

MINC-11

The Easy-to-Use Scientific, Engineering
and Laboratory System from Digital



digital
Digital Equipment
Australia Pty Limited

**With
Compliments**

for book

CAL COOK

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You'll find it easy to use MINC because you program in BASIC

Sit down at the keyboard. Turn MINC on and you have a BASIC system immediately ready to solve problems and acquire laboratory data. It's not even necessary to write a program first. With a few simple BASIC commands you can monitor a laboratory experiment, process data, solve complex computational

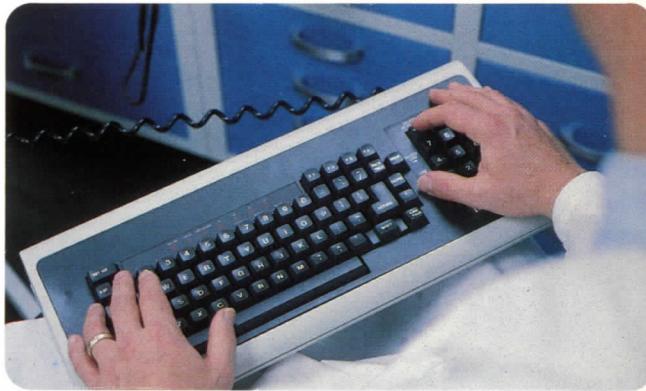
problems, and plot charts and histograms.

As you become familiar with your MINC System, you'll find that it has many powerful features that are not available—or, that are only available as extra-cost options—on desk-top calculator/computers selling in the same price range.

For example, MINC provides the IEEE interface so you can acquire data from IEEE-compatible laboratory instruments. A video graphics terminal, so you can display those data graphically. Twin

floppy disk storage so you can easily copy the data and programs you want to keep. They're all *standard* with MINC.

As you continue to use your MINC System, you'll find that you can do many things that would be impossible with a desk-top unit. MINC is a complete computer system. It is also a complete laboratory system. In addition to the built-in IEEE



interface, MINC provides seven different plug-in input/output options for analog-to-digital and digital-to-analog conversions, digital input and output, analog multiplexing, and time-keeping operations. As many as eight modules can be used at a time to support both routine and highly complex laboratory experiments. And, you can mix and match these plug-in modules as your needs change from day to day or experiment to experiment.

Interfacing a lab instrument to a MINC module is as simple as plugging in a single connector. When you finish your experiment, you unplug the connector and wheel the MINC cart to the next job.



MINC was developed to meet your needs...

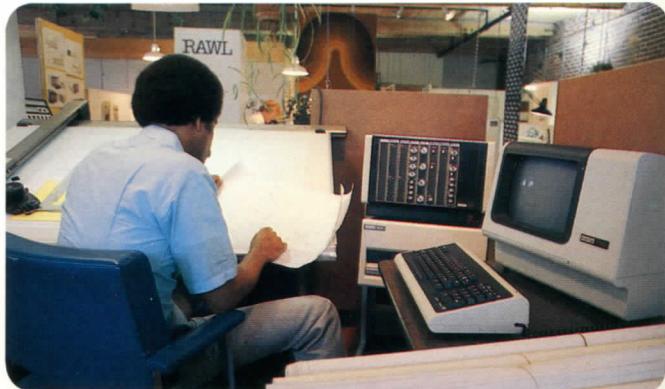
MINC stands for Modular INstrument Computer. It was developed by Digital's Laboratory Data Products Group to meet the demand for a low-cost, easy-to-use system that would combine the best features of both desk-top calculator/computers and laboratory minicomputer systems.

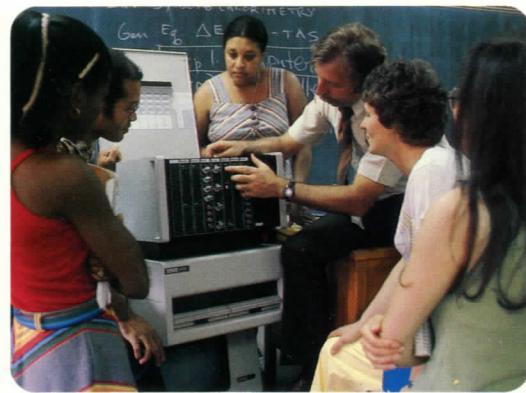
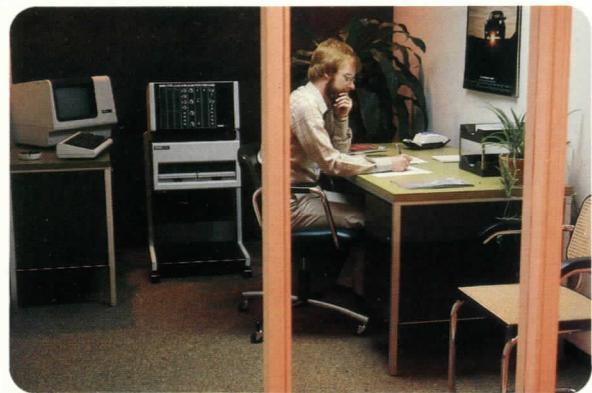
A primary design objective was to make it easier for the user to interface the computer to laboratory instruments and test equipment. The modular approach taken in the design of MINC makes it possible for technicians—without computer experience or training—to set up practically any laboratory or test procedure.

