.

And, the PCOX/3270 PC requires even less memory than a comparable IBM 3270 PC.

Migrate from 3278 to 3270 PC emulation

The PCOX/3270 PC Upgrade provides an easy migration



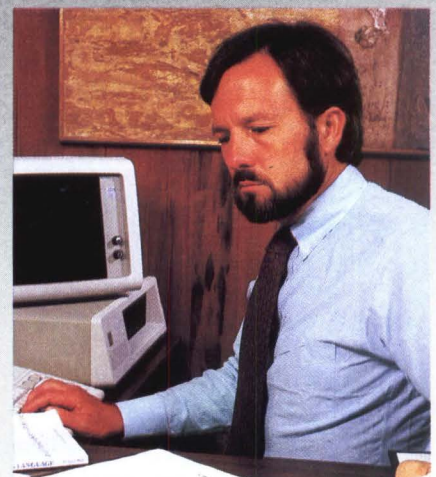
PCOX/3270 PC functionality allows users to access multiple host databases concurrently and, with KEYBOARD MATE, reduces the number of keystrokes.

path from single to multiple host capability:

- For PCOX/STANDARD and PCOX/PLUS products
- For IRMA boards.

Now you can easily upgrade your current coaxial connection to multihost functionality: Five host sessions, one PC session, two notepads, printer support and IBM 3270 PC Application Program Interface.

CIRCLE NO. 52



CXI product upgrades designed by developers like Jeff Bowers are provided to users on diskettes.

Cost effective remote access to your host

CXI offers users three solutions to improve remote micro-to-mainframe communications:

- PCOX/STANDARD REMOTE™
- PCOX/PLUS REMOTE™
- PCOX/3270 PC REMOTE™

Each PCOX remote product connects directly to a synchronous modem. By emulating an IBM 3274 cluster controller, PCOX eliminates the requirement for such costly equipment. And, you can cost-effectively link several PCs to the same modem with CXI's DAISY CHAIN KIT.™

Users can choose among a variety of features.

- Single host access through the emulation of an IBM 3278/79 terminal with hot key to PC session.
- Windowed access to a host session, a PC session and two notepads.
- File transfer software to upload and download host data.
- PC printer support through emulation of a host-addressable 3287 printer.
- Remote 3270 PC emulation with up to five host sessions, a PC session and two notepads viewed at one time.
- Use of IBM's 3270 PC Application Program Interface.

CIRCLE NO. 53

Expand your LAN capability with PCOX/GATEWAY micro-to-mainframe connections

PCOX/GATEWAY™ products provide you a wide range of alternatives to cost effectively incorporate your LAN into your micro-to-mainframe strategy.

These products provide each LAN user with:

- Multiple host sessions with 3270 PC emulation.
- 3278/79 terminal emulation.
- Local printer support with 3287 printer emulation.
- Connection to the mainframe through existing IBM 3274 controllers via a Category A coaxial cable.
- Connection to the mainframe remotely through a leased or dial-up telephone line.

PCOX/GATEWAY™ products operate on an IBM PC Network, Token Ring, or NETBIOS-compatible resource sharing LAN.

CIRCLE NO. 54



PCOX remote products connect PC users in branch offices via synchronous modem to host databases.

Host graphics on your PC

CXI's PCOX/GRAPHICS™ is a coaxial connection offering users a single slot solution to access both mainframe graphics and mainframe data.

PCOX/GRAPHICS provides:

- True IBM 3279 Model S3G terminal emulation on an IBM PC, XT, AT or compatible using a color monitor.
- Support of the IBM 5154 Enhanced Color Display in high-resolution mode.
- Use of mainframe graphics software such as SAS-Graph,™ GDDM™, and DISSPLA™.
- Fast access to host graphics information.
- File transfer capability to upload and download information.
- IRMA compatibility.

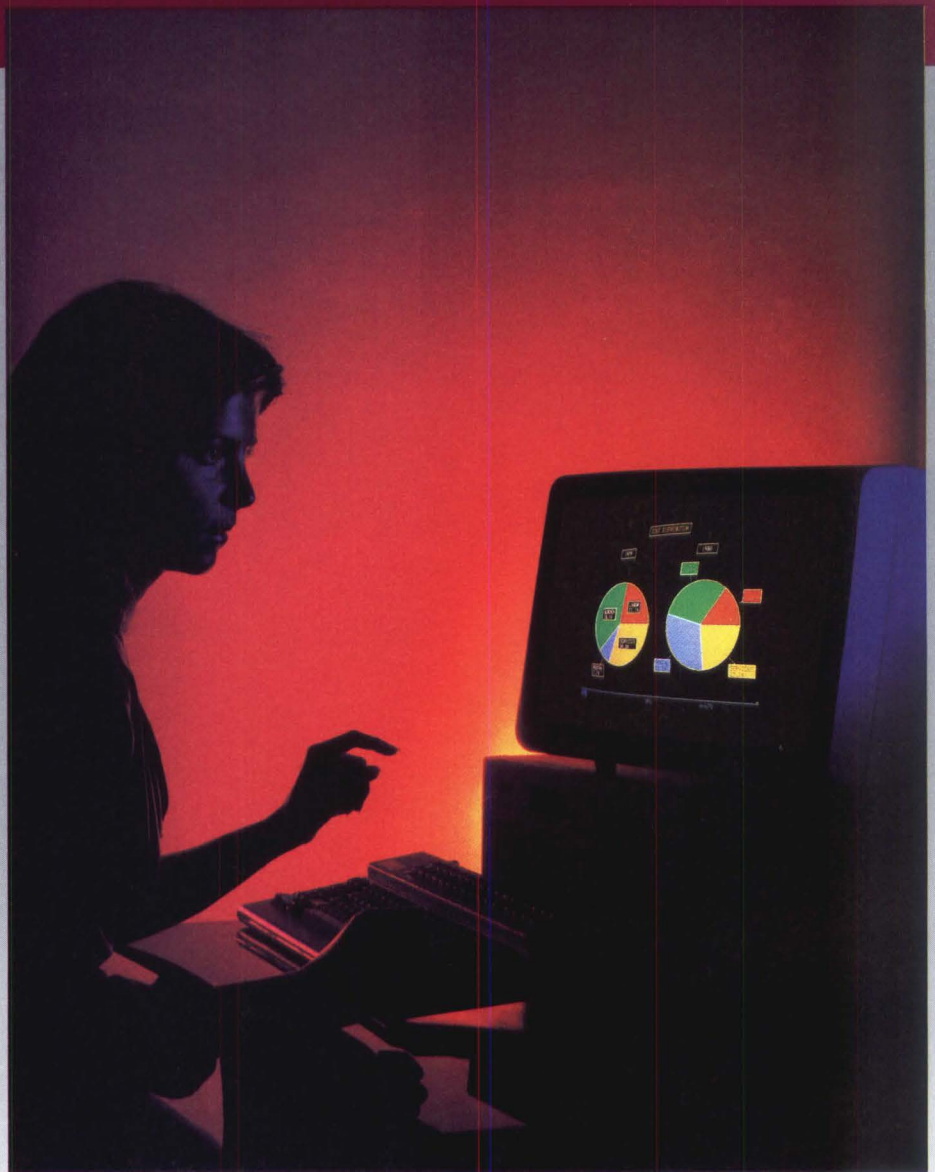
CIRCLE NO. 55

Connect your PC to a System 34/36/38

With PCOX/5251 TWINAX you can access data from your system 34/36/38 on your PC via twinaxial cable.

- Emulate a 5251 model 11, a 5291 models 1 or 2, or 5292 terminals.
- Upload and download data with file transfer software.
- Use PC attached printers to emulate 5250 series printers.
- Access a PC session and up to seven host sessions concurrently.
- Use one host session for local printer support.

CIRCLE NO. 56



PCOX/GRAPHICS users can access mainframe graphics and host databases on their PC.

KEYBOARD MATE enhances PCs

CXI's KEYBOARD MATE™ is a compact keyboard attachment which allows PCOX users 3270 PC functions on your present keyboard eliminating multiple keystrokes for many host and windowing operations.

CIRCLE NO. 57

COAX MATE eliminates cable

CXI's COAX MATE™ multiplexes two Category A coaxial devices over one coaxial cable, doubling the capacity of already-installed cables.

CIRCLE NO. 58

Commitment to customer support

At CXI, we provide extensive customer support through a worldwide distribution network and a staff of sales support specialists. CXI offers both hotline telephone support and training for users and potential customers alike.

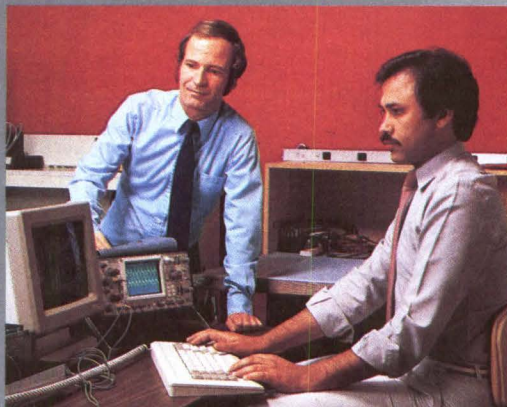
Our products are easy to install. They are sold with clear, concise user documentation to facilitate both installation and operation. Customer-support specialists are available to help quickly integrate PCOX products into your network.



Customer service is top priority for CXI's Pam Grange and other members of our technical support staff.

PCOX products are supported by software from companies such as:

- Applied Data Research
- Cincom Systems
- Computer Associates
- Cullinet
- Duns Plus
- Informatics
- McCormack & Dodge
- Micro Tempus
- Performance Software
- SAS



CXI's VP of Engineering Taylor Gahr works with design engineers like Shashi Rattan to develop PCOX hardware.

Product development tracks IBM

CXI has effectively tracked IBM's technology, offering 3278/79 emulation, 3270 PC capability, 3279-S3G graphics functionality, and gateways to IBM's PC Network. We will continue to track IBM's micro-to-mainframe strategies, and incorporate the essential elements into our product line.

CXI supports all major micro-to-mainframe software

As the only company offering three distinct application program interfaces — the PCOX, IBM and IRMA interfaces — CXI provides the broadest capability available to incorporate any micro-to-mainframe software into your network strategy.



CXI's leadership is based on quality, service and value. Our expertise has been recognized by customers such as

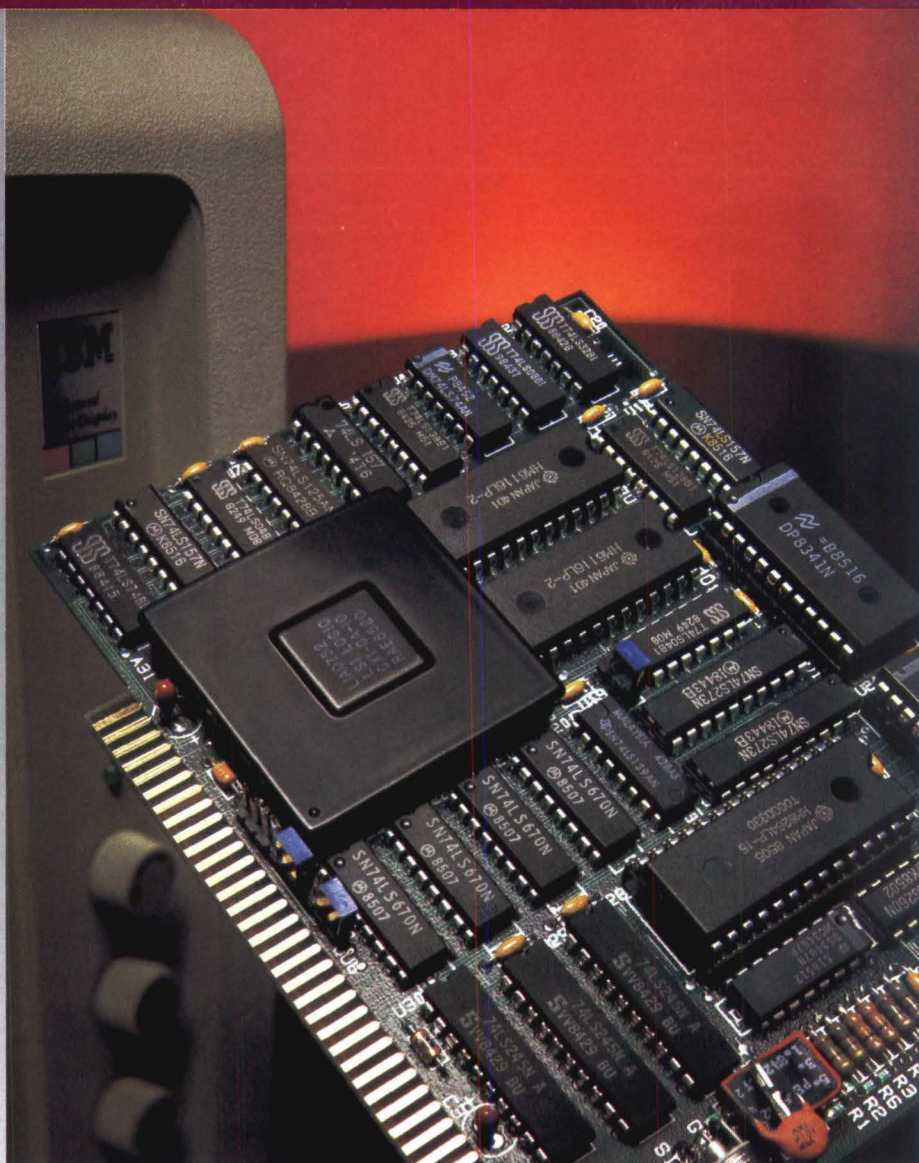
- General Motors • EDS
- TWA • Citicorp • IBM
- Avon Products • Del Monte Foods • JC Penney • Exxon
- General Electric • Coca Cola • Bank of America
- Nordstrom • Bank of Montreal • British Petroleum
- Pacific Mutual Insurance
- Polaroid • United Airlines
- Time, Inc. • Travenol Labs
- Motorola • Pacific Bell
- New England Life • Pratt & Whitney • Utah Power & Light • General Dynamics
- Carter Hawley, Hale.

CXI also sells PCOX products on an OEM or private label basis to

- ITT Information Systems • Fujitsu • Ericsson
- Information Systems AB
- Philips International BV
- AST Research Inc. • Tecmar
- Intelligent Technologies
- Asher Technologies.

Founded in 1982, CXI has become a leader in the development of micro-to-mainframe technology. We design, manufacture and market the most advanced products for corporate communication networks. And we are backed by a significant financial investment from ITT Corporation.

