DATAPOINT

MARKETING
NEWS

Zenith ARCNET Local Area Network Driver/Receiver Announced

DATAPOINT has recently announced that the LAND hybrid component for the DATAPOINT® ARCNET™ RIM (Resource Interface Module) designed and manufactured by Zenith under a non-exclusive license will be commercially available from Zenith CRT and Components Operations.

A complement to the RIM and transceiver chips already available through Standard Microsystems Corporation, the LAND replaces 30 discrete components. In addition, it provides the link interface between the controller and the transmission cable in the interface module for the ARCNET network.

Designed to facilitate the manufacturing and quality control process as well as to reduce costs, the new line driver/receiver hybrid provides the circuitry required to interface the controller to the baseband coaxial serial data link. In a 1 3/8'' by 2'' compo-

nent, the LAND provides the necessary noise immunity and filtering for interference-free transmission on the coaxial cable.

With the Standard Microsystems Corporation RIM chip and the new Zenith LAND, only the design of the processor interface is required to take advantage of the ARCNET networking technology. The public availability of the new LAND hybrid is yet another step forward in making the ARCNET network easily accessible by non-DATAPOINT equipment. Zenith will feature the LAND hybrid at the National Computer Conference in Anaheim, California in May.

ARCNET
DATAPOINT first introduced the ARC® (Attached Resource Computer®) local area network in 1977. Since then more than 5,000 DATAPOINT local area networks have been installed worldwide. Since

1981, when DATAPOINT made the RIM (Resource Interface Module) chip commercially available, vendors like Nestar and Tandy have taken advantage of the ARCNET technology to provide networking for IBM personal computers, Apple II and III computers, and the TRS-80 Model II, the TRS-80 Model 12, and the TRS-80 Model 16 computers.

With the new Zenith LAND, more vendors are expected to take advantage of the proven DATAPOINT local area network. Zenith CRT and Components Operations is a leading manufacturer of CRT displays, switching power supplies, and other high technology components for the electronics industry.□

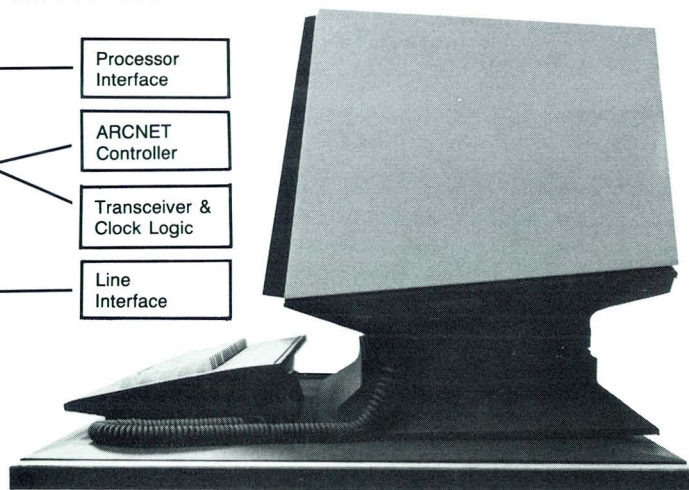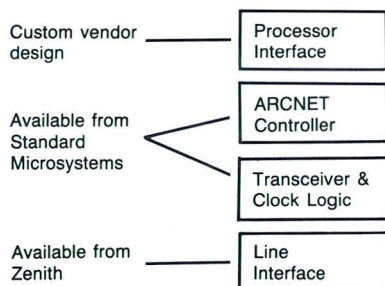## Holland Named Vice President, Sales/Systems

David H. Holland has recently been appointed Vice President, Sales/Systems for the company's Office and Computer Products Group. In his new position, Holland will be responsible for domestic sales and systems organizations, educational and customer training activities and national accounts.
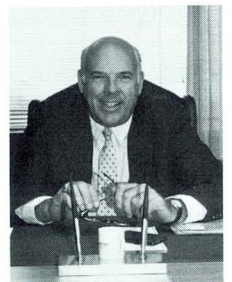
Holland comes to DATAPOINT from Xerox Corporation, where he held various sales, marketing and sales management positions. Joining Xerox in 1965, his most recent position was midwest regional sales manager for the Business Systems Group.

A graduate of Michigan State University, Holland has a bachelor's degree in Business.□

ARCNET Interface Module

Custom vendor design	Processor Interface
Available from Standard Microsystems	ARCNET Controller
	Transceiver & Clock Logic
Available from Zenith	Line Interface

With the Standard Microsystems RIM (Resource Interface Module) and Transceiver chips and the new Zenith LAND (Local Area Network Driver), any vendor can take advantage of the proven DATAPOINT ARCNET local network by designing only the processor interface.
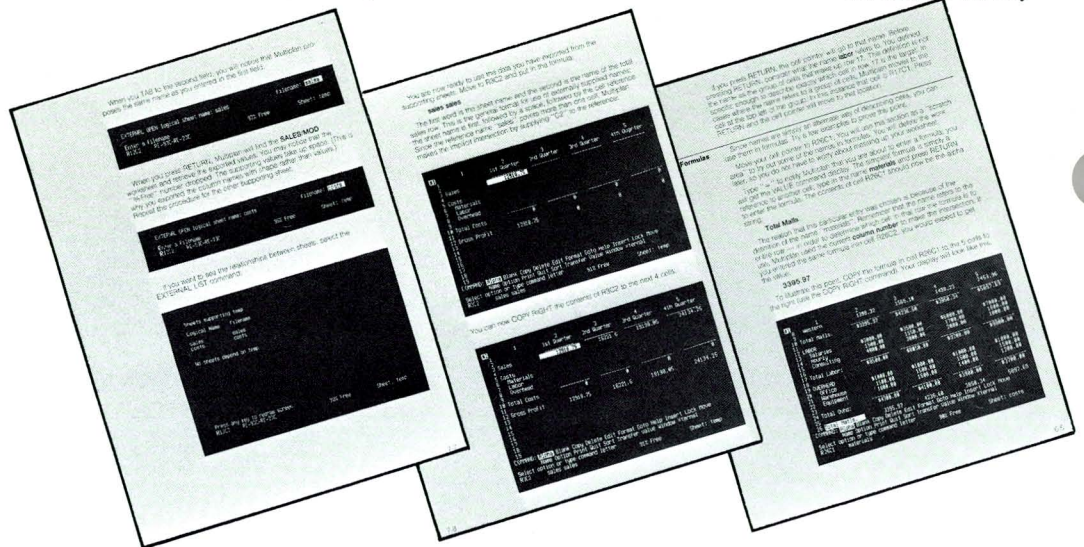
Multiplan 1.2 Available

Multiplan, the DATAPOINT financial modeling package, has been enhanced and is now available for RMS™, DOS.D/DOS.G, and DOS.H. The RMS version, Multiplan R 1.2, was released with RMS 1.10, while the DOS-based versions-Multiplan D 1.2 and Multiplan H 1.2 have just been released. The

In addition, Multiplan now releases all of the temporary storage space used during expression evaluation, thereby avoiding some of the previously unwarranted "insufficient memory" conditions.

A new COPY option allows a cell VALUE to be exported, as well as cell

Model Description	Code	Price
Multiplan R 1.2 software (RMS)	9873	*
Multiplan D 1.2 software (DOS.D, DOS.G)	9854	*
Multiplan H 1.2 software (DOS.H)	9874	*
Multiplan R Manual 1.2	50758	$25.00
Multiplan D Manual 1.2	50757	25.00
Multiplan H Manual 1.2	50731	25.00
Multiplan R Kit (50758 + 61300)	50770	25.30
Multiplan D Kit (50757 + 61300)	50771	25.30
Multiplan H Kit (50731 + 61300)	50772	25.30
Multiplan Quick Reference Guide	61300	.30
Multiplan Brochure	61415	1.35
Multiplan Mailer	61326	.25

*Media must be ordered separately. There is a one-time software license fee of $1500 for RMS Multiplan, unless the order for the software accompanies an order for a DATAPOINT processor. Monthly maintenance for RMS Multiplan is $20. There is no software license fee or monthly maintenance fee for DOS Multiplan.

new version contains many new features, functions and enhancements over the original DOS-only Multiplan 1.1.

New Functions
Functions added to the newly released 1.2 versions include standard deviation, factorial, compound interest, internal rate of return, sum-of-years digits and double-declining balance methods of depreciation, text centering and several Boolean functions. Some of the enhancements in Multiplan 1.2 address the spreadsheet size and memory limitations of version 1.1. The newly released software provides an additional 1K of work space, increasing the potential sheet size from 18K to 19K.

CONTENT. Copying with values takes less space and permits a user to export values to another sheet and then break the external link. Also, more information about named areas and supporting worksheets is now provided when PRINTing with expressions. Extraneous import and export information can be identified and removed, thus saving space.

Additional Enhancements
The linking process in Multiplan has been enhanced. More about the powerful linking feature will appear in an upcoming issue of *DATAPOINT Marketing News*, but here are highlights of the newest version. Export specifications are defined when cells or groups of cells are NAMEd, combining two previous steps into one.

Also, EXTERNAL OPEN now allows convenient unlinking of sheets. There is no limit to the number of sheets which one worksheet can support. A TRANSFER LOAD of a worksheet will reflect the changes made to these immediately supporting sheets. There is no defined limit to the number of levels of supporting worksheets, but each sheet maintains information up to 26 levels of its supporting sheets. TRANSFER UPDATE recalculates and updates through these 26 levels of

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> **"An EXTERNAL LIST now displays information on whether or not supporting sheets are up to date, along with the relationships between worksheets."**

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worksheets. An EXTERNAL LIST now displays information on whether or not supporting sheets are up to date, along with the relationships between worksheets. TRANSFER SAVE now performs a "failsoft" operation by writing a temporary file.

Several enhancements have been made to the PRINT function. Multiplan 1.2 saves print margin specifications in each /MOD file. Either a print file or a text file may now be generated, and the new version allows non-contiguous areas to be printed, such as column one, column four, and column six.

Complementing the new Multiplan software is new user documentation. Multiplan manuals for each version are available, as are kits which contain the manual and a Multiplan Quick Reference Guide. Here are the model codes and prices for Multiplan software and documents.□

Buffie Wise
Ext. 7151

The 9621/2 printer provides a high degree of functionality and reliability. Other features make this printer an ideal output device for many applications.
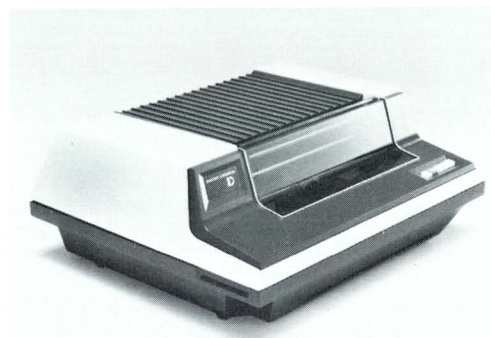
Price Schedule Update

There are four product additions in the remanufactured section of the new U.S. Price Schedule. These include the 9022, 9020, 9605 and 5556 systems. Maintenance, installation and cost for each item has been listed below for your convenience.

