

DIGITAL RESEARCH NEWS

Volume 4, No. 1

For Digital Research Users Everywhere

First Quarter 1984

AT&T, DRI unveil joint project

DRI to port UNIX® System V for Intel

A version of UNIX System V will be made available to microcomputer users by the end of 1984 under the terms of an agreement between Intel Corp. and Digital Research.

"This is a major development for the microcomputer industry because it marks the first time UNIX System V will be available for personal computers," said Bruce Weiner, manager of UNIX Business Development at Digital Research. "UNIX has become popular in the main frame and especially in the minicomputer markets because of its versatility."

Digital Research is porting UNIX System V to the Intel iAPX-286 family of microprocessors. The agreement involves AT&T Technologies, formerly Western Electric, which owns the rights to UNIX.

AT&T Technologies retains exclusive rights to the product upon completion of the engineering. Intel and Digital Research, however, have been granted the non-exclusive right to market object code versions of UNIX System V to manufacturers and retailers.

"The agreement between Intel and Digital Research recognizes that UNIX is an emerging standard for microcomputers," said Rick Deutsch, Intel program manager for the UNIX System V. "Intel supports the creation of standards, and we believe Digital Research has the technical and managerial skills necessary to produce a UNIX of high quality. The effort is part of the



ongoing cooperation that has existed between the firms for years."

Originally designed for minicomputers, UNIX is known for its scientific and engineering applications. It has gained wide acceptance among software developers.

Specifically, UNIX System V is being developed for Intel's 80286 microprocessor. Part of the iAPX-286 family, the 80286 is a 16-bit chip. Deutsch said it is suited to industrial control, robotics, multitasking communications and professional computers.

The version of UNIX System V for the 80286 microprocessor will provide portability across different types of chips and operating systems including Concurrent DOS, Weiner explained.

"Digital Research's version of UNIX System V will complement our other operating systems and provide end users a path to upgrade from one system to the next," said Allen Beebe, director of Systems Software at Digital Research. "We support a full range of operating systems from single user, single tasking systems to multiuser, multitasking systems. And we have portability between those systems."

Said Beebe, "The agreement with Intel to provide UNIX to the marketplace is part of Digital Research's strategy of making desktop computers work in more ways than ever before."

Pact on standards expands micro uses

AT&T has taken its first major step into the microcomputer marketplace by entering a long-term agreement with Digital Research to develop standards and expand uses for personal computers.

The standards are based on UNIX System V, a popular minicomputer operating system developed by AT&T. A microcomputer version of UNIX System V is being developed by Digital Research for the Intel 80286 microprocessor. Release is scheduled for the third quarter of 1984.

"Development of UNIX System V for Intel repre-



sents a significant stride toward standardization in the field of microcomputers," said John Rowley, president of Digital Research. "AT&T and Digital Research are cooperating to bring standards to the industry for the benefit of manufacturers, software writers and end users."

Work on the Intel microprocessor is being coordinated with development of a UNIX Applications Library. AT&T has contracted with Digital Research to develop the library under the supervision of a team from both companies. Among the first products to appear in the library are programmers' languages and tools from Digital Research and AT&T.

The UNIX System V library is to be channeled through Digital Research manufacturers, distributors and Referral Dealers throughout the world.

"Both companies believe that the UNIX Applications Library is crucial to the acceptance of UNIX System V as an industry standard," Rowley said. "We are convinced that end users will benefit from our concerted effort to establish such standards, which make portability across different types of microprocessors and systems a reality."

"By making more UNIX-based software available, our partnership helps satisfy customer demand for a powerful operating system and a wide range of applications."

UNIX was developed in 1969 by AT&T's Bell Laboratories. Written in C language, it simplified the transporting of software to new processors or from main frames to microcomputers.

UNIX provided a number of advanced features including a hierarchical file structure, shell (command language interpreter), multiuser and multitasking capability. These innovations made it popular at universities, governmental agencies and some commercial companies. Scientists and programmers find it particularly useful.

Several versions of UNIX have been developed by See AT&T, page 4

Concurrent™ DOS for Motorola increases applications base

A wider range of applications will be available for users of the 68000 family of microprocessors as a result of an agreement between Motorola and Digital Research.

Under terms of the agreement, Digital Research is developing its newly released Concurrent DOS for the Motorola 68000 microprocessor. Concurrent DOS,



MOTOROLA INC.

which is Release 4.0 of Concurrent, allows users to run CP/M® and PC-DOS applications.

"The agreement reinforces Motorola's commitment to support the 68000 family of microprocessors with state-of-the-art operating systems and software developed by third-party vendors," said Tom Beaver, director of Motorola's Microsystems Operations.

Because Concurrent™ DOS supports software written for CP/M and PC-DOS, a huge library of applications will be available to end users. Applications soft-

ware will be portable from Concurrent DOS to UNIX System V at the source code level.

The contract calls for Digital Research to implement Concurrent DOS on Motorola's VME/10™, a desktop computer that uses a 68000 microprocessor.

"This latest development provides end users an increased flexibility in software along the lines of industry standards," Beaver said. "This is the first in a series of moves to provide complete portability between the VME/10 microcomputer, UNIX System V and applications from other major operating systems."

During the first quarter of 1984, Digital Research is to release CP/M-68K™ versions of programmers' tools for the VME/10.

"Independent software vendors can begin writing applications that will be ready for the arrival of Concurrent DOS, scheduled for release on the VME/10™ at the end of the year," said Darrell Miller, Digital Research marketing manager for operating systems. "Source code for applications written with languages for CP/M-68K will be compatible with that of Concurrent DOS and UNIX System V."

See Motorola, page 4



Did you know that Digital Research . . .

■ ■ ■ offers the most extensive line of high level languages and programmer productivity tools that run on PC-DOS and MS-DOS as well as CP/M and Concurrent CP/M.

■ ■ ■ has the largest number of installed operating systems. There are more than 1.5 million licensed users of the CP/M family.

■ ■ ■ has the largest applications base. More than 15,000 applications programs are available for CP/M users.

■ ■ ■ works with the largest number of hardware manufacturers.

More than 1,000 original equipment manufacturers offer Digital Research operating systems.

■ ■ ■ has more than 100 sales and technical support personnel around the world to assist you.

■ ■ ■ has more than 25 products supported on five microprocessors which are continually reaffirming the company's reputation for technical excellence.

DIGITAL RESEARCH®
We make computers work.

New retail channels implemented by DRI

Digital Research has strengthened its dealer network to provide you with a greater number of retail outlets and more efficient service for your software needs.

As part of the change DRI has ceased all direct sales of its products in order to channel all products through the distributor-dealer network.

The system gives customers a quick and easy method to find out about all of DRI's product line from the hundreds of dealers throughout the world, said Zenon Olearczuk, DRI retail merchandising manager. There are more than 12 software distributors at 44 locations who keep the retail stores stocked with DRI supplies and literature.

By abandoning direct retail sales, Olearczuk said DRI can focus on expanding its base of distributors so that more people may have access to its products. Inde-

pendent Software Vendors are assured of access to all DRI products through Westico, based in Norwalk, Conn.

"Westico is technically oriented," said Dean Miller, retail sales representative at DRI's New York office. "Their specialists can give technical support to professional ISVs at the level an experienced software author can appreciate."

A system to provide buyers an information channel has been implemented by DRI. All distributors are required to attend a training seminar to help them answer questions asked by dealers. Distributors and dealers also are supported by the DRI retail sales team.

Digital Research is continuing to provide referral and product information through toll free numbers: (800) 772-3545 ext. 400 in California or (800) 227-1617 ext. 400 for out-of-state inquiries.