VP of Worldwide Distribution Grant Wieler answers questions about CXI's micro-to-mainframe products.



CXI's advanced micro-to-mainframe technology provides our customers with cost-effective add-in communication products.

The PCOX product line is available from an international network of distributors specializing in data communications products.

For the name of your nearest CXI distributor call **(800) 225-PCOX**. In California call (415) 424-0700.

FOR COMPLETE PRODUCT INFORMATION, CIRCLE NO. 59

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Local Area Networks

| Local area network | | | | | Network interface hardware | | | | |
|----------------------|-------------------------|-----------------|--|--------------------|-----------------------------------|-------|---------------------|---------------------|----------|
| Company Network name | Networking media/access | Data rate (bps) | Max. no stations Max. distance (end-to-end) | Gateways available | Network interface model name/type | Ports | Computers supported | Networking software | Price \$ |

3M 3920 Varsity Dr., Ann Arbor, MI 48104, (313) 973-1500 CIRCLE 305

| | | | | | | | | | |
|--------|--------------------------------------|------|------------------|--|----------------------------|--------------------------|---------------------------------------|----------|-------------|
| LAN/I | broadband; token-passing | 2.5M | 10,000; 14 miles | | 7014 box | | all computers with asynch RS232C port | included | 2,100 |
| | | | | | 7102 box | | all computers with asynch RS232C port | included | 1,400 |
| | | | | | 7108 box | | all computers with asynch RS232C port | included | 3,200 |
| LAN/II | broadband; token-passing, IEEE 802.4 | 10M | 16,000; 40 miles | X.25 level 2, HDLC, IEEE 802.3 and Ethernet baseband | 7202 Remodulator | | | included | 9,950 |
| | | | | | 7204, 7208, 7212, 7216 box | 16 asynch | all computers with asynch RS232C port | included | 5,850-8,150 |
| | | | | | 7241, 7242, 7243 box | 3 asynch, 3 synch, RS422 | all HDLC, X.25 LAPB, synch computers | included | 5,950-9,590 |

LOCAL AREA NETWORKS

ABLE COMPUTER 3080 Airway Ave., Costa Mesa, CA 92626, (714) 979-7030 CIRCLE 306

| | | | | | | | | | |
|--------|---------------------------------------|----|--------|--|------------------------------------|------------|--------------|----------------|---------------------|
| ATTACH | twisted-pair, fiberoptic; proprietary | 1M | 1-5 km | | Host Interface (DH, DMF, D2) board | 128 asynch | DEC PDP, VAX | opt. Lanswitch | 11,250-500,000 plus |
|--------|---------------------------------------|----|--------|--|------------------------------------|------------|--------------|----------------|---------------------|

APPLE COMPUTER INC. 20525 Mariani Ave., Cupertino, CA 95014, (408) 996-1010 CIRCLE 307

| | | | | | | | | | |
|-----------|-----------------------|--------|----------------|------|----------------------|---------|-----------|----------|--|
| AppleTalk | twisted-pair; CSMA/CA | 230.4K | 32; 1,000 feet | SDLC | LaserWriter required | | Macintosh | | |
| | | | | | Macintosh required | 2 RS422 | Macintosh | included | |

APPLITEK CORP. 107 Audubon Rd., Wakefield, MA 01880, (617) 246-4500 CIRCLE 308

| | | | | | | | | | |
|--------|---|-----|------------------|-------------------------------------|----------|----------|----------------|--|---------------|
| UniLAN | baseband, broadband, fiberoptic; proprietary, Unilink | 10M | 64,000; 20 miles | Burroughs, SNA, Sperry Univac, X.25 | NI10 box | 2 asynch | any IEEE 802.3 | | 11,250-13,500 |
|--------|---|-----|------------------|-------------------------------------|----------|----------|----------------|--|---------------|

se

RM/Cobol

Hayes

Hewlett-Packard
LaserJet

SS

Token Ring

Microsoft
Word

3+

ft
n

Wordstar
2000

Epson

Xerox

o

NCR

AT&T

AppleTalk

Finally, a network th

Thanks to 3+.

The multi-user PC network operating system that does everything you need it to do.

Like conform to all the standards. And play all the greats. Ethernet. STARLAN. Token Ring. AppleTalk. Peripherals like the HP Laserjet and Apple LaserWriter. Plus all the latest multi-user software such as dBASE III Plus, RM/Cobol and R:base 5000 Multi-User.

Because 3+ doesn't "emulate" the standards like other networking schemes. It implements them. Exactly. Including the Microcom MNP protocol. The XNS protocols. The

Microsoft Redirector. And, of course, PC/MS-DOS 3.1.

In fact, 3+ gives you everything PC/MS-DOS does. "Plus" a whole lot more. Such as internetworking. To link multiple local area networks over ordinary phone lines. And remote PC access. For networking at home or on the road.

Electronic mail, too. To send information to any user on any of your networks. Whether they're across the building—or the country.

And if you're designing for the IBM mainframe environment, get our 3+3270. And you're into the corporate data bank.

3+ support of AppleTalk and Token Ring will be available in mid-1986. Word Perfect is a trademark of SSI Software. Sidekick is a registered trademark of Borland International. Open Systems is a trademark of Open Systems, Inc., a UCCEL Company. Reflex is a trademark of Borland Analytica, Inc. dBASE III PLUS is a trademark of Ashton-Tate. Hayes is a registered trademark of Hayes Microcomputer Products, Inc. Hewlett-Packard is a registered trademark and LaserJet is a trademark of Hewlett Packard Company. IBM is a registered trademark and PC-DOS and AT are trademarks of International Business Machines Corp. Xerox is a registered trademark of Xerox Corp. Microsoft and Multiplan are registered trademarks and Microsoft Word and MS-DOS are trademarks of Microsoft Corp. COMPAQ is a registered trademark and COMPAQ Deskpro is a trademark of COMPAQ Computer Corp. MultiMate is a trademark of MultiMate International. WordStar 2000 is a trademark of Micropro International Corp. Epson is a registered trademark of Epson America, Inc. AT&T is a registered trademark and STARLAN is a trademark of AT&T.

IBM

Ethernet

ITT XTRA

He

COMPAQ
Deskpro

dBASE III
PLUS

MultiMate

Be

STARLAN

Telex

Okidata
Microline 193

Gr

R:Base 5000
Multi-User

3Server

Lotus 123

D

at plays all the greats.

We could go on. But you get the idea. The 3+ family is the most complete and compatible network operating software you can buy.

In fact, there's only one other thing you'll want. A way to manage network communications, files, printers and backup.

We have that, too. In our 3Server family of dedicated network servers. Each delivers maximum network performance for 5 to 50 users. Or, thanks to 3+ versatility, you can use ordinary PC ATs or compatibles.

And remember, with us, you're not just a customer. You're a partner. Fully supported

with competitive reseller margins. Regional sales and service training. An engineering "hot line." And much more. All backed by 3Com, the most experienced supplier of PC networking products.

So why settle for half a networking solution? Or a proprietary approach that locks you into a dead end? Call now at 415/960-9415.

Because in networking, there's only one way you can have it all.

3Com[®]

CIRCLE NO. 18 ON INQUIRY CARD

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Local Area Networks

| Company Network name | Local area network | | | | Network interface hardware | | | | |
|---|---|------------------------------------|---|-----------------------|--------------------------------------|---|---|---|-------------------|
| | Networking media/access | Data rate (bps) | Max. no stations Max. distance (end-to-end) | Gateways available | Network interface model name/type | Ports | Computers supported | Networking software | Price \$ |
| | | | | | NI10G box | 24 synch | Burroughs, Honeywell, IBM, NCR, Sperry | | |
| | | | | | NI10T box | 32 asynch, 32 synch | any computer with asynch RS232C port | Network control Mode(\$250 per port) | 6,000-15,000(box) |
| ASHER TECHNOLOGIES | | | | | | | | | |
| 1009 Mansell Rd., Roswell, GA 30076, (404) 993-4590 | | | | | | | | | CIRCLE 309 |
| Quadnet VI | baseband, coaxial; CSMA/CD, CSMA/CA | 1.43M | 235; 4,000 feet | Quad3270, SNA | QN6100 board | 1 asynch, 2 parallel | IBM PC/XT/AT and compatibles | | 2,085-97,275 |
| QNet IX | baseband, twisted-pair, fiberoptic; token-passing | 10M | 255; unlimited | | QN9100 board | 1 asynch, 2 parallel | IBM PC/XT/AT and compatibles | | 2,485-147,403 |
| AST RESEARCH INC. | | | | | | | | | |
| 2121 Alton Ave., Irvine, CA 92714, (714) 863-1333 | | | | | | | | | CIRCLE 310 |
| LOCAL AREA NETWORKS | PCnet | baseband; CSMA/CD | 800K | 224; 7,000 feet | | PCnet board | | included; opt. NETBOIS software | 495 |
| | PCnet II | baseband, twisted-pair; CSMA/CA | 800K | 160; 2,500 feet | BSC, SNA | PCnet II board | | included; opt. NETBOIS software | 495 |
| | Resource Sharing Network | baseband; CSMA/CD | 5M | 64; 1,500 feet | | Resource Sharing Network board | | NETBIOS software | 495 |
| CODEX CORP. | | | | | | | | | |
| 20 Cabot Blvd., Mansfield, MA 02067, (617) 364-2000 | | | | | | | | | CIRCLE 311 |
| 4000 Series LAN | baseband, broadband; CSMA/CD, IEEE 802.3 | 10M | unlimited | SNA, X.25 | 4020 Nest | 96 asynch | all computers with asynch port | CORT/XNS software | |
| | | | | | 4020 Unit box | 4 asynch | all computers with asynch port | CORT/XNS software | 996 |
| COMMUNICATION MACHINERY CORP. | | | | | | | | | |
| 1421 State St., Santa Barbara, CA 93101, (805) 963-9471 | | | | | | | | | CIRCLE 312 |
| Ethernet | baseband; CSMA/CD, IEEE 802.3 | 10M | 1,024; 2.5 km | | DRN-1100 box | 16 asynch, console | | Internet TCP software | 9,900 |
| | | | | | ENP-20 board | 2 asynch | computers with Berkeley UNIX Version 4.2, System V | opt. Internet TCP/IP, Fusion XNS software | 3,000 |
| | | | | | ENP-50 board | 2 asynch | DEC MicroVAX | opt. Internet TCP/IP software | 2,700 |

Local Area Networks

| Local area network | | | | Network interface hardware | | | | | |
|---|---|-----------------|--|----------------------------|-----------------------------------|----------------------------------|---|---|---------------|
| Company Network name | Networking media/access | Data rate (bps) | Max. no stations Max. distance (end-to-end) | Gateways available | Network interface model name/type | Ports | Computers supported | Networking software | Price \$ |
| COMPLEX SYSTEMS INC. 4930 Research Dr., Huntsville, AL 35805, (205) 830-4310 | | | | | | | | | |
| XLAN | baseband, twisted-pair; CSMA/CA | 1M | 192; 8,000 feet | | IP-3 box | 192 asynch, 64 parallel | any computer with asynch ASCII port | opt. Traverse software | 298-198(port) |
| CONCORD DATA SYSTEMS INC. 397 Williams St., Marlborough, MA 01752, (617) 890-1394 | | | | | | | | | |
| Token/Net | broadband; token-passing, IEEE 802.4 | 5M, 10M | 25 miles | | TIM 200 box | 2 asynch or 2 synch, 2 RS449/422 | any computer with RS232C, RS449, RS422 ports | | 4,135 |
| | | | | | TIM 200 box | 3 asynch or 3 synch, 1 RS449/422 | any computer with RS232C, RS449, RS422 ports | | 5,135 |
| | | | | | TIM 220 box | 12 asynch or 12 synch | any computer with RS232C, RS449, RS422 ports | | 5,940 |
| CORVUS SYSTEMS INC. 2100 Corvus Dr., San Jose, CA 95124, (408) 559-7000 | | | | | | | | | |
| OMNINET | baseband, twisted-pair; CSMA/CD | 1M | 64; 4,000 feet | | Apple board | | Apple II, Ile, Macintosh | opt. Constellation III software | 2,490 |
| | | | | | IBM PC board | | IBM PC/XT/AT and compatibles | opt. Constellation II, Novell Netwave/O, OMNISHARE software | 2,490 |
| | | | | | MultiBrand box | 2 asynch, 1 parallel | Apple II, Macintosh; DEC Rainbow; IBM and compatibles | opt. Print Server II, Dialout software | 990-2,100 |
| CYB SYSTEMS INC. 2215 West Braker Lane, Austin, TX 78758, (512) 835-2266 | | | | | | | | | |
| Unite | baseband, twisted-pair; CSMA/CD, IEEE 802.3 | 10M | 255; 1,500m | | DataManager box | 18 asynch, 18 synch, 1 parallel | IBM PC/XT/AT, PC compatibles | included | 17,619-21,064 |
| | | | | | DataMate box | 10 asynch, 10 synch, 1 parallel | IBM PC/XT/AT, PC compatibles | included | 12,537-15,982 |
| | | | | | DataMaster box | 34 asynch, 34 synch, 1 parallel | IBM PC/XT/AT, PC compatibles | included | 31,795-35,290 |
| DATA GENERAL CORP. 4400 Computer Dr., Westboro, MA 01580, (617) 366-8911 | | | | | | | | | |
| Ethernet/IEEE 802.3 | baseband; CSMA/CD, IEEE 802.3 | 10M | 1,024; 2,500m | | Intelligent LAN Controller | | ECLISPE MV/2000, MV/4000, MV/8000-II, MV/10000 | opt. XODIAC, TCP/IP software | 4,500 |

LOCAL AREA NETWORKS

COST SAVING CONNECTIONS

RS232 INTERFACE PROBLEM SOLVERS...FROM WESTERN TELEMATIC INC.

END DATA SWITCHING PROBLEMS



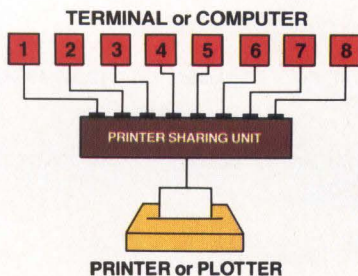
Is switching data cables becoming a pain in the ASCII? Automatically switch between computers, printers, instruments—just about any RS232 device.

Economically expand computer ports, access multiple computers or remote peripherals.

From simple AB switches to intelligent 196 port code activated switching systems, our reliable, easy to use, interface switches will help end your interconnect problems.

EFFICIENT PRINTER SHARING

It's time to make more efficient use of your expensive printers. Share a single plotter, daisy wheel, dot matrix or laser printer with up to 8 computers, word processors or CAD systems. Ideal for the automated office, school or engineering lab.