There are also a number of deleted products which will be handled by special quotes through the Pricing Department. If you require additional information, call Mike Hoke, Traditional Equipment Marketing, at extension 5119.□

Mike Hoke
Ext. 5119

Remanufactured Equipment -- Product Additions						
Model Code	Maint.	Install.	List	4-10	11-25	26 +
5566	188	200	5200	4940	4836	4680
9605	16	40	1550	1473	1442	1395
9020	2	25	475	451	442	428
9022	14	25	495	470	460	446

Color Business Graphics Enhances Sales Presentations

If you have a Color Business Graphics system available in the office, then you have a valuable sales tool at your disposal. There are numerous presentations available for use on the CBG system. The following are some of the presentations that have been prepared on CBG:
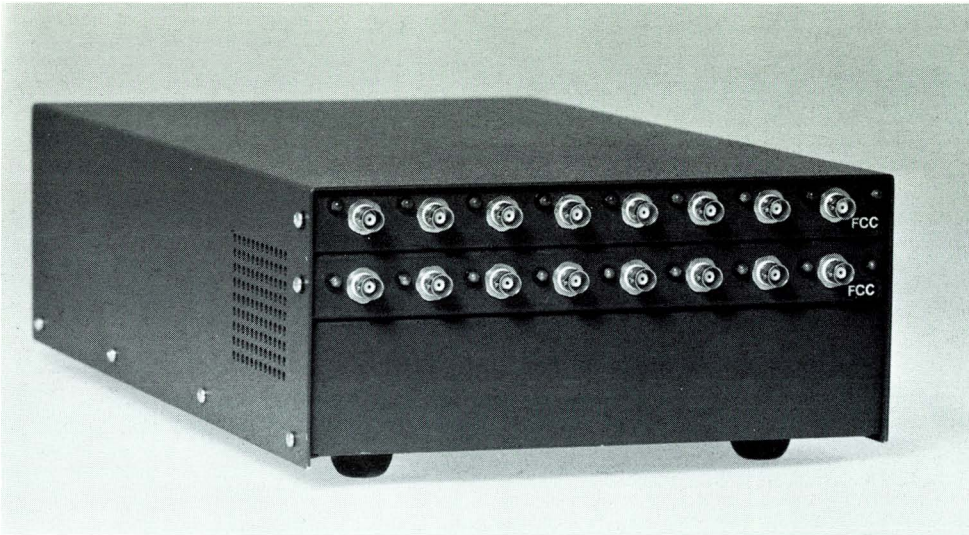
- The Datapoint Corporate Overview
- 8600 Hardware Configuration Guide
- 1560 Sales Presentation
- CDR Sales Presentation
- CBG Sales Presentation
- LDCS Presentation
- ACD Presentation
- Multiplan
- Networking
- REP/OEM Program

If you're giving a sales presentation within the office, you can use the CBG monitor as your presentation medium. You can "customize" the sales presentation by including the company's logo and financial data charted from their annual report. Use font 5050 to draw proposed hardware configurations. If your presentation is at a customer site, you can output the information to slides.

By using CBG to prepare these sales presentations, you will increase the customer's perception of your professionalism while emphasizing the fact that DATAPOINT is indeed the leader in integrated electronic office systems. No other competitor has a product comparable to the CBG. It may be just the edge you need to close that sale.

For additional information, call Debbie Pena, Product Line Management, at extension 5327.□

Debbie Pena
Ext. 5327

Product Spec for 160 CPS Matrix Printer Revised

The 9621/2 printer product specification sheet (#60793) has been revised and is currently available through Software Services. Many of the changes made to this document pertain to the command options for character control functions (i.e., expanded fonts and compressed print).

New users of the 9621/2 printer, particularly those utilizing the 0061 expanded font option, should obtain the 1983 revision of this document. All systems engineers responsible for supporting 9621/2 installs should acquire a copy also.

The 9621/2 160 CPS matrix printer is a mature product in the DATAPOINT printer line. It provides functionality and a high degree of reliability. Utilizing a 9 x 9 matrix character format, the 9621 offers:

1) expanded font.
2) compressed print.
3) double density printing (near letter quality).
4) a prom option for creation of custom design fonts.

These features, in conjunction with a moderate level duty cycle, make the 9621/2 an ideal output device for many applications. For example, program development environments and applications that require printing of shelf labels have found the 9621/2 to be a very desirable device.

Additional information can be obtained by contacting Jim Moore, Product Manager (Product Marketing) at extension 7151.□

Jim Moore
Ext. 7151

The hub is a very simple means of keeping a baseband communications network functioning at full capacity.

Hub Aids Networking Functions

A lot of print has been devoted to the workings of the ARCNET local network, with little having been said of the "HUB." Everyone probably has a fair understanding of what the RIM controller does for the ARCNET network, but the hub is not always fully appreciated for its contribution to the network. Let's look first at the difficulties in tying a number of nodes together in a network.

Whenever a transmission line (an ARCNET coaxial cable) is terminated, the possibility for a reflection from that termination exists. (A reflection is, in the simplest terms, a portion of the transmitted energy which is unabsorbed at the termination. This unabsorbed energy can't just go away, so it turns around and travels back towards the transmitter.) If a termination was perfect, it would be able to absorb all the transmitted energy; unfortunately, the perfect line termination has yet to be built.

To make matters worse, if the line is terminated improperly (we're talking about a situation that's really bad -- like the coax being connected to absolutely nothing), reflections can approach the original signal in intensity. A transmission line was never intended to be tapped (that means intercepting the signal in the middle of the cable). Attempting to do so usually results in the worst kind of difficulties imaginable -- severe reflections and diminishing signal intensity with each additional tap.

Handling Line Reflections
So what does all this have to do with our wonderful hub? When a distribution scheme was being considered for the network under development in R&D some seven years ago, the pro-

blem of line reflections was the number one item on a list of problems to be overcome. If one is willing to live within certain constraints regarding the placement of taps along the cable, it is possible to tap a coaxial cable and "survive" the reflections. This is what the architects of ETHERNET have done.

Initially, this type of scheme was considered in DATAPOINT Reasearch and Development for the ARCNET local network. It was quickly discarded. Instead, the idea of having one or more "hubs" in the system was proposed. One of the main requirements of this hub is that each of the ports must look like an "ideal" tap -- that is, the signal quality and strength should not diminish as the number of ports increased, and each port should be able to supress any reflection. A bus exists internal to the hub, linking all the ports together. Coupling the ports in this manner allows the ARCNET network to circumvent the traditional difficulties of a baseband distribution system.

In a nutshell, the hub's operation can be described as follows:

When a port detects any incoming activity, the circuitry within the hub inhibits the transmitter portion of that port and disables the receiver portion of the other ports. This condition is maintained within the hub for a calculated period after the detection of any activity on the port with the incoming data. (The period is the time it takes a transmitted signal to propogate down 2000 feet of RG62 cable and reflect back.)

What has been done, in fact, is to turn off the hub receivers during any time that a reflection can occur. A minimum turnaround exists in the RIMs, guaranteeing that the hub "dead time" will always exist. This sort of scheme

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"The very nature of the hub-type architecture enhances the ability to isolate a problem within a system."

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can only exist in a network that is contention free -- CSMA/CD cannot support a HUB in its architecture.

Isolate Problems
A secondary, although probably more noticable, aspect of the hub architecture is its ability to isolate problems. The very nature of the hub-type architecture enhances the ability to isolate a problem within a system. By concentrating all the nodes within a small area (as is done in an ARCNET system), the system troubleshooter has enhanced his ability to analyze a problem many times over.

A lot of time and space can be spent describing exactly how the hub accomplishes these marvelous feats, but the point I'm really stressing is that the hub is considerably more than a handy way to tie a bunch of coax lines together. It is a very simple, very elegant means of keeping a baseband communications network functioning at full capacity without the worries of proper cable lengths and proper terminations. It is as much a part of the success of the ARCNET local network as the token passing protocol carried out in the RIM controller. It is, in every sense, the focal point of the physical network.□

**Ed Bertness
Ext. 7151**
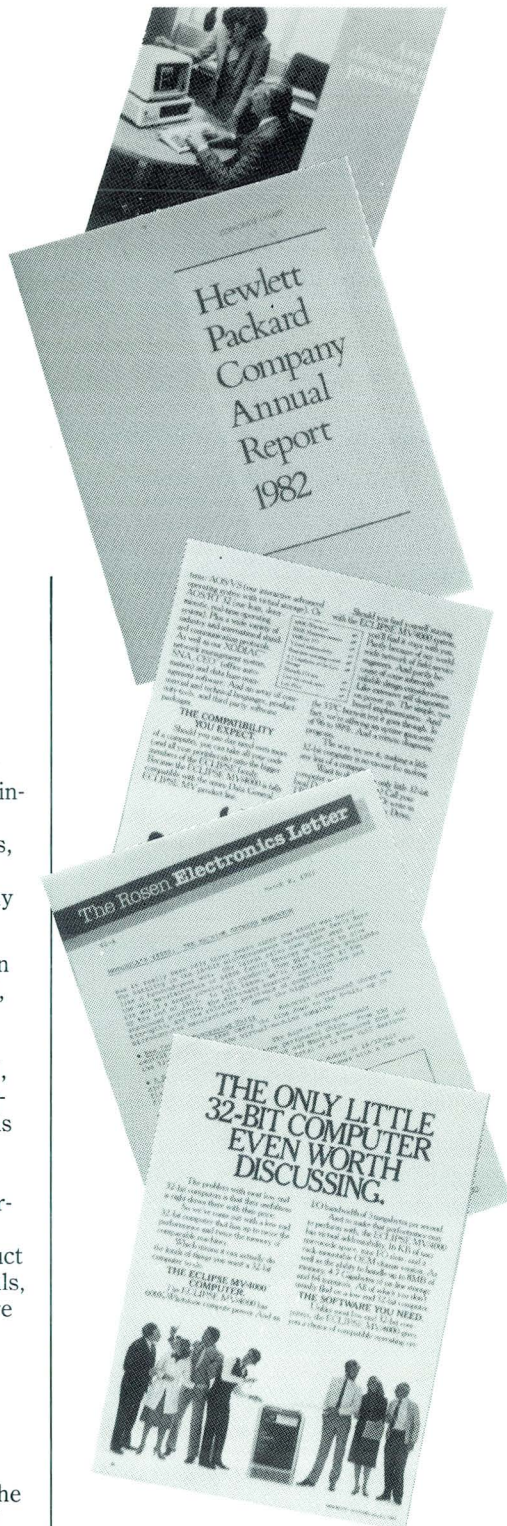
What the Competition Tells Us

When evaluating the industry's competition, there are many sources for information: consultant reports, articles in newspapers and magazines, trade shows, advertisements, press releases, annual reports, and company publications.

DATAPOINT participates with seven other companies (Data General, IBM, Mohawk Data Services, Pertec, Raytheon, Wang, and Texas Instruments) in a program called EPAI, Exchange of Publicly Available Information. The program functions in this way: each company exchanges two copies of each of their "publicly available" publications with other participating companies. In this way, DATAPOINT is able to obtain product specifications, price lists, user manuals, new product announcements, software catalogs, customer bulletins, and reference manuals from other companies.

Maintaining Information

As a result of the EPAI program, DATAPOINT has excellent files in the Corporate Library on the products of each of these seven companies. For companies that do not yet participate in EPAI, financial information, press releases and brochures are requested directly.

As the Corporate Library develops its internal indexing systems, access to the contents of these EPAI materials will be enhanced (beyond filing by product number). This is an important achievement, especially when information is required on products which DATAPOINT is competing heavily against.