*Digital Research now offers
PROFESSIONAL PROGRAMMER
SUPPORT
For information call
(408) 646-6464 (408) 646-6465*

How to find facts fast

Digital Research continues to expand its data base of microcomputer information available through CompuServe and THE SOURCESM, time sharing services for microcomputer users.

The data base is geared to professional programmers and businesspeople who seek timely, reliable information about microcomputers or software. It also provides technical information on all products from Digital Research.

The service is updated weekly and includes information on commonly asked questions about microcomputers, general facts about the world of microcomputers

and microcomputer products, user group lists, recommended reading, quotes from experts in the microcomputer field, and dates for upcoming trade shows and seminars. Information about Digital Research covers products and prices, ordering, technical materials, marketing information and a dealer list.

Subscribers can retrieve information virtually around the clock using a phone link to a microcomputer. For information on either of the two subscriber services, call toll free (800) 227-1617, ext. 400, or in California (800) 772-3545, ext. 400.

Convenience shopping for business software

With thousands of computer products available to business users, it is easy to get confused. Digital Research is making it easier to select the right product with the introduction of the Digital Research Applications LibraryTM.

The library is a collection of all of DRI's retail products. Found at retail stores, the library contains DRI's business applications, languages, operating systems and some new hardware products.

The library is separated into sections for quick reference to operating systems, DRI languages and some of the most popular business products. DRI's CP/M-86[®] and Concurrent CP/M[™] — operating systems that run on the IBM PC — can be found here. One section of the library, formerly called the CP/M Applications Library and now a part of the Digital Research Applications Library, is devoted solely to the business environment.

Initially, the business products found in the library are intended for use on the IBM PC. Software for the DEC[®] Rainbow[™] is scheduled for debut in March, and software for other computer systems will be

added as the library expands.

The business software is placed in what Hal Steger, DRI library applications manager, called the "target applications section." Simply, these are specialized applications for business. "The target applications section provides packages that allow you to do budgeting, cash flow analysis and financial statements," Steger explained.

The product line has expanded to include two new entries: The Condor[™] III data management system and the Target[™] Applications Library from Comshare[™]. Tutorials are also being added to the library.

"Until recently, software companies have not been paying much attention to the first time user," Steger said. "But now we're bundling tutorials with the programs."

A popular feature of the business products is SpeedStart, which is provided on each of the business packages sold in the library. With it, you load a single disk and are ready to start working. "This is a tremendous convenience, especially for the first time user," Steger said.



DRI selects Ogilvy & Mather

Ogilvy & Mather Inc. has been awarded a multimillion dollar advertising account from Digital Research Inc. The account is handled by O&M's Los Angeles branch, one of 144 offices worldwide. Mike Marsak, left, vice president/manager supervisor at O&M, oversees the Digital Research account. Meanwhile, Terry Pickett, right, of Pickett Communications Inc., has been hired to produce Digital Research brochures and literature. Marsak and Pickett work with Sue Cooper, advertising and sales promotion manager for DRI.

New version of Dr. LogoTM released for 8-bit micros

A version of Dr. Logo for 8-bit computers for programmers and consumers who wish to teach themselves programming is slated for release in February.

Like its 16-bit counterpart, the 8-bit Dr. Logo requires no previous knowledge of programming. Yet its advanced design makes Dr. Logo a versatile tool for experienced programmers. It utilizes "turtle" graphics, a triangular pointer displayed on the video screen which helps users visualize cursor position and movement. Easy-to-understand documentation for the beginner is provided.

The Dr. Logo package is equipped with its own operating system as well as the Logo programming language. Dr. Logo runs

on Zilog Z-80 based computers that use CP/M[®] 8-bit operating system and 56K TPA. At least 64K of available memory is required.

Technical features include informative error messages, debugging facilities such as TRACE and WATCH, a double-precision floating point that supports 15 digits, a list of primitives, comments and indentation, and compatibility with Apple Logo. Among its game programming primitives are RANDOM and SHUFFLE as well as PADDLE and BUTTON, which provide joy stick control.

Sony has released the 8-bit version of Dr. Logo in Japan and several other manufacturers are scheduled to follow suit nationwide.

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Digital Research sets up dealer channels to assure end users access to products and service.

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A family of products brings graphics capabilities to the desktop as DRI expands its role as vendor of graphics software.

Windows designed into Concurrent CP/M 4
Concurrent CP/M with Windows lets users divide the CRT into four miniscreens so they can operate and monitor different tasks at once.

PC-DOS bridge built into latest CP/M release 5
Concurrent CP/M Release 3.1 bridges the gap between CP/M and PC-DOS so users can run applications from either type of operating system.

New DRI technology benefits users 6
A "common backend" for language compilers shortens the wait between introduction of microprocessors or operating systems to the introduction of applications software.

Languages products released for PC-DOS 6
DRI supports PC-DOS with 12 languages that improve the portability of applications.

ANSI standards met with DR FORTRAN-77 6
DR FORTRAN-77 brings the power of mainframe FORTRAN to microcomputers and is capable of utilizing the one megabyte of memory provided in professional computers.

CP/M on a chip 7
Personal CP/M may be installed on an inexpensive chip that helps keep the cost of computers down. An interactive product, Personal CP/M is designed for beginners who seek a simple way of operating micros.

Personal BASIC for beginners 7
First-timers are taught programming with a tutorial provided in Personal BASIC, a language that also provides novice programmers plenty of power.

Plug-in CP/M board designed for Apple 8
Apple users can use applications software for CP/M by installing the CP/M Gold Card, a plug-in board that fits neatly inside their computers.

Introducing inexpensive graphics

Want micro graphics? DRI has answer

The era of inexpensive graphics has been introduced by Digital Research with the advent of software products that turn a desktop computer into a design tool. The products are an innovative solution to the growing demand of business graphics.

DR Draw™, DR Graph™ and Access10™ have been designed to provide in-house capability for graphics. "There aren't any other companies with as broad a product line for graphics presentations," says Fred Langhorst who directed development of graphic products at DRI. "Now you can use your personal computer to produce high quality visuals."

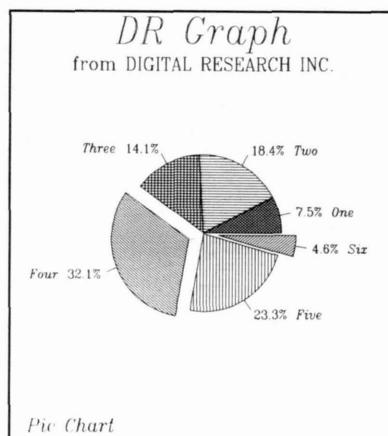
Langhorst, a former General Motors executive with an engineering graphics background, illustrated the importance of business graphics with these examples:

- About 520 million camera slides were developed in 1983 for business at a cost of at least \$3 bil-

lion, according to statistics by Hope Reports, Rochester, N.Y.

- Of those slides, 34 percent were graphics, 23 percent were photographs, 25 percent were text and 18 percent were copies, Hope stated.

- Low-cost hardware has been



introduced by firms such as IBM and Polaroid which reproduce high quality images.

The new hardware is being utilized to its limits with software supplied by Digital Research, Langhorst said.

Slides produced quickly

"Typically, it was necessary to contract with a film processing lab to make slides for a presentations," Langhorst explained. "The turnaround time was three or four weeks from conception of the artwork to final completion of the slides. Now within a matter of a few hours you can get the same thing."

Digital Research has pinpointed presentation graphics as one of its major products, according to Langhorst. The company seeks to become the main source of applications software for use in the officeplace.

"Users can expect consistent and comprehensive software because it comes from a single vendor," Langhorst said. "We meet the majority of needs for business

and professional customers who want quality visuals, and we will continue to provide additional applications as the graphics market grows and matures."