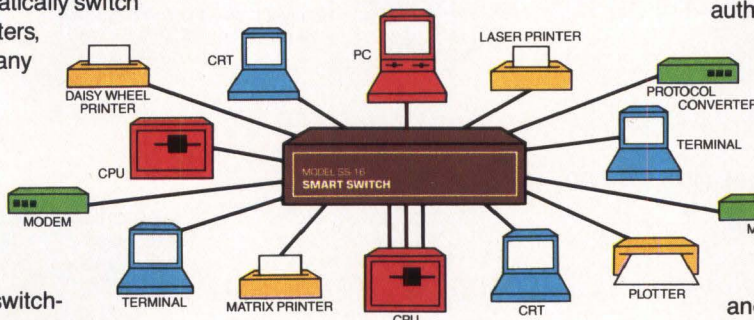


Our 4 or 8 port Printer Sharing Units work automatically. No cable switching or knobs to turn. Software changes are usually unnecessary since they use standard Ready/Busy or XON/XOFF handshaking.

AFFORDABLE RS232 NETWORKING

Create your own local network with our Any-port to Any-port Smart Switches. Available in either 8 or 16 port versions, the Smart Switch is ideal for computer port expansion, computer sharing, engineering work clusters and much more.

Each port has its own spooling buffer. So any baud rate can communicate with any other baud rate and parity anywhere in the system.



A special supervisory port lets you monitor activity on any other port, connect ports together, broadcast messages or designate the supervisory power to other ports.

The Smart Switch is easy to use. User friendly commands allow you to select ports, disconnect and display port activity. A push button defines each port for either DCE or DTE. So if you need an intelligent, affordable way to link your RS232 system, you're ready for the Smart Switch.

CONCERNED ABOUT DATA SECURITY?



Prevent unauthorized access to your computer system. Our Dial-back Security Unit prevents outsiders from peeking at, destroying or tampering with your data. Only users entering authorized passwords and dial-back numbers stored in the 200 number battery backed directory will be allowed access.

An auxiliary command port is used to set-up the directory and security levels as well as log each password attempt and duration of each call.

Simply connect the DSU between your computer and modem and feel secure about who's using your data.

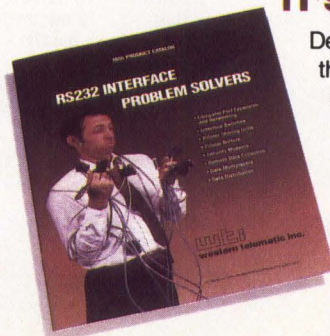
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CIRCLE NO. 19 ON INQUIRY CARD

Local Area Networks

| Local area network | | | | | Network interface hardware | | | | |
|---|---|-----------------|--|--------------------------|-----------------------------------|-----------------|--|------------------------------|-------------------|
| Company Network name | Networking media access | Data rate (bps) | Max. no stations Max. distance (end-to-end) | Gateways available | Network interface model name type | Ports | Computers supported | Networking software | Price \$ |
| DATAPOINT CORP. 9725 Datapoint Dr., San Antonio, TX 78284, (512) 699-7000 | | | | | | | | | |
| ARC | baseband, fiberoptic; token-passing | 2.5M | 255; 4 miles | Datapoll, SNA, X.25 | COM 9026 board | | Compaq; Datapoint 1200, 1560, 6600, 8400, 8600, 8650, 8850; IBM PC | opt. XODIAC, TCP/IP software | 1,750 |
| | | | | | | | | | CIRCLE 317 |
| DAVID SYSTEMS 701 E. Evelyn Ave., Sunnyvale, CA 94086, (408) 720-8000 | | | | | | | | | |
| David Information Manager | twisted-pair; CSMA/CD, IEEE 802.3 | 2M | 384; 4,000 feet | SNA/SDLC, X.25 | David Manager box | 384 | IBM 3270, IEEE 802.3 compatible | | 390 |
| | | | | | | | | | CIRCLE 318 |
| DIGITAL EQUIPMENT CORP. 200 Baker Ave., Concord, MA 01742, (617) 264-1420 | | | | | | | | | |
| Ethernet | baseband, broadband; CSMA/CD, CSMA/CA | 10M | 1,023; 3.8 km | DECnet, SNA TCP/IP, X.25 | DECNA board | | DEC Pro 350, Pro 380 | opt. Pro-DECnet (\$95) | 895 |
| | | | | | DEQNA board | | DEC MicroVAX I, II | opt. DECnet (\$495-\$1,450) | 1,150 |
| | | | | | DECserver 100 box | 8 asynch | | included | 2,600-2,750 |
| | | | | | | | | | CIRCLE 319 |
| DIGITAL MICROSYSTEMS INC. 1840 Embarcadero, Oakland, CA 94609, (415) 261-1034 | | | | | | | | | |
| HiNet | baseband, dual twisted-pair, fiberoptic; master/slave polling | 500K | 63; 5,000 feet | IBM 3270, X.25 | HiNet PC Adapter Card board | 1 asynch, RS422 | Columbia; Corona; Compaq; IBM PC/XT/AT; NCR; Olivetti M24; TeleVideo | included | |
| | | | | | | | | | CIRCLE 320 |
| DIGITAL PRODUCTS INC. 600 Pleasant St., Watertown, MA 02172 (617) 924-1680 | | | | | | | | | |
| NetCommander | twisted-pair; serial RS232C | 110-19.2K | 30; 800 feet | | NC4 box | 4 asynch | all computers | opt. BLAST software | 1,095 |
| | | | | | NC8 box | 8 asynch | all computers | opt. BLAST software | 1,695 |
| | | | | | NC16 box | 16 asynch | all computers | opt. BLAST software | \$2,950 |
| | | | | | | | | | CIRCLE 321 |
| EQUINOX SYSTEMS 12041 S.W. 144 St., Miami, FL 33186-6108, (305) 255-3500 | | | | | | | | | |
| Data PBX | twisted-pair; TDM | up to 9600 | 1,320; 1 mile | | LM-48 box | 48 asynch | all asynch computers | | 7,200-14,400 |

LOCAL AREA NETWORKS

Local Area Networks

| LOCAL AREA NETWORKS | Local area network | | | | | Network interface hardware | | | | |
|---|----------------------|--|-----------------|---|---------------------|-----------------------------------|---------------------------|---|---|---------------|
| | Company Network name | Networking media access | Data rate (bps) | Max. no. stations Max. distance (end-to-end) | Gateways available | Network interface model name/type | Ports | Computers supported | Networking software | Price \$ |
| EXCELAN INC. 2180 Fortune Dr., San Jose, CA 95131, (408) 434-2237 | | | | | | | | | | |
| | EXOS | baseband; CSMA/CD, IEEE 802.3 | 10M | 1,024; 3 km | | EXOS 201 board | Ethernet, SBX | Multibus computers | NX200; opt. EXOS 8010 TCP/IP protocol package | 1,995-2,045 |
| | | | | | | EXOS 202 board | Ethernet, SBX | VMEbus computers | NX200; opt. EXOS 8010 TCP/IP protocol package | 2,280-2,330 |
| | | | | | | EXOS 203 board | Ethernet, SBX | Q-bus computers | NX200; opt. EXOS 8010, 8030, TCP/IP protocol packages | 2,280-2,330 |
| | | | | | | EXOS 205 board | Ethernet SBX | IBM PC/XT/AT and compatibles | NX200; opt. EXOS 8011, 8050 TCP/IP protocol packages | 995 |
| FIBERCOM INC. P.O. Box 11966, Roanoke, VA 24022-1906, (703) 342-6700 | | | | | | | | | | |
| | Whispernet | fiberoptic; CSMA/CD, IEEE 802.3 | 10M | 1,024; 4 km | X.25 | WS/1-A box | 32 asynch | all computers with RS232C, RS422 ports | included | 10,000-15,000 |
| | | | | | | WS/1-SDLC box | 32 synch | all IBM | included | 10,000-15,000 |
| | | | | | | WS/1-HSM box | | DEC VAX, PDP | included | 15,000 |
| FOX RESEARCH INC 7005 Corporate Way, Dayton, OH 45459, (513) 433-2238 | | | | | | | | | | |
| | 10-NET | twin-ax, twisted-pair; CSMA/CA | 1M | 10,000 feet | RS232C, SNA | 10-NET Circuit Board | | Compaq; Corona; IBM PC/XT/AT; Olivetti M24; TeleVideo; Zenith 100 | included | 695(node) |
| GANDALF DATA INC. 1020 S. Noel Ave., Wheeling, IL 60090, (312) 541-6060 | | | | | | | | | | |
| | PACXNET | baseband, twisted-pair, fiberoptic; dynamic time slot allocation | 19.2K-64K | 25,000; 3.1 miles | IBM 3270, T-1, X.25 | PACX 2000 box | 1,920 asynch, 1,920 synch | any asynch computer | opt. LINK 2000 and PACX 2000 software | 9,600-269,500 |
| | | | | | | SWITCHMUX box | 16 asynch, 4 synch | any asynch or synch computer | included; opt. LINK 2000 software | 2,050-4,350 |
| GENERAL DATACOMM INC. Route 63, Middlebury, CT 06762, (203) 758-1118 | | | | | | | | | | |
| | DATX | baseband, twisted-pair; proprietary | 75-19.2K | 1,320; 15,000 feet | | DATX 2000 box | 1,320 asynch, 1,320 synch | | | 60,000 |

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G/NET™ is our Local Area Network for IBM PCs and compatibles. Incorporating the Novell NetWare/G family of network operating systems, G/NET offers electronic mail, print spooling, multiple file and communications servers, and access to over 3,000 LAN applications. And with our G/NETBIOS™ option, you can even run programs developed for IBM's PC Network or Token Ring LAN.

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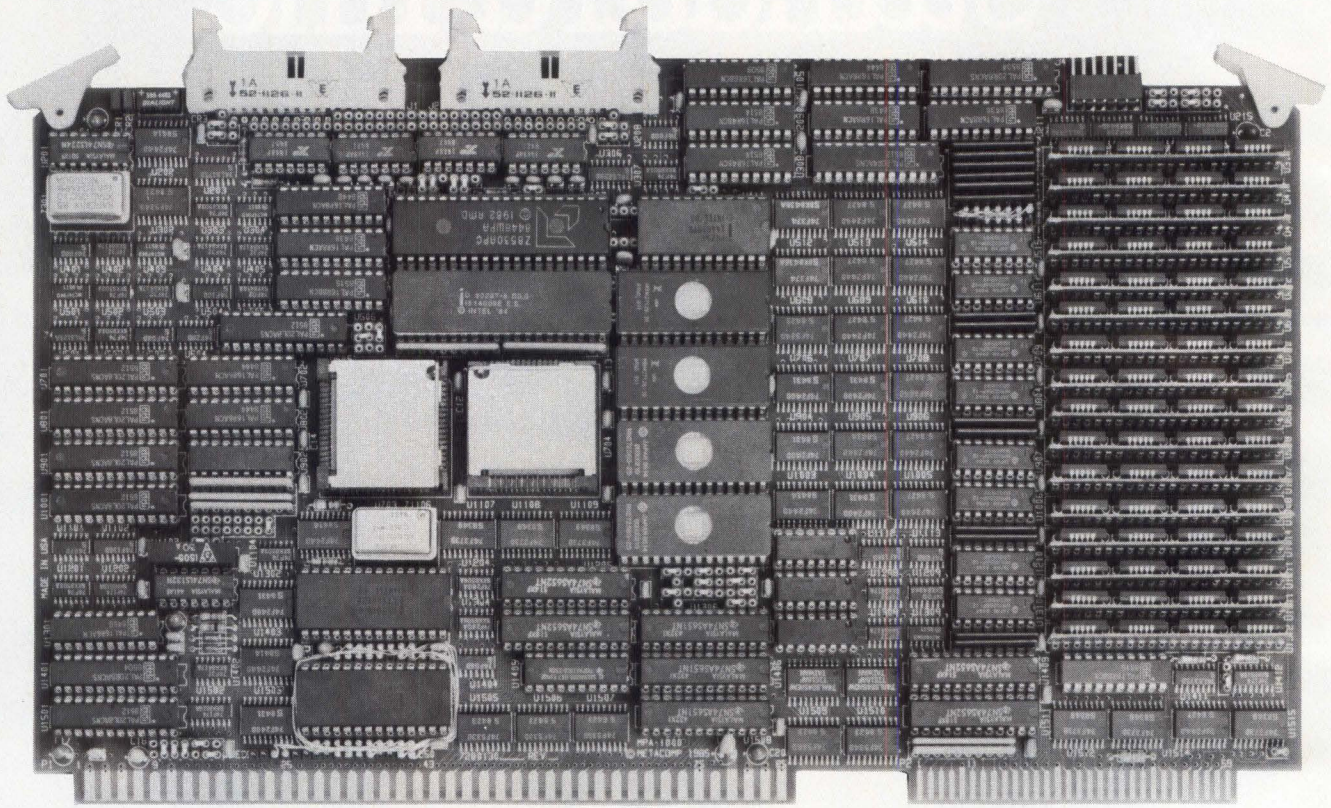
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CIRCLE NO. 20 ON INQUIRY CARD

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An 80286 CPU Board Without Compromise.

The MPA-1000 is the only Multibus-compatible CPU that taps the full capabilities of the 80286 microprocessor. An honest engine, built to unleash the full potential of the 80286 in multi-user, multi-tasking or real-time applications. And it delivers the power and memory for these demanding applications all in a single card slot.

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Multibus is a registered trademark of Intel Corporation.

