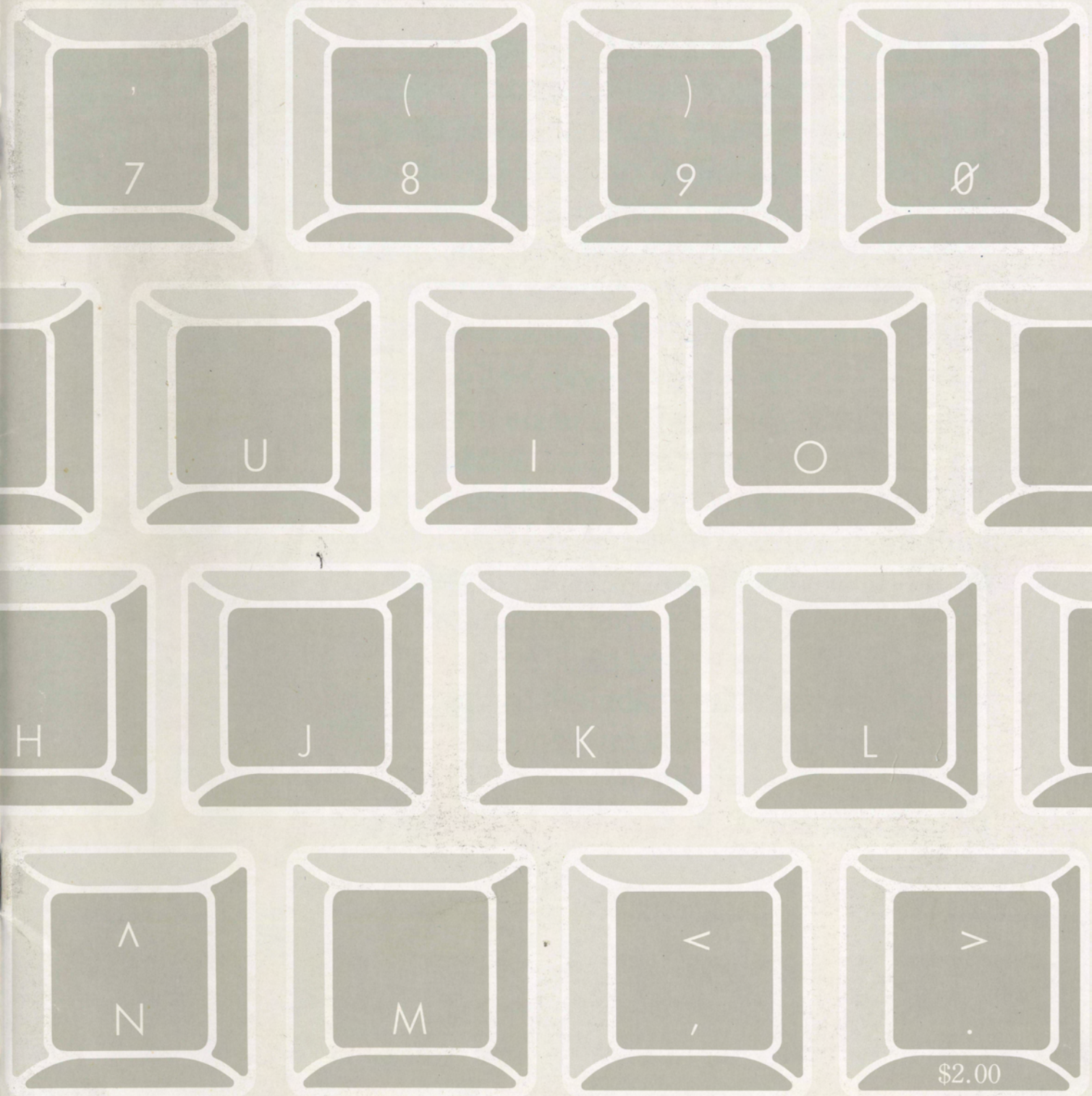
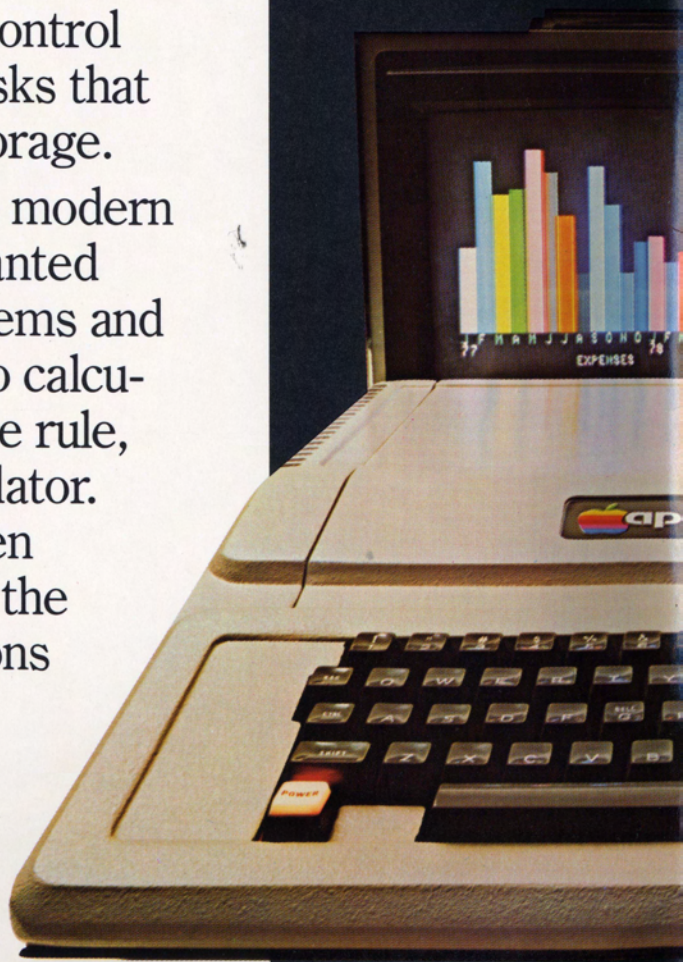
A CONSUMER'S GUIDE TO PERSONAL COMPUTERS