The common denominator for all of Digital Research's graphics products is GSX™, a graphics extension to Digital Research's operating systems. GSX is continually refined and enhanced to assure customers access to a wide variety of hardware and software, Langhorst said. That means businesses may select from the newest types of video screens, printers, plotters, mice or light pens. GSX supports the recently introduced Diablo® color ink jet plotter and Polaroid's Palette™, a shoe box-sized device for producing color slides.

Digital Research graphics products are channeled through its retail network. For information on the outlet nearest you, call (800)227-1617 ext. 400, or in California dial (800)772-3545 ext. 400.

DR Access10

DR Access10 gives your personal computer the graphics capabilities of a mainframe system by providing an inexpensive software link between mainframes and microcomputers.

The link to mainframes is especially helpful to corporations with a large pool of microcomputers, said Bill Higgs, product line manager of DRI's graphics applications products. Until now special terminals were required for anyone who wanted to use the graphics program of a mainframe system. Access10 utilizes microcomputers, which are already an integral part of most offices.

Using microcomputers increases the versatility of the resources already in the workplace, and it increases the number of workers who have access to mainframe capabilities. It also maintains the privacy and speed of personal computers. Access10 can be

lates Tektronix 4010, 4012 and 4014 graphics terminals. With Access10 a microcomputer can display, plot, print or gain access to any data from any Plot 10-compatible program, including ISSCO's Tell-a-graph, Tektronix's EZ Graphing, Precision Visuals' Graph Master and SAS Graph.

DR Access10 is available through retail outlets at a suggested price of \$500. For information regarding your nearest retailer, call Digital Research at (800)227-1617 ext. 400, or in California at (800)772-3545, ext. 400.

DR Draw

DR Draw from Digital Research Inc. brings the strengths of visual communications to your fingertips. With DR Draw and your own imagination you can create graphics that make your meetings and other presentations come alive. DR Draw eliminates the need to deal with outside vendors to get your graphs and overheads created.

Designed as a flexible graphics tool for the office, DR Draw can produce presentation-quality graphics inexpensively. Higgs said it provides businesspeople with a flexible method of producing charts and graphs. "Besides," he said, "using it is a snap."

Basically, DR Draw provides a number of menus to choose from. Each menu is broken down into a number of choices. At the push of a button, DR Draw directs the computer to design a circle or bar or whatever other image fits into your report.

The product was engineered for simple operation by DRI's Ron Taylor and Susan Bancroft, Higgs said. The creation of a complex flow or word chart may be easily produced. For example, if you wish to map out the organization of your department, pick the menu for CREATE. Name the file and then select the EDIT menu. This opens up a list of selections such as MOVE, CHANGE, DELETE and so on.

Choosing the ADD function allows you to build your flow chart. The selections here are limited to CIRCLES, ARCS, POLYGONS, POLYNUMERALS, BARS and TEXT. These functions have the

ability to turn a business professional into an artist. With DR Draw, Higgs said, a detailed chart may be constructed in the morning and be ready for an afternoon conference.

"If you're making an organizational chart and you don't like the way blocks are designed, then you can move them right on the screen," Higgs said. "You don't have to rely on cut-and-paste techniques. Later, you can call up the file and change it rather than start from scratch."

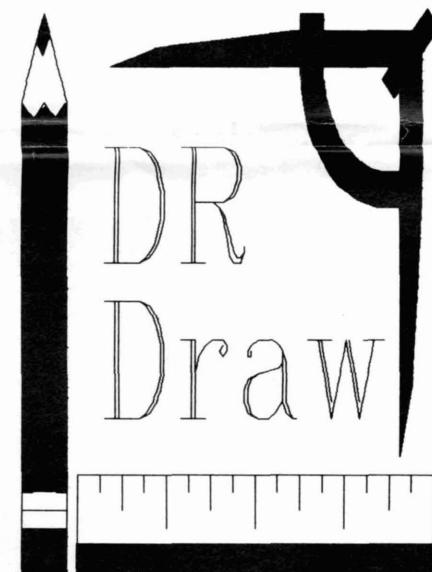
DR Draw runs under CP/M®, Concurrent CP/M, CP/M-86, PC-DOS and MS-DOS™ operating systems equipped with a graphics extension package, known as GSX. A mouse adaptor may be used to bypass the keyboard. The graphics extension in the operating system may be used on a wide range of graphics hardware.

"Because it's based on GSX, businesses can take advantage of the newest and best products such as plotters, printers, slide making machines and color jet plotters," Higgs said.

GSX add-on

Digital Research and Polaroid Corp. are developing an inexpensive method of producing high resolution slides and pictures with a shoe box-sized attachment to a personal computer. The attachment is achieved with the creation

of an image is produced on the screen with DR Graph, DR Draw or Access10 — Digital Research graphics products based on GSX. The image is electronically stored and reconstructed on film in the Polaroid Palette.



DR Draw

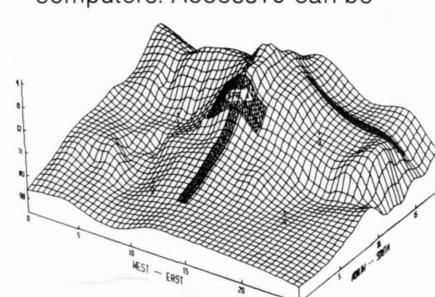
"If a business has major clients visiting, it can quickly create customized diagrams for use in a slide presentation and have the slides ready the same day the clients arrive," Higgs said.

Customized slides are impressive to clients and may be produced easily, Higgs explained. Once pictures are saved in computer memory they may be edited again and again. The development process of the film itself is a new but simple procedure. Said Higgs, "It takes about a half hour to develop and then mount slides for an entire roll of film."

The Polaroid Palette may be adapted to the IBM PC or other microcomputers which are outfitted with DRI's GSX. Available at retail outlets, the Polaroid system includes the image box recorder, two removable cameras (one for slides and another for prints), a film processor, a slide mount, Polaroid utilities software, a cable and documentation. Suggested retail price is \$1,500.

"With personal computers using the Polaroid Palette and DR Draw, which turns a computer screen into

See GSX, page 6



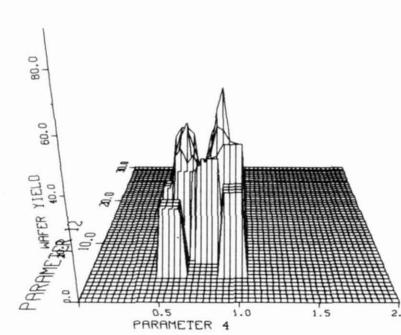
Access 10

implemented at a fraction of the cost of buying special terminals, Higgs said.

"Instead of having to walk down the hall and wait in line to use the special terminal, people have the convenience of working at their desks," he added.

A graphics printer may be added to complete the worker's desktop system. There are several inexpensive yet high quality models such as those produced by Epson® Higgs said. Or a Polaroid Palette may be attached to develop slides of computer drawings. Because the slides are electronic reproductions of the computer-made drawing, they have the same high resolution provided by a mainframe.