EPAI is an important resource for field personnel, both for answering direct questions about competitor products and as a support resource for our competitive analyst, Frank Bell, who is available to assist you in evaluating the competition.

Susan Hughes
Ext. 7151

Price Schedule Utilizes New Codes

For the first time the U.S. Price Schedule (pink sheets) will include the use of status codes for remanufactured equipment. Utilizing status codes for all equipment allows Traditional Equipment to move the 9504 Card Reader into status five.

Status five is reserved for remanufactured products that have been restricted to specific customers only. Purchase prices and delivery quotations are available on request by calling Traditional Equipment Marketing at extension 5119.□

J.J. Vanderbrink III
Ext. 5119

Special Prices Promoted

Traditional Equipment Marketing (TEM) is presently promoting a special program. This program offers competitive pricing on the following products: 1532s, 1536s, 1802s, 1804s, 4520s, 9367s, 9231s, 9232s, 9602s, 9280s and 9260s.

If you are involved in a competitive situation and any of these products can help meet your objectives, we can quote special prices and ASAP delivery dates.

Special bonuses will be paid to SRs, SSRs, SMRs, AMs and OSMs on these selected products. These bonuses are in addition to the normal field incentives for refurbished equipment. "TEM Special Project Code 81" must be included on orders for payment of Schedule A Bonuses.

TEM is looking for ways to help meet your objectives. Give us a call at extension 5119.□

Larry Elliott
Ext. 5119

Serial Printers Attach to RMS

DATAPOINT offers a wide range of printers to meet speed, duty cycle, and print quality requirements of user applications. This article will take the mystery out of connecting a major subset of these printers (those with "serial interfaces") to both local and remote processors running RMS.

When Computer Terminal Corporation (DATAPOINT) introduced its initial desktop computer back in 1972, the DATAPOINT parallel "I/O Bus" was born. This parallel interface served to connect all peripherals, even the keyboard/screen, to the central processor for high-speed data transfer. This architecture was continued as the processor and peripheral product line expanded during the 1970s. As technology has progressed, additional interfaces have developed to increase connection distances and reduce cable sizes and cost. The interface of particular interest to our printer discussion is the "serial interface."

"Serial" implies that data characters are serialized and transferred bit by bit rather than being presented one character at a time as in the parallel interface. The serial interface implemented by DATAPOINT printers (EIA RS-232C) permits data transfer at approximately 960 characters per second at distances up to fifty (50) feet over small, inexpensive "twisted-pair" cable. The chief advantage of serial printers is the freedom of physical placement given by this increased cable length, and the reduced cabling size and cost. The parallel interface is still needed when higher transfer rates are required (i.e., 900 LPM printer).

Local Connections

Under the Resource Management System, serial printers can be used as "system" printers in exactly the same manner as parallel printers. An RMS system printer can be used directly by all manner of RMS systems utilities, word processing, Multiplan, user programs, etc. The user simply configures RMS to recognize the serial printer and specifies the connection means and speed. Local printers are generally configured for the top speed of 960 characters per second (i.e., 9600 bits per second), and physically attach to the system as illustrated (Fig. 1).

Processor	Interface Options
8600	"KDS" Serial Port (Built-in)
	-OR-
	MPCA Card (Option #0103)
8800	MPCA Card (Option #8806)
6600	MPCA Interface (9462)
3800	ICA (Built-in Depending on Model)

RMS Serial Printer Interfaces (Fig. 1)
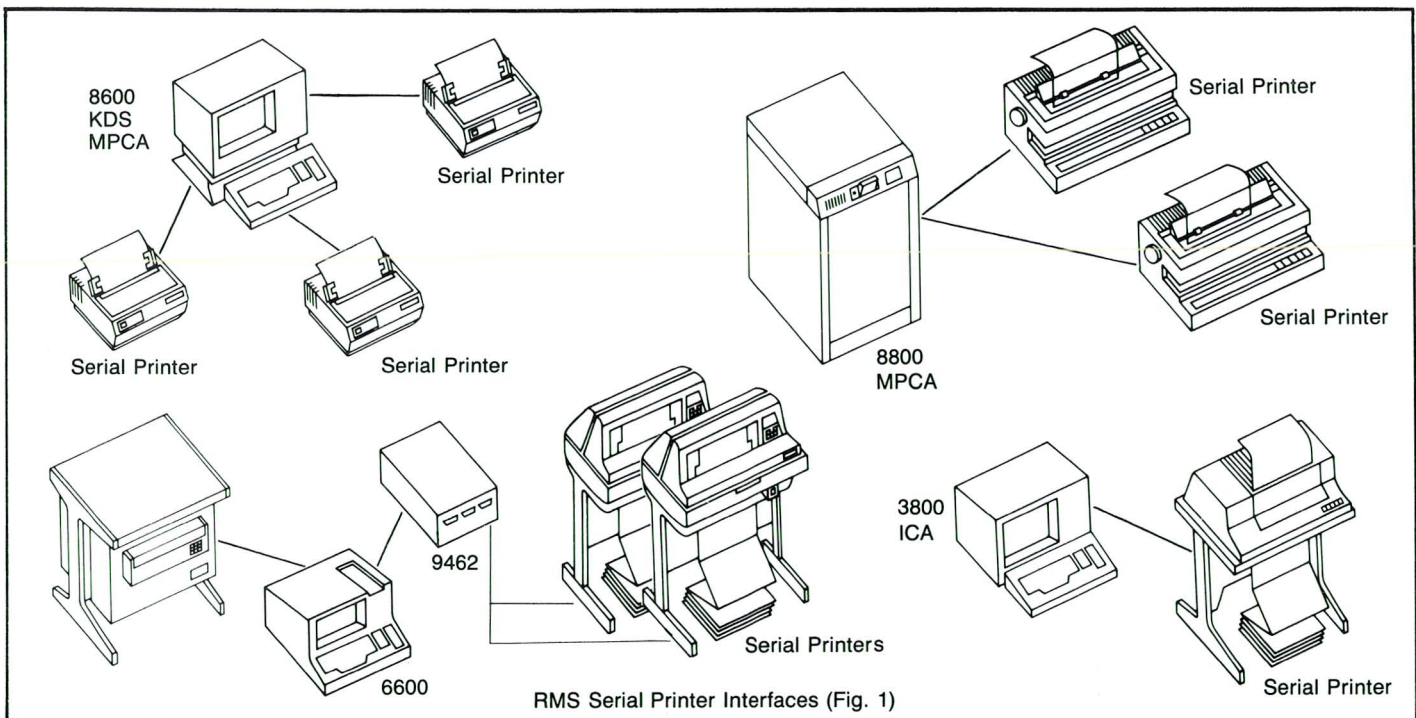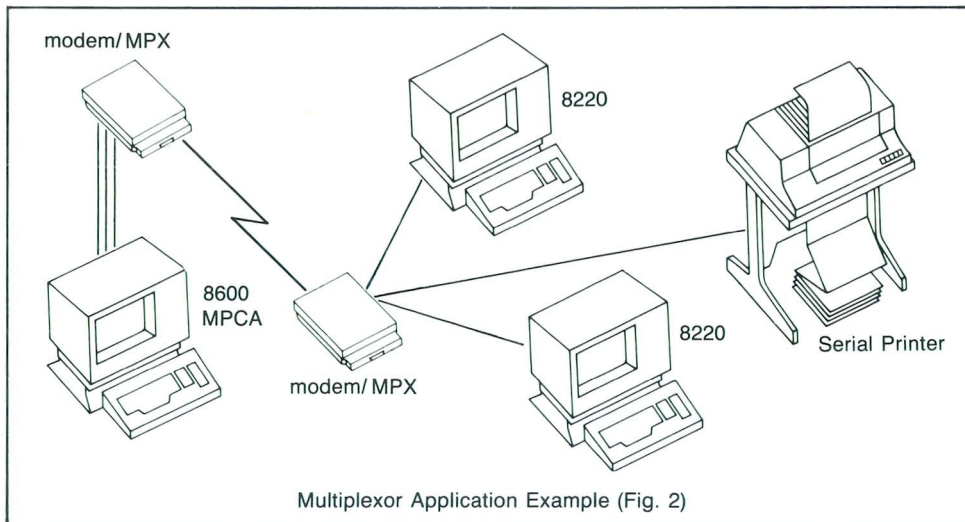
Multiplexor Application Example (Fig. 2)

Each 8600, 8800, and 6600 MPCA allows four, eight, and eight serial printers to be attached, respectively. Multiple MPCAs can be used if required, up to a physical maximum of three MPCAs. However, the 3800 (3815, 3820) ICA permits only one serial printer to be attached. 8800, 6600, and properly equipped 3800 systems can also attach parallel printers if required.

So now that you've got a 35 CPS printer attached to your 8600, how do you make it print at 960 CPS? You don't! Instead, the 35 CPS printer informs the processor when it can accept more data via a "BUFFER NOT FULL" indicator. The "BUFFER NOT FULL" indicator is cabled to the processor's interface as a "CLEAR TO SEND" signal. All of our serial

> **"As characters are printed and the buffer begins to empty, the printer raises the "BUFFER NOT FULL" indicator again and the processor can resume sending data to the printer."**

printers are able to accept a considerable number of characters into their "buffer storage" prior to actually printing them.

When this buffer fills, the printer simply drops its "BUFFER NOT FULL" indicator to signal the processor's software to temporarily suspend transfer of more characters. As characters are printed and the buffer begins to empty, the printer raises the "BUFFER NOT FULL" indicator again and the processor can resume sending data to the printer.

Remote Connections
The local RMS system printer connections described above work if the

printer can be placed within 50 feet of the processor. But what if the printer is across the building or even in another city? To permit the serial data to reach such a remote serial printer via telephone lines requires additional equipment -- modulator/demodulators. Modems, as they are known, convert the serial data stream to and from audible signals that can be transferred by the telephone system. They make the remote serial printer behave as if it were locally attached . . . ALMOST.

Unfortunately, hooking up remote serial printers IS NOT like playing horseshoes. Even though the transfer rate is generally much slower (i.e., 120 CPS) than that of local printers, it still surpasses the print rate of many of our serial printers. This problem is particularly evident when the proportion of paper movement commands (i.e., line feed, form feed) is highly relative to actual printed characters or when operator intervention is required (i.e., out of paper). With local printers this problem is avoided by using the serial printers "BUFFER NOT FULL" indicator to signal "CLEAR TO SEND" to the processor. Unfortunately, standard modems cannot transfer this indicator. (Fig. 3)

Dedicated Lines Never Die
Don't despair, since solutions DO exist! If the cost of a dedicated communications line can be justified, standard modems can be combined with non-standard cables to solve the problem. Modems transfer data by altering (i.e., modulating) a carrier tone or signal. The presence or absence of this carrier signal is monitored by the receiving modem, and is provided by the modem as a "CARRIER DETECT" indicator. Normally this signal is cabled to the processor's interface as "CARRIER DETECT" and when this signal drops,

the software effectively "hangs up" the telephone connection. However, in our case this signal is cabled to the processor's interface as "CLEAR TO SEND."

The remote serial printer's cabling is then designed to tell the modem to raise/drop its carrier tone as the printer's buffer empties or fills. Specifically, the printer's "BUFFER NOT FULL" signal is cabled to the modem as "REQUEST TO SEND".

> **"The communications protocol which drives ANY serial printer does not provide for correction of errors introduced into the data as it goes from the processor interface to the printer."**

Thus, via a little slight of hand (i.e., special cables), a remote serial printer can be connected to a processor via dedicated lines and standard full-duplex asynchronous modems (i.e., DATAPOINT 9478/9479, Bell 212, etc).