WHAT IS A COMPUTER? A computer is both a powerful calculator and a system for storing, updating and using information. It solves complex mathematical problems very rapidly. And a computer can also communicate (in words and pictures as well as numbers), maintain records, control equipment and do many other tasks that require extensive information storage.

Computers became part of the modern lifestyle because mankind wanted better tools for solving problems and keeping records. One need led to calculating machines– the abacus, slide rule, adding machine and pocket calculator. The other can be traced back even further through filing cabinets to the picture writing of early civilizations and the notched sticks of primitive man.



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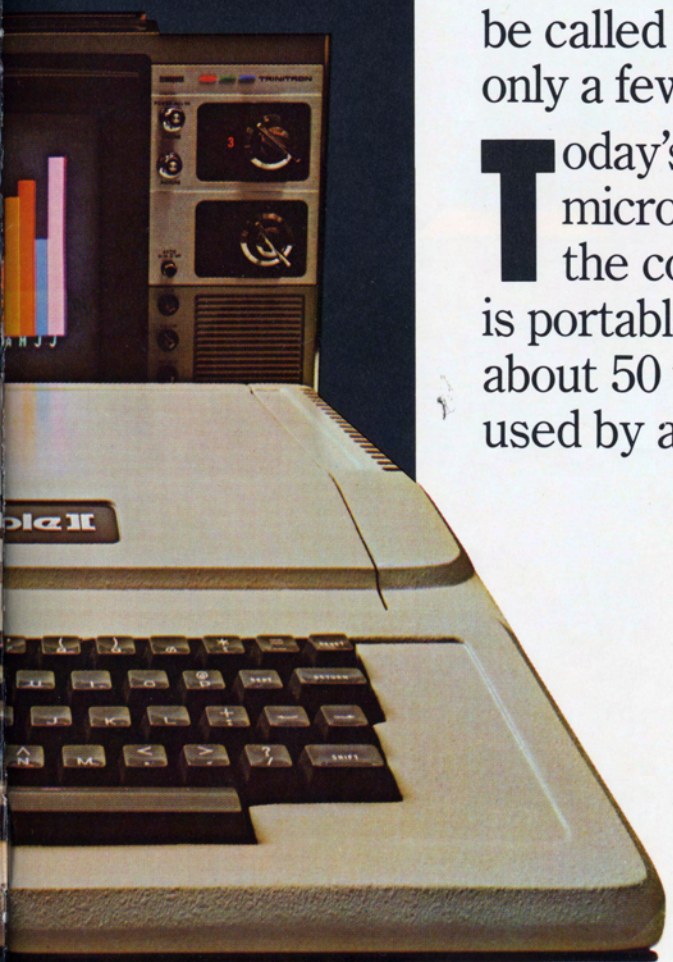
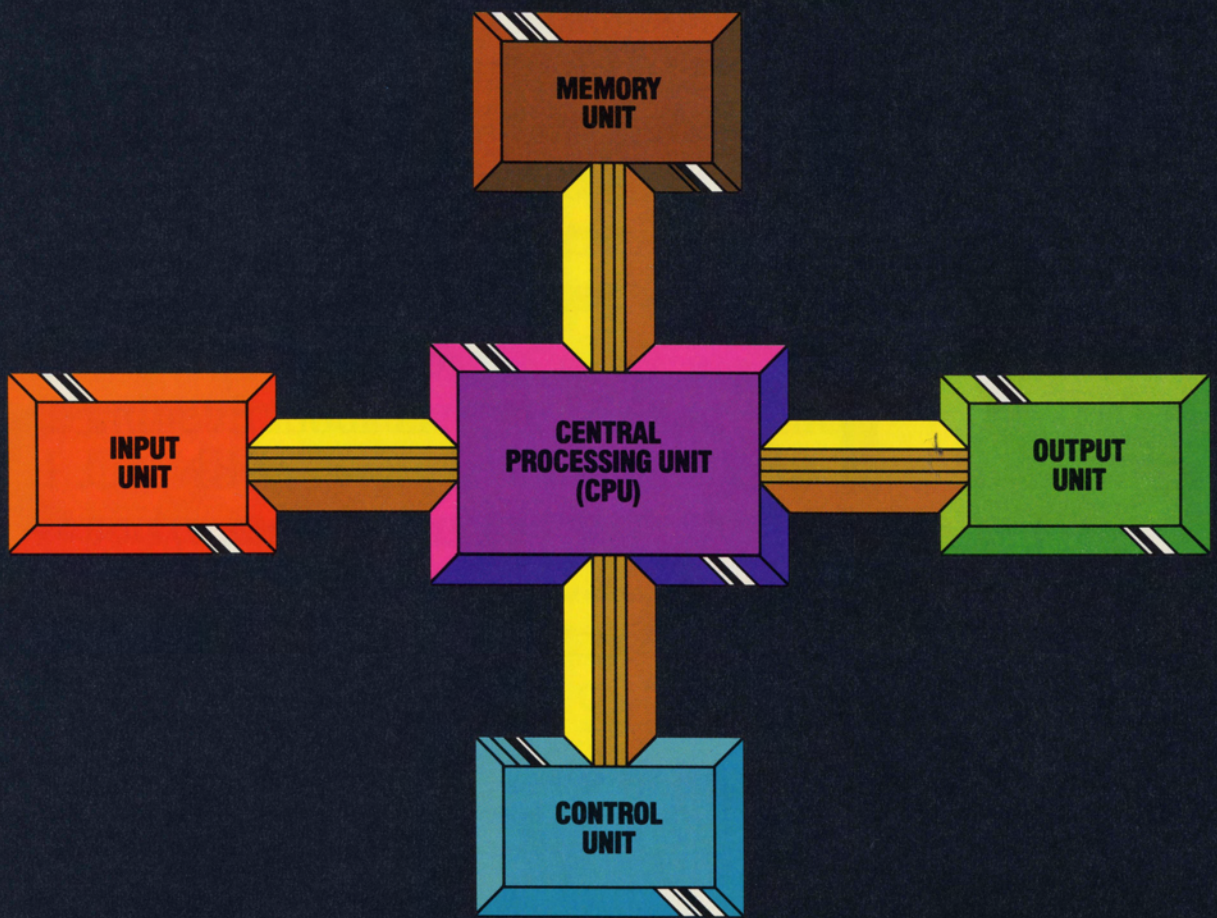


The first electronic computer was really a giant calculator named ENIAC (Electronic Numerical Integrator and Calculator). Built in the 1940's with 18,000 vacuum tubes, it filled a large room and consumed 130,000 watts of power. It could be called the first personal computer – only a few experts could run it.

Today's personal computer, built with a microprocessor, has about five times the computational power of ENIAC. It is portable, about 18 inches square, needs about 50 watts of power, and can easily be used by all members of a family.


MEMORY UNIT
INPUT UNIT
CENTRAL PROCESSING UNIT (CPU)
OUTPUT UNIT
CONTROL UNIT

Computers, like some calculators, are programmed– given a series of instructions by the user– to govern their operation. All computers consist of five basic parts. These subsystems are:

1. CPU OR CENTRAL PROCESSING UNIT

The CPU is the "brain"– the part that manipulates all information and performs all calculations.