Technically, DR Access10 emu-



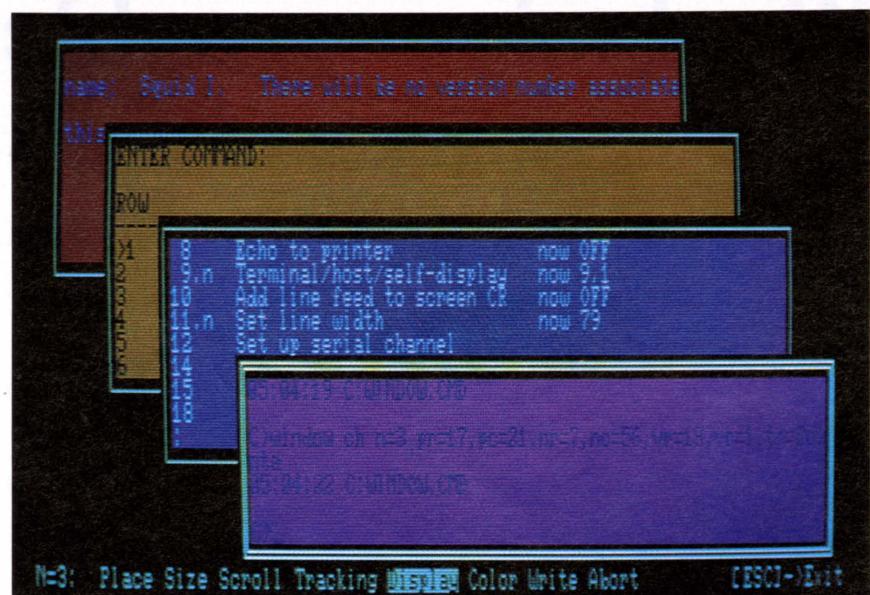
Access 10

of a device driver for the Palette.

"A business can avoid the high cost of sending out to have slides made and can retain confidentiality of information because it now can keep the entire process within the office," explained Higgs.

Here's how it works: The Polaroid Palette is driven by GSX, DRI's Graphics System Extension. When

"It's a natural thing to want to see all of your work at once . . . what Concurrent CP/M with Windows provides is an environment for the way people work."



Concurrent CP/M™ has working windows

Look at your desk. More than likely there are several stacks of work that need close attention. Everything is in front of you, so you don't forget one stack while you attend to another.

Concurrent CP/M with Windows works that way. It turns your personal computer into a simulated desktop where you can stack up several jobs at once, work on one and keep an eye on the others.

"It's a natural thing to want to see all of your work at once," said Darrell Miller, marketing manager for operating systems. "What Concurrent CP/M with Windows provides is an environment for the way people work."

Concurrent CP/M with Windows is currently available for IBM PC or XT outfitted with at least 256K and dual disk drives. It is sold along

with Digital Research's graphics extension, GSX.

Technology unsurpassed

The idea of concurrency in microcomputers was introduced by Digital Research in 1982 with Concurrent CP/M — a product that has not been equaled by any other company. It was a natural outgrowth of CP/M-86, designed for 16-bit computers, and CP/M-80®, which by the late 1970s ruled as a standard for 8-bit computers.

Concurrent CP/M heralded the age of "multitasking" on personal computers — the ability of one person to perform several jobs at once, such as printing and editing. (See related article on Concurrent CP/M Release 3.1, a new product that extends multitasking to an entire office.)

Concurrent CP/M incorporates the best characteristics of previous CP/M operating systems. It is fast and it is simple. Adding windows is not simply a cosmetic change.

"What we have with Concurrent CP/M with Windows is simply the most powerful operating system available..."

printed before starting another task.

"There are all sorts of examples of how Concurrent CP/M helps people work more efficiently," said Gary Gysin, product manager of Concurrent CP/M with Windows. "For example, one window can be set aside for electronic mail so you'll know immediately when messages are received.

"Also, data may be integrated on Concurrent CP/M with Windows. In other words, information may be transported from one window to the next."

Working with Windows

Integration is a flexible method of preparing business reports. For example, windows may be assigned to word processing, data base management, spread sheet and graphics. Information from the window for the data base may be cut and pasted to the window for word processing, et cetera.

A number of software applications may be combined in the different windows. Users can pick and choose from literally hundreds of pieces of software, and new applications are continually created by Digital Research's network of Independent Software Vendors. Further, the Digital Research Applications Library (see related story in this issue) can assist businesses in selecting the most suitable software.

"What we have with Concurrent CP/M with Windows is simply the most powerful operating system available," Gysin said. "It is the only operating system for personal computers that uses today's hardware to its fullest capacity."

Motorola

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Languages for Concurrent DOS and UNIX System V that may be used on the VME/10 scheduled for introduction are Digital Research C™, Pascal/MT+™, CBASIC Compiler™, DR FORTRAN-77™, PL/I™, BASIC Interpreter™.

Concurrent DOS is a multitasking operating system offered to manufacturers. Besides bridging PC-DOS and CP/M operating systems, it provides a number of advanced features not found on other microcomputer operating systems. The Digital Research implementation on the VME/10 includes windows, hierarchical file support, single user or multiuser configuration and GSX™, the graphics extension.

"Once the porting project is completed, applications may be transferred easily from CP/M to

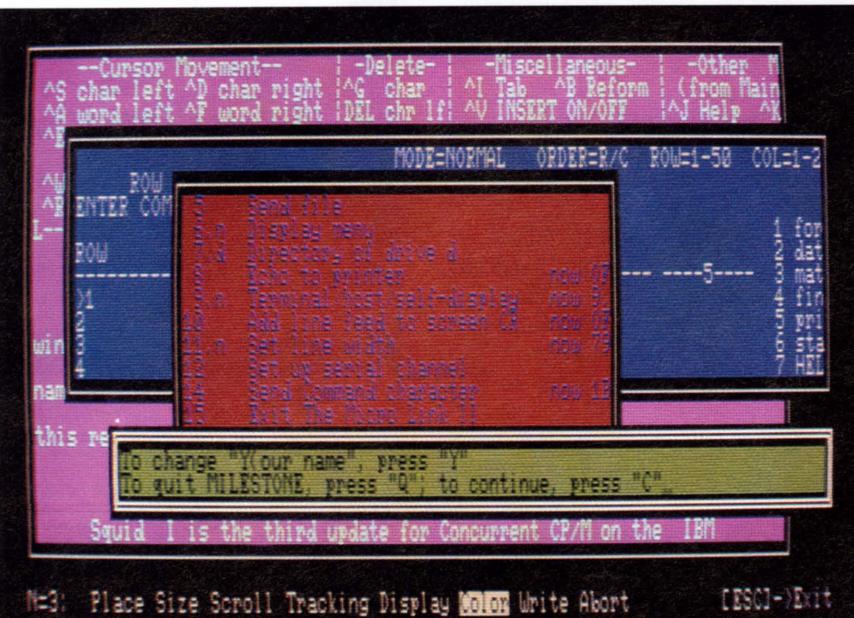
Concurrent DOS and UNIX System V," Miller said. "End users can then take advantage of a wide library of applications, and they may upgrade from one operating system to the next."

AT&T

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Bell Labs. UNIX System V is the latest and most advanced version.

"AT&T Technologies is very pleased at what promises to be a constructive and mutually beneficial relationship with Digital Research," said Jack Scanlon, vice president of AT&T Technologies. "We believe that relationships such as this will help us achieve our ultimate goal of making UNIX System V the industry standard, and it will help make the operating system compatible with a variety of applications software."



DIGITAL RESEARCH, the world's leading supplier of micro-computer software, offers challenging opportunities within a stimulating technical environment. With a strong reputation for innovation and commitment to excellence, the Digital Research team is expanding to meet the growing needs of our industry. Based on this expansion, we are currently seeking candidates for:

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- Software Engineers
- Software Quality Assurance Engineers

Contact Digital Research Personnel Department for further information on these positions.

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Personnel Dept., P.O. Box 579 Pacific Grove, CA 93950.

Systems Software

Concurrent CP/M helps save energy

Imagine an office where heat and air flow are automatically controlled by a microcomputer that doubles as a business machine. That's the idea behind one company's innovative use of an IBM PC and Digital Research's Concurrent CP/M.

Johnson Controls Inc. of Milwaukee, Wisc. devised the system to help businesses conserve energy and save money. How? By a network of equipment that reacts to temperature variations throughout a building or complex of buildings. The network — called CHAIN for Computerized Head-end Access Information Network — helps guarantee no areas are too hot or too cold.