Another possible approach involves the use of third party "black boxes" which fit on the processor/printer ends of the modems and provide large buffer capacity (i.e., 32 to 64K) and magically "pass" the printer buffer status to the processor. Such devices are relatively inexpensive (i.e., $300 at each end) and avoid the need for specialized cabling.

One thing that must be considered when serial printers are hooked-up is error control, or more specifically, the lack of same. The communications protocol which drives ANY serial printer (whether it is local or remote) does not provide for correction of errors introduced into the data as it goes from the processor interface to the printer.

RMS—Remote Serial Printer Connection (Fig. 3)
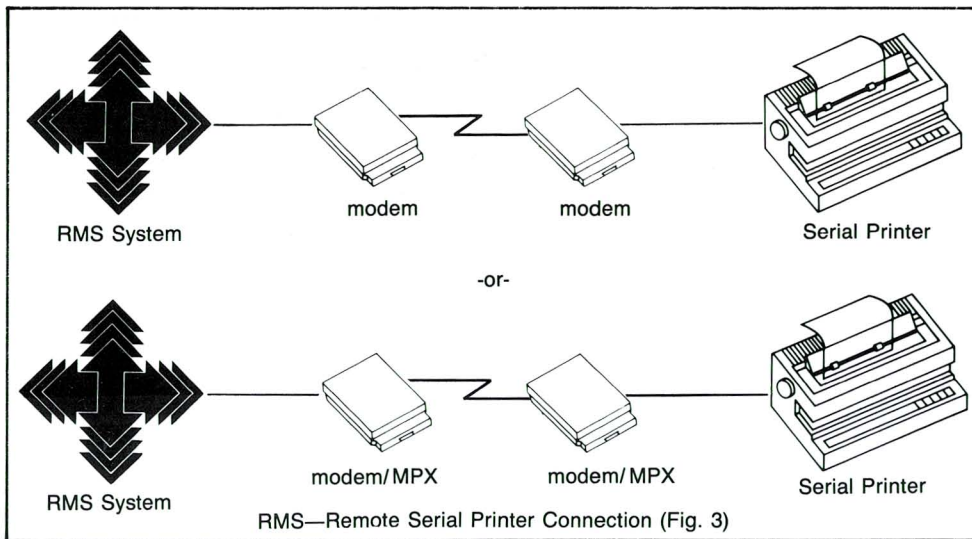
Although it is very unlikely, it is possible that loose connections, physical disturbance of the printer cable, electrical disturbances, etc., can cause even a local serial printer to receive (i.e., print) data other than what was sent by the processor's program. While you might find this beneficial if the the printer put an amount of $9347 instead of the intended $2347 on your check, Accounts Payable would fail to see the humor! For extremely critical data, overprinting is a consideration. Errors induced on the first printing would be printed over with different data on the second pass, thus giving clear visual indication that an error had occurred.

Since the likelihood of a significant induced error is considerably higher for remote serial printers, techniques such as overprinting should be strongly encouraged when faithful reproduction is critical. Alternatively, the multiplexor approach described below can be used on the dial or dedicated line to reduce the probability of induced error to the same low level as that of local serial printers.

Multiplexors to the Rescue
Another marvel of technology is the key to solving the dial-up problem -- THE MULTIPLEXOR. A multiplexor (MPX) typically combines the function of a high speed modem (i.e., synchronous) with the function of logically splitting this high transfer rate capability to attach multiple lower-speed devices such as printers or terminals. In the example shown in Figure 2, several printers and terminals are connected to an RMS system via a single dial-up line. Depending on the sophistication (i.e. $$) of the multiplexor, a remote printer will consume one or two ports on the multiplexor.

The basic principle behind the printer and processor cabling for multiplexors is to allow the remote serial printer's "BUFFER NOT FULL" indicator to transfer to and control the processor's "CLEAR TO SEND" indicator. Numerous advantages are gained by

> **"Display and print rates can be improved dramatically, and error-free transfer of data is guaranteed."**

using multiplexors. Besides reducing the number of communication lines and modems required to connect a group of remote users to the system, many multiplexors provide high speed, error-checked transfer to and from these users. Display and print rates can be improved dramatically, and error-free transfer of data is guaranteed (unlike the normal teletype protocol).

Dedicated lines are fine for many applications, but they can be expensive in situations where printer usage is light. What about using the standard dial telephone network? If you attempt the dedicated line solution for dail-up remote serial printers, the printer can make the connection just fine. Unfortunately, you cannot make the processor's "CARRIER DETECT" signal go away to tell the software to hang up the telephone. Even if you could, RMS would not disconnect the phone since it doesn't know that remote serial printers exist! This means that if your user wants to connect remote serial printers to RMS vial dial-up phone lines, he must manually disconnect the call at the processor end when he's through printing.

It Can be Done
Serial printers CAN be interfaced to RMS, both in local and remote situations. Remote serial printers connected

via dedicated lines require special cabling or "black boxes" to accomplish the connection. Remote serial printers can be similarly connected via dial-up lines but this will require the user to manually disconnect the call at the processor end. Multiplexors provide additional benefits in terms of speed and error correction. More details on multiplexors can be found in the Dispersed Data Processing Handbook (Model Code –61379, pp II 1.11-1.12). More details on cabling can be found in Software Operations News –25, Chapter Seven.□

Terry McDaneld
Ext. 7151

New Director for Guest Services

In case you haven't heard, Guest Services has a new Director -- Al Colley. Previously Director of Customer Education, Colley brings several years of customer relations experience to his new position.

Colley will report directly to Jim Whitehouse, who now holds the position of Staff Assistant to David R. Fernald, Vice President of Marketing. In this position, Whitehouse will assist Fernald in a variety of marketing functions. In addition, he will retain responsibility for the President's and Achievement Clubs.

We are excited about the changes and hope you will continue to give your support to this department.□

Rebecca Savage
Ext. 7376

Multi-Volume Copying on DOS.H

Have you ever had the need to copy a file residing on a 93XX disk system to a diskette when the file is larger than 1MB? As you know, it doesn't fit.

With the release of DOS.H 2.7, you have the ability to do that copy. The COPY command has an option that
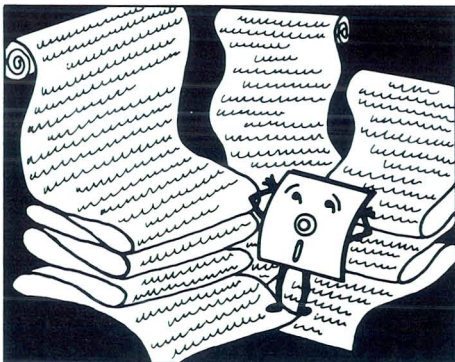
allows multi-volume copies to or from diskettes; however, it only works with 93XX disk systems, not diskette to diskette. If you have a file that is in excess of 1MB in size and you wish to copy it to diskettes you can enter:

COPY<filename>,<new filename>;M

This starts the copying process to the diskette; when the diskette is full, it continues the copying to the next diskette that is online. If you want the same diskette drive to be used throughout the copy you simply add a drive specification to the M option.

Restoring to the disk from the diskette is done in exactly the same manner. Specific details are in the DOS.H Users Guide.

Another application of this is for backing-up disks to diskettes. Using LOAD15 is a fast and simple way to perform back-ups; however, if sectors have become locked out on the disk since the last backup, LOAD15 is unable to properly restore the disk. If

you back-up with the following procedure, the problem disappears (though it will be slower):

- Run FILES on the disk with the output to a file. Edit the file into a chain file by inserting COPY before each file name, adding a drive specification to direct the output to the diskette, and adding the M option to each line. Noe run the chain file. It may be slower, but if sectors get locked out on the disk you can still restore it from your back-up.

Let's clarify one point. The M option allows any file that may overflow the diskette to be continued onto another diskette. The file does not have to be larger than 1MB, and the diskette the file is being copied to can even have files already on it. The new file will simply be added to it. You need never see "FILE SPACE FULL" during a COPY from disk again.□

Darrell Deam
Ext. 5520

Crandell Named Director of Production Operations

Edward C. Crandell has recently been appointed director, production operations for the company's manufacturing division. Reporting directly to John Novack, plant manager, Crandell will be responsible for the production and test operations within the plant.

Crandell joins DATAPOINT with 29 years of experience in manufacturing engineering, materials, production and general management. His most recent position was vice president and general manager for a division of Joy Manufacturing.

A graduate of the University of Arkansas, Crandell has a bachelor of science degree in Industrial Engineering. In addition, he holds an MBA from Oklahoma City University.□

Purchase Upgrade Program Revised

The Purchase Upgrade Program (PUP) has been revised to show only one (1) conversion:

Conversion Type	Definition	Conversion Revenue Value
A	Purchased 5500 traded in for purchased 6600	$6,000

The Purchase Upgrade Program is now a straight purchase for purchase program. Please note the new price that is now in effect.

Ordering procedures for PUP will stay the same. When ordering, make sure code number "06" is designated in the Special Project Code section on the Equipment Order Schedule (EOS). Also, write "Purchase Upgrade Program" in the Special Instructions area on the EOS. This will ensure that the order is being processed properly. In addition, the serial number of the processor being traded in should be identified on the order.

Customers should be made aware that Traditional Equipment is on an "as available" basis; therefore, product availability may vary day-to-day. Before quoting lead times for Traditional Equipment, please call Traditional Equipment Marketing for current availability. Also, if there is a delay between quoting lead times to your customer and your customer actually signing the order, please call again for verification of equipment availability. This will be of benefit to you in the long run and will ensure customer satisfaction.□

Gerry Mulligan
Ext. 5119
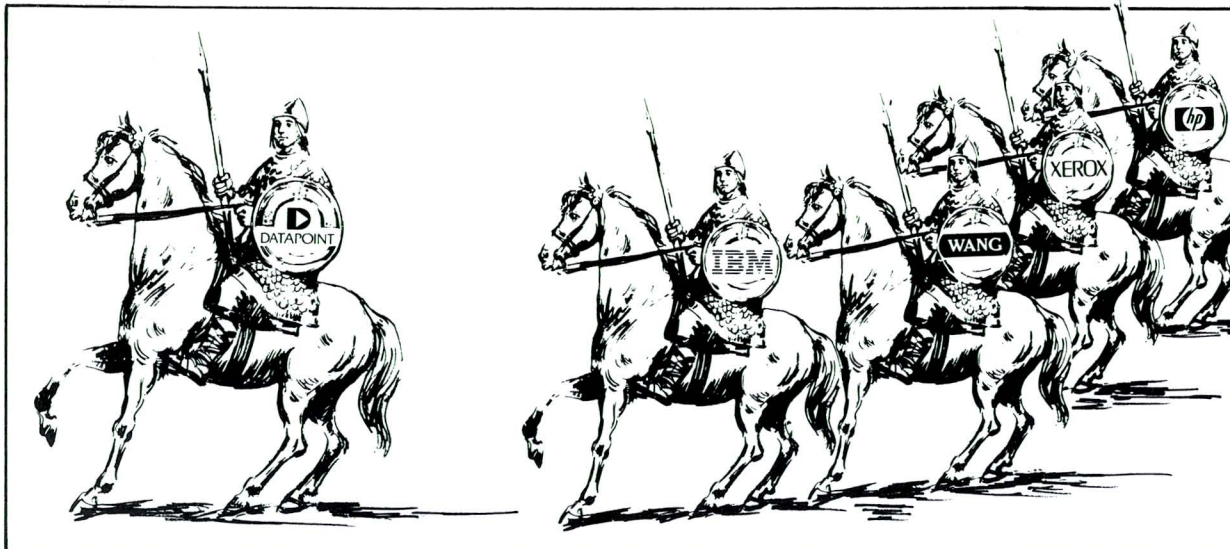
A Competitive Look at the Automated Office

During the last two years, we have been buried under mountains of press and trade articles and blitz advertisements announcing the emergence of such "new" technologies as Office Automation, Local Area Networks, Multifunction/Multitasking workstations and Personal Computers.

