nibble®

THE REFERENCE FOR APPLE® COMPUTING

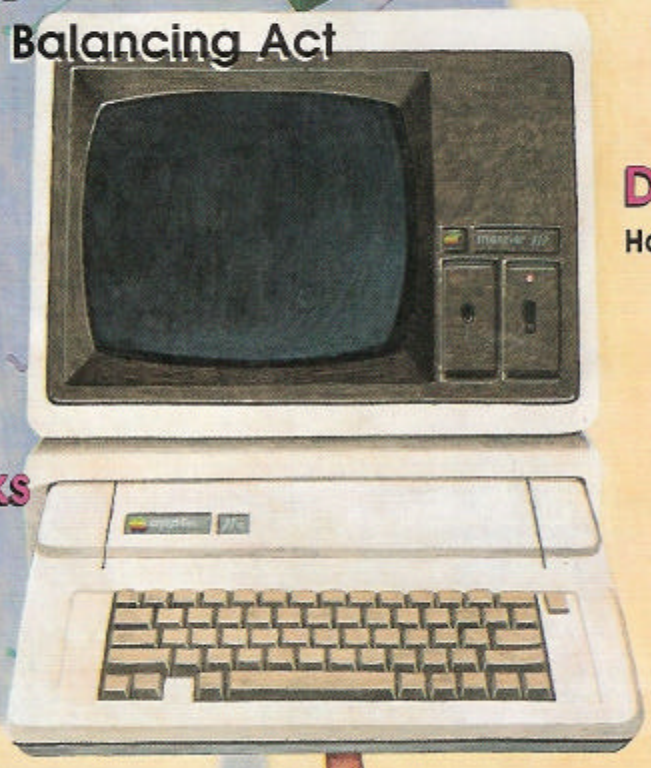
OCTOBER 1986
VOL. 7 / NO. 10
U.S.A. $3.25
CANADA $4.50

Apple's Hot New Computer!

The Apple IIGS

THE NIBBLE BANKER

Checkbook Balancing Act



DISK RESCUE

Hope for Damaged Disks

AppleWorks Graphs

The Hottest New Games

PLUS . . .

- Build an External Speaker
- RAM Disks Explained
- Using MouseText
- Crunch Your Applesoft Programs

0 74470 12699 10

by David Szetela

THE NEW II

It's here — Steve Wozniak's dream machine, the ill-fated //x that spawned the Cortland, is now the Apple IIGS. On September 15, Apple announced their fantastic new addition to the Apple II line. Even the price is fantastic: under $1,000 for the computer, keyboard and mouse (disk drives and monitor are extra). And there's good news for //e owners: a dealer-installed upgrade will turn your trusty workhorse into a IIGS — for about $500! To get an idea of the incredible capabilities of the new II, take a peek at the new products announced for it in the On the Scene column on page 86. Better yet, go to your local Apple dealer on September 27. On that day, Apple will be sponsoring demonstrations of the new IIGS and other goodies . . .tell them *Nibble* sent you.

WHAT IT IS

The easiest way to describe the IIGS is to call it a (slow) color Macintosh that can run (almost) all Apple II software. The IIGS central processing unit is a 16-bit 65C816, running at 2.8 MHz. Standard memory is 256K RAM and 128K ROM, expandable to a whopping 8 megabytes RAM and 1 megabyte ROM. There are eight slots; one dedicated to RAM/ROM expansion, and seven I/O slots that will accept any peripheral cards intended for the Apple II Plus or //e. You'll be able to plug in any of the Apple II disk drives, and also the new Apple 20-megabyte SCSI (Small Computer Systems Interface) drive, through the optional SCSI interface.

There's a built-in clock, and a mouse is standard. AppleTalk is built in; look for the IIGS (and the //e with an optional AppleTalk card) to interface with Apple networks and AppleTalk peripherals such as the LaserWriter.

The IIGS has two execution modes, *emulation* and *native*. In native mode (running off a new disk operating system called ProDOS 16), the machine runs at 2.8 MHz and can (theoretically) directly address up to 16 MB of memory. In emulation mode, the IIGS "pretends" it's a 128K Apple //e that can run virtually all of the existing Apple // software, either at normal speed or at an "accelerated" rate that's about three times faster than the //e.