The monitoring equipment that make up the CHAIN network includes Digital System Controllers. These controllers are programmed to send and receive data about the ambient environment: temperature, air flow, lighting and such. So sensitive are the digital controllers that they perceive variations in temperature down to a fraction of a degree. Data are sent automatically to the IBM PC.

"It's the latest technology in the world of energy control," said Mike Bonfiglio, product manager for Johnson Controls. "It allows a business to have accurate control of the overall environment within a building."

Concurrent CP/M brings flexibility

Bonfiglio said that using an IBM PC makes energy management

affordable to small businesses that already own or plan to invest in a personal computer. Concurrent CP/M was chosen because it allowed engineers to tailor the PC to the CHAIN network, Bonfiglio said.

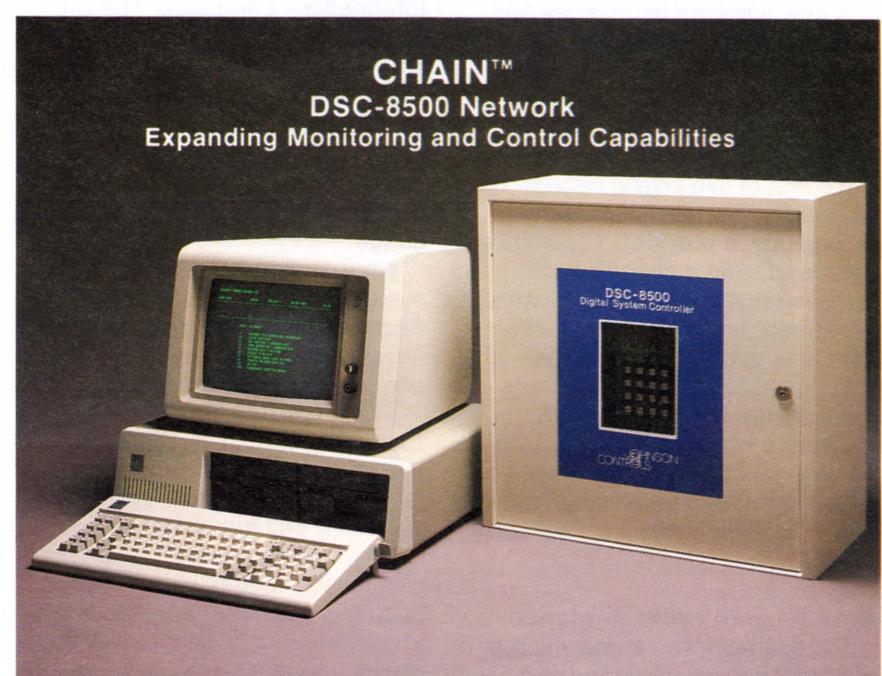
Further, it meant that the microcomputer could perform duties other than those of a monitoring station. With the multitasking feature offered by Concurrent CP/M, the IBM PC also functions as a business computer. Daily business transactions proceed without the user ever realizing his micro is in constant communication with a network of digital controllers.

For example, imagine you are printing a document. Meanwhile, the computer receives a myriad of details about thermostats, fans, hot water valves and air vents. The status of the CHAIN network can be called up without having to stop the print mode. Then temperature settings at any of the monitoring stations within the network may be changed with a few keystrokes.

"If a fanbelt breaks anywhere within the system, a report is sent to the IBM PC along with the time and date," Bonfiglio said. A warning alarm tells users that there is a malfunction within the monitoring network.

Micro Market entered

The company was formed nearly 100 years ago with the introduction of the first electric thermostat. Until recently, the firm has concerned itself with automatic controls for



The CHAIN network utilizes an IBM PC running under Concurrent CP/M to help monitor temperatures throughout a building or series of buildings. Concurrent CP/M, a multitasking operating system, permits the uninterrupted flow of data from the CHAIN to the IBM PC. A warning alarm sounds on the PC in response to any malfunction within the network. The system is sold by Johnson Controls, which has specialized in energy controls for almost 100 years.

large scale heating and air conditioning systems. It has grown into a billion dollar enterprise that specializes in computerized monitoring and control. Johnson Controls collaborated with Diversified Technology to produce software for the CHAIN network.

So far, the acceptance of the new product has been encouraging. Bonfiglio said 40 of the microcomputer systems were sold

before deliveries began in November. The first building outfitted with the system was a post office in Duluth, Minn. Bonfiglio said banks, department stores and schools have followed suit.

"The energy savings can be anywhere between 10 percent to 30 percent and sometimes more," Bonfiglio estimated. "We usually guarantee a two-year payback on the product."

DIGITAL RESEARCH NEWS

Digital Research News is a publication of Digital Research Inc., 160 Central Ave., P.O. Box 579, Pacific Grove, CA 93950. (408) 649-3896. TWX 910 360 5001.

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NWS-101-001

Concurrent CP/M Release 3.1 offers PC-DOS compatibility

A new version of Concurrent CP/M which may be used for multiple users and provides PC-DOS compatibility is being licensed to hardware manufacturers.

Concurrent CP/M Release 3.1 replaces MP/M-86™ as Digital Research's multiuser system. Targeted at 16-bit microcomputers, Release 3.1 may also be configured for a single user environment.

Kevin Wandryk, product line manager for the new release, said the PC-DOS mode in the new release increases the availability of applications software. End users can choose between products for Concurrent CP/M or PC-DOS. Digital Research will provide a list of those applications from PC-DOS which may be used, Wandryk said.

The manufacturer's version was introduced in December at the COMDEX/Fall trade show in Las Vegas and is scheduled to ship in March. It is considered an umbrella operating system that combines all the best features of its predecessors and adds others.

Improvements incorporated

"It's based on our two years of experience in concurrent technology," said Wandryk. Speed of processing and command execution were increased. There were also several other technical changes that improve overall performance, Wandryk said.

Some other key features of

Release 3.1 are:

- GSX graphic extension sold with Release 3.1 at no extra charge.
- Supports the 8087 Math Coprocessor.
- The capability for windowing.
- Shared code support, which reduces program loading time and the amount of memory required. (This is particularly helpful in multi-user environments where more than one person may be using the same application.)
- Support of networking with DR Soft/Net™. By using DR Soft/Net in combination with Concurrent CP/M, clusters of independent

machines may be linked together to share equipment or information.

• Multiuser capability.
"Concurrent CP/M Release 3.1 reaffirms our commitment to multi-user systems," Wandryk stressed. "The new release is a higher performance product."

Release 3.1, which combines all of the most popular features of previous releases, becomes the sole operating system offered to manufacturers. This reduces confusion about the types of operating systems from DRI, Wandryk said, and it permits DRI to focus on support and marketing of one operating system.

DEC Rainbow outfitted with Concurrent CP/M

Digital Research has signed an agreement with Digital Equipment Corporation to market Concurrent CP/M on the recently introduced DEC Rainbow and Rainbow Plus™ personal computers.

The DEC implementation of Concurrent CP/M includes the Digital Research graphics extension, GSX. The GSX package allows for the use of DR Draw, DR Graph and other software adapted for color and design.

"The DEC design for Concurrent CP/M utilizes the Rainbow to its

maximum capacity," said Don DeVitt, senior technical support engineer at Digital Research. "For example, it allows the use of 132 column width on the screen instead of the usual 80 columns."

Other features provided by DEC engineers include simple menus for scrolling, character size and a HELP menu which is displayed at the touch of a single key. It has five virtual consoles each of which may be dedicated to different tasks. This version supports a 10 MB hard disk and up to 896 K of RAM.

Systems Software

DRI makes language porting easier

A new software technology has been developed by Digital Research that benefits manufacturers, Independent Software Vendors and end users alike.

