The Developer Business Report — *April 1995*

AppleDirections

Announcing WWDC '95
The 1995 Worldwide Developers Conference will be held May 8–12 at the San Jose Convention Center in San Jose, California. Online registration forms, as well as more information, are available on AppleLink (path—Developer Support:Developer Services:Events/Marcom:WWDC). You can also get more information by fax (800-770-4863 in the United States; 415-637-2607 elsewhere) and through the Internet at either http://www.info.apple.com/dev or wwdc.carlson.com.

Apple News

OpenDoc Slated for Fall; Oracle Announces Support

The first commercial release of OpenDoc, Apple's document-centered software architecture, will ship in early fall, according to Apple Computer, Inc. Additionally, Oracle Corporation recently announced plans to support OpenDoc with its line of development tools by the end of the year.

The OpenDoc fall commercial release will be the first one available to you for licensing with your products, enabling you to start shipping your OpenDoc products to customers. Apple will ship OpenDoc with Macintosh systems as soon as possible after the commercial release is available.

Before then, Apple will ship several special developer releases, following Developer Release 1, which shipped in January. OpenDoc Developer Release 2, scheduled to ship in May, is expected to include complete features of the first commercial release, including scripting and linking, and an early release of CALib, software that will help you convert existing monolithic applications to OpenDoc container applications.

The OpenDoc developer releases mark a change in how Apple will deliver system

Strategy Mosaic

Portrait of the Future: Learning

By Gregg Williams, Apple Directions *staff*

Part One: The Underpinnings of Apple's Strategy

The poet Wordsworth was right: The child *is* father of the man.

From the early days of the Apple II, Apple Computer, Inc., has been very visible in education. An entire generation of students grew up using Apple II computers in grade school, and many of them went on to use Macintosh computers in college. So guess what computer they're probably using right now?

Apple's support for education, which goes back to the earliest Apple II days, is one very real indication of the company's commitment to learning. Apple's Education Division has an underlying philosophy—supported by products, programs, support, and initiatives—that is dedicated to the goal of increasing the effective use and integration of technology in schools.

Underlying this goal is Apple's long-held belief that technology can enhance and strengthen learning in a variety of disciplines, as well as help people develop critical thinking and problem-solving skills, retrieve and share information, and communicate with each other.

Apple's goals take on new meaning in light of the Goals 2000: Educate America Act

Real Virtual Reality

One of my own pet notions is that we use the computer for a lot of things we knew how to do before there were computers—writing, math, communications, games, and so on. Seems to me that the computer will only become truly ubiquitous—and sell to that majority of as-yet-computerless households—when it does something useful and appealing that no other tool or appliance can do. I think that the range of experiences you'll be able to bring to users with a new Apple technology, QuickTime VR, fits into that category.

As its name implies, QuickTime VR brings virtual reality to the desktop, letting you build electronic three-dimensional environments based on renderings and/or standard 35-mm still photography that users can explore from the safety of their Macintosh and Windows computers. Users can navigate through panoramas, poking their heads into nooks and crannies and picking up and inspecting objects along the way.

With software that employs QuickTime VR, people will be able to visit the world's wild places, view a recently found Cezanne in the Winter Palace in Russia, wander through the Roman Forum, pick up the Hope diamond, or check out the closet space in the new home they want to build. And all that will happen while they're sitting at their desks.

QuickTime VR has the potential to widen, significantly, the current bounds of personal computing, and I'm not the only one who thinks so. Listen to some of your colleagues who have already had a chance to work with QuickTime VR:

From the time I first became aware of QuickTime VR, it was extraordinarily clear to me that it is a fundamental technology that will break open an entire new category of software.

—Peter Black-
President, Xiphias

With QuickTime VR's image depth and resolution, and with the ability to move in 360 degrees around an environment,

QuickTime VR brings interactive multimedia to another level. This promising new technology has tremendous potential.

—Axil Comras
Product manager, Brøderbund

QuickTime VR is a staggering new tool for photographers and visual communicators. It opens up endless possibilities for new visual approaches and provides new ways to teach, entertain, explore, and become involved in an environment. It takes "virtual reality" beyond virtual and well into reality.