CIRCLE NO. 21 ON INQUIRY CARD

Local Area Networks

| Local area network | | | | | Network interface hardware | | | | |
|---|--|-----------------|---|--------------------|-----------------------------------|-------------------------------|--|---|--------------------|
| Company Network name | Networking media/access | Data rate (bps) | Max. no. stations Max. distance (end-to-end) | Gateways available | Network interface model name/type | Ports | Computers supported | Networking software | Price \$ |
| HONEYWELL INFORMATION SYSTEMS INC. | | | | | | | | | |
| 200 Smith St., Waltham, MA 02154, (617) 895-6000 | | | | | | | | | CIRCLE 328 |
| Ethernet Product Line | baseband; CSMA/CD, IEEE 802.3 | 10M | 1,000 and up; 2,800m | SNA/SDLC, X.25 | CS/1 Series box | 32 asynch, 32 synch | all computers | included | 10,080-16,380 |
| | | | | | CS/100 Series box | 14 asynch, 10 synch | all computers | included | 3,780-5,670 |
| IDE ASSOCIATES INC. | | | | | | | | | |
| 35 Dunham Rd., Billerica, MA 01821, (800) 257-5027 | | | | | | | | | CIRCLE 329 |
| IDEAnet | baseband; CSMA/CD | 800K | 20; 2,000 feet | | IDEAnet board | | IBM PC/XT/AT | included | 1,195(starter kit) |
| INFOTRON SYSTEMS CORP. | | | | | | | | | |
| 9 North Olney Ave., Cherry Hill, NJ 08003, (609) 424-9400 | | | | | | | | | CIRCLE 330 |
| INX4400 | twisted-pair; proprietary | 35M | 4,000; 64 km | SNA, X.25 | RSEU box | 64 asynch, 64 synch, RS422 | transparent | | |
| | | | | | RSEU-128 | 128 asynch | transparent | | |
| INTERCONTINENTAL MICRO SYSTEMS CORP. | | | | | | | | | |
| 4015 Leaverton Court, Anaheim, CA 92807, (714) 630-0964 | | | | | | | | | CIRCLE 331 |
| TurboLAN | baseband, twisted-pair, coaxial; token-passing | 2.5M | 4,000; 40 miles | | LAN-PC board | | IBM PC/XT/AT; Tandy 1000, 1200 | opt. Server AT/XT | 495-1,595 |
| | | | | | LANS-100 board | | any computer with S-100 bus | | 495 |
| | | | | | WS80-X board | 2 asynch, 2 synch, 2 parallel | compatible with any multiuser using TurboDOS | opt. Server-WS | 995-2,995 |
| KEE INC. | | | | | | | | | |
| 10739 Tucker St., Beltsville, MD 20705, (301) 937-4740 | | | | | | | | | CIRCLE 332 |
| KEE LAN | broadband; CSMA/CD | 2M | 16,000; 20 miles | X.25 | 6002-2-8 box | 2 synch, 2 parallel | all computers with synch port | | 2,340 |
| | | | | | 8002-8-32 box | 8 asynch, 2 parallel | all computers with asynch port | | 3,990 |
| | | | | | 8002-32R box | 32 asynch, 2 parallel | all computers with asynch port | | 11,100 |
| MAGNOLIA MICROSYSTEMS INC. | | | | | | | | | |
| 4039 21st Ave. West, Seattle, WA 98199, (206) 285-7266 | | | | | | | | | CIRCLE 333 |
| MAGnet | baseband, twisted-pair; token-passing | 500K | 64; 200 feet | | XM-422-PC board | 1 synch | IBM PC compatibles | opt. Concurrent CP/M with DR/NET software | 595 |
| | | | | | XM-422-89 board | 1 synch | Zenith Z89, Z90 | opt. DR/NET software | 595 |

LOCAL AREA NETWORKS

Local Area Networks

| Local area network | | | | | Network interface hardware | | | | |
|--|---|-----------------|---|---------------------------|-----------------------------------|-------------------------------------|--|--|-------------------------|
| Company Network name | Networking media/access | Data rate (bps) | Max. no. stations Max. distance (end-to-end) | Gateways available | Network interface model name/type | Ports | Computers supported | Networking software | Price \$ |
| MICOM-INTERLAN INC. 155 Swanson Rd., Boxborough, MA 01719, (617) 263-9929 | | | | | XM-422-696 board | 1 synch | Zenith | opt. DR/NET software | 595 |
| CIRCLE 334 | | | | | | | | | |
| NET/PLUS | baseband; CSMA/CD, IEEE 802.3 | 10M | 1,024; 500m | | NP100 board | | DEC VAX 11/730, 11/750, 11/780, 11/785; PDP-11 | | 3,600-4,700 |
| | | | | | NP200 board | | DEC MicroVAX II, LSI-II | | 2,100-2,800 |
| | | | | | NP300 board | | Multibus-based computers | | 2,100-4,000 |
| | | | | | NP600 board | | IBM PC/AT and compatibles | | 1,200-1,600 |
| CIRCLE 335 | | | | | | | | | |
| MOLECULAR COMPUTER 1983 Concourse Dr., San Jose, CA 95131, (408) 434-9500 | | | | | | | | | |
| System 16/300 | twisted-pair; CSMA/CD, CSMA/CA, proprietary | 800K | 768; 32,000 feet | IBM 2780, 3270, SNA, X.25 | System 16/300 box | 7 asynch (server), 2 synch (server) | IBM PC/AT and compatibles | Novell Advanced NetWare software | 6,995-99,995 |
| | | | | | 16370 PC Interface board | RS422 | IBM PC/AT and compatibles | Novell Advanced NetWare software | 195 |
| CIRCLE 336 | | | | | | | | | |
| MOTOROLA SEMICONDUCTOR PRODUCTS (MICROSYSTEMS) 2900 S. Diablo Way, Tempe, AZ 85282, (602) 438-3501 | | | | | | | | | |
| Ethernet | baseband; CSMA/CD | 10M | 60; 500m | | MVME330UX board | | VME-based systems using UNIX System V | Fusion XNS protocol software | |
| | | | | | MVME330VX board | | VME-based systems using VERSAdos | Fusion XNS protocol software | |
| MAP | broadband; token-passing, IEEE 802.4 | 10M | | | MVME370SET-1 board | | any VME-based system | | 3,995 |
| CIRCLE 337 | | | | | | | | | |
| NCR CORP. 1700 S. Patterson Blvd., Dayton, OH 45479, (513) 445-5000 | | | | | | | | | |
| NCR PC2PC | baseband, twisted-pair; CSMA/CA | 1M | 64; 4,000 feet | | board | | NCR DMV, PC4, PC6, PC8 and compatibles | NCR PC2PC Version; opt. NCR PC2PC Mail | 495(node) |
| CIRCLE 385 | | | | | | | | | |
| NESTAR SYSTEMS INC. 2585 East Bayshore Rd., Palo Alto, CA 94303, (415) 493-2223 | | | | | | | | | |
| PLAN Service Arcnet | baseband, coaxial; token-passing | 2.5M | 255; 4 miles | SNA | Network Interface Card | | IBM PC/XT/AT, Portable PC and compatibles | PlanPak software | 17,000(10 workstations) |

LOCAL AREA NETWORKS

THE DAWN OF COMPATIBLE COMMUNICATIONS

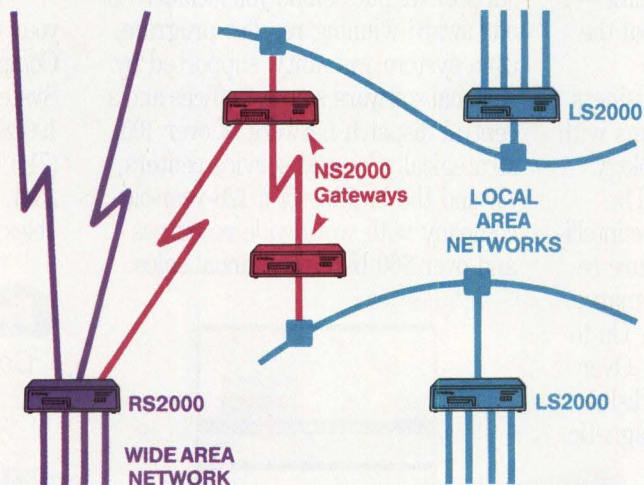
FutureCom™ is Here! Introducing the FutureCom 2000 Integrated Area Network™ and the end of compatibility and connectivity problems in networking.

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The FutureCom LS2000 Local Server provides access for computer or terminal devices to an Ethernet LAN for efficient local resource sharing. The RS2000 Remote Server provides wide area connectivity via multiple RS-232 composite links (up to 4 per node).* Both servers support up to 32 channels and provide local and remote switching, port contention and advanced security features.

FutureCom Integration The key to the Integrated Area Network is the NS2000 Network Server, a bridge between Ethernet and RS-232. The NS2000 consists of one Ethernet link and up to four RS-232 links. Use it to connect multiple



LANs across standard leased telco lines, and/or integrate FutureCom LANs and WANs into a single network.

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Find Out More The Integrated Area Network is the solution to your networking problems. Let us show you how easy it can be to design

a FutureCom Network. Call us toll-free (800) 235-6935 in the Continental U.S., or in California (800) 368-8092 and ask for a free FutureCom brochure. ComDesign, Inc. 751 South Kellogg Avenue, Goleta, California 93117. (805) 964-9852. TWX 910-334-1189.

 **ComDesign**
Leaders in Data Communications

*X.25 and other networking capabilities are currently under development.



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IT TAKES a company that provides industry standard operating systems like UNIX, PICK and RM/COS plus hundreds of vertical applications through CAPS, the CIES Applications Programs Service.

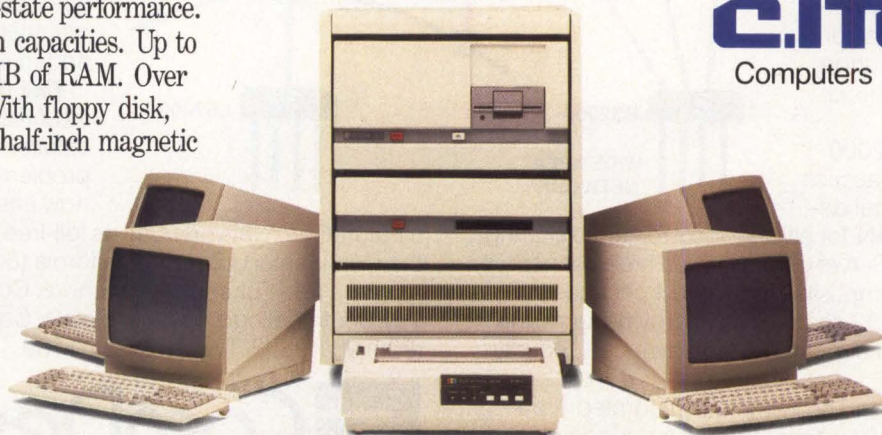
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C.ITOH
Computers



BUSINESS COMPUTER SYSTEMS

Local Area Networks

| Company Network name | Local area network | | | | Network interface hardware | | | | |
|---------------------------|---|-----------------|--|--------------------|--------------------------------------|-------|---|---------------------|----------------------------|
| | Networking media access | Data rate (bps) | Max. no stations Max. distance (end-to-end) | Gateways available | Network interface model name type | Ports | Computers supported | Networking software | Price \$ |
| PLAN Series Token Ring | baseband, twisted-pair; token-passing | 4M | 260; 1,000 feet | SNA | IBM Token Ring Adapter Card | | IBM PC/XT/AT, Portable PC and compatibles | PlanPak software | 17,500(10 workstations) |

NETWORK DEVELOPMENT CORP.
81 Great Valley Parkway, Malvern, PA 19355, (215) 296-7420

CIRCLE 338

| | | | | | | | | | |
|---|---------------------------|------|-------------------|-----|--------------|-------------------------------------|--|-------------------------|-----|
| Device Net- work Architec- ture (DNA) | baseband, twisted-pair | 800K | 64; 5,000 feet | DNA | DNA board | 4 asynch, 2 synch, 3 parallel | Compaq; Fujitsu; IBM PC/XT/AT; Leading Edge; Sperry; Zenith | DNA Network software | 695 |
|---|---------------------------|------|-------------------|-----|--------------|-------------------------------------|--|-------------------------|-----|

NOVELL INC.
1170 North Industrial Park Dr., Orem, UT 84057, (801) 226-8202

CIRCLE 339

| | | | | | | | | | |
|--------------------|--|-------|------------------------------------|--|-----------------|-------------------------|---------------------------------|---|-------|
| NetWare/ ARCNET | baseband; token-passing | 2.5M | 50(server) | | ARCNET board | 2 asynch, 1 parallel | IBM PC/XT/AT and compatibles | Advanced NetWare, SFT NetWare 286 software | 2,595 |
| NetWare/G-Net | baseband; CSMA/CD | 1.43M | 50(server); up to 7,000 feet | | G-Net board | 2 parallel | IBM PC/XT/AT and compatibles | Advanced NetWare, SFT NetWare 286 software | 2,395 |
| NetWare/ ProNET | baseband, twin-ax, twisted-pair, fiberoptic; token-passing | 9.94M | 50(server); 100m-2.5 km | | P-1300 board | 1 parallel | IBM PC/XT/AT and compatibles | Advanced NetWare, SFT NetWare 286 software | 3,095 |

PC LAN TECHNOLOGIES INC.
5780 Lincoln Dr., Suite 106, Minneapolis, MN 55436, (612) 935-7509

CIRCLE 340

| | | | | | | | | | |
|--------|--|-----------|------------|--|----------------------------|--|---------------------------------|--|------------------|
| LT LAN | baseband, twisted-pair; CSMA/CD, proprietary, IEEE 802.3 | 1M, 2M | 1,220 feet | | LT LAN Adapter board | | IBM PC/XT/AT and compatibles | | 750(starter kit) |
|--------|--|-----------|------------|--|----------------------------|--|---------------------------------|--|------------------|

PERKIN-ELMER CORP. (DATA SYSTEMS GROUP)
2 Crescent Place, Oceanport, NJ 07757, (201) 870-4500

CIRCLE 341

| | | | | | | | | | |
|--------|----------------------------------|-----|-------------------|------|---------------------------------------|----------|---------------------------------|-------------------------|-------------|
| Pennet | baseband; CSMA/CD, IEEE 802.3 | 10M | 100; 1.5 miles | X.25 | EDLC board | | Perkin-Elmer 3200, XF series | opt. Pennet software | 3,700 |
| | | | | | Ethernet Terminal Server box | 8 asynch | Perkin-Elmer 3200, XF series | included | 4,000-5,500 |

PHOENIX DIGITAL CORP.
2315 N. 35th Ave., Phoenix, AZ 85009, (602) 278-3591

CIRCLE 342

| | | | | | | | | | |
|---------|---|----|-------------------|------|-------------|--|---------------------------|-------------|---------------|
| OPTOnet | baseband, fiberoptic; token-passing, IEEE 802.4 | 1M | 253; 1-4 miles | Dpac | Dpac box | 48 asynch, 48 synch, 48 IEEE 488 | DEC, Honeywell, IBM PC | proprietary | 10,000-30,000 |
|---------|---|----|-------------------|------|-------------|--|---------------------------|-------------|---------------|