Apple's technical wizards went to incredible lengths to ensure compatibility, testing every major piece of software and making ROM modifications to accommodate renegade programmers who have ignored Apple's guaranteed Monitor entry points. I can testify personally to their near-fanatical dedication; at a sneak preview earlier this year, I watched Apple's Fern Bachman and Pete MacDonald track down a mysterious problem with *Nibble*'s COPY command program that kept crashing the IIGS into the Monitor. After nearly an hour of sleuthing, they concluded that, although *Nibble* author Ken Manly had used some exotic programming techniques, he hadn't done anything "illegal," and there was a good possibility that other programmers might try the same thing. So they changed the IIGS ROM code.

But the most dramatic features of the IIGS are its graphics and sound capabilities. Besides the standard //e display capabilities (40-column and 80-column text; Lo-Res, Hi-Res, double Lo-Res and double Hi-Res graphics), the IIGS also boasts a new super Hi-Res. The IIGS can strut Mac-like graphics in two modes: one with 200 × 320 resolution that can display up to 16 colors per line out of a possible 4,096 colors; and another with 200 × 640 resolution that can display 4 colors per line out of a possible 4,096.

As staggering as the graphics are, it's the sound that will really blow a lot of people away. The IIGS contains an Ensoniq 32 oscillator synthesizer chip with 64K of dedicated RAM. This means that the machine is capable of 15-voice music synthesis — a symphony of sound. It also means that, with up to 8 MB of directly addressable memory available, the IIGS can produce superb *digitized* sound. Imagine learning a foreign language by listening to your computer reproduce speech with excellent clarity!

Table 1 summarizes the IIGS features and compares them to the Apple //e and //c.

OTHER GOODIES

Other announcements from Apple this month include: an inexpensive RGB monitor; memory expansion for the //c; a new 3.5-inch drive that plugs into either the IIGS or the Macintosh; the HD 20C hard disk that connects to the Macintosh or, with a SCSI interface card, into the IIGS or //e; and an enhanced version of AppleWorks that takes advantage of extended memory in the //c, //e and IIGS to dramatically increase the size of the desktop and maximum size of a file.

WHAT'S NEXT?

The IIGS is truly the "engine" for next-generation software; turn to page 86 to see the first wave. Apple's excellent reputation for supporting developers has really paid off here — over 150 are working on IIGS software and hardware, and the best is yet to come. The machine is a developer's dream, with Mac-like features such as an advanced ProDOS operating system that provides memory management and supports desk accessories, and a toolchest called QuickDraw II that supplies zippy graphics routines in ROM.

THE MARKETS

Let's talk about the marketing plans for the machine. Apple sees it as a high-end home and school machine, and when you think about it, it's perfect for both. The graphics and sound make it the ideal teaching machine. It could produce a revolution in computer-aided instruction for music and foreign languages. It can run the Apple II software the kids are using at school. Since it can also run software that gives it that fashionable Macintosh look, it might be the ultimate home computer.

TABLE 1: The Apple // Family — How They Compare

	Apple //e and //c	Apple IIGS
CPU	65C02 or 6502	65C816
Memory	64K or 128K RAM 32K ROM	256K RAM, expandable to 8 MB 128K ROM, expandable to 1 MB
Expansion Slots	//e: 8; one dedicated to optional 80-column card //c: None	8; one dedicated multipurpose RAM/ROM expansion slot; 7 additional I/O slots
Display Modes	Text: 40-column by 24-line text 80-column by 24-line text (optional on //e) Graphics: Lo-Res: 40 × 40 dots, 16 colors Hi-Res: 280 × 192 dots, 6 colors Double Hi-Res: 560 × 192 dots, 16 colors (optional on //e)	Text: same as //e Graphics: same as //e, plus: Super Hi-Res: 320 × 200 dots, 16 colors per scan line from a palette of 4,096; 640 × 200 dots, 4 colors per scan line from a palette of 4,096
Keyboard	Attached 63-key, full-sized keyboard	Detached 80-key, typewriter-style keyboard including 10-key numeric keypad.