2. CONTROL UNIT

The CPU is controlled by two kinds of programs. "Software" programs are entered by the machine operator, stored in the memory unit and can be changed as often as desired. "Firmware" programs are built into the system, usually in devices called Read Only Memory (ROM) that store instructions permanently. Each instruction generally requires several computer operations. The control unit and firmware enable the computer to perform these operations in the right order and at the proper times.

3. MEMORY UNIT

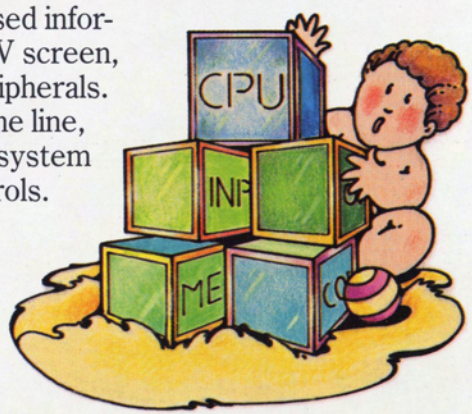
Software programs and data being processed are stored in the memory unit. This memory can be "randomly addressed," which allows the CPU to store and fetch (write and read) data rapidly. For the computer to handle more and more tasks, RAM must be expandable and able to "swap" programs and information with storage peripherals such as tape cassettes and magnetic disk memories.