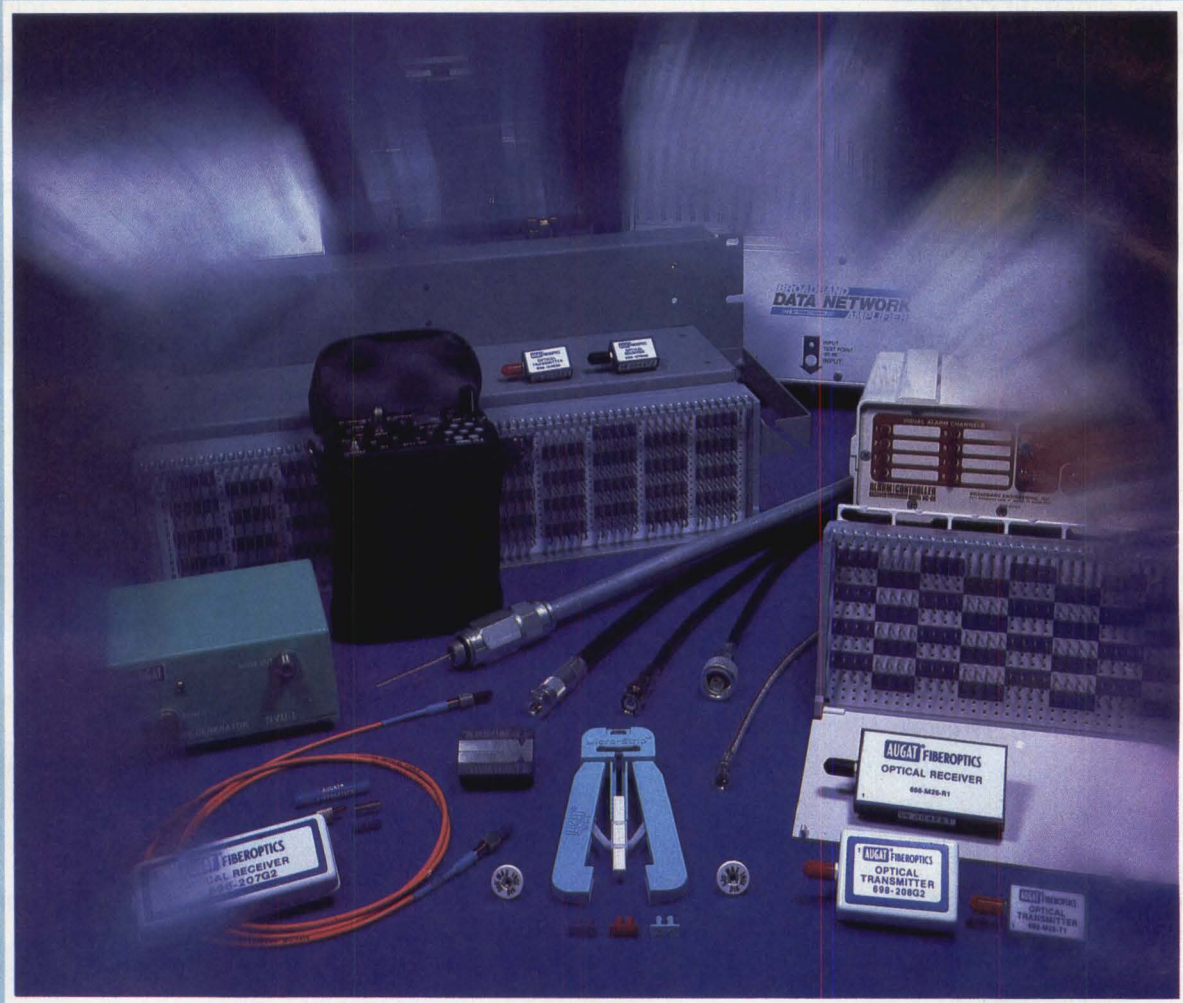
PRIME COMPUTER INC.
Prime Park, Natick, MA 01760, (617) 655-8000

CIRCLE 343

| | | | | | | | | | |
|----------------------|---------------------------------------|-----|--------------------|--|---|--|-----------------|---------------------------|---------|
| Primenet/ Ringnet | twin-ax, fiberoptic; token-passing | 10M | 128; 3,280 feet | | Primenet Node Controller board | | Prime 50 Series | opt. Primenet software | \$5,000 |
|----------------------|---------------------------------------|-----|--------------------|--|---|--|-----------------|---------------------------|---------|

LOCAL AREA NETWORKS

Networking... see your way clear



You're not alone. It's easy to get confused by the enormous spectrum of networking requirements, products and technologies that blur the way.

Let Augat bring your picture into focus.

Augat is one of the world's most respected names in electronic interconnection technology. We possess a unique capability for network solutions, because of unequalled product breadth coupled with vast experience in the OEM and CATV marketplaces.

Augat offers an unusual combination; the resources of a large (\$250,000,000.00), vigorous growth company plus a willingness and ability to go beyond merely selling products.

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• System Compatible Cross Connections

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COMMUNICATIONS GROUP
Quality and Innovation

CIRCLE NO. 24 ON INQUIRY CARD

Local Area Networks

| Company Network name | Local area network | | | | Network interface hardware | | | | |
|-------------------------|----------------------------|--------------------|--|-----------------------|--------------------------------------|-------|------------------------|------------------------|----------|
| | Networking media/access | Data rate (bps) | Max. no. stations Max. distance (end-to-end) | Gateways available | Network interface model name/type | Ports | Computers supported | Networking software | Price \$ |

PROTEON INC.

4 Tech Circle, Natick, MA 01760, (617) 655-3340

CIRCLE 344

| | | | | | | | | | |
|-----------|---|-----|---------------|--------|----------------|--|---|------------------------------------|-------------------|
| ProNET-10 | baseband, twin-ax, twisted-pair, fiberoptic; token-passing, IEEE 802.5 | 10M | 255; 50 km | | P1000 board | | DEC PDP-11, VAX | opt. TCP/IP, Ringway software | 3,150-1.5 million |
| | | | | | P1200 board | | all Multibus computers | opt. TCP/IP software | 3,150-1.5 million |
| | | | | | P1300 board | | AT&T 6300; Columbia; Compaq; Eagle; IBM PC/XT/AT | opt. Netware/P, TCP/IP software | 799-200,000 plus |
| ProNET-80 | baseband, twin-ax, twisted-pair, fiberoptic; token-passing, IEEE 802.5 | 80M | 240; 50 km | DECnet | P1080 board | | DEC PDP-11, VAX | opt. TCP/IP, Ringway software | 8,000 |

QUANTUM SOFTWARE SYSTEMS LTD.

215 Stafford Rd. W., #104, Nepean, Ontario, K2H 9C1, Canada, (613) 726-1893

CIRCLE 345

| | | | | | | | | | |
|---------------------------|---------------------------|------|--------------------|--|---------------|--------------------------|------------------------------|----------|-----|
| QNX Operat- ing System | twin-ax; token-passing | 2.5M | 255; 6,000 feet | | QNET board | 10 asynch, 2 parallel | IBM PC/AT and compatibles | included | 950 |
|---------------------------|---------------------------|------|--------------------|--|---------------|--------------------------|------------------------------|----------|-----|

SIECOR CORP.

P.O. Box 13625, Research Triangle Park, NC 27709, (919) 549-6571

CIRCLE 346

| | | | | | | | | | |
|-------------------------|---|-----|------------------|--|----------------------------|--|------------------------|--|--|
| Fiber Optic Ethernet | baseband, fiberoptic; CSMA/CD, IEEE 802.3 | 10M | 1,024; 2.5 km | | Ethernet LAN vendors | | all major computers | | |
|-------------------------|---|-----|------------------|--|----------------------------|--|------------------------|--|--|

STEARNS COMPUTER SYSTEMS

P. O. Box 9384, Minneapolis, MN 55440, (612) 829-0361

CIRCLE 347

| | | | | | | | | | |
|--------|--|------|-----------------|-----|-----------------|--|---------------------------------|----------|-----|
| ViaNet | baseband; token-passing, IEEE 802.3, IEEE 802.4, IEEE 802.5 | 2.5M | 255; 3 miles | SNA | ViaNet board | | IBM PC/XT/AT and compatibles | included | 499 |
|--------|--|------|-----------------|-----|-----------------|--|---------------------------------|----------|-----|

TELTONE CORP.

10801 120th Ave. N.E., Kirkland, WA 98033, (206) 827-9626

CIRCLE 348

| | | | | | | | | | |
|------------------------|--------------|------|------------|--|----------------|------------------------|---|--|---------|
| Data Carrier System | twisted-pair | 9600 | 5,000 feet | | DCS-2B box | 1 asynch | DEC, Data General, Hewlett-Packard, Honeywell, Prime | | 435-673 |
| | | | | | DCS-2SE box | 1 asynch or 1 synch | DEC, Data General, Hewlett-Packard, Honeywell, IBM, Prime | | 592-875 |

TIENET INC.

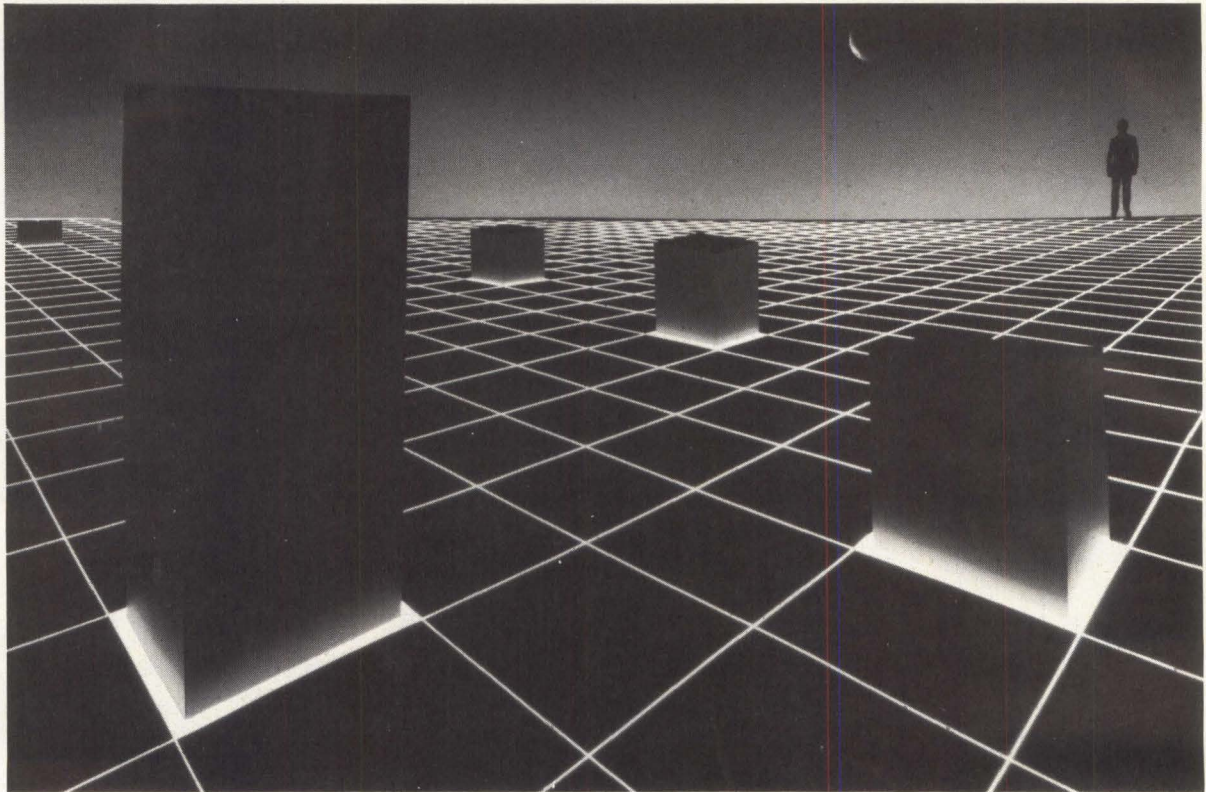
2300 Central Ave., Suite F, Boulder, CO 80301, (303) 444-2600

CIRCLE 349

| | | | | | | | | | |
|--------|---|----|--------------------|--|---------------|------------------------|--|--|---------|
| Tienet | baseband, twisted-pair, coaxial; CSMA/CD, proprietary | 1M | 24,000; 2 miles | | Tienet box | 16 asynch, 16 synch | Apple, Data General, DEC, Hewlett-Packard, Honeywell, Perkin-Elmer | | 460-551 |
|--------|---|----|--------------------|--|---------------|------------------------|--|--|---------|

LOCAL AREA NETWORKS

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tion, and sales results. Administrators and secretaries instantly recall standardized sections of contracts, proposals, and business letters. And software developers organize original and updated code modules.


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CIRCLE NO. 25 ON INQUIRY CARD

Local Area Networks

| Company Network name | Local area network | | | | Network interface hardware | | | | Price \$ |
|----------------------|-------------------------|-----------------|--|--------------------|-----------------------------------|-------|---------------------|---------------------|----------|
| | Networking media/access | Data rate (bps) | Max. no stations Max. distance (end-to-end) | Gateways available | Network interface model name type | Ports | Computers supported | Networking software | |

WANG LABORATORIES INC.

One Industrial Ave., Lowell, MA 01851, (617) 459-5000

CIRCLE 350

| | | | | | | | | | |
|---------------------|--|-----------|--------------------------|--|---------------------------|--|---------------------------------------|--|-----------|
| WangNet/ FastLAN | broadband; CSMA/CD, token-passing, proprietary, IEEE 802.3 | up to 10M | up to 10,000; 4 miles | | Cable Interface Unit box | | Wang VS, OIS, Alliance | | 3,800 |
| | | | | | CMUX box | | IBM 3270 | | 3,375 |
| | | | | | Fixed Frequency Modem box | | any computer with RS232C, RS449 ports | | 850-1,200 |
| | | | | | IBM PC-Net Adapter box | | IBM PC/XT/AT | | 400 |

WESTERN TELEMATIC INC.

2435 S. Anne St., Santa Ana, CA 92704, (714) 979-0363

CIRCLE 351

| | | | | | | | | | |
|--------------|--------------|-------|-------------------------|--------------------|-----------|-----------|---------------------------------------|--|-------|
| Smart Switch | twisted-pair | 19.2K | 16; up to 2,000 feet | ASCII, RS232C port | SS-8 box | 8 asynch | all computers with RS232C serial port | | 695 |
| | | | | | SS-8B box | 8 asynch | all computers with RS232C serial port | | 995 |
| | | | | | SS-16 box | 16 asynch | all computers with RS232C serial port | | 1,895 |

WESTWIND COMPUTER

1690 65th St., Emeryville, CT 94608, (415) 652-3222

CIRCLE 352

| | | | | | | | | | |
|-----|-------------------------|------|----------------|--|---------|-------------------------|---------------------------|---------------------------|-------------|
| WEB | flat cable; proprietary | 350K | 7; 500 feet | | WEB box | 2 asynch, 1 parallel | most computers using CP/M | WEBstat, WEBmail software | 1,295-1,995 |
|-----|-------------------------|------|----------------|--|---------|-------------------------|---------------------------|---------------------------|-------------|

XEROX CORP.