In terms of user perception and market share, the leaders in the office automation marketplace are IBM, Wang and

> **"Most of these companies have made dramatic announcements stating the redirection of their research, development and marketing activities toward the automated office."**

DEC, respectively. Competing for fourth place are DATAPOINT, Data General, Prime, Honeywell, Burroughs, Sperry, Hewlett-Packard, NCR, and further down the list, Xerox, Four Phase, Basis Four and a host of others. Most of these companies have made dramatic announcements stating the redirection of their research, development and marketing activities toward the automated office.

A Closer Look
Let's take a look at Office Automation as offered by IBM and DEC. IBM's statement of direction is probably best depicted with the 8100 Distributed Office Support System.

The 8100 Series is intended primarily as a local data processing system run in conjunction with large 370-type mainframes in distributed environments. Its "new direction" software is really the key to the 8100 in distributed situations. Three systems software programs provide office automation functions under the DPCX (Distributed Processing Control Executive) operating system. DOSF (Distributed Office Support Facility) provides local document word processing and storage facilities. DISOSS (Distributed Office Support System) offers electronic mail and filing support in conjunction with a central host system and AAACX (DPCX Automated Administrative Activities) handles calendar/schedules, telephone messages, sign out/in and scratch pad features.

The 8100/DPCX DOSF/DISOSS/AAACX processor with at least 768K of main memory and 58MB of disk is required to "distribute" office automation abilities to its workstations. The processors range in price from $68,440 to $125,450 and the system software required comes to about $1200 in monthly license and support charges. As is typical with IBM, a special dedicated terminal is required for specific functions. The 3732 Text Display Station (at $3628) is required to display text and access any of 29 embedded control functions. Of course, if you want to change the embedded format controlled by DOSF, you will need an 8775 Display Terminal with Interactive Display Text Facility (IDTF). It ranges from $4,733 to $5,791, depending on how many ROM programmed utilities you order with it.

If the user wishes to add more "distributed processing" capability to his mainframe, IBM will be glad to supply the 5520 Administration System which integrates word processing, files processing and electronic mail functions. It also includes the ability to use Displaywriters and Personal Computers as workstations. This is needed since the 5520 does no data processing and supports no programming languages. The price for the 5520 processor averages $50,000 plus $389 a month software license fee.

Now, the popular Displaywriter ($6,500) and Personal Computer ($3,500) workstations can be added.

> **"Like IBM, DEC has attempted to get a free ride into the automated office by using its existing base of pre-office automation computers as a ticket."**

What is the cost per workstation? About $15,000 (if you already have an S-370 mainframe and $150,000 if you don't) for a 16-workstation setup, without printers or disk storage.

Other Alternatives
Now let's look at DEC, since we can't afford IBM's solution to the integrated, distributed office. Like IBM, DEC has attempted to get a free ride into the automated office by using it's existing base of pre-office automation computers as a ticket. In previous years, DEC has introduced several standalone attempts at wproviding machines for the office, most of which were less than successful. Since it's statement of redirection was made in 1981, DEC has decided on two ways to integrate the office; Professional microcomputers and/or office automation software.

DEC's latest announcement "All-in-1*" is basically a menu-driven package of

improved versions of the VAX* software offered previously. The package is aimed at professionals and managers. Included are a desk calculator, on-line phone directory, calendar management and automatic meeting scheduler, electronic file cabinet and WP features including laser printer support, a query language and graphics. Nice, but how much does it cost?

As usual, DEC prefers to package hardware and software when it sells All-in-1, making the low end minimum VAX 11/730 with software $93,000; however, you can buy the software for $29,000. The top end is left to the imagination, but if terminal and printer support and basic communications are desired the CPU complex and software could easily exceed $250,000.

Applicable All-in-1 workstations include DECmate* word processors ($4,000), Professional Computers ($5,000) or intelligent terminals ($2,500—$4,000). In order to access

> **"Such common features (to DATAPOINT) as resource sharing, modular growth path, common instruction set, low cost expandable local area network, etc. are still on the drawing board or in evaluation."**

such utilities as DECmail* (EMS), word processing, networking (DECnet*/Ethernet) and All-in-1, three operating systems need be employed: VMS on the VAX, P/OS on the workstation and the RSX-11 control program, total software cost about $45,000 or $2000 a month. What is the cost per workstation -- about $17,000 without printers or disk storage. Keep trying!

Still Trying

If it hasn't struck you yet, the fact is that IBM and DEC, along with Wang, Data General, Burroughs and a host of others are spending big bucks and many man hours attempting to come up with an integrable system capable of supporting the most basic requirements of office automation. Such common features (to DATAPOINT) as resource sharing, modular growth path, common instruction set, low cost expandable local area network, etc. are still on the drawing board or in evaluation.

Resources are available if you are interested in knowing more about the current offering of our larger competitors, such as:

IBM -- DISOSS, DIA, DCA, local area network, administrative systems, etc.

DEC -- All-in-1, Professional computers, DECnet

Wang -- Alliance*, Professional Computers, Wangnet*

If there are any other "innovative" developments you may hear about, please let us know. Up-to-date information is usually available through one or more of the resources that are available through the Corporate Library, competitive analysis in Product Marketing, and the Small Business Computer Division.□

**Frank Bell
Ext. 7151**

*All-in-1, VAX, DECmate, DECmail and DECnet are trademarks of Digital Equipment Corporation. Alliance and Wangnet are trademarks of Wang Laboratories.

New Software Handbook Available

The Software Ordering Handbook (model code 61170) has been revised to reflect current policies and procedures. Major changes include incorporation of the new Software & Documentation Internal Order Form (model code 60601), recognition that the Software Order Form has replaced the Software Order Schedule as the preferred customer order form, and removal of the Supplies section. In addition, the entire text has undergone a general dusting off to tighten up prose and remove inconsistencies and redundancies.

In case you're not yet familiar with the Software Ordering Handbook, it's purpose is to reflect the forms and rules for the easiest ordering and delivery of software. The material is based on input from the field as well as the home office. The Software Ordering Handbook is part of the Software Ordering Guide (model code 61120) which also contains the latest Software & Documentation Price Schedule and Software Catalog.

The last page of the Software Ordering Handbook is a Reader Suggestion Form. The use of this form is encouraged, especially if there are new topics which you feel should be added or if you see something that "isn't done that way here."□

**Carolyn Lusk
Ext. 7151**

Understanding ARCNET Token Passing Concepts

In the April issue of *DATAPOINT Marketing News*, we considered access methods for local area networks. In this article, we will discuss the total ARCNET token passing concept. DATAPOINT has held this information as proprietary (until September 1982) in order to protect our position as the leader in local area networking. We are still the leader in this technology, but the introductions by other vendors are confusing many customers.

This confusion is impeding the adoption of our proven network. The disclosure of the ARCNET network has enabled a wider acceptance of our proven techniques and helped ebb any migration to other networks. Anyone who installs an ARCNET network becomes a potential market for DATAPOINT equipment and more important, the DATAPOINT ARC local area network!

Conventional Token Passing

Conventional token passing networks are usually based on the regeneration of messages at each node in a ring configuration. This technique suffers from hardware reliability and, consequently, will destroy the entire network with a single point failure. Some implementations provide a dual system with a double ring and double system controllers in order to provide system reliability. Of course, the user must pay for these extras.

The DATAPOINT token "passing" technique differs significantly from conventional token passing and ring regeneration techniques. The token, and all traffic, is presented to the cable such that all connected devices actually receive entire transactions. This technique is known as the broadcast access method (BRAM).

Intelligence at each node allows only the information destined for that node to be interpreted. Only messages with the proper address are actually accepted by the node interface. By utilizing this technique, the problem of a single break in a ring is totally eliminated. The BRAM technique removes the structural limitations imposed by a ring or loop network. Signals are broadcast over any free-form, physical layout; therefore, the break of any single node cannot destroy the network.

To enable such a system to operate properly, other considerations must be understood. In order to ensure each node receives the token in a timely fashion, the token must be addressed to each possible station on a network. Each active address must wait for the token and, when a message transaction is completed, must pass the token to the "next" addressed node. A tech-

> **"Intelligence at each node allows only the information destined for that node to be interpreted."**

nique which allows the addition or deletion of a node(s) at any time must be accommodated (dynamic configuration). Messages must be acknowledged when transmissions are completed, including detection and re-creation of lost tokens. In addition, a system must meet the electrical conditions which connect a large unstructured topology.
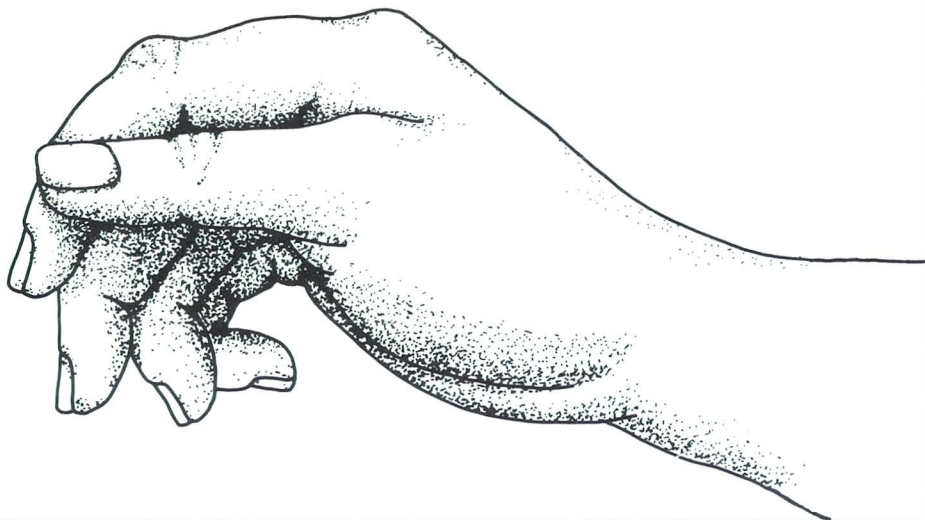
The DATAPOINT ARCNET local network meets all the requirements for a successful token passing "ring" network. The ARCNET network is a bus topology with "stars" at any points along the bus route and with minimal structure constraints. It operates logically as a ring -- the token always circulates in a predetermined path, based on the current active nodes, and returns to each station in a known sequence. This structure is what makes it appear to be a logical ring.

Understanding the System

To understand the actual "workings" of the ARCNET network, it is best to follow a system through its various message and configuration generations. Assuming a steady state of operation, a new node is attached to the network (or a station applies power). This action causes a message to be injected onto the bus, which destroys any traffic or tokens currently being exchanged. The RECONfiguration burst is recognized by all interface units (RIMs) as an alert. Next, all RIMs enter the RECON mode of operation. This action takes place whenever the bus has been idle for a period of time corresponding to loss of the token in a network. If any node does not receive a token in a predetermined time (corresponding to a maximum system with each station transmitting a maximum length message), a RECON is generated.