The design is based on more than 20 years experience with laboratory systems. MINC is a direct descendant of Digital's LINC computer, the first computer

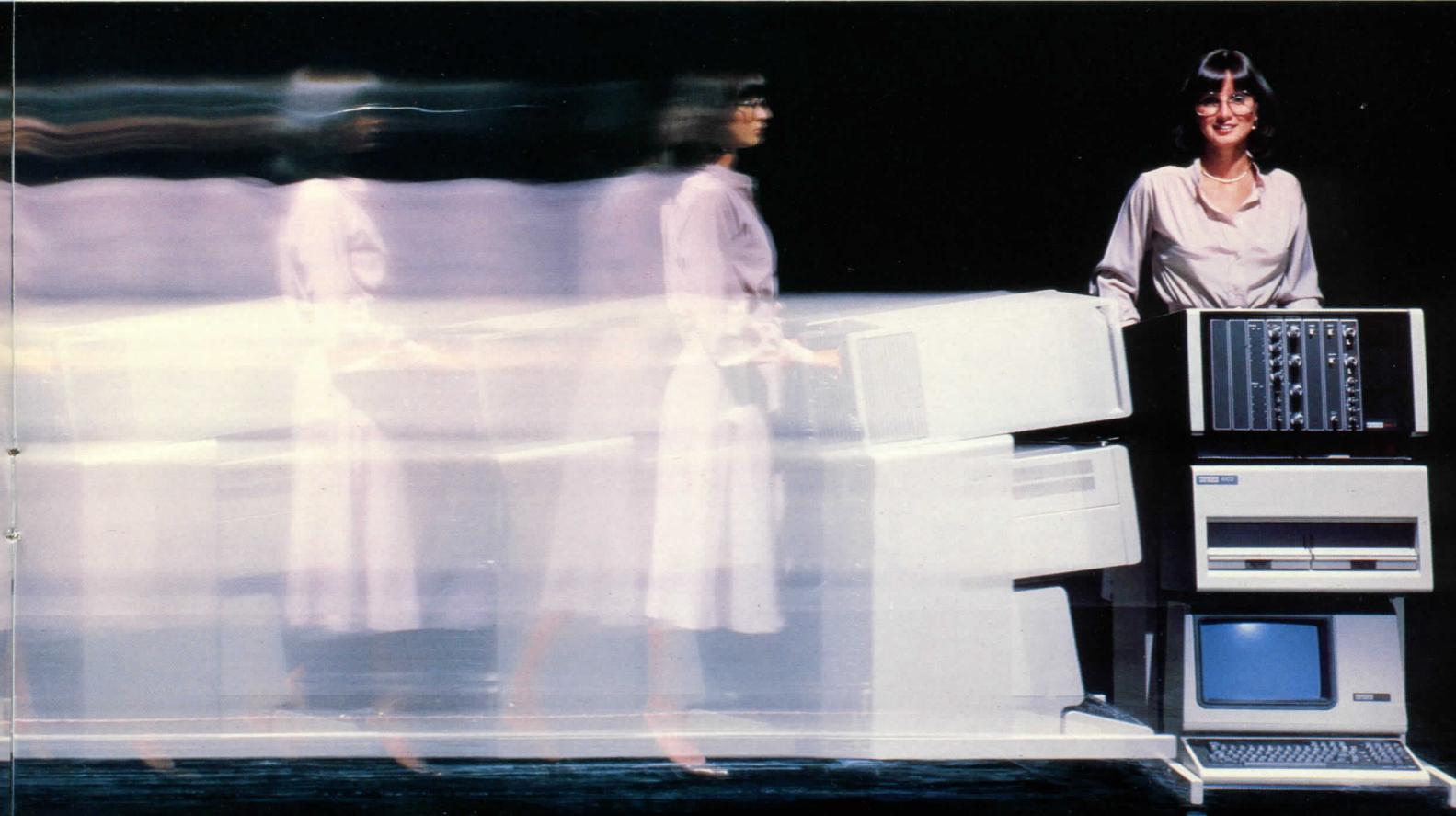
developed specifically for laboratory use.

Since the production of LINC in the early 1960's, Digital has become the largest manufacturer of minicomputers in the world, as well as an acknowledged leader in the development of medium and large-scale interactive computer systems. Today, well over 100,000 Digital systems are being used in research labs as well as in business, industry, and government.