Xerox Square, Rochester, NY 14644, (716) 423-5078

CIRCLE 386

| | | | | | | | | | |
|-------|-------------------------------|-----|------------------|--|-------------|--|---------------------------------|----------------|--------------------|
| XC 22 | baseband; CSMA/CD, IEEE 802.3 | 10M | 30; 5600 feet | | XC 22 board | | IBM PC/XT/AT; Xerox 6060 family | XC 20 software | 600-850 (per node) |
| XC 24 | baseband; CSMA/CD, IEEE 802.3 | 1M | 200 | | XC 24 board | | IBM PC/XT/AT; Xerox 6060 family | XC 20 software | 600-850 (per node) |

XYPLEX INC.

100 Domino Dr., Concord, MA 01720, (617) 371-1400

CIRCLE 353

| | | | | | | | | | |
|---------------|---|-----|-------------|----------|---------------|-----------|--|--|-------|
| Xyplex System | baseband, broadband, fiberoptic; CSMA/CD, CSMA/CA, IEEE 802.3 | 10M | 32,000 feet | BSC, SNA | XP-4N64 board | 64 asynch | | | 8,100 |
| | | | | | XP-CC8 box | 8 asynch | | | |

LOCAL AREA NETWORKS

Information was solicited but not received from the following manufacturers:

3Com Corp.
1365 Shorebird Way
Mountain View, CA 94043
(415) 961-9602

IBM Corp.
900 King St.
Rye Brook, NY 10573
(914) 934-4839

Network System Corp.
7600 Boone Ave., North
Minneapolis, MN 55428
(612) 425-2202

Sytek Inc.
1225 Charleston Rd.
Mountain View, CA 94043
(415) 966-7300

Bridge Communications
1345 Shorebird Way
Mountain View, CA 94043
(415) 969-4400

Metapath
222 Lincoln Center Dr.
Foster City, CA 94404
(415) 345-7700

Northern Telecom Inc.
9705 Data Park
Minneapolis, MN 55343
(612) 932-8000

Ungermann-Bass Inc.
2560 Mission College Blvd.
Santa Clara, CA 95050
(408) 496-0111

Coherent Communications
Systems Corp.
60 Commerce Dr.
Hauppauge, NY 11788
(516) 231-1550

National Instruments Inc.
12109 Technology Blvd.
Austin, TX 78727
(512) 250-9119

Orchid Technology
47790 Westinghouse Rd.
Fremont, CA 94539
(415) 490-8586

Ztel Inc.
181 Ballardvale St.
Wilmington, MA 01887
(617) 657-8730

Gateway Communications Inc.
16782 Redhill Ave.
Irvine, CA 92714
(714) 261-0762

NEC Information Systems Inc.
1414 Massachusetts Ave.
Boxborough, MA 01719
(617) 264-8000

Santa Clara Systems
1610 Barryessa Rd.
San Jose, CA 95133
(408) 729-6700

LOCAL AREA NETWORKS

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Limited Distance Modems

- Surge Protectors Standard—no extra "lightning sponges" needed
- Electrical Isolation Standard—cleans up noisy data
- Data Rates to 57.6kbaud at low cost
- Distances to 12 miles
- Signal powered available—LDM35

LDM422 RS-232/RS422 converter and limited distance modem

- Multi-drop operation for 4 wire Local Area Network
- Two wire bidirectional simplex operation
- RTS/CTS carried through—may be used as second data pair
- Surge protection and isolation on all I/O lines

Asynchronous Protocol Analyzer

- Software makes a Personal Computer into an analyzer
- Trigger strings
- Monitor and simulation modes
- Includes full functioned RS-232 breakout box and line adapter for little more than the cost of a breakout box

HIGH SPEED, INDUSTRIAL LIMITED DISTANCE MODEMS

| Series | Surge Protection | Isolation | Max. Distance | Max. Data Rate | Connection | Power |
|--------|------------------|-----------|---------------|----------------|------------|-----------|
| LDM30 | yes | receiver | 12 mi. | 57.6kbaud | 4 wire | DC or AC |
| LDM35 | yes | receiver | 7 mi. | 19.2kbaud | 4 wire | SignalPwr |
| LDM70 | yes | complete | 12 mi. | 57.6kbaud | 4 wire | DC or AC |
| LDM422 | yes | complete | 7 mi. | 19.2kbaud | 2, 4, or 8 | DC or AC |

PROTOCOL ANALYZER

| | |
|---------|---|
| APA 120 | Software, RS 232 Breakout Box, Adapter, cables and manual |
|---------|---|

Prices: LDM30 - \$73, \$81; LDM35 - \$81; LDM70 - \$109, \$119; LDM422 - \$123, \$132; APA120 - \$495.

Improving Productivity



CIRCLE NO. 26 ON INQUIRY CARD

Tomorrow's Multiplexer Today



PHONE LINE EFFICIENCY

MC-610
\$1495.00 QTY 1

- PC networking
- Resource sharing
- RS-232 data collection
- Error deletion and correction
- 3 Character address to connect to any one of over 500 ports.
- Six RS 232 ports, any or all can be active simultaneously.



MC-600
\$866.00 QTY 1

THE SMART RS-232 SWITCH: THAT DOES IT ALL

- Any port to any port
- Many ports to one port
- One port to many ports
- Port configuration retained even after power off power on sequence.
- Uses standard off the shelf software.



1-800-252-ALGO
9198-C Red Branch Rd.
Columbia, Md. 21045
TX 333405 Algo, Col.
In Md.: 301-730-7442

CIRCLE NO. 27 ON INQUIRY CARD

Networking Software

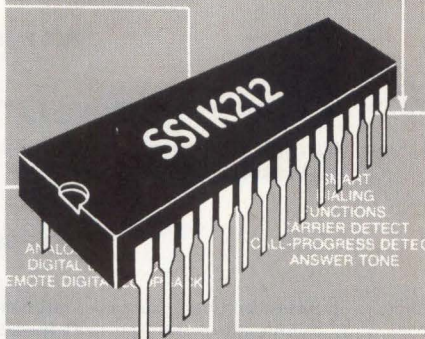
| Company | Package name | Network | Network hardware interface | Computer/operating system compatibility | Required additional software | Price \$ | Function |
|--|-----------------------------------|---|--|--|------------------------------|------------------|--|
| APPLIED INFORMATION SYSTEMS INC. 500 Eastowne Dr., Chapel Hill, NC 27514, (919) 942-7801 | | | | | | | |
| | | | | | | | CIRCLE 354 |
| BURCOM | proprietary | DEC PDP-11, VAX | DEC VAX/VMS, PRO/POS, MICRO/RSX, PDP-11/RSX | | | 700-5,000 | allows communications between DEC and Burroughs computers, supports the Burroughs point-to-point conversational and poll-select protocols, emulates MT983 terminal |
| APPLIED INTELLIGENCE INC. 1043 Stierlin Rd., Mountain View, CA 94043, (415) 967-3512 | | | | | | | |
| | | | | | | | CIRCLE 355 |
| PC/NOS | network independent | | MS-DOS, PC-DOS | | | 125(per node) | provides concurrent user/server capabilities on LAN, allows sharing of most devices which are part of the MS-DOS device chain, compatible with IBM PC Net applications |
| AST RESEARCH INC. 2121 Alton Ave., Irvine, CA 92714, (714) 863-1333 | | | | | | | |
| | | | | | | | CIRCLE 356 |
| AST-NETBIOS Option | AST LANs | AST PCnet, PCnet II, Resource Sharing Network | IBM PC/XT/AT with DOS 3.1 | AST or IBM Network Program or equivalent | | 195(per network) | ensures compatibility with application and utility software designed for the IBM PC network, fully emulates IBM NETBIOS, provides node-naming facilities |
| AST-Network Program | NETBIOS-compatible LAN | NETBIOS compatible | IBM PC/XT/AT with DOS 3.1 | none | | 75 | allows sharing of disk and printers over LAN |
| AST SNA/BSC Gateway | NETBIOS-compatible LAN (AST, IBM) | AST PCnet, PCnet II, Resource Sharing Network or equivalent | IBM PC/XT/AT with DOS 3.1 | none | | | allows LAN users to access a mainframe via SNA or BSC protocols |
| AUSCOM (A KMW SYSTEMS CO.) 2007 Kramer Lane, Austin, TX 78758, (512) 836-8080 | | | | | | | |
| | | | | | | | CIRCLE 357 |
| Fusion TCP/IP | ARPANET | Auscom Model 8911A | IBM VM/CMS, MVS | | | 5,000-15,000 | allows an IBM mainframe (or plug-compatible mainframe) to communicate via an Auscom Model 8911A to an Ethernet LAN |
| XNS | networks supporting XNS | Proteon ProNET interface | IBM VM, MVS | | | 5,000-10,000 | allows an IBM mainframe (or plug-compatible mainframes) to communicate via an Auscom Model 8911A to Proteon's token-passing ring LAN |
| COMMUNICATION MACHINERY CORP. 1421 State St., Santa Barbara, CA 93101, (805) 963-9471 | | | | | | | |
| | | | | | | | CIRCLE 358 |
| Internet TCP-IP | Ethernet (TCP-IP) | Communication Machinery ENP | UNIX System V, Berkeley UNIX Version 4.X, DEC VMS, MS-DOS, XENIX | | | 500 | allows TCP-IP communication over an Ethernet, includes Mil Spec versions of TCP-IP, ARP, ICMP, UDP; Dept. of Defense-defined FTP, TELNET and SMTP utilities |
| QM100 | ARAPNET, any TCP-IP network | intelligent processor | | | | 20,000 (source) | allows a host to communicate on a TCP-IP LAN, includes the Dept. of Defense-defined FTP, TELNET and SMTP utilities |

REMOTE DIGITAL LOOPBACK

SPOTLIGHT #19

IN A SERIES

**NOW AVAILABLE-
THE ONE-CHIP
BELL 212A 1200
BPS MODEM**



FEATURES:

- One-chip Bell 103/212A compatible modem IC
- Call progress detection and DTMF tone generator on-chip
- Easy to use 8-bit parallel bus (28 Pin DIP, QUAD) or optional serial bus for modem control (22 Pin DIP)
- Interfaces directly with 8051 or 8048 family of microprocessors
- Integrated analog and digital design provides exceptional performance
- Low power CMOS uses a single +10V supply

The SSI K212 is a complete Bell 212A modem on a single chip, and it incorporates all the primary functions needed for a typical intelligent modem. Included on a single chip are full Bell103 and 212A operating modes, a call progress monitor, and a DTMF dialer. The device also has an 8-bit parallel bus for control of modem functions and will directly interface with the 8048/8051 family of low-cost micro controllers. A complete modem requires only the addition of the phone line interface and a control microprocessor.

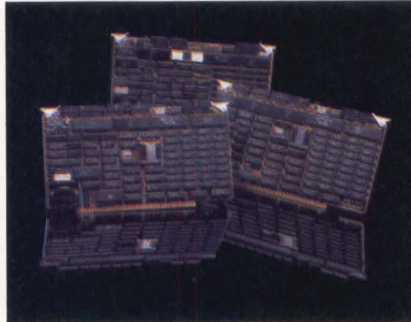
The one-chip K212 provides functions on a single chip which were previously only possible using many separate components. The new one-chip modem IC simplifies the design problem for users who are building modems for personal computer applications, and it is ideal for use in any self contained or integral modem system. The K212 provides exceptional performance under poor line conditions, and allows all Bell 212A operating modes.

For more information, contact: **Silicon Systems**, 14351 Myford Road, Tustin, CA 92680, (714) 731-7110, Ext. 595.



CIRCLE NO. 15 ON INQUIRY CARD

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Intercontinental Micro is shipping solutions today for all your S-100 BUS 16-bit and PC network needs.

Our products have always featured Direct Memory Access, Memory Management and Vectored Priority Interrupts to give you the fastest networks possible, bar none.

Of course, we also offer a complete line of 8-bit and interface/controller products as well as the sophisticated TurboDOS™ multiuser operating system.

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8MHZ 80186, 2 sync or async serial I/O channels, 20 parallel I/O lines, 256K RAM expandable to 1 megabyte, onboard floppy disk controller.

CPS-186-

10MHZ 80186, 4 sync or async serial I/O channels, 20 parallel I/O lines, 256K RAM expandable to 1 megabyte.

CPS-16-

8MHZ 8086, 256K RAM expandable to 1 Megabyte, 2 sync or async serial I/O channels, 20 parallel I/O lines.

LANPC-

Allows IBM PC/XTs,™ PCs or compatibles to integrate into TurboLAN,™ ARCnet™ and S-100 BUS networks.

LANS 100-

Build Zenith Z100,™ PC and S100 networks with simple installation.



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IBM PC, and XT are trademarks of International Business Machines, TurboLAN is a trademark of Intercontinental Micro Systems. ARCnet is a trademark of the Datapoint Corporation, Zenith Z100 is a trademark of the Zenith Corporation.

CIRCLE NO. 32 ON INQUIRY CARD

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See P. 76 for Mini-Micro Marketplace

Networking Software

| Company | Package name | Network | Network hardware interface | Computer/operating system compatibility | Required additional software | Price \$ | Function |
|---------|--------------|---------|----------------------------|---|------------------------------|----------|----------|
|---------|--------------|---------|----------------------------|---|------------------------------|----------|----------|

COMMUNICATIONS SOLUTIONS INC.

992 S. Saratoga-Sunnyvale Rd., San Jose, CA 95129, (408) 725-1568

CIRCLE 359

| | | | | | | | |
|------------------------------------|-----|-------------|--|--|--|-----|--|
| Access/BSC 3270 | BSC | synch modem | IBM PC and compatibles, MS-DOS, UNIX systems, proprietary multi-user and multi-tasking systems | | | 200 | allows IBM PC or compatibles, UNIX systems, or proprietary multi-user, multi-tasking systems to communicate to IBM hosts |
| Access/SNA 3270 Access/SNA 3770 | SNA | synch modem | IBM PC or compatibles, MS-DOS, UNIX systems, proprietary multi-user, multi-tasking systems | | | 200 | allows IBM PC or compatibles UNIX systems, proprietary multi-user, multi-tasking systems to communicate to IBM hosts |
| Access/SNA APPC Access/DIA | SNA | synch modem | IBM PC and compatibles, MS-DOS, UNIX systems, proprietary multi-user and multi-tasking systems | | | 200 | allows application programs to communicate with each other using IBM Advanced Program-to Program Communications (APPC/LU6.2) protocols |

CORVUS SYSTEMS INC.