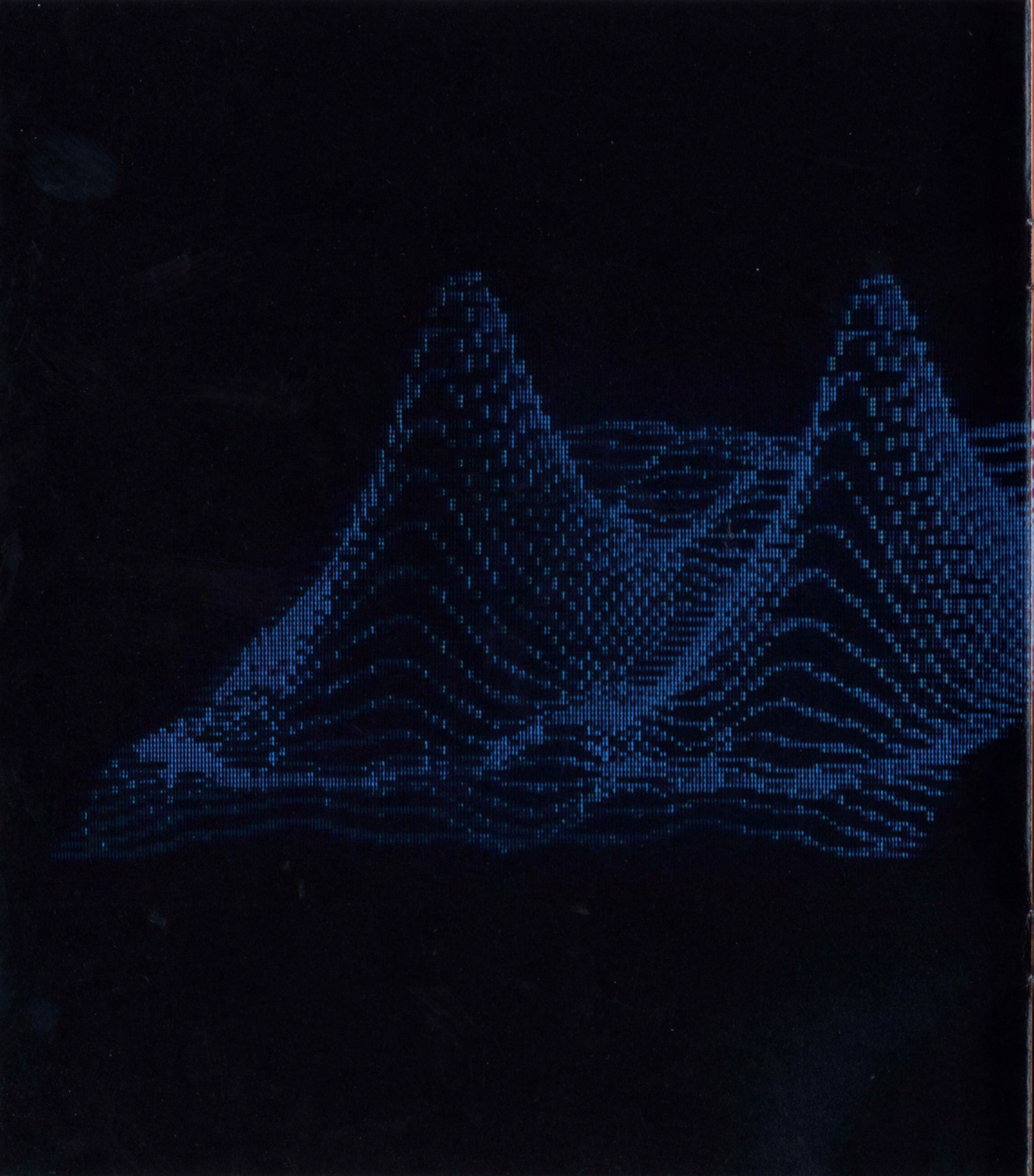
4. INPUT INTERFACE UNIT

Information, control signals and software enter the computer through this unit, which is attached to a keyboard and other peripherals. For control applications, the input should also be connectable to thermostats and other electrical instruments.

5. OUTPUT INTERFACE UNIT

Results of calculations and processed information go out through here to a TV screen, printer, tape cassette or other peripherals. Outputs could also go to a telephone line, home security and environmental system controls or even to appliance controls.





How does a programmer communicate with a computer? Think of the computer as another country with its own language. If you went to France for a vacation, you could learn French first or hire an interpreter. A computer programmer can learn to use special "machine languages" or he can use interpreter languages that the computer, itself, translates into instructions. Such interpreters include BASIC, FORTRAN, COBOL, PASCAL, APL, etc. Because BASIC is the most versatile and simplest to learn, it is the preferred language for personal computers.

WHAT WILL A COMPUTER DO?

It will do calculations, keep records and perform control tasks accurately, rapidly and tirelessly – and even play games with the children or help you compose and play electronic music. A personal computer is a servant that can save time, educate, entertain, control and guard your home 24 hours a day. It's used by adults for household management, business and technical work, and enjoyment. It's used by children to learn about computers and to develop mental skills and manual dexterity. An advanced personal computer can do this and more – such as expand to include new capabilities like telephone answering, as they become available as "enhancements."


RECIPE FILE
GOULASH A LA FENESTRA
SONY
THE CLASSIC ITALIAN COOKBOOK
MARCELLA HAZAN
The Complete Book of BREADS
BY BERNARD CLAYTON, JR.
THE KITCHEN BOOK
RECIPES

WHO USES COMPUTERS TODAY?

Until 1977, computer systems cost $20,000 to $2,000,000. Now, systems in the $1,000 range make it possible for any family to own a computer. Over 100,000 personal computers are already in use, and the growth rate indicates that seven out of 10 American homes will have one by 1985. Computers are becoming as much a part of the progressive household as microwave ovens, encyclopedias and color TV recorders.