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Software is basic to the MINC system

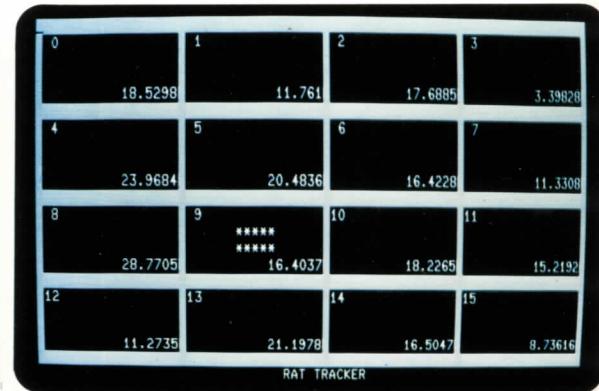
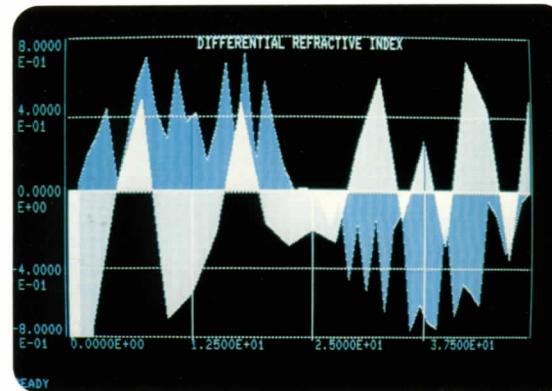
There are many different computer languages, but probably the easiest to learn and the easiest to use for scientific and engineering calculations is BASIC. Because this language resembles English, it's ideal for applications where you work with the computer in a conversational mode.

MINC is delivered with complete ENHANCED BASIC software for computation, graphics, and instrument control together with ready-to-run mathematical, statistical, and data processing programs.

Turn MINC on and it's ready to use. If you can program a calculator in BASIC, you can program MINC. If you've never done any programming before, you'll find that MINC BASIC is easy to learn and use because there

are dozens of special commands that simplify laboratory procedures and graphic presentations.

For example, a single command will cause analog data acquisition with the simultaneous display of those incoming data. Commands like this can often eliminate the need for programming in the normal sense. With MINC BASIC, the user simply tells the system what to do next.

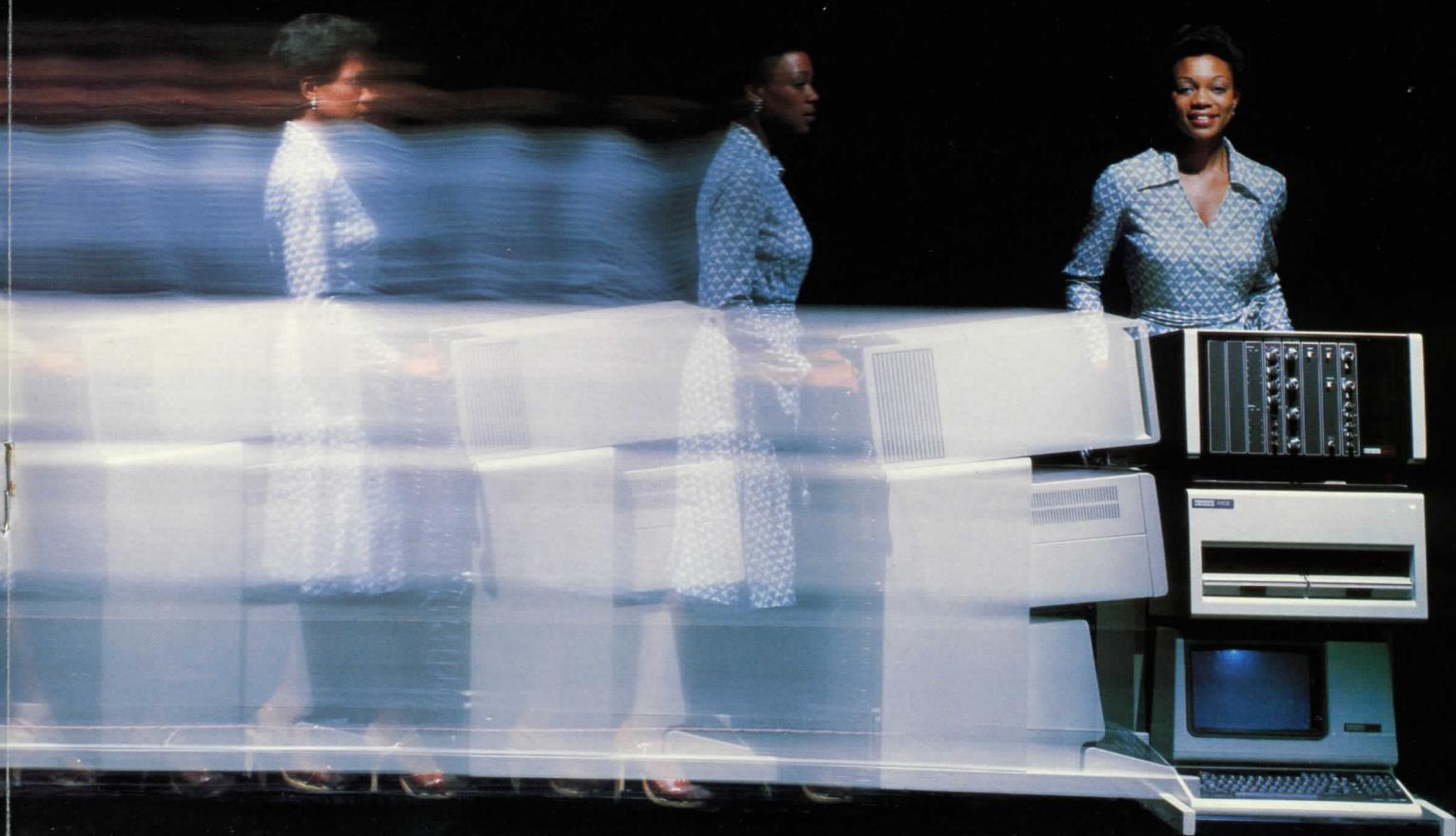
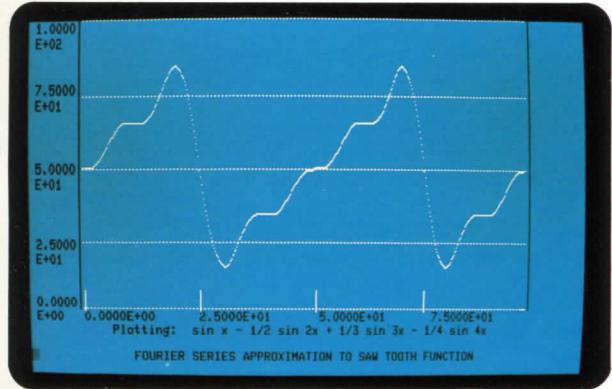