Each unit establishes a time which is based on its specific RIM address. The RIM with the highest address will time out first and assume initial control of the network. That RIM will then broadcast an INVITATION TO TRANSMIT to itself. This establishes the RIM as the highest numbered in the system and alerts all other RIMs that the reconfiguration has begun. The RIM then waits for a period of time after transmitting (the time re-

quired for any message to be carried from one end of a four mile cable and back).

Following this wait, the RIM sends an invitation to the next RIM and continues until an acknowledgement is received. The address of this Next ID

"The total time required for a system reconfiguration is dependent on the number of active RIMs and the physical length of the network."

(NID) is retained by the RIM for future token passing. (This saves time previously wasted in inviting non-existent RIMs to participate.) This results in the establishment of a "ring" that will be followed as each RIM transfers control via the Invitation To Transmit (Token).

Reconfiguration Time
The total time required for a system reconfiguration is dependent on the number of active RIMs and the physical length of the network. To speed up the process and decrease transmission delay times, RIM addresses must be assigned as geographically sequential. A typical system reconfigures in 50,000th of a second.

When a node leaves the network, reconfiguration is not required. Only the previous node needs to know of the deletion, and this is handled automatically when the token is not acknowledged by the departed node. The previous node then begins a search for the Next ID in the recofiguration process and establishes a new NID address.

Once a node has the token, the right to initiate a data transfer to or from the node is activated. The controlling station transmits a Free Buffer Inquiry to the destination node. This eliminates cluttering the network with transmissions that can't be received. The receiving node replies with either an ACKnowledgement indicating it is ready to receive the packet, or a Negative ACKnowledgement (NACK) denying accessibility.

The possibility of no response is handled by establishing a wait time period. (Just as in the RECON, this is the time required for a transmission to travel four miles to the furthest possible node and return). If the inquiry is acknowledged, then the node in control of the network sends the data packet.

Confirmation
Each data packet is appended with a cyclic redundancy check character (CRC) which is a logical combination of selected bits in the data packet. The receiving station calculates the CRC based on the data received and sends an ACK only if the CRC is correct. CRC failure will result in a NACK being sent.

The implementation is such that the control station must relinquish the token to the NID node after one message is transmitted. The time involved will prohibit the node from retaining the token. In addition, the other RIMs will force a recofiguration if the token is not passed within a specific time. This ensures each station is given an equal chance to participate in the network at specific intervals.

So, in a system with ten active nodes, each node will have the token over 3,500 times each second (if no messages are sent). It will have the token 172 times per second if every node sends a 100 byte message each time. If only one station is sending messages in this ten processor system,

it will be able to send 1,200 messages per second or 120,000 bytes per second.

Token passing networks have been proven to work reliably. Concerns regarding single point failure, installation, maintenance and service have been answered by the ARCNET network implementation. DATAPOINT provides the best network for totally deterministic data transfer in a dispersed data processing system. Design maturity has eliminated the "bugs" that are still to be discovered in new, emerging technologies. Other vendors are beginning to recognize this potential and are implementing their processors to attach to an ARCNET-type network.□

Al Malinger
Ext. 7151

8600 Configuration Guide Revised

The second edition of the 8600 Sales Configuration Guide (model code #61535) is now available from Software Services. This printing has eliminated some minor errors. Also included are new model codes for cables and new maximum supported cable lengths.

The 8600 Sales Configuration Guide contains diagrams, model codes and pertinent information regarding 8600 configurations. It is proving to be a valuable sales tool. If you have any suggestions for future revisions, please call Sam Walker or Philip Abdouch in Product Marketing at speed 799 (extension 7151).□

Philip Abdouch
Ext. 7151
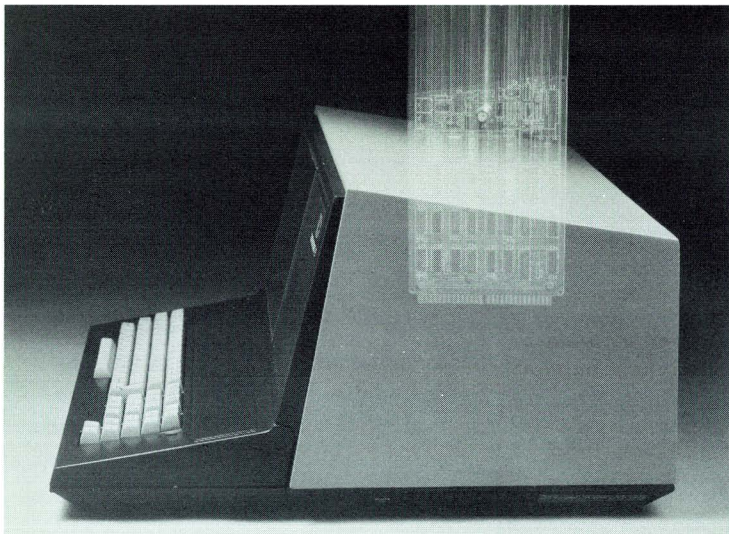
A 1560 system with an ARCNET interface card can actively participate in a DOS D ARC local area network.

DOS.D ARC -- The 1560 as an Applications Processor

Many of you may be skeptical, but it is true -- the 1560 can actively participate in a DOS.D ARC local network. A 1561 applications processor can do it. So can any 1560 system with an ARCNET interface card. In many cases, this is an extremely attractive solution for your customers.

Just how does it work? In the situation where your customer has an existing DOS.D ARC system installed and

> **"The 1561 must be initially MOUNTed from the 1560 file processor; subsequent MOUNTs may be from either 1560 FPs or from DOS.D FPs."**

wants to add several multi-function workstations, the 1560 may be just the ticket. Add a single 1560 file processor (a 1565 or 1566 with 128K and an ARCNET interface card) to the ARC local network and as many 1561 applications processors (AP) as are needed (within the 255 processor limit, of course).

Software

All of the DOS.H software must reside on the 1560 file processor (FP). This includes the operating system itself, and all "/CMD" code -- IEOS, Multiplan, DS1500, communication emulators, utilities, etc. The 1561 must be initially MOUNTed from the 1560 file processor; subsequent MOUNTs may be from either 1560 FPs or from DOS.D FPs. Note: IEOS support under ARC15 is scheduled for release in calendar Q3 FY83.

Machine level code (/CMD) must be loaded from the 1560 FP; everything else can come from the DOS.D FP.

This means that you can load the DATASHARE interpreter (DS1500) from the 1560 FP and execute DATABUS programs directly from the DOS.D FP against data files on the DOS.D FP. You can even execute code directly from the DATASHARE library on the DOS.D FP and use the /ISI files there, too.

Other Uses

The same holds true for IEOS and Multiplan. Load the software from the 1560 FP and execute it against files on the DOS.D FP. The IEOS libraries and Multiplan worksheets are the same ones that are used by DOS.D APs running the same software.

Communication emulators are loaded from the 1560 FP. The data is transmitted from, or received onto, the DOS.D FP. Application program source code is kept on the DOS.D FP and EDITed on the 1561. They can even be compiled on the 1561 using DBCMP15 -- just don't expect to use AIM™, or any of the other DS6 features that are not supported on the 1560.

Alternatives

Of course, there are situations when the 1561 is not a viable alternative to the 8600. For instance, the 1561 does not support COBOL, AP3270 or DS3270. Nor does the 1561 support more than four DATASHARE stations. It cannot convert to RMS, although it can function as an RMS workstation by using EM820015, which should be released shortly.

But at $3,995 for a 128K processor, the 1561 offers an extremely attractive solution for customers usind DATASHARE who do not necessarily

want to add 8600s to their system. If your AP has local storage (either disk or diskette), it can run CP/M as a stand-alone system. Use the CPMCOPY utility to transfer DOS files to the local CP/M volume, execute CP/M programs against it, then transfer back to the DOS FP.

Stand-Alone Systems

A single 1560 system may also function in a similar manner. By adding an ARCNET card to any 1560 system, either disk or diskette, your customer can gain access to all of the data on his DOS.D ARC system. Simply BOOT the 1560 from its local storage and execute the MOUNT15 command to get into the ARC network. All of

> **"This approach (Using a 1560 FP and multiple 1561 APs) may prove to be the most effective solution for some of your prospective sales situations."**

the DOS.H software must come from the local storage, but data from the DOS.D FPs may be used as if it were available locally.

This approach (using a 1560 FP and multiple 1561 APs) may prove to be the most effective solution for some of your prospective sales situations. Don't discount it lightly. And don't be afraid to propose it. It could swing an order in your direction that you might otherwise lose in a price war with the competition.□

**Dan Carmen
Ext. 5520**
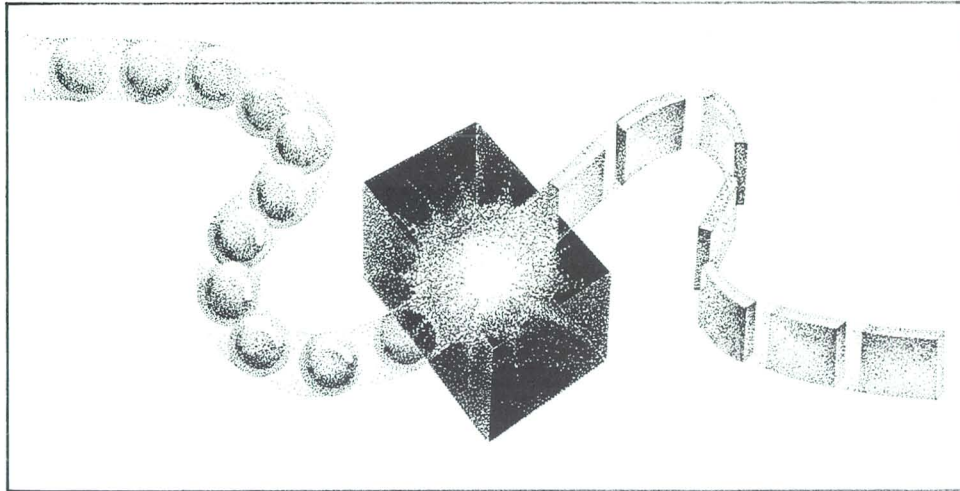
SNA Provides Effective Interface to Mainframes

As the leader in dispersed data processing, DATAPOINT Corporation is committed to providing systems which interface effectively with our customers' mainframe computer systems. Compatibility with the data communications protocols and network structures of the primary mainframe computer manufacturers is essential. It allows the central and dispersed processor to work together to respond to the user's needs.

The IBM network structure, Systems Network Architecture (SNA), and the bit oriented communications protocol—Synchronous Data Link Control (SDLC), have gained considerable acceptance among IBM mainframe users. DATAPOINT offers SNA/SDLC hardware and software products to meet this market requirement. Our approach addresses two functional areas.

Accessing Programs

DATAPOINT systems are capable of accessing interactive host application programs. Our implementation provides emulation of IBM 3270 information display system components. Specifically, the 3274 controller, with multiple 3278 display stations, and 328X printers may be emulated in ARC local network installations. The 3276 controller with the integral 3278 display station and a single 328X printer can be emulated in single workstation environments. This approach provides an effective interface to interactive processing functions in an SNA/SDLC communications network.