Digital Research FORTRAN-77™ is the first of five Digital Research languages that will adopt the new technology. It provides a "common back-end" that makes it simpler to transport programming languages to different types of microprocessor chips and operating systems.

Dr. Kin-Man Chung and Craig Franklin, the Digital Research engineers who designed the technology, said the common back-end reduces the wait between advances in hardware and the availability of software.

Development cycle shortened

For example, say a new microprocessor CPU is produced and installed into a personal computer. To develop even one programming language for that computer may take as long as two years, Chung said. There has been an even longer wait for applications software. The new software technology can greatly shorten that waiting period.

Basically the process works like this:

This innovative technology involves the front-ends of a language which emit a Common

Intermediate Language. The CIL is standard for all compilers. It operates with a code generator and run-time library, which constitute the common back-end of the technology. Working together, the code generator for front-end and run-time produce native machine language.

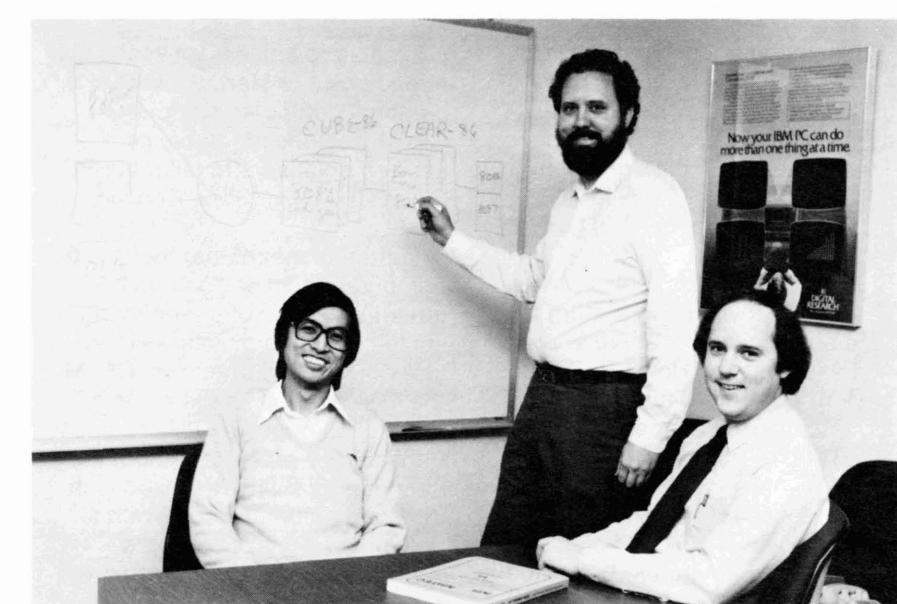
When a new CPU or operating system is selected, Digital Research engineers need to develop only code generator and one run-time for all the languages — FORTRAN-77, Pascal/MT+, Digital Research C™, CBASIC and PL/I. The job is simplified because both the front-end and back-end are written in Digital Research C language.

"The common back-end allows us to get a lot more accomplished in a shorter time," said Lowell Wolf, product marketing manager for DR FORTRAN-77. "This technology will eventually provide portability across the 8086, 80286 and 68000 CPUs as well as across CP/M-86, Concurrent CP/M, PC-DOS, MS-DOS and Bell Laboratories' UNIX®."

Strategy outlined

"Our common back-end strategy will be the basis for all future compiler projects at Digital Research.

Wolf pointed out that the new technology frees programmers to create new programs rather than



Craig Franklin, standing, and Dr. Kin-Man Chung, left, developed the common back-end technology to simplify the porting languages. Lowell Wolf, right, is product marketing manager for Digital Research FORTRAN-77, the first product implementing the new technology.

spend time reconstructing their applications software. Applications programs can be transferred from one type of computer to another simply by recompiling and linking the software.

Programmers may also take advantage of the standard coding conventions provided by the common back-end, according to Wolf. Programs written in one language can call subroutines written in

another language, meaning programmers can utilize the language most suited to the task.

"Common back-end technology is a first in the microprocessor industry," Franklin said. "Time is everything in this fast changing industry and we now have the means to reduce the time it takes to get product to market — not only for DRI but also for software developers and OEMs."

Two-in-one buy for programmers

Programmers who grew up on IBM mainframes used a flexible software tool called SPF, or Structured Programming Facility. It had no equivalent in the microcomputer field — until micro/SPF™.

Cathy Murphy, DRI product marketing specialist, said micro/SPF is the answer for corporations wanting to cut costs and save time retraining employees on microcomputers. It simulates the environment of a mainframe, which may suffer critical slowdowns as more and more people access the system. With micro/SPF, the mainframe can be freed of tasks that require valuable computing time.

Phaser Systems Inc. created micro/SPF and shares distribution rights with Digital Research. It is available for microcomputers using the CP/M-86 operating system, Concurrent CP/M and PC-DOS.

See your local dealer. For dealer information call (800) 227-1617, ext. 440 or in California only (800) 772-3545, ext. 400.

Edit tool for micros

Two products that were sold separately by Digital Research to assembly language programmers have been combined into one handy package called DR Assembler Plus Tools™.

The two products are Programmer's Utilities (PUG) and Symbolic Instruction Debugger (SID). All of the features that were in these two packages are provided in DR Assembler Plus Tools, which includes the assembler, linker, debugger, librarian and cross-reference utility.

DR Assembler Plus Tools may be used on the CP/M family of operating systems, including Concurrent CP/M, CP/M-86, PC-DOS and MS-DOS.

DRI products now available for IBM 3270

Programming languages and products for PC-DOS and the recently announced IBM 3270 Personal Computer have been released by Digital Research.

"Digital Research, under agreement with IBM, did the work necessary to make certain that the languages would be compatible with the IBM 3270 PC," said John Rowley, Digital Research president. The IBM 3270 PC can act as a microcomputer-mainframe link that is capable of up to four interactive sessions with one or more mainframe computers.

The languages and products that may be used on the IBM 3270 PC are: Level II Cobol™, Animator™ (a program debugger), Forms II (a screen generator for COBOL), a Native Code Generator, PL/I, Pascal/MT+, Digital Research C, CBASIC Compiler™, Access Manager™, Display Manager™, micro/SPF and DR Assembly Plus Tools.

Carmen Governale, DRI marketing manager for languages, said applications produced with these languages are portable between Concurrent CP/M, CP/M-86 and PC-DOS.

"Our language support of PC-DOS provides a bridge from PC-DOS to Concurrent CP/M," Governale said. "Anyone who has invested in the DRI languages can move up to different, more advanced and powerful systems without having to buy new software."

ANSI specs met in new FORTRAN

DR FORTRAN-77, a new language compiler developed by Digital Research, makes the most out of microprocessor technology with features commonly found on FORTRAN for minicomputers or mainframes.

The new compiler is scheduled for release by March. It implements a common back-end, a new technology to aid the transporting of languages and software from one microprocessor to another. (Refer to related article above.)

Lowell Wolf, product marketing manager, said DR FORTRAN-77 features a number of advancements not found on any other FORTRAN for microcomputers. Programmers can use the full one megabyte of memory provided on the Intel 8086 and 8088 microprocessors. Also, the new compiler meets all the X3.9 specifications adopted by American National Standards Institute.

"That is important because FORTRAN compilers for minicomputers and mainframes also conform to the ANSI '77 standard," Wolf said. "The standard aids programmers who want to transport software from a mainframe or minicomputer to a personal computer."