Of course, it is also possible to write an entire program before acquiring data, but whether operated in "program" or "immediate" mode, the user has the BASIC software needed for laboratory, scientific, engineering, and statistical applications.

This software is fully documented. "Beginner" and "Expert" manuals have been written so that both the novice and the computer buff can learn what they want to know and make the system do the things they want it to do. And MINC is shipped

with an easy-to-read self-instruction manual, enabling you to rapidly learn BASIC, if you don't already know it.

And, if one of the things you want to do is use MINC as a general-purpose computer, you can do it. You can use MINC BASIC for record keeping, report generation, and general-purpose computing. Your MINC system will support Multi-Terminal BASIC. And, if you want, you can switch to another language like FORTRAN or APL. That's functionality.



**MINC is designed
so you can install
and run it yourself—
you don't need
programmers,
computer operators,
or someone from the
factory to set it up**

You start using your MINC system the day it's delivered. All you have to do is open the cartons and connect the components. It's no more complicated than putting a stereo system together.

Now that the system is assembled, insert the diskette with complete MINC BASIC for computation, graphics, and instrument control and push the power switch. The system will then tell you it's ready and you can start to use it as a simple calculator. Or, you can start keying in BASIC commands to control and monitor a laboratory experiment, process data, or plot charts and graphs.