Interfaces	//e: Mouse, joystick, hand controller port, RCA-type jack for video monitor
	//c: same as //e, plus:
	Headphone jack with volume control
	Video expansion interface
	Two serial input interfaces
	External disk drive interface
		NTSC-compatible composite color video
		Analog RGB video output
		Headphone jack with programmable volume control
		Apple DeskTop Bus input port for daisy-chained keyboards, mice and other input devices
		SmartPort disk interface for 5.25 in. and 3.5 in. drives
		Two serial ports using SCC communication chip
		Game/joystick port
		Input/output sound connector on logic board

Sound Capability	//e: Built-in speaker //c: Built-in speaker with volume control	Ensoniq 32 oscillator synthesizer chip with dedicated 64K RAM
Other Features	//c: Built-in 5.25 in. disk drive	Apple DeskTop Mouse standard Built-in clock

But where does that put the Mac? With the mouse interface, desktop metaphor, windows, pull-down menus, desk accessories, SCSI interface and AppleTalk capabilities, IIGS software can act just like Macintosh software, and with high resolution color to boot. The IIGS falls short of the Macintosh in only one significant area: it's slower. But it only appears slower if you have the opportunity to compare the two machines side-by-side. To first-time users, the IIGS will certainly look like a color Mac, which leads to the inevitable question: why is the Macintosh twice the price? Why pay double for the equivalent of a monochrome IIGS?

I think the answer lies in Apple's long-term strategy. Company Chairman John Scully has already announced that Apple will release more new products during the coming year than in its entire corporate history. We've seen several of those new products this week; the next wave is likely to advance the state of the Macintosh to the point that it's clearly distinguishable from the IIGS in performance as well as price.

WHO DID IT?

The IIGS is an incredibly fine computer, arguably the finest assemblage of chips and resistors ever soldered together. So, we'd like to salute the people responsible for breathing new life into the Apple // line, and for producing the most exciting event this industry has seen since January 1984.

First, credit must be given to Steve Wozniak for creating the first IIGS prototype, the Apple I, and for bucking stiff opposition for so many years to evangelize for the extension of the // line.

Next, we want to thank the Apple Gang of Four — John Sculley, Del Yoccam, Jean-Lois Gasee and Bill Campbell — for recognizing that Woz was right, and for turning on the collective genius of the IIGS development team. The team includes (in no particular order): Nancy Stark, one of the first and most energetic champions; Harvey Lehtman, manager of the group that developed the system software; Rob Moore, manager of the team that developed some of the miraculous hardware, including Jay Rickard's Mega //, "the //e-on-a-chip," and Larry Thompson's VGC (video graphics controller); Curtis Sasaki, IIGS Product Manager; Ed Colby, CPU Product Manager; Jim Jatczynski, manager of the Operating Systems Group; Fern Bachman, one of the people responsible for making sure that the IIGS could run all of the 20,000 Apple // software packages available; Gus Andrate, who worked on the sound tools and the unified drive firmware; and Peter Baum, Rich Williams, Eagle I. Berns, John Worthington and Steven Glass, who each developed parts of the masterfully-executed IIGS system software and firmware.

Ladies and gentlemen of Apple, on behalf of the Apple // user community, you have earned our gratitude and admiration.

WHAT WE'LL DO

We're just as excited about the IIGS as you probably are. We expect that many of you who are //e owners will hasten to upgrade. The price is low enough that many of you will buy the IIGS as a second machine. We plan to provide the same kind of coverage of the IIGS that we have for the other members of the // family for the past seven years. Whenever possible, the programs we publish will run on all of the // machines but will take advantage of the special features of the IIGS. And we'll certainly feature programs from time to time that will really show off the new machine's unique capabilities. Finally, you'll continue to find comparative reviews of products for all of the members of the // family.

The IIGS marks the beginning of a new generation of Apple // computers. Let's use it, enjoy it, and learn about it. . . together.