Designed for flexibility

Some other advanced features on the DR FORTRAN-77 compiler are:

- Support for the Intel 8087 math coprocessor.
- Overlay capability so programs can run on systems that have less memory.
- Ability to handle arrays as large as 65,546 elements.
- Capability to exchange subroutine calls between different languages.
- Single and double precision real numbers.
- 40-character variable names.
- Subscript checking option.
- Free-form source coding without regard to fields or columns.
- Compatibility with Digital Research's programmer tools, Access Manager and Display Manager.
- Compatibility with GSX, the graphics operating system extension from Digital Research.

"No other FORTRAN can match the abilities of DR FORTRAN-77," Wolf said. "It is a powerful compiler that gives programmers flexibility in producing applications software."

GSX

Continued from page 3

a drawing board, the ability for visual communications has grown substantially," said Joe Kowalik, product development manager for Polaroid.

Annual U.S. volume of slide production for office use is more than 400 million. The Palette will make it simpler and less expensive to

produce presentation quality graphics.

For more information about the Polaroid Palette and using the GSX operating system extension, contact your local computer retail dealer. To find the dealer nearest you, call (800) 227-1617 ext. 400, or in California (800) 772-3545 ext. 400.

Personal CP/M™ is good news for novice and professional

Personal CP/M, a new version of Digital Research's popular operating system, takes the trauma out of learning how to use a computer.

Designed for home computers, Personal CP/M is a simple guide to the operation of the machine. It is menu-driven — providing lists of options from which users may select. By using these simple menus users do not need to remember numerous and cryptic commands for printing, opening a file and so on.

Computer manufacturers have the freedom to install Personal CP/M on a variety of formats such as diskette or cassette. One major advantage of Personal CP/M is that it may be imprinted on an inexpensive component of the computer — a ROM chip. The ROM chip helps keep the cost of a computer down because it is included in the price of the machine.

American Microsystems Inc., a subsidiary of Gould Inc., and Zilog® Corp. recently agreed to combine Personal CP/M into a chip based on the industry standard Z-80® microprocessor. This is especially useful for microcomputers not requiring disk storage.

Standardization sought

"At AMI, we see the union of these three companies as a major advancement in the ability to put a powerful, standardized operating

system on board a microprocessor," said Thomas E. Woodward, AMI group vice president. "We believe this will lead to new levels of integration and more cost-effective systems in silicon."

AMI and Zilog Corp. will manufacture, market and distribute Personal CP/M on a chip.

"Personal CP/M represents a major step in the evolution of

"Personal CP/M represents a major step in the evolution of microcomputer design . . ."

microcomputer design," said John Rowley, president of Digital Research. "With it, the CP/M operating system, which supports the largest library of applications software, can be easily built into products.

Compatibility offered

"And for manufacturers and users, Personal CP/M saves expense and time. It avoids the inconvenience of having to load an operating system from disk. We expect the availability of an integrated CP/M microprocessor chip will greatly increase the cost effectiveness and broad-based applicability of CP/M within the next six months."

Personal CP/M was designed as a versatile operating system for 8-bit computers in the low-end market — machines costing less than \$1,000. It is upwards compatible with other versions of CP/M, so anyone familiar with CP/M syntax may continue to use traditional commands rather than the HELP menu.

"In Personal CP/M we focused our attention on making the computer more friendly," said Jim Tillinghast, product manager for Personal CP/M. "It allows users to have a dialogue with the computer."

Personal CP/M communicates with users in English. If you want to add a printer to a computer or copy information from one disk to another, it walks you through the procedure.

The new version of CP/M allows buyers of low-end computers to run more advanced programs than ever before. This is achieved through the streamlined design of Personal CP/M. It requires eight times less space on the ROM chip than similar operating systems such as MSX.

"Personal CP/M is a perfect product for beginners using home computers because it is easy to learn and use," said Tillinghast. "But it is also useful to professionals who desire a simple yet versatile system that can handle their daily business chores."

"Media Quotes"

Digital Research continues to make news in the industry and the general press. Following are excerpts from a few of the articles which have appeared recently.

"If you buy a computer that uses CP/M, you will indeed have access to a wide variety of business programs. Furthermore, programs that use the CP/M operating system are almost guaranteed to run on your computer, since most computers that use CP/M have similar capabilities."

San Francisco Chronicle,
Dec. 4, 1983

"Digital Research continues to refine CP/M and keep its abilities current with state-of-the-art in computing. The recent introduction of the GSX kernel, a set of graphics enhancements that allow CP/M to manipulate directly the graphics display of the latest computer systems, is one example. A networking kernel, and kernels for other specific computer hardware improvements are on the way."

Creative Computer,
November 1983

"If you or your employees intend to use a personal computer a great deal, you should try to obtain a version of CP/M that supports concurrent operations. The ability to have several different programs going at once is not appreciated at first, since it is a bit confusing to understand. But after you have had several incidents where you have to wait for the computer to finish one task so that you can start another, you will wonder how any computer can do without it."

LIST, November 1983

"Breaks can be self-generated, such as those made to check a word in the dictionary, or they can be imposed from the outside. We work in an interrupt-driven manner, allowing phone calls, messages, or fellow workers' inquiries to tear us from the task at hand. Many users of Concurrent CP/M say that the operating system seems like a natural extension of the way they work because it enables them to switch among tasks without losing the thread of any of them."

Byte, November 1983

"What's revolutionary is that the vast majority of microcomputer manufacturers decided to design their computers to use the same operating system — Digital Research Inc.'s CP/M — thus creating a de facto standard. For the first time, a user can take a program out of one computer and put it into another as easily as moving a cassette tape from a car stereo to a home stereo."

Computer World, Oct. 10, 1983

"Digital Research Inc. has good reason to be pleased. At long last, IBM has given its official backing to the software company's multitasking Concurrent CP/M-86 for the IBM Personal Computer and its XT. The computer manufacturer introduced seven applications packages that run under Concurrent, as well, making the operating system much more useful to PC and XT users."

Advertising Week, Oct. 3, 1983



Norm Alcott, product marketing manager, demonstrates the tutorial for Personal BASIC, a powerful language with special adaptations for neophyte programmers.

Learn how to program with Personal BASIC™

You don't have to be a programmer to enjoy Digital Research's Personal BASIC. Even though an experienced programmer can appreciate the flexibility of this new language, it has special features for the beginner.

"Personal BASIC has a step-by-step tutorial," said Norm Alcott, product marketing manager for the BASIC line. "It not only teaches you the language, but by the time you are finished, it will have taught you how to program."

Another special feature helps beginners correct errors. Said Alcott, "It automatically checks the syntax, and this also makes it easier to learn programming because

you can correct your logic errors immediately."

