

# Apple Lisa



*The Apple Lisa is a 32/16-bit personal computer featuring six integrated software packages covering office applications. Its standard configuration includes the CPU, 12-inch CRT display, detachable-keyboard, 1MB RAM, 1.7MB diskette storage capacity, 5MB hard disk storage capacity, and a mouse.*

## BACKGROUND

*Apple Computer, Inc., 20525 Mariani Avenue, Cupertino, CA 95014. Telephone (408) 996-1010.*

Apple Computer designs, manufactures, and markets personal computers and systems for use in business, education, scientific, and home applications. Apple's manufacturing plants are located in and around corporate headquarters in Cupertino, CA; in Garden Grove, CA; Carrollton, TX; Cork, Ireland; and the Republic of Singapore. In addition, 12 regional support centers in the U.S. and Europe distribute Apple products worldwide to a network of more than 3,300 independent retail dealers.

## SYSTEM CHARACTERISTICS

The idea behind Lisa started in 1979 and after three years of development and an investment of more than \$50 million, Apple Computer, Inc. will begin shipping the personal computer this quarter. The name Lisa, an acronym for Local Integrated Software Architecture derived during the projects early stage, does not really describe the system today.

Lisa is configured with a Motorola MC68000 microprocessor, one megabyte of parity-checking memory, dual 860K byte diskettes, a five megabyte external hard disk, video display, keyboard, a "mouse" control device, and six integrated software packages. When linked to Apple's local area network, between two and 128 Lisas can exchange information and share centrally-stored files.

The system was designed to as a full-function office Workstation. Lisa's "desktop" CRT displays graphic representations (icons) of equipment or tools (application programs)

**Current models:** Lisa.

**Memory:** 1MB RAM.

**Storage capacity:** 860KB diskette; 5 MB hard disk.

**Workstations:** 1 to 128 on AppleNet local area network.

**Base list price:** \$9,995, including CPU, 1MB RAM, two 850 KB diskettes, 5MB hard disk system, display, keyboard, "mouse" control device, software, 1 parallel port, 2 serial ports.

**Typical list prices:** \$10,890, same as base configuration plus dot matrix printer and parallel interface card.

**Popular options:** from Apple—printers, hard disk, parallel interface card, Lisa Terminal.

**Principal programming languages:** Basic, Cobol, Pascal.

**Principal applications software:** electronic spreadsheet, word processing, graphics, database management, project management, telecommunications, diagnostics.

**First shipment:** Spring 1983.

**Number installed to date:** new product.

**Available through:** Apple account executives and authorized Lisa dealers.

that are familiar to the office environment. These icons include a waste-basket, clip board, letter files, folders, stationary pads, and specific application programs.

The Motorola MC68000 features a 32-bit internal architecture and a 16-bit external data path, input and output functions are controlled by three other microprocessors. The MC68000 has the ability to generate 24-bit addresses and to provide up to 16 megabytes of memory. This provides the storage capacity for many applications and allows multitasking. Presently, the Lisa is equipped with one megabyte of memory which is expandable to two megabytes.

The two Apple-manufactured diskettes are 5/4-inch double-sided, double-density drives which provide a total storage capacity of 1.7 megabytes. Self-identification data, used when restructuring jumbled information, is contained on each diskette in 24 bytes of additional memory.

The diskette drives are controlled by a Synertek 6504 processor; this clip allows the disk rotation speeds to vary with each track and create a uniform recording density across the disk surface. Software controls the loading and release of the drives. Lisa knows when a diskette is presented and loads it automatically and when the user wants to remove the diskette, the system closes the files. Because the diskettes are built-in, erroneous disk switching and data loss are prevented.

An additional five megabytes of storage is provided by Profile, Apple's 5/4-inch Winchester disk. Lisa's applications can be stored on this disk (six programs require 2MB storage); this allows the applications to run concurrently. >

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▷ Memory management is another standard feature of the Lisa system. The feature will:

- permit the operating system to relocate segments in memory
- provide access controls for blocks of memory
- segment into 128 variable-length blocks dynamically controlled by the memory map table

The 12-inch, black-on-white, bit-mapped display features a 364 line by 720 dot resolution. Because each dot on the screen is controlled by a corresponding bit in memory, the high resolution is used at all times—whether text or graphics is being displayed. The MC68000 processor is capable of displaying the work being done without slowing down the other operations.

Bit-mapping permits texts and graphics to intermix on the screen. It also redefines or extends character sets by loading new tables into memory. Eleven typeface styles and sizes are available; each creates normal, bold, italics, shadow, and underlined characters.

Rather than a physical switch, the computer has a software controlled on-off button. When the user presses the “off” button, Lisa begins clearing its “desktop,” returning the information to the appropriate disk or diskette storage area. The system turns itself off when all the files are properly stored.

This “desktop” can display the integrated software applications simultaneously. A menu bar, which is always visible, is located at the top of the screen, and lists the users’ possible task options.

A National COPS microprocessor controls Lisa’s keyboard. The keyboard is made up of 76 typewriter-style keys; 8 include data processing or program development symbols. When not in use, the keyboard can be stored in a hollow area at the base of the CRT/system unit. The keyboard is primarily used to enter data; the mouse, however, is the main cursor control and can be used to call up information. This mechanical device is attached to the CRT/processor unit via a 2-foot wire cord. It can be rolled across the users’ desk to position the cursor on the screen. The COPS microprocessor follows these movements and translates them to the cursor.

