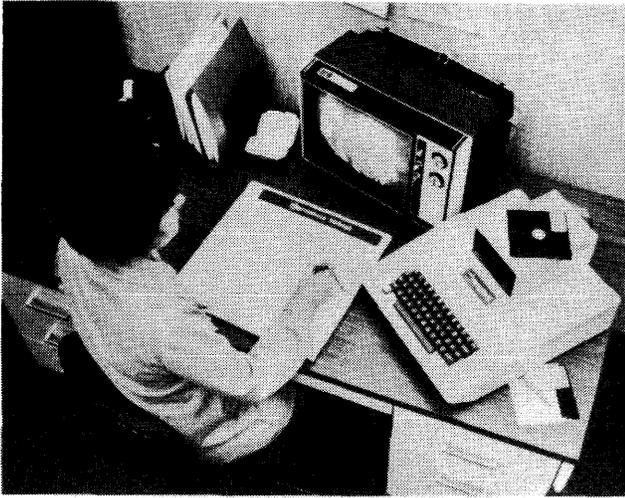# Apple II and Apple II Plus

The Apple II configured for fairly typical home use, with single diskette drive and TV set for color graphics monitor. Not as commonly used is the graphics tablet shown here, capable of producing high-resolution, multi-colored drawings.

Current models: Apple II, Apple II Plus.
Memory: 16KB-48KB RAM; 116KB-1.6MB diskette.
Base list price: $1,195-$1,495 (processor/memory).
Typical list prices: about $2,000 (student)—32KB RAM and mini-diskette; about $5,000 (business)—48KB RAM, two mini-diskettes, B/W video monitor, printer, "Controller" business software.
Primary uses: color graphics applications, professional offices, education, home/hobby, small business.
Popular options: from Apple—graphics tablet; independent sources—wireless home controller; music synthesizer; voice recognition system.
Principal programming languages: BASIC, PASCAL.
Principal applications software: Dow Jones, "Controller" business system, point of sale.
First shipment: Apple II—1978; Apple II Plus—1979.
Number installed to date: about 55,000.
Available through: about 650 dealers nationwide.

BACKGROUND INFORMATION

Manufacturer: Apple Computer Inc., 10260 Bandley Drive, Cupertino, CA 95014. Telephone (408) 996-1010.

Apple Computer Inc. was formed in January 1975, and its first product, the Apple, was introduced in 1977. The present product lineup consists of the Apple II and Apple II Plus. Each is provided with a different version of BASIC in ROM: Apple II Plus has a floating point BASIC, while Apple II uses an integer version of BASIC. Apple II Plus enhancements also include an Auto-Start ROM chip for automatic disk loading, reset protection and screen editing.

To date, about 55,000 systems of all types have been sold through more than 650 dealers (about two-thirds of which are designated Level 1 service centers, capable of making minor repairs). List prices for 16KB, 32KB, and 48KB Apple II or Apple II Plus systems are $1,195, $1,345, and $1,495, respectively. Many dealers, however, offer discounts of up to about 15 percent for the Apple II and the memory modules used with either Apple system.

Over 30 Apple users' groups have been formed. The large and active Apple customer base, exceeded only by the Commodore PET and Radio Shack TRS-80 in size, and second only to Radio Shack in dollar value of personal computers shipped, has spurred the establishment of a major sub-industry of independent hardware and software vendors who are actively creating products for Apple owners. (Please refer to Section 3 for a listing of these firms.)

SYSTEM CHARACTERISTICS

The Apple II is designed with eight expansion slots inside the keyboard chassis for plug-in system expansion modules, eliminating the need for a separate expansion chassis. Each slot can accept an interface/controller card capable of attaching a peripheral or I/O subsystem. Memory is expandable from 16K bytes of RAM to 48K bytes in 16KB increments by inserting RAM chips into available sockets on the main board. Each Apple system also includes 8K bytes of ROM, with extra sockets capable of holding an additional 4KB. The Apple II also has a built-in cassette tape interface, and a built-in speaker can be programmed for single-voice music, synthesized speech, and video game sound effects.

The system does not come with either a display screen or a printer. A variety of printers are available directly from Apple, or Apple provides an interface card for attaching printers from independent sources. The user must furnish his own display screen, which is often a color TV, permitting use of Apple's popular color graphics feature.

Although the majority of presently installed Apple computers have found their way into home use, an ever-increasing number of systems are being used for business applications. The unusually rich complement of business software and the variety of high capacity peripherals available for the Apples make these systems ideal candidates for professional or very small business offices. Minimum systems (16KB RAM, $1,195) can be used in the home for entertainment and some limited number of domestic applications. Full-scale systems costing as much as $5,000 or more (consisting of a 48KB RAM Apple II Plus with two disk drives, a B/W video monitor, a printer, and the "Controller" business system software package) can support a variety of programming languages, data management needs, on-line access to powerful commercial data bases, and general business applications for firms with sales in the $1 million to $25 million range. ▷

Apple II and Apple II Plus

▷ HARDWARE/PACKAGING

PROCESSOR/MEMORY
Model: Synertek 6502 microprocessor; 8 bits
RAM: 16KB to 48KB in 16KB ($160) increments
ROM: 8KB; two additional 2KB blocks available
System prices: 16KB ($1,195); 32KB ($1,345); 48KB ($1,495)