Homemakers use computers as appliances to plan budgets, menus, and kitchen inventories; to record tax deductions and to balance checking accounts. Personal business applications range from consulting engineering to investment management. A quality personal computer easily handles computations for such demanding fields as architectural design and thermal dynamics.

But the greatest impact will be on the young. Your children are entering a world that has made computerized methods the key to success in many business and professional fields. Personal computers are designed to help prepare children for this world.

Schools have begun to use computer-aided instruction. College courses in math, statistics, science and engineering are increasingly computer-oriented. Because the personal computer gives the student additional help, it is expected to replace most calculators at the college level in five years–just as calculators replaced slide rules–and be widely used at other grade levels.


apple II
SONY

Enjoyment is a major reason for the popularity of programmable computers. You don't need to be a programmer to use a computer–program libraries are available–but many users get great satisfaction from developing their own personal programs. Ask the neighbor who owns one. Some have even taught their computers to operate with voice commands spoken in plain English!

HOW DOES A PERSONAL COMPUTER DIFFER FROM OTHER COMPUTERS?

The major difference is ease of use. A good personal computer comes ready to use with a built-in keyboard for input and a program library on tape cassettes. It connects to an audio cassette recorder for program loading and information storage, and to a TV set for output. They are as easy to connect as the speakers of a hi-fi system. Other peripherals are also easy to connect. The best computers have programming aids that help you become an expert at your own pace.

HOW DO YOU SELECT A

The machines on the market today range from cheap units that only use "canned" programs to versatile, high performance, user-programmable systems. You can start sorting them out by defining your needs and planning your applications. Remember to keep the whole family in mind. Once you have your goals in place, evaluate the alternatives, make a fair comparison, reach a conclusion and make the purchase. Your evaluation should cover these important questions:

MANUFACTURER'S REPUTATION?