—Scott Highton
Professional photographer

When most people hear about what QuickTime VR can do, it generally brings to mind ideas for interesting, creative applications. My own favorite: putting the great science and art museums of the world on CD-ROM for the education market, both in homes and schools. Taking students to museums is something the computer can do that traditional educational tools simply can't, especially in our budget-cutting era. QuickTime VR museums would enhance children's education in a way only dreamed of before. (Walking through a QuickTime VR museum could even be an improvement on "reality:" viewers will be able to look at exhibits without a crowd of people standing between them and what they're trying to see.)

We'll be telling you more about Quick-Time VR in future issues of *Apple Directions*. In the meantime, if you want to get going with your own QuickTime VR ideas, you'll be able to purchase QuickTime VR authoring tools through APDA by early April. If you'd like to receive notification of their availability, send your name, company name, address, phone, fax, and e-mail address to QuickTime.VR@applelink.apple.com.

Paul Dreyfus
Editor

IndustryWatch: News & Perspective

Better Business Propositions

Prepared by the Apple Directions *staff*

IndustryWatch is our regular compilation of news about events happening outside the Apple Computer, Inc., R&D complex. Each month, we gather the most notable items, which we hope will point you toward new opportunities, help you avoid mistakes, and alert you to key developments in the industry. We're not trying to cover everything in the computer industry; other publications already do that. Instead, we're digging through the news to present you with the most interesting tidbits, ones that translate into ideas you can use.

OK to Support OLE Through OpenDoc, says Microsoft

We've known all along that it's OK to support Microsoft's Object Linking and Embedding (OLE) by writing your component software according to the CI Labs/Apple OpenDoc specification. (In fact, we think it's far preferable.) OpenDoc functionality is a superset of OLE's, and it provides an easier way for you to write component software than OLE does. Also, parts and containers that work under the OpenDoc architecture will also work with OLE.

Now Microsoft has said that it's OK, too. The company recently said it would let you use the Windows 95 logo with your component software product whether it supports OLE directly or through OpenDoc. The Windows 95 logo is a seal of approval from Microsoft that alerts buyers that the application supports Windows 95 the way Microsoft would like it to.

Implications/Opinions: Microsoft's announcement at least lowers the volume of the Apple vs. Microsoft/OpenDoc vs. OLE debate, and gives you one more reason to adopt OpenDoc—or, more accurately, takes away a reason for worrying about doing so.

If using the Windows 95 logo is crucial to your plans for marketing your new products that work under the component software architecture, you no longer have to worry about losing that ability by developing for OpenDoc.

For more information on OpenDoc, see the collection of previously published *Apple Directions* articles about Apple's compound document architecture on AppleLink (path—Developer Support:Developer Services:Periodicals:Apple Directions:OpenDoc articles).

Apple Directions Online—May

The May issue of *Apple Directions* will be available on AppleLink, the Internet, and eWorld by April 15, at the following locations:

AppleLink: path—Developer Support:Developer Services:Periodicals:Apple Directions.

Internet: select Developer Services and Products at the location www.apple.com.

eWorld: in the Apple area of the Computer Center.

Software Sells Hardware: One More Example

Next-generation video game systems from Sony—the PlayStation, which sells for U.S. $390—and from Sega—the Saturn, which sells for U.S. $425—have been shipping in Japan since November, and are expected to ship in the United States later this year. It appears that one Saturn software title, Sega's Virtual Fighter, has given the Saturn strong initial appeal in the market. Virtual Fighter breaks new ground because the fighters are three-dimensional figures that have very fluid and realistic movements.

Implications/Opinions: The general industry consensus is that Sony's PlayStation box has better capabilities than the Saturn. However, in their first month of availability, the Saturn outsold the PlayStation 500,000 to 300,000. We think this is an example of how a great software title—that is, Virtual Fighter—is more important than better hardware. We don't know who the eventual winner of the video game wars will be, but we're sure it'll be the system with the best titles.