2100 Corvus Dr., San Jose, CA 95124, (408) 559-7000

CIRCLE 360

| | | | | | | | |
|------------------|---------|---------------------|---|------------------|--|---|---|
| Constellation II | OMNINET | OMNINET transporter | IBM PC and compatibles, MS-DOS, Corvus Concept, Macintosh, Apple II | none | | 495(per network interface, includes Constellation software) | provides disk and printer sharing in LAN environment, supports network booting and file transfer via multiple operating systems on the same network |
| SNA Gateway | OMNINET | OMNINET transporter | IBM PC and compatibles, MS-DOS, Corvus Concept | Constellation II | | 5,000 | allows personal computer on OMNINET to access a mainframe SNA network, providing 3278 emulation, file transfer and program-to-program communication; implements all of the SNA layers and allows multiple active sessions |

COSI

313 N. First St., Ann Arbor, MI 48103, (313) 665-8778

CIRCLE 361

| | | | | | | | |
|-------|----------|--------|---|------|--|------------------------------------|--|
| Tango | Ethernet | RS232C | IBM PC and compatibles, computers with UNIX | none | | 195(PC package); 295(UNIX package) | connects IBM PC running DOS with UNIX-based micro- and minicomputers; emulates DEC, IBM, Tektronix graphics terminal |
|-------|----------|--------|---|------|--|------------------------------------|--|

DATA GENERAL CORP.

4400 Computer Dr., Westboro, MA 01580, (617) 366-8911

CIRCLE 382

| | | | | | | | |
|------------------|--------|---|---|--|--|--|---|
| Data General SNA | SNA | intelligent synch controller, synch modem | Data General AOS, AOS/VS | | APILU 2; SNA 3270, 3278 APL, RJE 80; Data General SNA, SDLC, XDLC | | implements SNA specifications |
| TCP-IP | TCP-IP | intelligent LAN controller | Data General AOS/VS, Data General UX (native mode UNIX) | | | | implements TCP-IP, Berkeley UNIX Version 4.2, Dept. of Defense specifications |
| XNS | XNS | | Data General AOS, AOS/VS | | | | implements XNS/ITP specifications |

DATAPOINT CORP.

9725 Datapoint Dr., San Antonio, TX 78284, (512) 699-7000

CIRCLE 362

| | | | | | | | |
|-----|--------|----------------------------------|---|--|--|--|---|
| RMS | ARCNET | resource interface modules, hubs | IBM PC, MS-DOS, UNOS, CTOS, Datapoint DOS | | | | provides full resource sharing and multi-tasking capabilities |
|-----|--------|----------------------------------|---|--|--|--|---|

NETWORKING SOFTWARE

Networking Software

| Company | Package name | Network | Network hardware interface | Computer/operating system compatibility | Required additional software | Price \$ | Function |
|---------|--------------|---------|----------------------------|---|------------------------------|----------|----------|
|---------|--------------|---------|----------------------------|---|------------------------------|----------|----------|

DIGITAL EQUIPMENT CORP.

200 Baker Ave., Concord, MA 01742, (617) 264-1420

CIRCLE 363

| | | | | | | | |
|--------|--------|-------------------------------------|------------------------------|--|--|----------|---|
| DECnet | DECnet | DEUNA, DEQNA, DMR-11, DZ-11 | DEC VAX-11, MicroVAX, MS-DOS | | | 95-4,425 | provides all ISO/OSI layers for communication between systems running DECnet |
| LAT | LAT | DEUNA, DEQNA, DECserver 100, LAT-11 | DEC VAX-11, MicroVAX | | | 150 | provides terminal to host connection and multiple sessions to any system on the LAN |

EXCELAN INC.

2180 Fortune Dr., San Jose, CA 95131, (408) 434-2300

CIRCLE 364

| | | | | | | | |
|-----------|----------|--------------------|--|------|--|------------------------------|---|
| EXOS 8011 | Ethernet | EXOS 205 | IBM PC/AT, XENIX | none | | 595 | allows an IBM PC/AT to communicate over an Ethernet, implements TCP-IP, TELNET, FTP and R utilities |
| EXOS 8012 | Ethernet | EXOS 201, 202, 203 | Berkeley UNIX Version 4.2, UNIX System V, Intel 286/310, NCR Tower, Integrated Solutions, Mostek | none | | 1,645 | allows UNIX-based, Multibus, VMEbus and Q-bus computers to communicate over an Ethernet, implements TCP-IP, FTP, TELNET and R utilities |
| EXOS 8040 | Ethernet | EXOS 203, 204 | DEC VAX/VMS, MicroVAX/MicroVMS | none | | 2,150 (MicroVAX); 5,000(VAX) | allows DEC VAX and MicroVAX to communicate over an Ethernet, implements TCP-IP, FTP and TELNET utilities |

INTEL CORP.

3065 Bowers Ave., Santa Clara, CA 95051, (408) 987-8080

CIRCLE 365

| | | | | | | | |
|-------------------------------------|----------------------|---|---|--|--|-----------------------------------|--|
| iRMX Networking Software (iRMX-NET) | OpenNET (IEEE 802.3) | iSBC 186/51, iSBC 552, iSBX 586, iSMX 552 | iRMX 86 | Intel iNA 960, iRMX 86 | | 2,000 (single-user license) | provides transparent remote file access and additional networking services among multiple Intel 286/300 series supermicrocomputers and IBM PC/XT/ATs and compatibles when combined with other Intel OpenNET LAN product modules designed for Ethernet LANs |
| MAP-NET | OpenNET/MAP 2.1 | iSMX 554 | iRMX 86 | iNA 960, iRMX 86 | | 2,000(8-user development license) | implements ISO's OSI layers 5 through 7 as specified by MAP 2.1, provides MAP 2.1 ISO FTAM, Session CASE, and Network Management Directory Services; preconfigured to run on Intel's iSMX 554 MAP board |
| XENIX Networking (XENIX-NET) | OpenNET (IEEE 802.3) | iSX 552 COMMEngine (Multibus board) | IBM PC/MS-DOS 3.1, iNDX, iRMX 86, MS-NET 1.0, XENIX 3.0 | Intel iNA 960 transport software XENIX 3.0 | | 2,000-2,800 (single-user license) | provides transparent remote file access and additional networking services among multiple Intel 286/300 series supermicrocomputers and IBM PC/XT/ATs and compatibles when combined with other Intel OpenNET LAN product modules designed for Ethernet LANs |

LINKWARE CORP.

77 Rumford Ave., Waltham, MA 02154, (617) 894-9330

CIRCLE 366

| | | | | | | | |
|------------------------------|--|-------------------------------------|--|------|--|------------------------------|--|
| Linkware: Information Server | DECnet, Ungermann-Bass and compatible LANs | asynch modem, Ungermann-Bass NIU150 | IBM VM/CMS, MVS/TSD, System 38; DEC VAX/VMS; UNIX System III, System IV, Berkeley UNIX Version 4.1 and 4.2 | none | | 12,000-35,000 (site license) | host resident file server application with corresponding PC software facilitates transfer and information sharing between dissimilar hosts, PCs and terminal users; includes bundled terminal emulation software |
|------------------------------|--|-------------------------------------|--|------|--|------------------------------|--|

Networking Software

| Company | Package name | Network | Network hardware interface | Computer/operating system compatibility | Required additional software | Price \$ | Function |
|-------------------------|--|-------------------------------------|---|---|---------------------------------|---|----------|
| Linkware: PC Connection | DECnet, Ungermann-Bass and compatible LANs | asynch modem, Ungermann-Bass NIU150 | IBM PCs and compatibles, DEC Rainbow, DECMate II, Apple Macintosh, DG/One, Lee Data 400 | none | 20,000 (unlimited site license) | microcomputer-resident application communicates with Linkware's Information Server on the host, enables PC users to upload or download binary and text data, makes files available to a terminal user (and vice versa) or exchanges files with an incompatible application, provides terminal emulation | |

MOTOROLA SEMICONDUCTOR PRODUCTS (MICROSYSTEMS)

2900 S. Diablo Way, Tempe, AZ 85282, (602) 438-3501

CIRCLE 367

| | | | | | | |
|----------|---------|---------------------------|-------------------------|--|--|---|
| MicroMap | MAP 2.1 | Motorola MVME371, MVME372 | any VMEbus-based system | | | allows any VMEbus-based system to communicate with MAP token bus protocol |
|----------|---------|---------------------------|-------------------------|--|--|---|

NESTAR SYSTEMS INC.

2585 E. Bayshore Rd., Palo Alto, CA 94303, (415) 493-2223

CIRCLE 383

| | | | | | | |
|-------------------------------|--------------------|--|------------|-------------------------------|------------------------------|--|
| Plan Series Utilities Program | Nestar Plan Series | Nestar Network Interface Card or Token-ring Adapter Card | IBM PC-DOS | Nestar PC-DOS support package | 1,000 (one-time license fee) | |
|-------------------------------|--------------------|--|------------|-------------------------------|------------------------------|--|

NETWORK SYSTEMS CORP.

7600 Boone Ave. North, Minneapolis, MN 55428, (612) 425-2202

CIRCLE 368

| | | | | | | |
|-------|------------------------|------------------------------------|--|------|-------------------------|---|
| Netex | HYPERchannel, HYPERbus | HYPERchannel adapter, HYPERbus BIU | IBM MVS/SP3, MVS/X3, VM/SP; DEC RSX-11 | none | 10,000-23,000 (license) | facilitates communication between different computers without requiring modification to the computer operating system |
|-------|------------------------|------------------------------------|--|------|-------------------------|---|

NOVELL INC.

748 N. 1340 West, Orem, UT 84057, (801) 226-8202

CIRCLE 369

| | | | | | | |
|------------------|--|------|--------|------|-------|--|
| Advanced NetWare | NetWare/G-net, NetWare/S-net, NetWare/ProNET, NetWare/ARCNET | none | MS-DOS | none | 1,595 | LAN operating system software supports multiple file servers, bridges, gateways, remote workstations and DOS 3.1 |
| SFT NetWare 286 | NetWare/G-net, NetWare/S-net, NetWare/ProNET, NetWare/ARCNET | none | MS-DOS | none | 2,495 | LAN operating system software supports multiple file servers, bridges, gateways, remote workstations and DOS 3.1; features disk mirroring, media correction and transaction back out |

PACER SOFTWARE INC.

1227 Pearl St., La Jolla, CA 92037, (619) 454-0565

CIRCLE 370

| | | | | | | |
|--------|-------------|--|--|------|---|--|
| pcLINK | proprietary | | Apple Macintosh, DEC VAX, IBM PC/XT/AT, Prime PRIMOS | none | 2,000(server software and up to five PCs) | microcomputer interconnect package for the Prime 50 Series and the DEC VAX; Apple Macintosh, IBM PC/XT/AT and compatibles are the target PCs |
|--------|-------------|--|--|------|---|--|

PATHWAY DESIGN INC.

One Apple Hill, P.O. Box 8179, Natick, MA 01760, (617) 237-7722

CIRCLE 371

| | | | | | | |
|---------|--|------------------------|--------------------------------|--|---|---|
| netPATH | SNA, NetWare, Etherlink, OMNINET, ProNET, PCnet, Quadnet | communications adapter | IBM PC, MS-DOS, Novell NetWare | | 3,995(32 sessions); 2,995(16 sessions); 1,995(8 sessions) | allows LAN PCs to operate on IBM SNA network, supports 32 concurrent sessions |
|---------|--|------------------------|--------------------------------|--|---|---|

PERKIN-ELMER CORP. (DATA SYSTEMS GROUP)

2 Crescent Place, Oceanport, NJ 07757, (201) 870-4500

CIRCLE 372

| | | | | | | |
|-------------|--------------|---------------|--------------------|------|-------------|--|
| PENnet Plus | X.25 ISO/OSI | synch adapter | Perkin-Elmer OS/32 | none | 2,300-7,000 | allows a Perkin-Elmer 3200 system to communicate over an X.25 or Ethernet IEEE 802.3 link, provides transport ISO 8072/8073 Class 3 service with program interface and routing functions |
|-------------|--------------|---------------|--------------------|------|-------------|--|

Networking Software

| Company | Package name | Network | Network hardware interface | Computer/operating system compatibility | Required additional software | Price \$ | Function |
|---|------------------------------------|--|----------------------------|---|--|--|--|
| PENnet Plus S3200X | X.25 ISO/OSI | | synch adapter | XELOS (UNIX System V) | none | 5,000 | allows a Perkin-Elmer 3200 system to communicate over an X.25 or Ethernet IEEE 802.3 link, provides transport ISO 8072/8073 Class 3 service with program interface and routing functions |
| PROTEON INC. 4 Tech Circle, Natick, MA 01700, (617) 655-3340 | | | | | | | CIRCLE 373 |
| MS-DOS TCP/IP | ProNET | ProNET p1300 | | MS-DOS 2.0, PC-DOS 2.0 | | 250 | provides terminal emulation to a ProNET MIU over the network, file transfers between PCs on other TCP-IP hosts |
| VM/CMS TCP/IP | ProNET | ProNET p1000, IBM DACU | | VM/CMS | IBM VMCF | 15,000-17,000 | provides TCP-IP for the VM/CMS environment, allows remote login and file transfer to occur with other TCP-IP speaking hosts on the ProNET ring |
| VAX/VMS TCP/IP | ProNET | ProNET p1000 | | DEC VAX/VMS | none | 6,000 | provides Berkeley UNIX Version 4.2 networking facilities on a DEC VAX/VMS system, compatible with all TCP-IP implementations |
| SPARTACUS INC. One Lowell Research Center, 847 Rogers St., Lowell, MA 01852, (617) 275-4220 | | | | | | | CIRCLE 374 |
| KNET | Ethernet | K-200 | | IBM VM, MVS; DEC VAX/VMS, PDP-11 | none | 12,000(one time license); 9,500(protocol conversion); 8,500(XNS) | allows an IBM mainframe to communicate over an Ethernet with IBM and non-IBM workstations and computers; implements both TCP-IP and XNS protocols; supports FTP, TFPT, SMTP and TELNET |
| KNET/PC | Ethernet | 3Com 500B | | IBM PC, MS-DOS, XENIX | none | 700 | allows IBM PC/ XT/ AT and compatibles to participate on Ethernet as a peer with other hosts on the network, provides remote logon and file transfer services |
| THE SOFTWARE LINK INC. 8601 Dunwoody Place, Suite 632, Atlanta, GA 30388, (404) 998-0700 | | | | | | | CIRCLE 375 |
| LANLink | | | none | IBM PC-DOS, PC-DOS 3.1 | | 495(starter kit) | allows users to set up a star central file micro or daisy-chain micros together |
| THE SYSTEMS CENTER INC. 1320 Greenway Plaza, Irving, TX 75038-2510, (214) 659-9318 | | | | | | | CIRCLE 376 |
| SNA Gateway | SNA, Corvus OMNINET | dial or leased line modem (4800 or 9600 bps) | | IBM PC, MS-DOS, Corvus CCOS | Network Datamover (PC and MVS), mainframe-to-micro link software | 18,500(MVS); 9,500(SNA Gateway) | provides gateway from OMNINET to IBM mainframes, allows IBM PCs and Corvus Concepts to emulate IBM 327X terminals and mainframe- to-micro data transfer from host MVS mainframe to IBM PC on OMNINET |
| TECHNOLOGY CONCEPTS INC. Old County Rd., Sudbury, MA 01776, (617) 443-7311 | | | | | | | CIRCLE 377 |
| CommUnity | DECnet Phase IV | | | Berkeley UNIX Version 4.2, System V; MS-DOS | | 50,000 (end node); 75,000(full routing node) | packet orientated network structure with gateways to foreign networks, adaptive routing, file access and transfer, virtual terminal interface |
| TORUS SYSTEMS INC. 495 Seaport Ct., Suite 105, Redwood City, CA 94063, (415) 363-2418 | | | | | | | CIRCLE 378 |
| TAPESTRY | any IBM NETBIOS-compatible network | IBM NETBIOS, XNS | | MS-DOS 3.1 | none | 495(network manager package); 295(per workstation) | icon-based interface features gateways to mainframes; file, printer and modem sharing, file management |