In addition, DATAPOINT systems are capable of batch transmission and reception of data. They provide simultaneous emulation of multiple SNA logical units. This approach is used by the IBM 3770 series products. Specifically, the IBM 3777 console and its attached card readers, printers, and punches can be emulated. The emulated SNA logical units can be assigned to a variety of physical devices on the DATAPOINT system. This approach will provide an effective interface to batch processing functions in an SNA/SDLC communications network.

DATAPOINT offers ARC-based implementations using the ARCGATE concept of the shared communications processor. The communications function can be accessed from the users' workstations, while the physical communications is controlled by a communications processor running ACMLU software, (i.e., 6000 series processor with a 9481 multi-function communications adapter).

For interactive access from your customer's workstations, use either a DATAPOINT supported pass through emulator, (AP3270 under DOS.D and WS3270 under RMS), or create your own interface to IBM programs by using a DATAPOINT supported high-level language, (i.e., DATABUS, COBOL, etc.). For batch RJE, a DATAPOINT supported DATABUS® program may be used to access the IBM host through the ACMLU processor. Depending upon configuration ACMLU may access the IBM host processor either through interactive, batch, or interactive and batch simultaneously.

Access -- Interactive and Batch

DATAPOINT offers both interactive and batch SNA/SDLC access from single-user 1800 systems, and 3800 ARC application processors. With EM3276S both 1800s or 3800s can emulate a single station 3276 controller with optional attached printer. With MLSNA, batch processing functions are accessible from most DATASHARE VI configurations. The 1560 also supports batch processing using MLSNA15. Remember when selling multilink software that you do not imply they are emulations.

Multilink allows DATABUS, a high-level transaction language, to interact with an IBM host through a batch communications access method. If you want the DATABUS program to replace a remote batch terminal it will require extensive programming and may not answer your customer's throughput requirements.

DATAPOINT is committed in its thrust as the leader in Dispersed Data Processing and Office Automation. SNA/SDLC is an important part of our commitment to the intergration of the modern office.

Software Requirement	IBM Model #	Minimum Hardware
Interactive 3270—SDLC		
ACMLU	3274 Model 1C	120K 6XXX and 9481
AP3270	3278 Model 2	60K 3800 or 8600
WS3270	3278 Model 2	Full Screen Workstation
with 36K		
EM3276S	3276 Model 12	60K 1800/3800 and ICA
Batch 3770—SDLC		
ACMLU	3776/3777	120K 6XXX and 9481
MLSNA	3776/3777	60K DATASHARE VI processor
MLSNA15	3776/3777	128K 1560 with MFC board

Use this chart for hardware & software requirements.

If you have any questions or require additional information, please call Product Marketing at extension 7151.□

**Dave Hendon
Ext. 7151**

Traditional Equipment

Model Code	Description	Maint.	Install	Price
DISK SYSTEMS				
4520	5500 Proc., 5MB Storage (two 2.5MB Wanco Drives, 1 fixed, 1 removable cartridge), Controller, Multiport Comm Adaptor (9462)	272	700	6950
4530	5500 Proc., 48K, Dual Disk and Controller, 20MB, Multiport Comm Adaptor (9462)	361	800	8950
4620	6600 Proc, 5MB Disk Storage, Controller 20MB, Multiport Comm Adaptor (9462)	267	700	9950
4630	6600 Proc, 128K Dual Disk Controller, 29MB (9374), Multiport Comm Adaptor (9462)	341	800	16950
4650	DATASHARE system Proc, 128K, Dual Disk & Controller, 134MB (9392), Multiport Comm Adaptor (9462)	480	1000	38150
4730	DATASHARE System Proc, 256K Dual Disk & Controller, 20MB (9374), Multiport Comm Adaptor (9462)	357	800	18750
4750	DATASHARE System Proc, 256K Dual Disk & Controller, 134MB (9390), Multiport Comm Adaptor (9462)	496	1000	39950
1500 SYSTEMS				
1536	1500, 64K Memory, Two Diskette Drives (.5MB Total)	78	200	2950
1552	1550 Proc, 64K Memory, 1MB Diskette (SS-DD) (1404) ICA	82	195	4470
1553	1550 Proc, 64K Memory, 2MB Diskette (DS-DD) (1403) ICA	92	195	5070
1554	1500 Proc, 64K Memory, Single Spindle, 1MB Diskette 9DS-DD) (1401) 9310 Cartridge Drive, ICA	157	250	9950
1555	1550 Proc, 64K Memory, Single Spindle, 1MB Diskette (DS-DD) (1401) 9320 Cartridge Drive with MPCA, ICA	165	250	9950
1543	Diskette Expansion Module	33	195	1300
1402	Diskette Expansion Module (.5MB) for 1500/1550	39	195	2000
1403	Extension Diskette Module, 1 MB for 1550 (DS-DD)	49	195	2000
1404	Extension Diskette Module, 1MB for 1550 (SS-DD)	39	195	2000
1800 SYSTEMS				
1802	DATAPOINT 1800, 64KMemory, Removable Keyboard, Two Diskette Drives (1MB) (SS-DD) (1842) ICA	125	200	3990
1804	DATAPOINT 1800, 128K Memory, Removable Keyboard, Two Diskette Drvies (1MB) (SS-DD) (1842) ICA	135	200	4890
1812	DATAPOINT 1800, 64K Memory, 2MB Dual Diskette Drives (DS-DD) (1413) ICA	137	200	5200
1814	DATAPOINT 1800, 64K Memory, 2MB Dual Diskette Drives (DS-DD) (1413) ICA	147	200	6100
1816/0105	DATAPOINT 1700, 64K Memory, 1MB Single Diskette Drive (DS-DD) (1411) 9310 Cartridge Drive, ICA	191	250	9950
1817/0105	DATAPOINT 1800, 128K Memory, 1MB Single Diskette Drive (DS-DD) (1411) 9310 Cartridge Disk Drive, ICA	201	250	10850
1818/0105	DATAPOINT 1800, 64K Memory, 1MB Single Diskette Drive, (DS-DD) (1411) 9320 Cartridge Disk Drive with 4-Port MPCA, ICA	199	250	9950
1819/0105	DATAPOINT 1800, 128K Memory, 1MB Single Diskette Drive, (DS-DD) (1411) 9320 Cartridge Disk Drive with 4-Port MPCA, ICA	209	250	10850
1820/0105	DATAPOINT 1800, 128K Memory, 1MB Single Diskette Drive (DS-DD) (1411) 9310 Cartridge Disk Drive, RIM, ICA	216	250	10950
1842	Diskette Drive Expansion Module	39	195	1500
1412	Diskette Drive Expansion Module, 1MB Dual Dual (SS-DD) for use with 1800 using 1412/1413 drives	39	195	2000
1413	Diskette Drive Extension Module (DS-DD) 2MB Dual for use with 1800 using 1412/1413 drives	49	195	2000

Model Code	Description	Maint.	Install	Price
PROCESSORS				
5548	5500 Proc, 48K Memory	184	200	4950
5508	8K Memory Upgrade kit for 5500	*	195	250
6600	DATAPOINT 6600 Proc, 128K	297	200	10000
6640	DATAPOINT 6600 Proc, 256K	313	200	11800

*Maintenance price becomes price published for the new configuration.

Model Code	Description	Maint.	Install	Price
ARC FILE PROCESSORS				
4634	ARC File Proc, 20MB Disk Proc, 128K Dual Disk & Controller, 20MB (9374) RIM Adaptor (9483)	338	670	16950
4735	ARC File Proc, 256K Dual Disk & Controller, 20MB (9374) RIM Adaptor (9483)	354	670	18750
4654	ARC File Proc, 120MB disk Proc, 128K Dual Disk & Controller, 120MB (9390) RIM Adaptor (9483)	475	1000	39975
4755	ARC File Proc, 256K Dual Disk, 120MB (9390) RIM Adaptor (9483)	491	1000	41325
ARC APPLICATIONS PROCESSORS				
3810	ARC Application Proc, 64K, RIM Adaptor, ICA (I&II)	46	150	2950
3812	ARC Application Pro, 64K, Internal RIM, No I/O, No ICA (I&II)	45	120	2450
3815	ARC application Proc, 96K, RIM Adaptor, ICA (I&II)	50	150	3150
3817	ARC Application Proc, 96K, Internal RIM, No I/O Bus, No ICA (I&II)	49	120	2650
3820	ARC Application Proc, 128K, RIM Adaptor, ICA I&II)	54	150	3350
3822	ARC Application Proc, 128K, Internal RIM, No I/O, No ICA (I&II)	53	120	2850
6010	ARC Application Proc, 64K, RIM Adaptor	75	195	6400
6020	ARC Application Proc, 128K, RIM Adaptor	83	195	7300
6040	ARC Application Proc, 128K, RIM Adaptor	99	195	9100
CARTRIDGE DISKS				
9310	10MB Cartridge Disk without 4-Port MPCA	80	195	5500
9320	10MB Disk Cartridge with 4-Port MPCA	88	195	5500
9367	Dual Disk & Controller, 5MB Console	99	195	3500
9369	5MB Dual Disk Extension	79	195	3000
9374	Disk, Top Loading, 20MB (10/10) with Controller for use with DATASHARE & ARC Systems	163	250	7740
9375	Disk, Top Loading, 20MB Extension (10/10) for 9374 (I)	113	150	6830
9376	Disk, Top Loading, 40MB Extension (10/10, 10/10) for 9374	220	195	12740
DISK CONTROLLERS AND DRIVES				
9390	Disk, dual 120MB with Controller	263	250	29350
9391	Disk, Extension, 60MB for use with 9390	110	195	11950
9393	Disk, Extension, 60/60MB	220	225	22500
BELT PRINTERS				
9212	115-240 LPM Printer, 132 Column (III)	103	195	3900
9213	64 Char. Belt Option (340 LPM Option) for 9212,9214 & 9297 Belt Printer (III&IV)	330		
9214	Printer, Belt-132 Column, 230-240 LPM Paralle Interface	120	195	4300
FREEDOM PRINTERS				
9231/9232	80CPS Freedom Printer, Serial or Parallel	51	195	1050
1090	Option, Serial Interface Upgrade		195	150
1091	Option, Parallel Interface Upgrade		195	450
DRUM PRINTERS				
9280	300 LPM Printer, 64 Char./Single Channel Vertical For Control	140	195	6000
9281	300 LPM Printer, 96 Char./Single Channel Vertical form Control	155	195	6000
9260	600 LPM Printer, 64 Character	200	195	9500
9261	600 LPM Printer, 96 Character	220	195	9500

Model Code	Description	Maint.	Install	Price
MATRIX PRINTERS				
9621	160 CPS Matrix Printer, Serial	42	195	1550
9622	160 CPS MatrixPrinter, Parallel	42	195	1590
45 CPS PRINTERS				
9601	45 CPS Char. Printer, Serial	45	195	2900
9602	45 CPS Char. Printer, Parallel	45	195	3000
DATASTATION TERMINALS				
3601	Datastation Terminal (V)	25	35	695
8200	Datastation Terminal 9V	18	20	995
TAPE DRIVES				
9581	9 Track Tape, 1600 BPI, 8.5 Inch Reel	110	195	4000
9583	9 Track Tape, 1600 BPI, 10.5 Inch Reel	105	195	6000
9584	9 Track Tape, 1600 BPI, 10.5 Inc Reel	134	195	9000
COMM. ADAPTORS				
9400	Adaptors, Async Comm with EIA Interface (V)	16	25	200
9401	Comm Adaptor (V)	20	25	250
9402	Comm Adaptor (V)	20	25	300
9404	Comm Adaptor (V)	16	25	250
9408	DATASHARE Modem, 1200 Baud Transmit, 150 Baud Feceive, Full Duplex (V)	18	25	200
9409	DATASHARE Modem, 1200 Buad Receive, 150 Baud Transmit, Full Duplex (V)	18	25	200
9462	Multiport Comm Adaptor (V)	18	50	375
9481	Multifunction Comm Adaptor (V)	29	25	1450
9445	Data Access Arrangement Device (1001A-CDT) (IV&V)	2	75	150

Model Code	Description	Maint.	Install	Price
COMM. ADAPTORS CONT'D.				
9446	Data Access Arrangement Device (1001F-CBS) (IV&V)	3	75	175
9483	RIM Adaptor (V)	15	50	1250
9484	8-Port Active Hub (V)	11	60	900
9487	16-Port Active Hub (V)	16	80	1250
9478	DATASHARE modem with Internal DAA (1001F-CBS) Default Cable-8 Pin Plug, 1200 Baud Receive, 150 Baud Transmit, Full Duplex (V)	22	15	750
9479	DATASHARE Modem with Internal DAA (1001F-CBS) Default Cable-8 Pin Plug, 1200 Baud Receive, 150 Baud Transmit, Full Duplex (V)	21	15	750
CARD READERS				
9504	Card Reader, 80 Column, 300 CPM, 115 VAC	65	195	2500
9505	*Power Option for 9504, 230 VAC			

*No charge when ordered with 9504.