Do as you would in buying an appliance. Check the manufacturer's reputation. Look for quality construction. Ask about service. Who can repair the computer and how long will it take? Is there a warranty? How do dealers feel about the manufacturer's business practices? Talk to people who have personal computers.

EASE OF USE?

All computers compute but each is human-engineered to provide different benefits. You defined the benefits that should be built into your choice when you defined your family's needs. Generally, ease of use comes first. Is the computer easy to set up, operate and program? Can it help the whole family learn how a computer operates? Is it suitable for household management tasks like kitchen inventory, financial planning, mailing lists and phone directory? Will it meet your personal business and technical computation needs? Does it have enough memory for your calculations? Can it also serve as a home entertainment center?

SYSTEM EXPANDABILITY?

Ask the dealer to describe which features meet your initial needs and which can meet your future needs. What comes with the basic computer? Can the memory and interface units be expanded? Is it easy to expand? How do you add peripherals like a printer, typewriter or disk memory and accessories like a remote control outlet, voice or music synthesizer and security system? Don't settle for a system that cannot grow with your needs. Ask any computer owner– expandability is a *must* because interests and needs will change as you learn more about computer applications.

PERSONAL COMPUTER?

GRAPHICS? AUDIO?

Most home computers can put pictures on a black and white TV screen. The better models provide color and sound, too. Can you use color? How many colors? How many dots on the screen? Can you plot at your choice of screen locations? Is there audio output? The uses of audio output include warning the programmer that he has made an error, making interactive games more realistic, and generating computer music and speech.

SOFTWARE SUPPORT?

It's not only satisfying to run personally written programs but also essential for some home and many professional and educational applications. If you want to go beyond a cassette library, ask about languages and other software support. Is the computer programmable in machine language? In BASIC? What kinds of commands and how many commands are available? Does it come in cassette, ROM, or both?

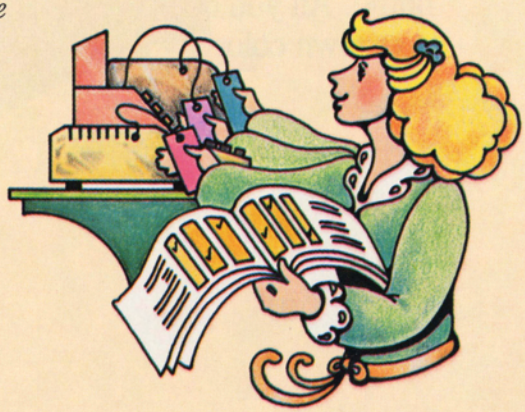
DOCUMENTATION (MANUALS)?

Documentation reflects the quality of system design and support. Ask to see *all* manuals and look through them carefully. The technical or "shop" manual should be only the beginning of the user's library. You need a software programming manual with clearly referenced commands and statements, a self-teaching manual on programming methods and documentation on peripheral units.

PERIPHERALS AND INTERFACES?

These are two keys to expandability. When comparing peripheral costs, always ask if the peripherals connect directly. If not, ask how much the interfaces will cost. And find out if you have to re-develop your software to use them. Look for a wide choice and don't accept vague promises of "future enhancements." A system with a good selection now will probably have a better one in the future.

This consumer's guide was written for people in all walks of life. Personal computer users range from persons with no previous technical experience to persons with long experience in computer technology. If you are a beginner, don't be intimidated by the technical jargon. Learn from it. Buy the system that suits your needs now, but look ahead. Plan for growth–yours and the computer's.



THE APPLE II™ PERSONAL COMPUTER

You can begin your evaluation by checking our reputation. We are Apple Computer Inc.®, a pioneer in the personal computer business and now the leading manufacturer of personal computers for the home.

The system at the right is APPLE II, today's most popular personal computer. It comes with a 1-year limited warranty with all warranty limits spelled out. Service is readily available and the basic computer system is on a single board that unplugs for rapid service. Expansion is also handled with plug-ins.

APPLE II has all the computer capabilities we've mentioned, plus many advanced features that help make it a good investment. For example, the optional peripheral interfaces are "intelligent"– they contain their own firmware to keep software simple and performance high as you expand the system. This is only one of the personal computer "firsts" you'll find in APPLE II.