The six application packages included with the system are LisaCalc, LisaWrite, LisaGraph, LisaDraw, LisaProject, and LisaList. Lisa runs its own operating system, which is also bundled. Apple currently offers LisaTest, a diagnostic program, and Lisa Terminal, a telecommunications package, as options. LisaTerminal allows users to emulate a VT52 or VT100 terminal. Together with Apple’s IBM cluster controller emulator, LisaTerminal can emulate 3270 terminals. Apple provides two printers—a dot matrix and daisywheel—for the user. Lisa’s software allows spooling of printer output.

The AppleNet, a local area network system, available with all Apple computers, as well as Lisa, will enable computers in the same office to communicate with one another. Through AppleNet, users can gain access to information contained in common files and databases, distribute documents electronically, share peripherals, and communicate with other computers and remote databases. AppleNet is scheduled to be available in late 1983.

Additional future announcements for the Apple Lisa include several foreign language versions, an application development toolkit, and Ethernet-compatible interfaces.

## HARDWARE

### PROCESSOR/MEMORY

Model: Motorola MC68000 (32/16-bit)  
 RAM: 1MB RAM, expandable to 2MB  
 ROM: 16K

### DISPLAY

Model: integral CRT  
 Screen size: 12-inch diagonal  
 Chars./screen: up to 6480, 144 characters x 45 lines  
 Char. type: upper/lower case; 364 x 720 pixels  
 Attributes: underline, italic, bold, proportional spacing, presentation-size styles, large type styles  
 Features: bit-mapped, low-glare, black on white screen, 16 shades of gray, 60 Hz refresh rate, “mouse” cursor control device, computer-oriented processor  
 Graphics: integrated  
 Interface: integral  
 Price: included w/system

### KEYBOARD

Type: detached, typewriter-style  
 No. of keys: 76 total, includes full ASCII set, an alternate character set to generate foreign language characters and math symbols, all programmable keys, N-key rollover  
 Interface: interface with control-oriented processor

### DIRECT ACCESS STORAGE

Model:	Apple Diskette	Apple Profile
Type:	5¼" double-sided, double-density	hard disk
Capacity/drive:	860KB formatted	5MB
Drives/system:	2	1
Avg. access time:	94 milliseconds	95 milliseconds
Transfer rate:	250KBS	5 megabits/sec.
Interface:	integral interface w/Synertek 6504 processor	parallel
Price:	included w/system	\$2,195

### PRINTER

Model:	Apple Dot Matrix	Apple Letter Qual.
Type:	bidir., dot matrix	bidir., daisywheel
Paper:	up to 8½", fan-fold, cut sheets	up to 14½", cut sheets, continuous forms
Char. set:	bit-mapped characters	none specified
Chars./line:	none specified	none specified
Speed:	120 cps	40 cps
Interface:	parallel	serial
Price:	\$695	\$2,195

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### ► DATA COMMUNICATIONS

Model: integral ports  
Trans. mode: async, sync  
Protocol: none specified  
Ports: 2  
Speed: rates are software programmable  
Interface: RS-232-C  
Price: included w/system

OTHER I/O: none specified

### I/O ELECTRONICS

Structure: 3 I/O bus slots, 3-slot expansion board with direct memory access capability, direct connection to system bus, zero insertion force connectors, memory-mapped I/O, vector interrupt capability

## SOFTWARE

### LANGUAGES

Basic: Basic Plus, \$295  
Pascal: \$595  
Cobol: \$995  
Assembler  
Fortran

### OPERATING SYSTEM

Name: Lisa operating system, bundled  
OS minimum memory allocation: 200KB  
Concurrent tasks: up to 6 via multitasking

### UTILITIES

Sort: none specified  
Text editor: Lisa Editor, debugger, linker wide range of utilities available

### DATA/DATABASE MANAGEMENT SYSTEMS

Name: LisaList, bundled  
Functions: creates, maintains, references personal databases

### COMMUNICATIONS SUPPORT

Name: LisaTerminal Telecommunications Software, \$295  
Functions: gains access to remote mainframe and public databases; emulates DEC VT100 or VT52 terminals; communicates with IBM or IBM-compatible systems that support 3270 bisync or SNA/SDLC protocols through an Apple 3270 cluster controller

### APPLICATIONS PROGRAMS

Electronic Spreadsheet: LisaCalc, bundled  
Word Processing: LisaWrite, bundled  
Graphics: LisaGraph, bundled; LisaDraw, bundled  
Project Management: LisaProject, bundled  
Database Management: LisaList, bundled  
Diagnostics: LisaTest

## SUPPORT SERVICES

### DOCUMENTATION

Range: systems and operators manuals available

### SUPPORT

Training & education: LisaGuide (self-based, computer-based, on-line, tutorial program), bundled; in-house training for larger firms available from Apple  
Maintenance: AppleCare, Carry-In-Service; on-site service program (a joint effort between Apple and RCA Data Services)  
Other: national support centers provide support and service via a toll-free number allotment of phone support time and one free software update supplied with each Lisa shipment ■