

Product Description

The Apple III

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Editor-in-Chief

This past May at the National Computer Conference in Anaheim, California, the Apple Computer Company introduced "Sara" (its code name for the Apple III), the



Photo 1: The Apple III, a new 6502A-based personal computer with built-in 5-inch floppy-disk drive, up to 128 K bytes of memory, and high-resolution color graphics. Pascal and Apple Business BASIC are built-in, and the machine features a new Sophisticated Operating System called SOS. The Apple III will sell in the premium price range of \$4500 to \$8000, which includes a complete software and hardware system with peripherals. Reportedly FORTRAN will be available for the unit later in the year. Although the Apple III can be used for a wide range of general applications, the keyboard has been designed with financial, small-business, and word-processing applications in mind. An Apple II-emulation mode is included to enable Apple II software to run on the Apple III.

long-awaited new computer from this closely watched company.

We spent some time recently at Apple getting a first-hand look at a product that has been the object of industry speculation and anticipation for nearly a year.

Personal computer designers are fond of using feminine names for computers during the development stages. The Atari 800, for instance, was referred to as "Colleen," within the company, for security purposes. A similar veil of secrecy surrounded "Sara." This led to speculation that the Apple III would use the Motorola 6809 processor, or that it would use bit-slice architecture, and that it would cost anywhere from \$700 to \$10,000.

The rumors were mostly off-base. In fact, the Apple III is a logical upgrade of the Apple II for use in professional applications like word processing and information management.

"It's also the ultimate hobbyist computer," says Apple vice-president Steve Jobs, lightheartedly. "The Apple III was conceived primarily to fill in gaps in the Apple II. It will not replace the Apple II by any means. It's designed to enhance it."

The price of the Apple III (\$4500 to \$8000) buys a lot of computer power. For these prices, the company will be selling not just a computer but a total system, including software and peripheral devices.

Hardware Features

First, the basics. The Apple III uses a 6502A processor running at 2 MHz. Custom large-scale integration (LSI) circuitry enables the computer to address up to 128 K bytes of memory. The circuitry is housed in an aluminum chassis that keeps radio-frequency interference (RFI) in and conducts heat out (no cooling fan is required). The chassis is housed in a plastic shell. The Apple III looks like the Apple II, with its distinctive white plastic case; however, the aluminum chassis adds some weight to it.

One important feature is the addition of an on-board, 5¼-inch floppy-disk drive.

"We no longer consider the floppy-disk drive to be a peripheral device. It's an integral part of today's computer systems," says Apple's Product Marketing Manager, Don Bryson. The decision to keep the video monitor as a separate, off-board unit was dictated by the fact that the computer would otherwise not be portable enough. "We wanted Apple III users to be able to take their machines home from the office at night," says Bryson.

The Keyboard

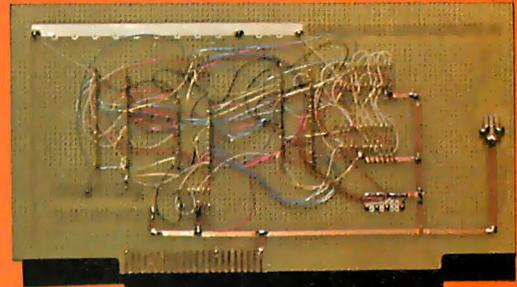
The Apple III shows signs of careful design throughout. The keyboard is a particularly good example of this care, being an outgrowth of the Apple II's popular keyboard. A numeric keypad has been added to the sculpted, Selectric-like keyboard. In fact, it has the same layout as an IBM Selectric typewriter, to make it as easy as possible for office workers to use the machine. Refinements include moving the Reset key off the keyboard. It is now located above and to the right of the keyboard; a reset operation now requires that the Control key be pressed along with Reset, thus eliminating a minor but irritating problem on the Apple II keyboard.