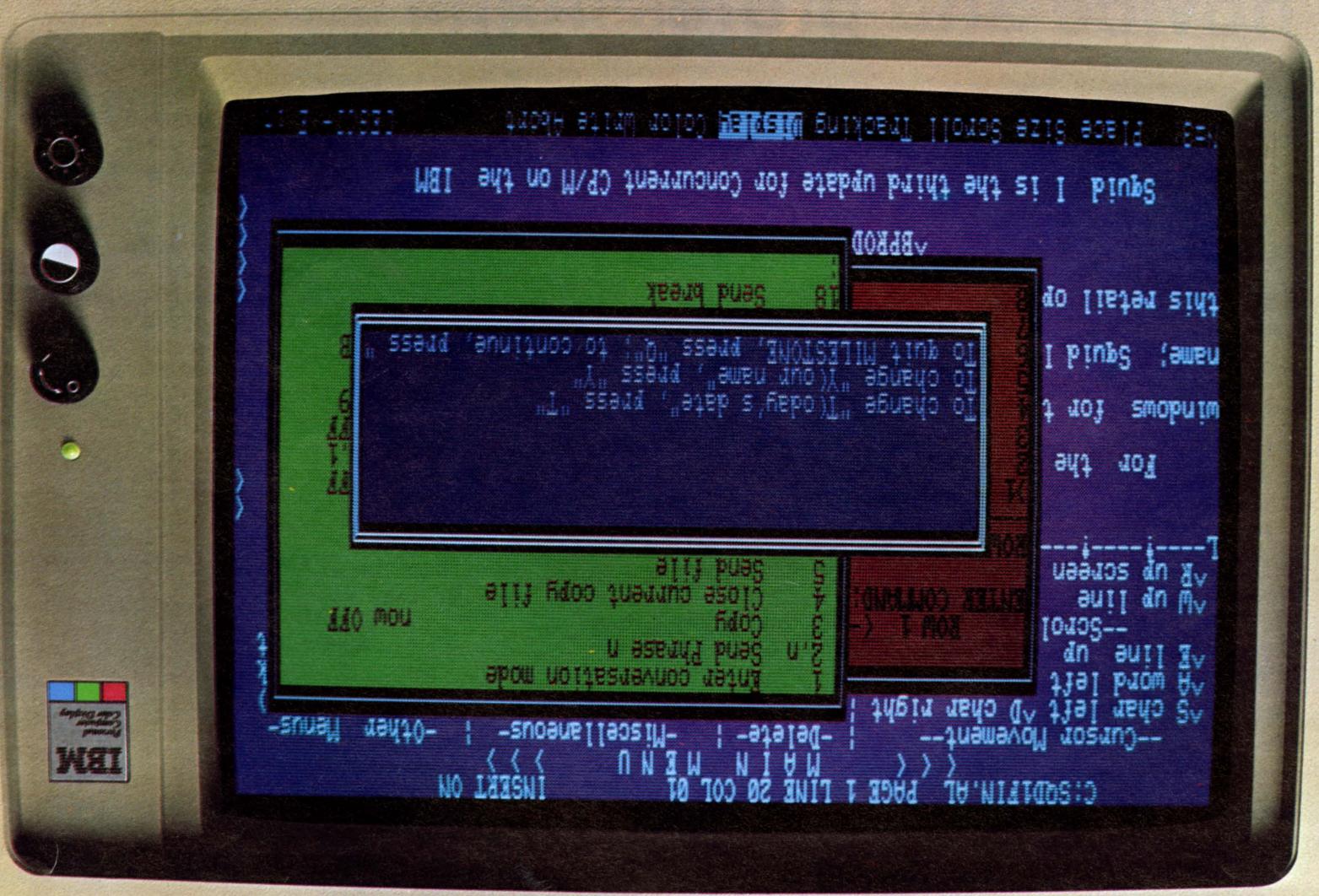
Alcott described Personal BASIC as a perfect tool for users interested in developing programs on their home computers. Games, personal accounting, mailing lists and such may be devised simply by using Personal BASIC. Complete documentation is provided for simple reference. "Personal BASIC provides a springboard into higher level languages," Alcott said.

Personal BASIC may be used with the CP/M-86 family of operating systems, which includes 16-bit machines such as the IBM PC. For price and other information on Personal BASIC, call your local dealer.

DR Soft/Net is available through computer manufacturers who provide the technical expertise for implementing the product. Although it is designed for 16-bit computers, it may be linked to a network of 8-bit computers that use DRI's CP/NET®. That means businesses don't have to worry that their early model machines have become obsolete, said Jim Funk, DRI product line manager.

DR Soft/Net is designed for the CP/M family of operating systems, especially CP/M-86 and Concurrent CP/M for 16-bit microcomputers. "It doesn't matter which CP/M-based machines you use," Funk said, "and it doesn't matter whether they are 8-bit or 16-bit."

Watch for DR Soft/Net, which is available soon to your favorite computer manufacturer.



DIGITAL RESEARCH NEWS

CP/M card designed for Apple®

Suppose you bought an Apple II® or Apple IIe®. It worked great until you wanted software that was written for a CP/M system instead of your Apple. What then?

The answer provided by Digital Research Inc. is a technological bridge that allows you to use products designed for other machines.

That bridge is a slim computer board from Digital Research called the CP/M Gold Card™.

The CP/M Gold Card slides easily into a slot already provided in your Apple. Once installed, the card opens the door to a world of software not otherwise accessible to you. This is accomplished through the concept of portability.

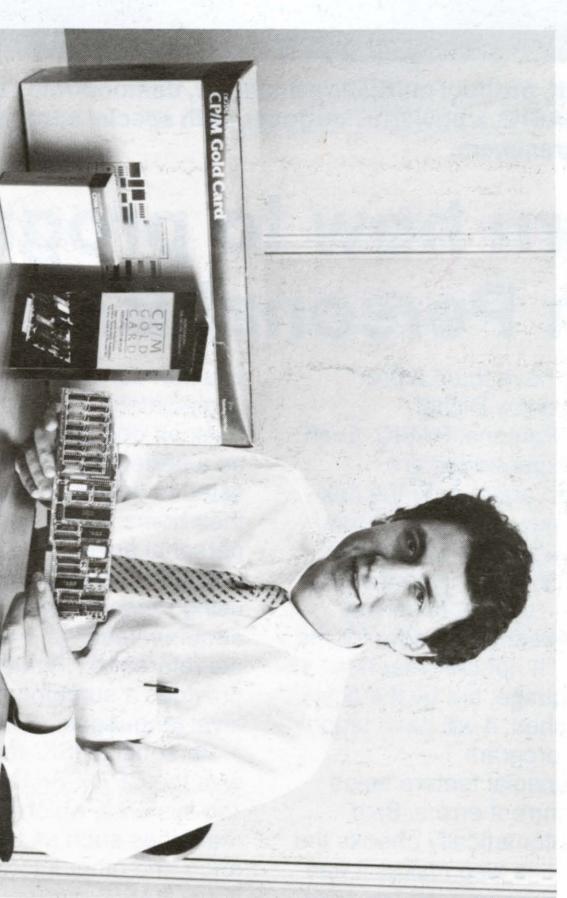
For example, software written for the Kaypro computer may be used on a Wang or Commodore™ computer. That is because all of these computers and some 900 others use the popular CP/M operating system.

The CP/M Gold Card links the CP/M system with the Apple DOS systems to provide the best of both camps. That means you can continue to use your favorite Apple programs and any of CP/M programs as well.

"It's flexible, and it's compatible with Apple II, Apple IIe and Apple II Plus® computers," said Product Manager Dave Woodruff.

The CP/M Gold Card was designed to be a complete system. The card is outfitted with a Zilog Z-80 microprocessor and CP/M Plus™ operating system.

Dave Woodruff, product manager for the CP/M Gold Card, says the plug-in board opens a world of CP/M software to Apple users.



CP/M-Plus is a single user system designed for the business environment. It provides banked memory, a feature that juggles data to increase the speed of information processing.

"We've beefed up the operating system to make it run more efficiently," Woodruff said. "The overall benefit is a three to ten times increase in speed performance."

Included in part of the CP/M Gold Card package is the CBASIC programming language, system utilities and documentation.

The Gold Card transforms the 40-character screen on the Apple into the 80-character display needed for CP/M software. This

eliminates the need to buy one card for the CP/M operating system and another to change the size of characters on the video screen. "It's a complete system. All you have to do is boot it and go," Woodruff explained.

Three types of CP/M Gold Card are offered to fit the different needs of customers: a version with 64K of RAM; one with 192K of RAM; and a third that allows for upgrades from the 64K ram to 192K RAM.

"We estimate that the total number of Apple II machines in use will be 1.2 million by the end of 1984," Woodruff said. "We're addressing the needs of those users to access CP/M programs."

DIGITAL RESEARCH NEWS

Digital Research News is published by Digital Research Inc. for customers everywhere.

Address all correspondence to
Editor, Digital Research News
P.O. Box 579
Pacific Grove, CA 93950
(408) 649-3896

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