Expanding Chinese Market: Look Before You Leap

The Chinese market for semiconductors is expected to more than double to an annual business of at least $7 billion between now and 1998, according to a report in the *San Jose Mercury News* on February 9, 1995. The report was based on a study released by the Semiconductor Industry Association (SIA), which forecasts Chinese chip demand growing 10 percent to 20 percent per year. That rate of growth would make China the largest semiconductor market by the year 2010.

Chinese customers will use chips in a range of consumer electronics products currently in demand in China, including refrigerators, televisions, cellular phones, and—yes—computers. If the market for hardware products is expected to grow, then the market for your software can't be too far behind.

Implications/Opinions: Adventurous souls take note—China could be a major new market for your products. Apple recognizes this, and to be sure it's among the first to market in China, late last year it established the Apple Publishing Center in Beijing in cooperation with an arm of the Chinese government.

For now, though, China may only be a market for the most adventurous. The SIA report points out that various hurdles (like those outsiders faced doing business in Japan in the 1960s and 1970s) make trade in China risky business for outside firms. Those challenges include ". . . [theft] of intellectual property, imposition of ad hoc taxes and charges, corruption, smuggling, frequent sweeping changes in law and regulations, and blurring lines of authority." The major obstacle appears to be software piracy; China currently has laws on the books protecting intellectual property, but no method of enforcing them.

For more information about the SIA study of the Chinese chip market, call Kevin Brett at the SIA at 408-246-2711.

Paper Prices on the Rise: Time to Go Online?

A shortage of paper in North America is expected to drive paper prices up dramatically in the United States and other areas in 1995. For

example, industry sources expect the price of newsprint, the inexpensive paper used by newspapers, to soar by as much as 65 percent this year.

Implications/Opinions: Your cost of goods is high enough already, even with today's paper prices. If you can't lock in paper prices with your print vendors (and even if you can), you should consider cutting down on your paper costs by putting at least some of your documentation on-line. It will save you some of the money you'd spend on printed manuals, and if you do it well, it will also cut down on your support costs, another skyrocketing budget item for many software companies.

A terrific tool Apple provides you for creating electronic instructional materials is Apple Guide, its online help architecture. Apple Guide is included as part of the latest version of the Mac OS, System 7.5, which has now shipped well over 1 million copies. This means there are now more than 1 million Macintosh customers who can view Apple Guides to your products. Apple Guide will prove especially useful to you if you're selling a Power Macintosh product, since the vast majority of Power Macintosh systems shipped to date included Apple Guide.

Adopting Apple Guide today is also an investment in your future: Apple intends to ship it with all future Macintosh computers. Also, Apple Guide will be one of the cornerstone technologies behind the "active assistance" that future versions of the Mac OS will provide users.

To find out more about Apple Guide and how you can get started with it, see "How Do I Use Apple Guide?" in the September 1994 issue of *Apple Directions* (available at the AppleLink location mentioned on page 3, or on the March 1995 Developer CD [path—Periodicals:Apple Directions:Apple Directions 1994: Apple Directions, 09/94]).

The Hidden Costs of Surround Video

Apple has generated a lot of press and developer enthusiasm with its QuickTime VR (short for *virtual reality*) multimedia technology for Macintosh and Windows systems. QuickTime VR provides tools for you to build electronic three-dimensional environments out of standard 35-mm still photography, which users can then explore on Macintosh and Windows-based personal computers.

Microsoft recently tossed its hat in the virtual reality ring by beginning to demonstrate its own VR-like technology called Surround Video,

which works only with Windows systems. Microsoft is making Surround Video very attractive by saying it will not charge royalties on multimedia titles that use it; Apple intends to charge a royalty for QuickTime VR–based products.

Implications/Opinions: It appears to us that there are some significant, not-so-hidden costs of using Surround Video to prepare three-dimensional multimedia products.