APPLE II is light weight and portable. It weighs only 11 pounds and is housed in a strong case molded of structural foam. It is as easy to carry as a briefcase in its optional vinyl carrying case. The computer is sold completely assembled, tested, and ready for use a few minutes after you bring it home. All you do is connect an inexpensive video monitor or your own color TV set (using an FCC-approved modulator).


Apple II
Reference
Manual
January 1978
CHECKBOOK
APPLE II
BASIC PROGRAMMING MANUAL
PLESOFT™
Manual
apple II

PERSONAL COMPUTER CHECK-OFF LIST

A shopping list will help you make a fair comparison between APPLE II and other personal computers when you get to the computer store. Read through the check-off list that starts below, mark the items that fit your family's needs and make an item by item comparison at the store. For the name of the nearest Apple Computer dealer call (408) 996-1010 in California or 800-538-9696 toll free.

Brand A	Brand B	Apple II
		✓
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		✓
		✓

WARRANTY AND SERVICING

1-year limited warranty

Service readily available

Plug-in boards and components for fast, low cost service

COMPUTER ELECTRONICS

One cabinet holds all electronics and interfaces

Power supply with output sufficient to power complete system expanded to 48 kilobytes of Random Access Memory (48K RAM), 12 kilobytes of Read Only Memory (12K ROM) and 8 peripheral interface and accessory cards

Keyboard with quality feel of office typewriter and N-key rollover that virtually eliminates speed related typing errors

Single-board computer construction

Brand A	Brand B	Apple II
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Easy, on-board expansion of memory–user or dealer installable

- Random Access Memory–4,096 to 48 kilobytes (4K to 48K RAM)
- Read Only Memory to 12 kilobytes (to 12K ROM)

Peripheral interface and accessory cards plug into eight connectors for easy expansion of system input/output capability

15-color output to standard color TV using inexpensive modulator

High speed cassette input/output interface to any standard audio cassette recorder. Program loading time is only 20 seconds per 4,096 bytes of program or data.

Audio speaker built-in to enhance both program writing and game playing

Four inputs for using four game paddles (two game controls supplied) or for connecting thermostats and other resistor type sensors.

Seven single input/output lines for connecting touch switches and other on-off sensors and for controlling relays, lights or other devices

SYSTEM SOFTWARE AND PROGRAMMING AIDS

BASIC language built-in. Two BASIC interpreters are supplied. An education BASIC utilizing integer arithmetic is resident in ROM. An extended floating point BASIC with 9-digit precision and scientific notation for scientific and business applications is supplied on tape, diskette, or as an optional ROM accessory card.

- Integer BASIC has 56 easy to use commands, statements and arithmetic operators.
- Extended floating point BASIC has 116 commands, statements, arithmetic operators and transcendental functions.

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Resident Monitor with mini-assembler and disassembler to facilitate machine language programming included

Special interactive communications features like:

- Complete cursor control–up, down, forward, backward
- Automatic line numbering capability
- Software selectable scrolling window, split-screen capability
- Letter, word or line delete, edit or copy capability

Special graphics capabilities like:

- 15-color display in a 40x48 array of dots
- 6-color display in a 192x280 array of dots
- Ability to plot any point in array with a simple PLOT X, Y command

Built-in speaker that provides:

- Audible warning of a programming syntax error
- Human engineering of programs by adding audio tones and even synthesized speech for impact and interactive response
- Music composition

Special BASIC programming commands like:

- PDL (x) for direct command of game paddle I/O port
- IN# x and PR# x for direct command of the eight input/output accessories and peripheral connectors

APPLICATIONS SOFTWARE

Financial, business and scientific programs

- DOW JONES* Investment Manager's Series, including:
  —Stock Quote Reporter–for current Wall Street prices (delayed 15 minutes)
  —Portfolio Evaluator–calculates portfolio value, long and short-term gains/losses

*In cooperation with Dow Jones and Co., Inc.

Brand A	Brand B	Apple II
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- Home Money Manager's Series, including:
  —Checkbook–an accounts payable data base manager
  —Basic Finance–computes parameters and provides amortization shedules for savings, loans, and leases

Education programs

- Hangman–a spelling quiz program
- Color Math–a flash card math quiz
- Mastermind–a color guessing game for logical thinking development
- Routines for drawing high resolution graphics shapes

Entertainment programs

- Slot Machine
- Blackjack
- Star Wars
- Star Trek
- Breakout
- Biorhythm

Other sources of programs

- *Some Common BASIC Programs,* Osborne and Associates–a book of business, statistics, mathematics and engineering programs. These programs run in APPLESOFT II
- *101 BASIC Computer Games,* Creative Computing–most of these games will run in APPLESOFT II
- *What to Do After You Hit Return,* Peoples Computer Company–a book of programs that will run on the APPLE II
- Magnemedia, Inc.–extensive library of educational programs that run on APPLE II