DISPLAY
Type: color or B/W TV set; or Apple Monitor II ($240), B/W
Number: none provided; maximum of one available
Screen size: from Apple, 9-inch; from other sources, any size
Chars./screen: 960; 40 chars./line, 24 lines
Char. type: upper case, 5x7 matrix; lower case with available software
Features: normal, inverse, or flashing characters
Graphics (low resolution): 15 colors in 1,600-point array (40 x 40 plus 4 text lines); 1,880 points without text
Graphics (high resolution): 6 colors in 44,800-point array (280 x 160 plus 4 text lines); 54,000 points without text
Interface: integral cable plug; TV set also requires RF modulator

KEYBOARD
Type: typewriter style, tactile, moveable
No. of keys: 52, ASCII character set
Interface: integral connection

DIRECT ACCESS STORAGE
Model/price: Disk II; $595 with controller; $495 alone
Type: 5¼" diskette
Capacity/drive: 116KB
Drives/system: 1-14; 2/controller
Interface: 1 slot/controller

PRINTERS

	Silentype	Printer II	Printer IIA
Type:	matrix, thermal	matrix, elec-trostatic	matrix, impact
Paper:	thermal, roll, 8.5"	aluminized roll, 4.75"	fan-fold, tractor, 9.8"
Char. set:	96	96	64 (u/c only)
Chars./line:	30	80	132
Speed:	40 cps	150 lpm	60 cps
Interface:	1 slot	1 slot	1 slot
Price:	$595	$695	$1,545

DATA COMMUNICATIONS

	Modem IIB (103A type)	Serial Interface card
Trans. mode:	half/full-duplex	half-duplex
Protocols:	asynch.	synch.
Lines:	1	1
Speed, bps:	110 or 300	75-19.2K
Interface:	1 slot	1 slot
Price:	$199	$195

OTHER I/O
Magnetic tape: cassette recorder optional, integral connection
Game controls: 2 hand-held paddles standard, integral connection
Loudspeaker: built into basic cabinet
Graphics input tablet: stylus-driven digitizer ($795), 200 points/inch, 1 slot
Standard interfaces: Parallel Printer ($180); RS-232C with Communications Interface Card ($225) and Serial Interface Card ($195)

I/O ELECTRONICS
Structure: 8 integral peripheral board connectors, buffered, with Direct Memory Access (DMA)

SOFTWARE

LANGUAGES
BASIC: Integer BASIC and Applesoft Floating Point BASIC; both available in ROM or on tape and diskette; add-on prices—Applesoft in ROM ($200); Applesoft on tape ($20)
PASCAL: UCSD version; requires optional Language Card ($495)
Assembler: 6502 Version in ROM

OPERATING SYSTEM
Name: DOS 3.2 ($25) for disk systems; other control functions in ROM
Type: single-thread execution with priority I/O interrupt structure
Functions: I/O device handling; keyboard and screen editing; program execution in single step and trace modes

UTILITIES
General: high resolution graphics aids; program chaining and renumbering, etc.
Programmer's Aid #1: ROM chip ($50) for program relocation and linking; musical tone generation; high-resolution graphics, etc.
Sort: none

DATA BASE MANAGEMENT SYSTEMS
Name/price: Apple Post; $49.95
Function: mailing list creation and maintenance; requires 48KB

Name/price: Checkbook; $20
Function: checking account records management

Name/price: File Cabinet; no charge
Function: general-purpose list management, including storing, searching, and sorting

COMMUNICATIONS SUPPORT
Name/price: Datamover; $7.50
Function: Apple to Apple data movement over telephone lines

Name/price: Communications Card; $225
Function: controller provides general data communications support

APPLICATIONS PROGRAMS
Accounting: General Business System I—The Controller ($625), including general ledger, accounts receivable, and accounts payable modules; requires 48KB
Retailing: Point of Sale—The Cashier ($250), for sales receipts, billing, mailing lists, etc.; requires 48KB
Stock market: Dow Jones Series ($50), including Stock Quote Reporter, Portfolio Evaluator, and News Reporter, all via telephone line links with Dow Jones wire service; requires 32KB
Education: more than 15 programs from Contributed Software Bank; CAI, logic tests, etc; nominal prices
Entertainment: more than 30 game programs, from Chess to Apple Organ, many from Contributed Software Bank; nominal prices

SUPPORT SERVICES

DOCUMENTATION
Range: about 12 manuals available, for between $2.00 and $15.00 apiece, such as Apple II Reference Manual ($10), 6502 Programming Manual ($15), Apple II Basic Programming Manual ($7), Applesoft Reference Manual ($10), Disk II Manual ($2)

SUPPORT
Training: none from Apple; available at discretion of dealer
Maintenance: 3 levels of hardware service; about two-thirds of dealers can make simple 1-day repairs (Level 1); Level II repairs at regional centers; Level III work at factory; all service fee based

TERMS AND CONDITIONS
Warranties: 90-day parts and labor; optional 1-year extended warranty ($195) for entire system
Discounts: none officially available at retail level; some dealers and mail order houses will offer up to 15% off list, especially for Apple II's and RAM ■