There are four cursor-control keys on the keyboard for applications such as word processing, and raised "dimples" on the D, K, and 5 keys to help the user locate those keys by feel. The Alpha-Lock key enables the entry of numerals in uppercase mode, and there are two user-definable keys for various software applications. Other handy features include built-in repeat on each key (there is no repeat key), and a fast-repeat feature useful for filling the screen with characters. The Shift-Tab and Shift-Space operations can be programmed to act as Back-Tab and Back-Space, respectively.



Photo 2: An example of the Apple III's high-resolution color graphics (290 by 192 lines of resolution with sixteen colors) displayed on an RGB (red, green, blue) color monitor. This particular demonstration is an animation program: the horses gallop on the screen.

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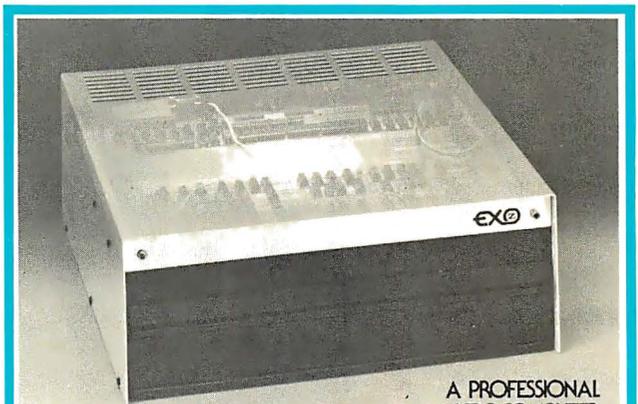
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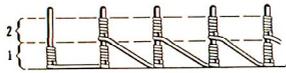
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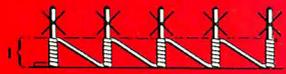
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Photo 3: The Apple III with its plastic case removed to reveal the shielded aluminum chassis, designed for heat dissipation and RFI (radio-frequency interference) containment.

There are four slots inside the Apple III for insertion of peripheral cards, compared with eight in the Apple II. This is not a disadvantage, because many of the applications that require the use of special peripheral cards on the Apple II are either built into the Apple III, or are taken care of by the very complete array of connectors on the back of the computer. These include a special 26-pin flat ribbon connector for daisy-chaining up to three additional floppy-disk drives into the unit; two DB-9 connectors for a silent dot-matrix thermal printer, joysticks, etc; a DB-15 video-out connector with a choice of black-and-white, NTSC-color, or RGB (red, green, blue) outputs, plus power supply voltages; an RCA video-out connector (black-and-white only); an external speaker jack that disables the internal speaker when in use; and an RS-232C serial I/O (input/output) port for a letter-quality printer, modem, etc. The Apple III also features an event timer and a battery-driven clock calendar.

Can Apple II peripheral cards be used in the Apple III? First a word about the design of the new peripheral cards. In order to meet Federal Communications Commission (FCC) RFI emission guidelines, new Apple III peripheral cards will have special shielded connectors and shielded cables going to the outside world. The new cards use the same bus structure and the same timing as the old cards, so an update to the new format will be straightforward for manufacturers. You *can* plug Apple II peripheral cards into the Apple III, but this might violate the RFI guidelines in some cases. The legality of the matter is somewhat up in the air at present.

The built-in 5¼-inch floppy-disk drive is manufactured by Shugart and is being second-sourced to Apple. It should be considerably faster than the Apple II drives both because of its mechanical design and because of the more efficient disk controller and operating system built into the Apple III.

Graphics

The Apple III's graphics capabilities go considerably beyond the Apple II's, offering 80 columns by 24 lines of text on the monitor screen—a must for serious word processing. The character dot-matrix is 8 dots high by 7 wide. Graphics modes include 560 by 192 lines (black

and white only) and 280 by 192 lines featuring sixteen high-resolution colors or sixteen shades of gray. (Compare this with the 280-by-160-line resolution in the limited-color, high-resolution mode of the Apple II.) Another mode offers forty characters with color-on-color; moreover, the Apple III offers the three Apple II graphics modes (yes, Apple II programs will run on the Apple III—more about this later).