I. Installation is available at the published price per unit subject to applicable minimum charge ($195—local, $390—remote).

II. 3800 Processors have general purpose keyboards. III. For options, see model codes 0593, 0594 and 9216 in Product Cross Reference.

IV. No installation charge if option is ordered with system.

V. Installation is available at the published price per unit subject to applicable minimum charge ($95—local, $195—remote).

NOTE: Quantity Pricing is Applicable to End-Users Only.

Long lead time or temporarily out of stock.

Trade Shows

June 14—16	Int'l Word Processing Assoc.(IWPA)	San Francisco
June 26—30	Nat'l Computer Graphics Assoc.(NCGA)	Chicago
Aug. 30 - Sept. 2	U.S. Int'l Tel.	St. Louis

Systems Education

NAME OF CLASS	DATES
IEOS	**June 20**
Assembler 2	**June 27, Aug. 15, Oct. 10, Dec. 5**
RMS 2	**June 27, Nov. 7, Dec. 5**
Assembler 1	**July 11, Sept. 12, Nov. 7**
Project Management	**July 18, Sept. 19, Nov. 28**
Color Business Graphics	**July 18, Oct. 10, Nov. 14,**
Advanced LDCS	**July 25, Oct. 31**
RMS 1	**Aug. 1, Aug. 22, Oct. 10, Oct. 24**
New Hire	**Aug. 8, Oct. 3,**
DOS Data Communications	**Aug. 15, Oct. 24**
DOS EMS	**Sept. 12, Nov. 14, Dec. 12**
Advanced ACD	**Sept. 19, Dec. 12**
Adv. Project Management	**Sept. 22, Dec. 1**
DATABUS/DATASHARE	**Sept. 26, Nov. 14**
COBOL	**Sept. 26**

The following classes will be scheduled pending minimum number of 10 students and available resources:

LDCS 2 (Advanced—5 days)
ISL Conversion Seminar (5 days)
COBOL (5 days)
RPG (5 days)
FORTRAN (5 days)
BASIC (5 days)

All classes will be held at the Systems Education Training Center, 4211 Gardendale, Suite A200, San Antonio, unless otherwise indicated.

These same systems-level classses are also available to customers. Registration of DATAPOINT Reps, OEMs and customers must be coordinated through regional SE managers.

For more information on Systems Education classes, please call extension 7368 or write to mail station C01.

Customer Education

BOSTON, MASSACHUSETTS

June 27	DOS DATABUS
July 18	RMS New Datapoint Customers
July 25	RMS DOS Customers

CHICAGO, ILLINOIS

June 13	RMS Basic Word Processing
June 20	RMS DOS Customers
June 27	DOS Basic Concepts and Operations
July 11	DOS Advanced Operations
July 18	DOS DATABUS
	DOS Basic Word Processing

HOUSTON, TEXAS

June 13	RMS DOS Customers
June 20	DOS Basic Concepts and Operations
June 27	RMS DATABUS
July 6	DOS Multiplan
July 11	DOS Introduction to Datapoint Programming
July 18	DOS Advanced Operations
July 25	DOS Basic Word Processing

NEW YORK, NEW YORK

June 13	RMS New Datapoint Customers
	DOS Basic Word Processing
June 20	DOS Basic Concepts and Operations
	DOS DATABUS
June 27	RMS Basic Concepts
July 11	DOS Basic Word Processing
	DOS Introduction to Datapoint Programming
June 18	DOS Basic Concepts and Operations
	RMS DOS Customers
June 25	DOS Advanced Operations
	DOS DATABUS

SAN ANTONIO, TEXAS

June 13	DOS Advanced Operations
	DOS DATABUS
	DOS ARC (Attached Resource Computer)
	DOS Basic Word Processing
	RMS DATABUS
June 20	DOS Advanced DATASHARE
	DOS Assembler (SNAP)
	DOS Advanced Word Processing
June 27	DOS Basic Concepts and Operations
	DOS Introduction to Datapoint Programming
	RMS New Datapoint Customers
	RMS Basic Word Processing
July 11	DOS DATABUS
	DOS Basic Word Processing
	DOS EMS (Electronic Message System)
	RMS DOS Customers
July 18	DOS Introduction to Datapoint Programming
	DOS ARC (Attached Resource Computer)
	RMS Basic Concepts
	RMS Advanced Word Procesing
July 25	DOS Basic Concepts and Operations
	DOS Advanced Operations
	DOS Advanced DATASHARE
	RMS DATABUS

SAN MATEO, CALIFORNIA

June 13	DOS Introduction to Datapoint Programming
	RMS DOS Customers
June 20	DOS Basic Word Processing
June 27	DOS DATABUS
	RMS Basic Word Processing
July 18	DOS Basic Concepts and Operations
	RMS New Datapoint Customers
July 25	DOS Introduction to Datapoint Programming
	DOS Basic Word Processing

WASHINGTON, D.C.

June 13	DOS Basic Concepts and Operations
June 20	DOS Basic Word Processing
June 27	DOS Advanced Operations
July 11	RMS Basic Concepts

Classes are subject to cancellation if minimum enrollment (six students) is not met. Notification of cancellation will be no later than 10 calendar days prior to class start date.

Registation for all Customer Education classes will be taken by Customer Education in San Antonio at (512) 341-3268. Please call San Antonio for information regarding classes or registration.
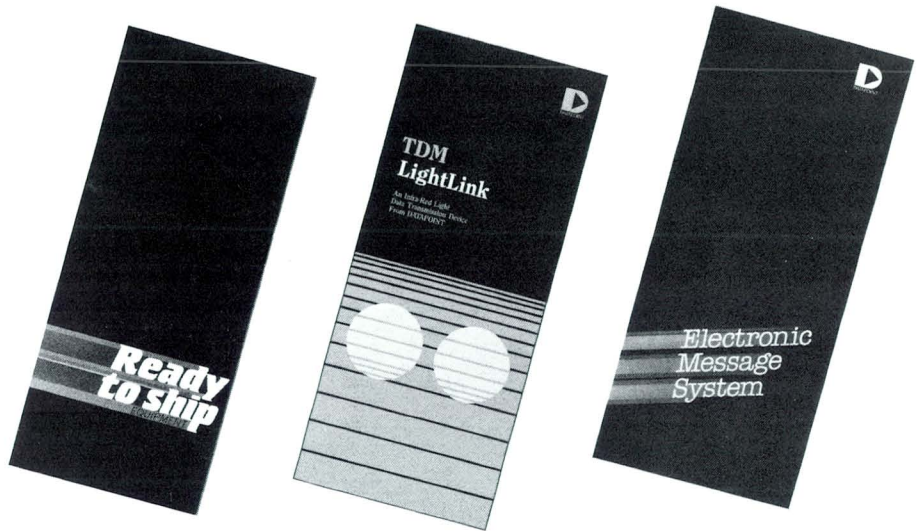
Marketing Support Materials

Ready to Ship Equipment Brochure,
Doc. #61586

1560 Processor Flysheet,
Doc. #61016, Rev. 5/83.

Active Hub 9484/9487 Product Specification,
Doc. #60504, Rev. 4/83.

TDM LightLink Brochure,
Doc. #61577

Electronic Message System Brochure,
Doc. #61578

Print Ad Schedule

JUNE PRINT ADVERTISING SCHEDULE

Wall Street Journal	June 22,23,28,30	ARC/Hyatt
Business Week	June 6	ARC/Hyatt
Fortune	June 13	ARC/Hyatt
Computer Decisions	June	ARC/Hyatt
	June	5000 LAN
Computerworld	June 6, 20	ARC/Hyatt
Datamation	June	ARC/Hyatt
	June	5000 LAN
Info. System News	June 13	ARC/Hyatt
Infosystems	June	ARC/Hyatt
	June	5000 LAN
MIS Week	June 1	ARC/Hyatt
Modern Off. Procedures	June	ARC/Hyatt
The Office	June	ARC/Hyatt
Communications News	June	ACD/Cap. Pres.
Telecommunications	June	ACD/Cap. Pres.

INTERNATIONAL ADVERTISING SCHEDULE

Business Week (Int'l)	June 13	Service
The Economist	June 11, 25	Service
Scientific Am. (Int'l)	June	Service
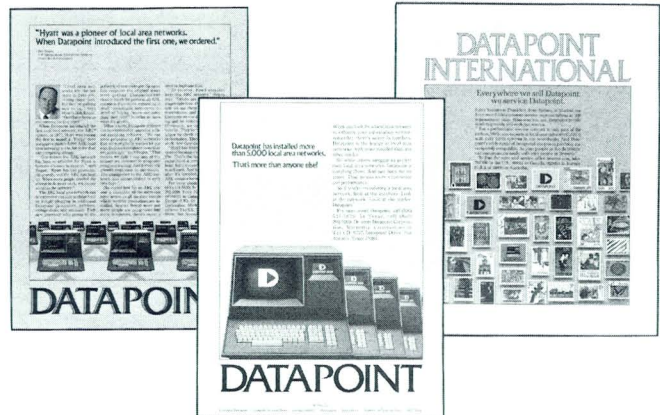
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_____ Association of Computer Users Benchmark Report: DATAPOINT 8600. Full 24-page report. (Maximum order 10 copies.)

_____ Computerworld reprint: DATAPOINT 8600 Stands Out in Multiuser Text. One-page synopsis of ACU Benchmark Report.

_____ MIS Week reprint: DATAPOINT Corporation has an Edge on its Competition.

_____ Electronic Business reprint: DATAPOINT's Strategy: Consolidate and Conquer.

_____ Electronic Engineering Times reprint: SMC First in LAN ICs (ARCNET-ETHERNET knock-off article.)

_____ Electronics reprint: DATAPOINT ARCNET Specification Inc.: ''Joining the Network.''

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