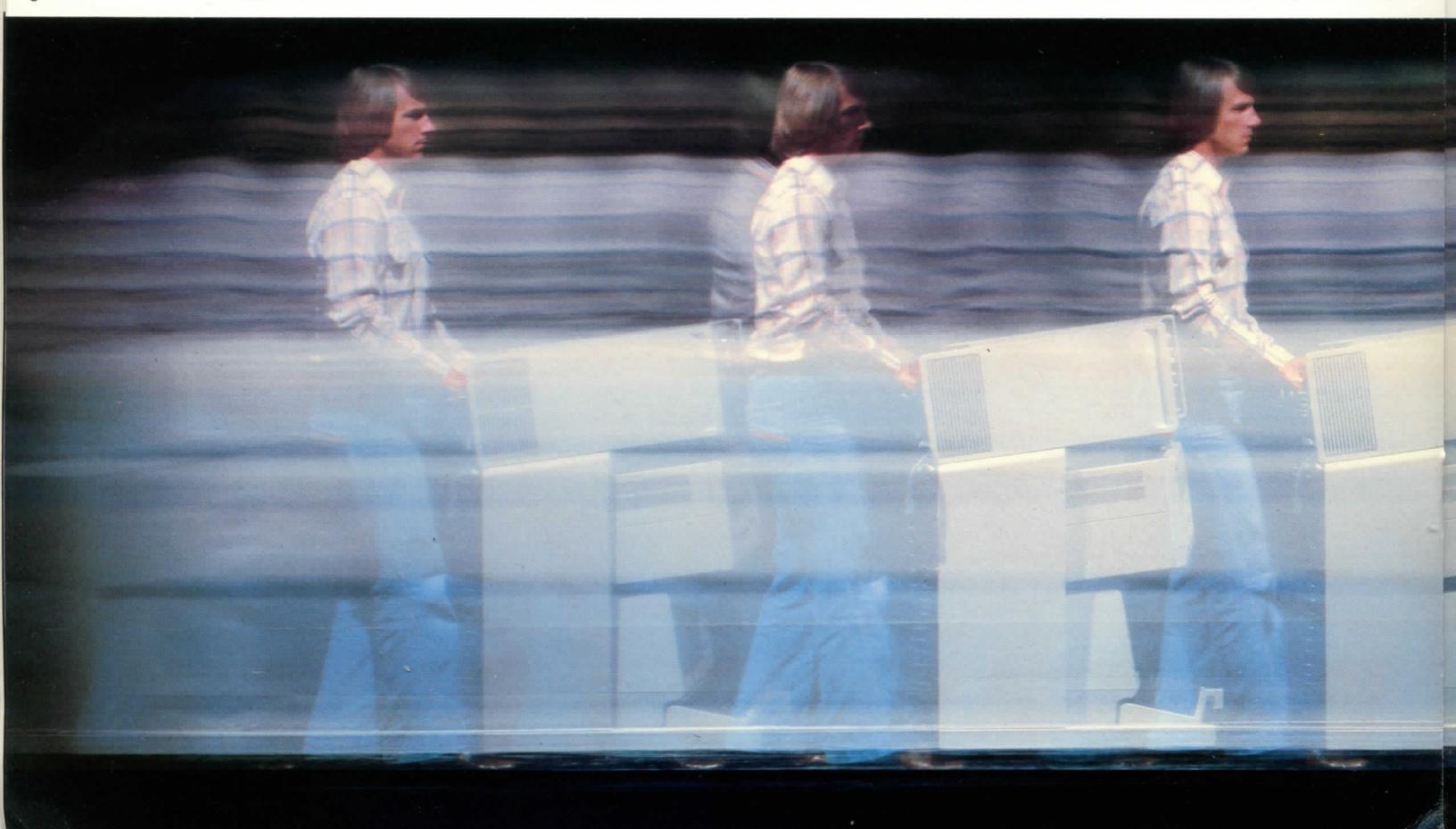
You don't have to be an old hand with a calculator or an experienced programmer to use MINC.

Scientific and engineering calculations and laboratory

procedures are complicated enough. There's no reason that engineering and laboratory personnel should have to become computer experts, too.

With MINC they don't have to.

MINC is designed for people who have never used a calculator or computer system before. In fact, it is easier to learn how to use MINC than it is to learn how to use most desk-top calculator/computers because Digital provides a step-by-step, self-



instruction manual. This book is written so that anyone can sit down at the MINC keyboard and learn the basics of programming in a matter of hours.

If you need the power and functionality to do things that would be impossible with a desk-top unit

MINC gives you the option of going beyond BASIC. Unlike a desk-top calculator/computer that has a "hard-wired" language that cannot be changed, MINC is available with an extensive list of software options including:

MINC software options

RT-11 FOREGROUND/BACKGROUND A real-time operating system that allows you to run two jobs—including batch processing—at the same time.

DECnet/RT-11 Supports communication between PDP-11's (including MINC) and other DIGITAL computer systems.

REMOTE-11 Supports communication between MINC and other PDP-11 computer systems.

RSX-11S Multiple task operating system.

DECnet/RSX-11 Allows programs developed on another system to be down-line loaded into a MINC running the multi-tasking RSX-11S.

FORTRAN IV ANSI Standard, with laboratory extensions.

APL High-level programming language.