Brand A	Brand B	Apple II
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USER Contributed Software

- Apple Software Bank Contributed Software Library–a rapidly-growing library of programs for business, scientific, entertainment, and educational purposes

DOCUMENTATION

Programming Manual. Over 100 pages of step by step, self-teaching procedures on "how to program" in BASIC for the beginner

Basic Language Reference Manual. Over 170 pages describing how to use the floating point BASIC language and a listing of all commands, operators and statements with syntax examples

System Reference Manual. Includes hardware description, software description, firmware description, detailed schematic diagram and general information on most aspects of the computer

Microprocessor Manuals. Complete documentation on how to design and program with the 6502 CPU at the component level is provided in 6502 Hardware Manual and Programming Manual

Technical Descriptions. Each peripheral interface has a Technical Product Description and Instruction Manual

INTELLIGENT PERIPHERAL INTERFACES AND ACCESSORIES

All APPLE II Intelligent Interfaces have built-in programs that eliminate the need for loading a cassette or writing a routine into your program to drive the peripheral. Each peripheral is addressed with simple BASIC commands for input and output control such as PR# x to output or IN# x to input.

Hobby Prototyping Board (A2B0001)–board for custom interface designs has 100-mil-grid hole pattern for wire wrapping or soldering

Parallel Printer Interface (A2B0002)–interface for most standard parallel input printers such as Centronics, Selecterm, Anderson Jacobson, Axiom, etc.

Brand A	Brand B	Apple II
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Communications Interface (A2B0003) – RS232C modem interface for telephone line data communications at 110 or 300 baud data rates (half or full duplex). APPLE II will operate as a computer or as an intelligent terminal in a distributed processing network with this board installed

High Speed Serial Interface (A2B0005) – RS232 serial interface to high speed printers, plotters and other instruments with standard RS232 interfaces operating half duplex. Data transmission rates are selectable from 75 to 19.2K baud

Mass Memory Floppy Disk Subsystem (A2M0004) – one 116K-byte drive with interface that also interfaces second 116K-byte mini-floppy disk drive, giving you expansion to 232K bytes per controller

APPLESOFT II – BASIC Firmware Board (A2B0009) – peripheral board containing APPLESOFT II, the 10K extended floating point BASIC language. Is switchable between business/scientific BASIC and education BASIC. Plugs into peripheral card slot.

PROGRAMMERS AID #1 (A2M0012)
Plugs into ROM socket on computer board and provides the following functions:

- Program renumber/append
- Tape verify
- High resolution graphics
- Musical tone generation
- Machine language program relocation
- Memory test diagnostics

APPLE II PERIPHERAL EQUIPMENT

All APPLE II peripherals connect directly to the computer. Those peripherals that would normally require interface electronics are supplied with the appropriate APPLE II Intelligent Interface.

MASS MEMORY FLOPPY DISK SUBSYSTEM — *(A2M0004)*– see Intelligent Peripheral Interfaces

MONITOR II — *(A2M0005)*– 9-inch, black and white television monitor

PRINTER II — *(A2M0010)*– Centronics Model μP1 printer with interface electronics

PRINTER IIA — *(A2M0011)*– Centronics Model 779 printer with tractor feed and interface electronics

REMOTE AC CONTROLLER — *(A2M0012)*– sending unit of Mountain Hardware INTROL system for controlling appliances and other AC line powered equipment

DUAL CHANNEL AC REMOTE — *(A2M0013)*– receiving unit of Mountain Hardware INTROL system

SPEECHLAB™ — *(A2M0015)*– Heuristics Model 20A speech recognition sytem for controlling the APPLE II with voice commands

MODEM IIA — *(A2M0017)*– Modem (telephone interface) with acoustic coupler and controller card, for transmitting information between computer systems

TAPE RECORDER — *(A2M0018)*– audio tape recorder for loading and saving data and programs on cassettes

NOW MAKE YOUR INVESTMENT.

We invited you to make a feature by feature comparison because we believe APPLE II is the best investment you can make in a personal computer system. It delivers quality and performance at low cost today and it will not become obsolete when your family's needs change in the future. APPLE II can be summed up in three words: *long term usefulness.* If you agree that value is the best investment, go down to the nearest Apple Computer dealer and make that investment today.

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