Software Features

At the heart of the Apple III is the SOS (Sophisticated Operating System), designed to handle multiple languages and peripherals. (Speaking of languages, the Apple III offers Pascal as a built-in feature, along with Apple Business BASIC. Although not officially announced, Apple will probably be offering FORTRAN later in the year for the Apple III.) The system architecture offers several new features, including extra instructions in the instruction set, a relocatable stack, relocatable base register, and extended addressing.

Floppy disks for the Apple III will have sixteen sectors, and the power supply has been made more "robust" to better handle multiple drives. The Apple III's designers believe that this will also clear up the occasional problems encountered in the past in trying to copy from one disk to another on the Apple II. Total capacity on a disk will be 143 K bytes. Pascal should also run considerably faster on the Apple III because it is built-in.

Compatibility with the Apple II

Considerable effort has been expended to make the Apple III as compatible as possible with the Apple II. In fact an Apple II-emulation mode has been built into the Apple III. Thirteen-sector Apple II floppy disks can be quickly updated to the new 16-sector format (there is a problem, however, if the old disks are protected against copying). Some older BASIC programs with PEEKs and



Photo 4: Back view of the Apple III, showing (from left to right) the 26-pin flat-ribbon connector for daisy-chaining up to three additional floppy-disk drives into the computer; two DB-9 connectors for joysticks, etc.; a DB-15 video-out connector with black and white, NTSC color (the standard North American color-television system), and RGB (red, green, blue); an RCA-type video-out connector (for black and white only); an external speaker jack; and an RS-232C serial I/O (input/output) port for a letter-quality printer, modem, etc.

POKEs may not run on the Apple III without modification, but the great majority should work unchanged.

"The Apple II emulation is a true emulation," says Don Bryson. "You'll be locked into the 40-character uppercase mode."

System Configurations and Availability

The Apple III will be sold as a *system*. This is central to the company's philosophy that a computer is more than just hardware, and that professional customers want a complete working package with software and documentation. The initial offering will be the \$4500 "Information Analyst" package, consisting of an Apple III with a Trendcom silent 80-column dot-matrix thermal printer; 96 K bytes of memory; black-and-white monitor; a special version of Visicalc, called Visicalc III, featuring 80 columns (Visicalc is a general-purpose, matrix-oriented program for handling financial and general data); SOS (Sophisticated Operating System); and Extended BASIC. This system will be available starting this month, July, at Apple dealers; widespread availability should occur in another few months.

Starting in the fall, Apple will offer another version of the Apple III, called the Software Development System, ranging in price from \$4500 to \$8000. The \$8000 version will be a word-processing package featuring a letter-quality printer (such as Qume or Diablo); an extra disk drive; a high-quality monitor; a word-processing software package; and a training course offered through Apple dealers. A less expensive version of the word-processing package will be available for \$4500; it will use the thermal printer.

The Market

Apple is banking on the fact that the Apple III can compete head-on with a wide variety of computers. Steve Jobs believes it will give a product like the Wang word processor a run for its money.

"It's easier to use than the Wang and costs less," Steve points out.

Its color graphics are another strong feature. We were treated to a beautiful demonstration of high-resolution color graphics using an RGB color monitor. Apple plans eventually to market an RGB color monitor with the Apple III.

"The Apple III was conceived to fill in the gaps in the Apple II. One small technical deficiency (40 columns instead of 80 columns on the Apple II) prohibited us from entering some of the markets we wanted to go after," said Jobs. "The Apple III complements the Apple II, but the Apple II is still better for some things. I see it continuing to carry the educational and low-end professional markets."

Apple is confident that outside suppliers of peripheral cards and software will be encouraged to offer products for the Apple III because of its evolutionary approach to product design. We applaud the careful design of the Apple III and the commitment of the company to making it as compatible as possible with the Apple II.

We look forward to examining the potential of the Apple III in future issues of BYTE. ■