The first, and largest, is that Surround Video products are not likely to generate sales in a substantial portion of the personal computer market—that is today's Mac OS and Windows 3.1 users. Surround Video requires a PC with at least a 33-MHz 486 chip (and Microsoft recommends using a faster processor). Also, according to Microsoft, Surround Video is slower and less effective on PCs running the Windows 3.1 operating system than it is on PCs running the forthcoming Windows 95 or Windows NT 3.

QuickTime VR, however, is truly a cross-platform solution. QuickTime VR runs on all Macintosh systems installed with QuickTime 2.0 and a 68030, 68040, or PowerPC chip as well as on most PCs running the Windows 3.1 operating system. Multimedia titles prepared using QuickTime VR will be appealing to today's vast customer base of Macintosh and PC users, while Surround Video products will realistically engage only tomorrow's Windows 95 users.

There's a second hidden cost of developing with Surround Video. While QuickTime VR lets you work from pictures taken with a standard 35-mm still camera, Surround Video reportedly works best with pictures from an expensive 360-degree panoramic camera in order to capture scenes.

Another cost is that while QuickTime VR will be available shortly after you read this, Microsoft has yet to announce a ship date for Surround Video. And even if it becomes available in the not-so-distant future, there will be no substantial customer base for Surround Video products until sometime after Window 95 ships this August.

Needless to say, we think QuickTime VR offers you a better technical solution for your 3D multimedia titles. (See this month's Editor's Note on page 2 to find out why we're excited about QuickTime VR.) In addition, despite the promise that Surround Video will be royalty free, we think that QuickTime VR offers you a better business proposition, as well. ♣

Portrait of the Future
continued from page 1

(signed by President Clinton in spring 1994), which calls for the United States to improve learning and teaching by creating a national framework for education reform.

What *is* learning? What is Apple's interest in this area, and what is Apple doing? How can you make your company and your products more visible in it? These are the questions that I'll address

in this two-part article (to be concluded next month).

What *Is* Learning?

"What do you mean by *learning?*" you might ask. "Why don't you just talk about *education?*" It's a good question.

Apple uses the term *learning* because it wants to focus on learning as a separate, larger market. Education takes place in the institutions of learning: schools, colleges, and universities. Learning, however, is not something that happens only within these institutions.

Learning is something you do all your life.

Apple is currently focusing on four separate learning-related markets:

• Pre-K–12 (pre-kindergarten through grade 12)
• higher education
• home learning
• business learning

The first two constitute the institutional education market that comes to most people's minds. However, home and business learning are two rapidly growing markets with no

established market leader, and Apple is eager to take advantage of this opportunity to leverage its knowledge of learning, its leadership in education, and its technical expertise into leadership in all four learning markets, both in the United States and worldwide.

Apple has separate functions within Apple USA, Apple Europe, and Apple Pacific, that deal directly with each of these markets. In many countries around the world, Apple is already a leader in learning; in many others, Apple is poised to increase share. There is a huge opportunity outside the

United States to leverage Apple's leadership by adapting existing materials for local use. For example, in the majority of non–English-speaking countries, the availability of learning titles is limited. Software translated into the local language is likely to encounter a strong demand and a relatively open field.

To help provide the strategic direction and a strong focus for learning, globally and across the different markets, Apple management created the Learning Program Office, headed by Rick Spitz, vice president of Apple's learning strategy. The charter of the new office is to create a unified learning strategy and vision to guide learning-related activities for Apple organizations, partners, and customers.

Why Is Learning Important to Apple?

Three reasons for Apple's interest in the usage area of learning come to mind. First, Apple is currently the market leader in education and is number one in the rapidly growing home learning market. Apple wants to leverage that advantage to establish predominance in the emerging business learning market.

Apple computers constitute 61 percent of the installed base of personal computers in K–12 schools in the United States. Significantly, the majority of these are Macintosh computers, though many of these are Apple II computers. Furthermore, Pre-K–12 buyers in the United States are expressing an increasing preference for Macintosh computers over IBM- and PC-compatible computers. (See the figure "Apple's Momentum in Education.")