Networking Software

| Company | Package name | Network | Network hardware interface | Computer/operating system compatibility | Required additional software | Price \$ | Function |
|---------|--------------|---------|----------------------------|---|------------------------------|----------|----------|
|---------|--------------|---------|----------------------------|---|------------------------------|----------|----------|

TRANSACTION DATA SYSTEMS INC.
7061 Grand National Dr., Orlando, FL 32819, (305) 351-1210

CIRCLE 379

| | | | | | | | |
|------------------------|-------------------------------|--------------------------------|--------------------------|--|--|--|--|
| Freedom Network System | PNF (Packet Network Facility) | asynch, bisynch protocols; SNA | Perkin-Elmer 3200 Series | | | | backbone packet network supports multiple priority levels, transaction switching |
|------------------------|-------------------------------|--------------------------------|--------------------------|--|--|--|--|

UNIPRESS SOFTWARE INC.
2025 Lincoln Highway, Edison, NJ 08817 (201) 985-8000

CIRCLE 380

| | | | | | | | |
|---------|-------------|---|------------------------|--|---|--|--|
| PCworks | proprietary | IBM PC, Apple Macintosh, Hayes Smartmodem | IBM PC, MS-DOS | | 195 | | allows sharing of data between IBM PC, Apple Macintosh or UNIX hosts, emulates standard ANSI, TTY or DEC VT52, VT100 terminals |
| UniHost | proprietary | Bell 103, 212A, Hayes Smartmodem | DEC VAX, UNIX, MC68001 | | 395(workstations); 595(MC68K); 795(VAX) | | allows sharing of data, supports ASCII and binary file transfer |

Information was solicited but not received from the following manufacturers:

| | | | | |
|---|---|---|---|---|
| Bridge Communications 1365 Shorebird Way Mountain View, Ca 94043 (415) 969-4400 | Honeywell Information Systems Inc. 200 Smith St. Waltham, MA 02154 (617) 895-3247 | Innovatek Microsystems Inc. Smithfield Rd. Millerton, NY 12546 (914) 373-9003 | Network Research Corp. 2380 N. Rose Ave. Oxnard, CA 93030 (805) 485-2700 | Orchid Technology 47790 Westinghouse Dr. Fremont, CA 94539 (415) 490-8586 |
| Gateway Communications Inc. 16782 Redhill Ave. Irvine, CA 92714 (714) 261-0762 | IBM Corp. 900 King St. Rye Brook, NY 10573 (516) 934-4839 | Metapath Inc. 222 Lincoln Center Dr. Foster City, CA 94404 (415) 345-7700 | Northern Telecom Inc. 9705 Data Park Minneapolis, MN 55343 (612) 932-8153 | Unisoft Systems Corp. 739 Allston Way Berkeley, CA 94710 (415) 644-1230 |

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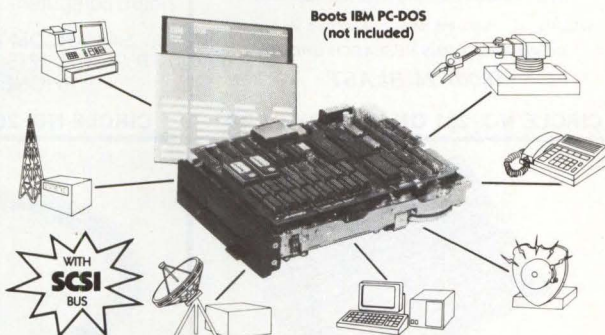
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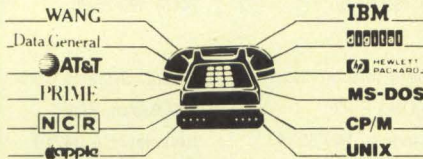
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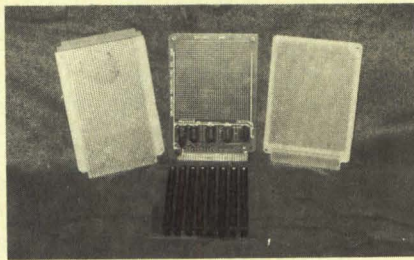
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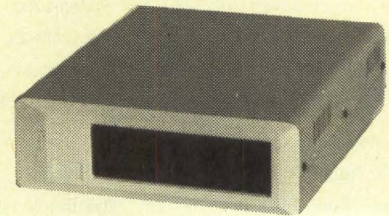
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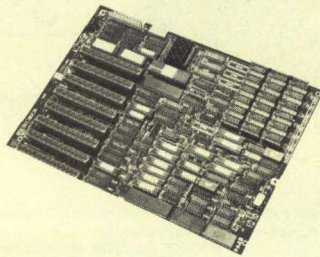


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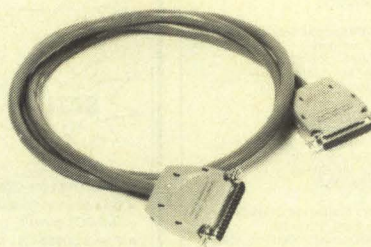
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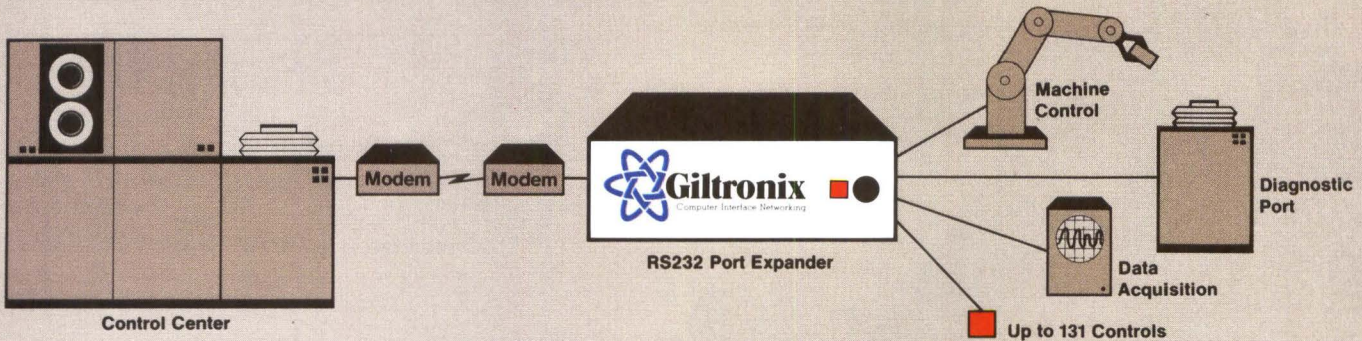
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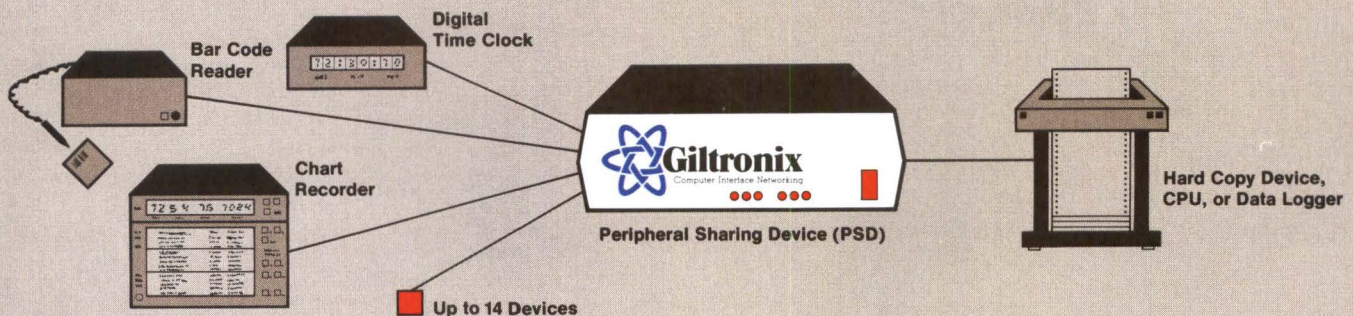
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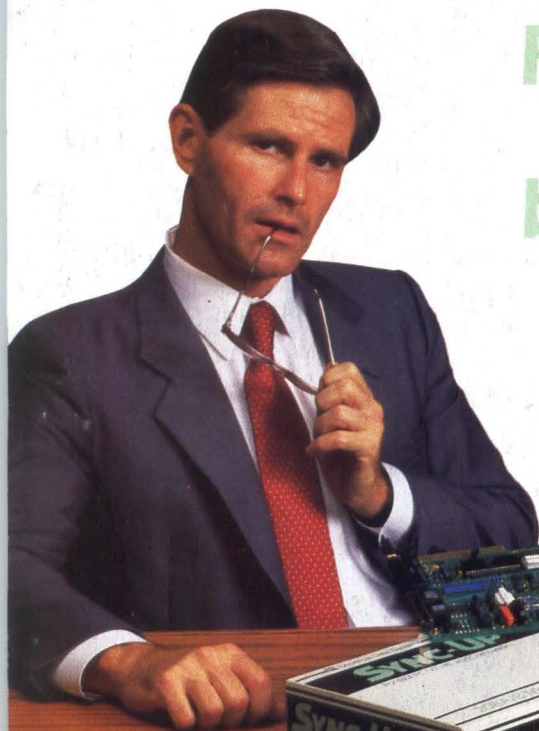
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For micro-to-mainframe or micro-to-micro bisync communications



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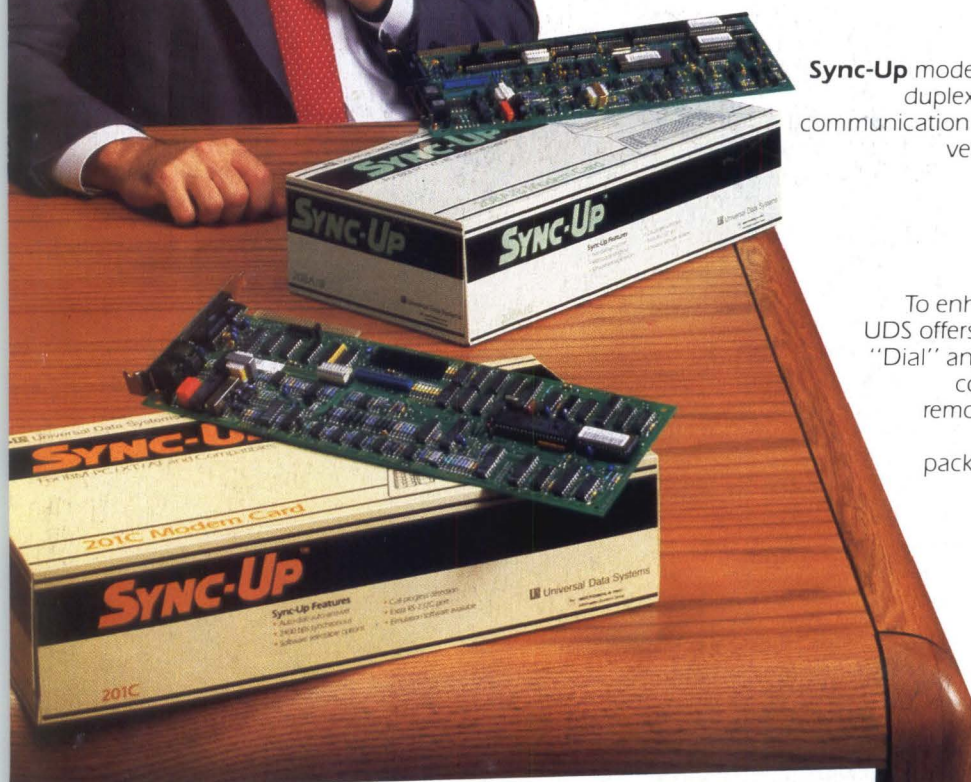
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Sync-Up modems are available in two models: 201C for half-duplex 2400 bps and 208B for 4800 bps half-duplex communication via the dial-up telephone network. 4800 bps version is strappable to the 208A configuration, which delivers full-duplex capability on four-wire dedicated lines.

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To enhance the performance of **Sync-Up** modems, UDS offers two custom software packages — **Sync-Up "Dial"** and **Sync-Up "BSC"**. "Dial" exercises complete control of the device until connection with the remote modem is achieved; control is then shifted to the RS-232C interface. "BSC" is the ideal package for micro-to-mainframe or micro-to-micro communication, since it fully emulates either a 2780/3780 or a 3270 terminal.

For full details and quantity prices on the **Sync-Up** hardware/software packages, contact UDS today. Universal Data Systems, 5000 Bradford Drive, Huntsville, AL 35805. Telephone 205/837-8100; Telex 752602 UDS HTV.



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| QUANTITY ONE PRICES | 201C | 208A/B |
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| With "Dial" Software | \$685 | \$1200 |
| With "BSC" Software | \$895 | \$1410 |
| Without Software | \$625 | \$1140 |

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