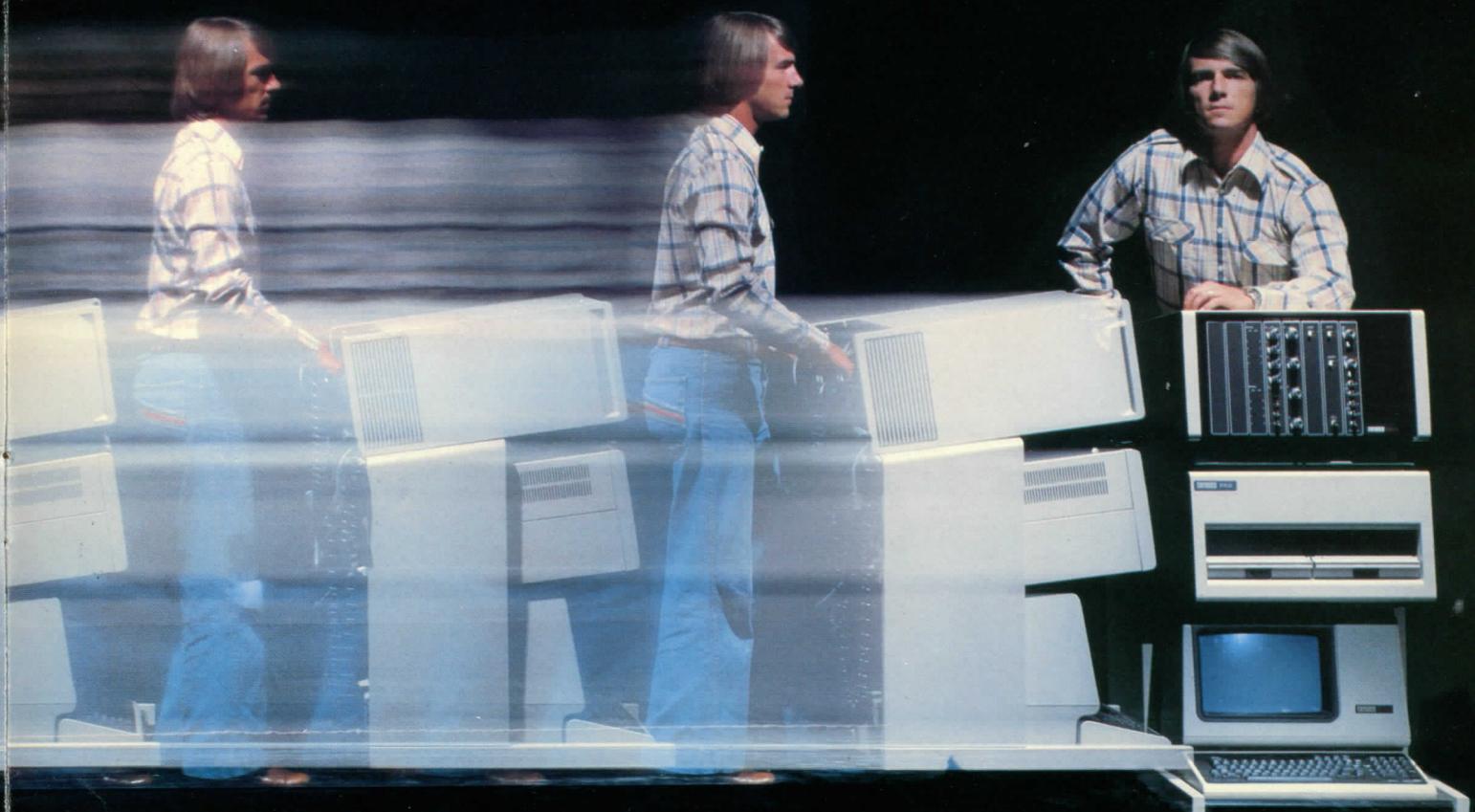
MULTI-TERMINAL BASIC Provides BASIC to multiple users simultaneously.

FOCAL An easy-to-use language similar to BASIC.

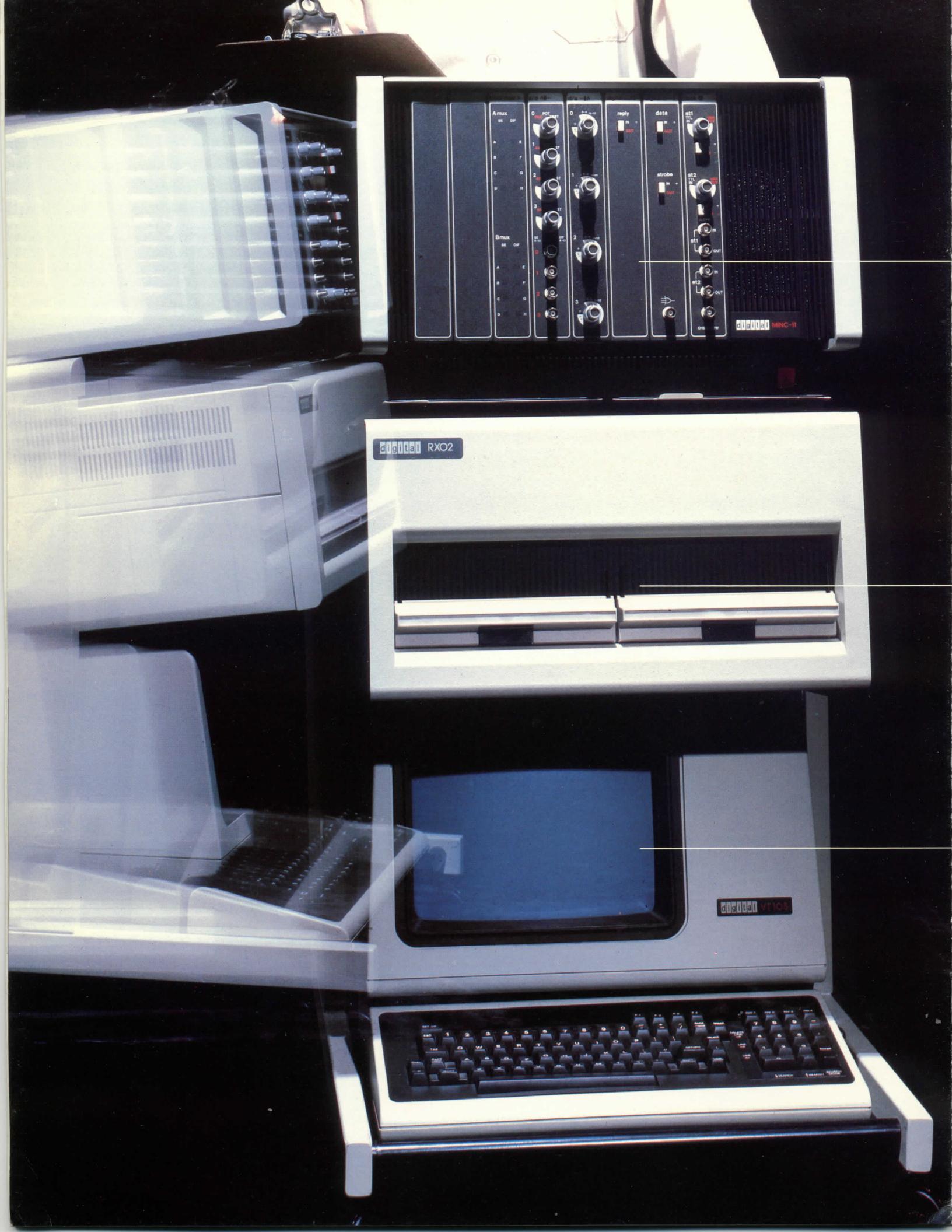
MACRO ASSEMBLY Machine level assembly language programming.



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**A closer look
at the
MINC system**



MINC is mobile. The entire system can be wheeled from laboratory to laboratory, office to office, or classroom to classroom. The top cabinet in the MINC cart contains

Digital's proven PDP-11 microcomputer with built-in IEEE interface and eight slots where you can plug-in MINC interface options.

Twin, double-density, million character floppy disk drives are mounted directly below the MINC box. A full-size, video graphics display,

with separate keyboard, is included with the system and may be stored in the bottom of the cart when not in use, or when the system is being rolled from job to job.

The heart of the MINC System —The PDP-11 microcomputer

The MINC System is built around the Digital PDP-11 microcomputer that has been

The MINC Modules— everything you'll ever need to acquire laboratory data, monitor experiments and control experimental equipment

Not every laboratory device can be connected to the IEEE interface. Some signals have to be amplified. Some procedures require a clock for timing external events. And, many tests require a large number of analog inputs or outputs. Digital input and output lines are also frequently needed.

There are seven different input/output modules that you can use with the MINC System including:

*Analog-to-Digital (A/D) Converter
(16 channels)*

Dual Multiplexer (Increased capacity of A/D Converter to 32 channels), three multiplexers can be used with a single A/D Converter to give a total of 64 channels.

Analog Preamplifier (4 channels)

Real-Time Clock

*Digital-to-Analog Converter
(4 channels)*

Digital Output (16 lines)

Digital Input (16 lines)

As many as eight modules can be plugged into the MINC box at one time. You select the modules you need to support the job you have to do. By using a number of different modules, you can tailor your MINC System to support as many as 64 analog-to-digital inputs at the same time. Configuration is easy. Connections are easy, too. Laboratory equipment may be plugged directly into the front panel of some modules. There are also controls on the module front panels. For example, the analog

Twin Floppy Disks let you store more data and retrieve it faster.

Whether you're performing scientific calculations, processing data, or are acquiring data, or monitoring and controlling laboratory experiments, the speed at which

you can work is often dependent on the type of data storage you have.

MINC has twin, double-density, floppy disk drives. Unlike the cartridge devices on calculator/computers, disks are random access devices. You don't have to wait for the tape to spool forward or backward to the information you need. The computer keeps track of just what is on each disk, and when that information is needed, the

disk "head"—which acts like the tone arm on a record changer—goes directly to the place where that information is stored. It takes less than half a second to select the desired information.

Floppy disks also store more data than tape cartridges. MINC provides on-line storage for more than a million characters of information—that's almost five times the capacity of the cartridge tape drives found standard on most calculator/computer systems.

MINC provides a full-sized graphic display that lets you "see" experiments in progress

The MINC System features a full-sized video graphics display with 12-inch screen and complete graphics software. A video output

is also provided so that you can videotape data as displayed on the screen or transmit data to video monitors in classrooms or other remote locations.

The graphic capabilities of the system allow the display of two independent histogram or point-plot graphs simultaneously. Graphs may be displayed, one above the other, or one may be superimposed over the other.

The video graphics display will print characters in BOLDFACE, reverse text (black on white or white on black), or continuous flashing, or all three.

The system will also display data graphically as they are acquired. Thus, you can monitor the acquisition process as it occurs.

used in more than 25,000 systems. This proven processor is delivered with 60,000 characters of solid-state memory, fast, hardware floating-point arithmetic (handles scientific notation), the standard IEEE interface, and three serial

line input/output channels to which you can connect an optional line printer and two serial line laboratory instruments.

The IEEE interface is a standard feature—not an extra-cost option.

The standard IEEE interface which supports up to 14 laboratory instruments and testing devices simultane-



Two disk drives are provided with each MINC. This allows you to copy data from one disk to another. The ability to make "backup" or "file" copies of valuable data is lacking in most calculator/computer systems because typically these machines only have a single tape drive. An additional drive costs additional money.

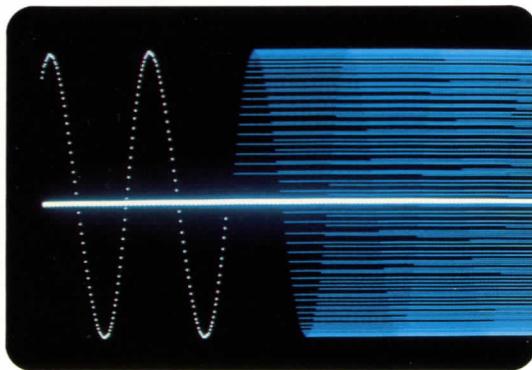
preamplifier has switches on the front that can be used to select the amount of signal attenuation or amplification. The four-channel Digital-to-Analog converter has control knobs to select voltage ranges of $\pm 2.5V$, $\pm 5V$, $\pm 10V$, $0-5V$, or $0-10V$ for each channel.

The top of the box is hinged to provide easy access to the input/output connectors that plug into the top of each module. Making connections requires nothing more complicated than a screwdriver. If you've ever connected a pair of speakers to a stereo receiver, you

ously is built right into the MINC system. In most calculator/computers IEEE interfaces are an extra-cost option.

In other words, MINC is a complete system.

can connect laboratory instruments to MINC. And, you only have to make those connections once. When you finish an experiment you leave the connectors attached to the laboratory equipment. In this way, when the time comes to use this laboratory equipment again, all you have to do is wheel MINC into the laboratory and replug the connectors. And, you cannot make a mistake with the MINC connectors. They are physically keyed so that, for example, only the A/D connector can fit on the A/D module. That's human engineering.



The standard MINC system

- Mobile MINC Cart
- PDP-11 microcomputer
 - 60,000 characters of solid state memory
 - Integral floating point unit
 - Line-frequency clock
 - Interface for Video Graphics Terminal,
 - optional line printer and two additional ASCII format serial-line devices
 - IEEE Bus Interface
 - Automatic program load and Diagnostic Module
- Twin, front-loaded Floppy Disk Drives
 - A million characters of random access memory
 - Double-density recording
- Video Graphics Terminal with separate Keyboard
- MINC Box with slots for eight optional laboratory interface modules including:
 - Analog-to-Digital Converter (16 channels)
 - Analog Multiplexer
 - Analog Preamplifier
 - Real-time Clock
 - Digital-to-Analog Converter (4 channels)
 - Digital Output (16 lines)
 - Digital Input (16 lines)
- ENHANCED BASIC software for computation, graphics, and instrument control
- Application software
- Complete Documentation including:
 - "Unpacking and Installing MINC"
 - "Introduction to MINC"
 - "MINC Programming Fundamentals"
 - "MINC Programming Reference"
 - "MINC Graphic Programming"
 - "MINC IEEE Bus Programming"
 - "MINC Lab Module Programming"
 - "Working With MINC Devices"
 - "MINC System Index"

If you would like more information or would like to see a MINC demonstration, mail one of the attached cards today or call your local Digital Sales Office

We'd like to show you how MINC can save you time and money. If you'd like to sit down at a MINC keyboard and actually operate the system or would like a chance to see, first-hand, just how easy it is to plug-in the optional modules and hook up lab equipment, fill out the attached card, contact your local Digital Sales Office, or telephone Jack Kay, MINC Product Manager, at the MINC Product Center, (617) 481-9511 Ext. 6969, or Phil Bagwell, MINC Product Manager/Europe, at our Geneva office, 41-(22)-93-33-11.

You can also use the cards to obtain additional MINC information.

Attention: Jack Kay, MINC Product Manager
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