One interesting figure supporting Apple's leadership in learning markets comes from the Association for Supervision and Curriculum Development. The numbers from its report,

Apple's Momentum in Education

K–12 purchase plans by platform and school year

This graph shows the purchase plans of K–12 public schools for the years indicated, as reported by the QED *Educational Technology Trends 1993–1994 Report* (August 1994). The vertical axis represents the percentage of districts planning to purchase computers for that year.
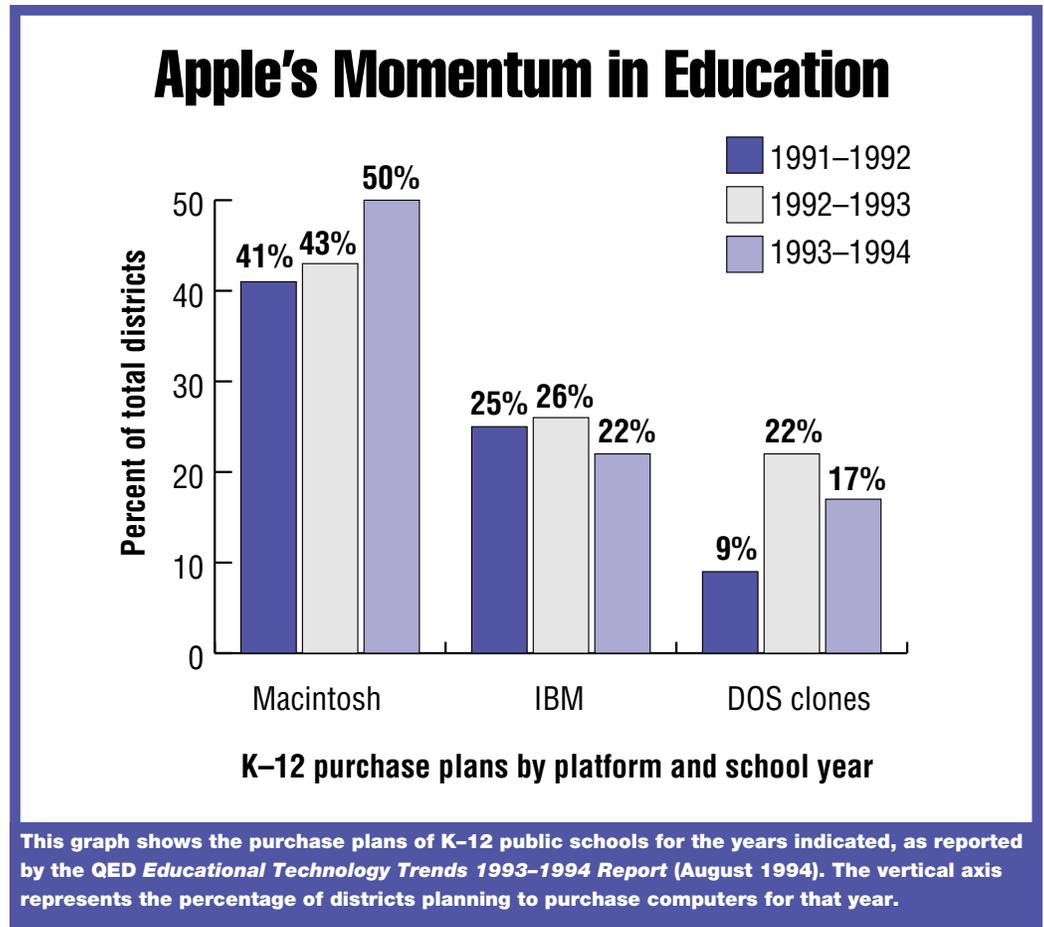
"1994/1995 Only the Best: The Annual Guide to Highest-Rated Education Software/Multimedia for Preschool–Grade 12," are revealing. Eighty-one percent of the highest-ranking programs in this guide run on Macintosh computers, of which 23 percent run *only* on Macintosh computers. By comparison, only 62 percent run on either MS-DOS or Windows-compatible computers.

With its reputation for leadership in education, Apple plays a strong and growing role in the expanding global K–12 and higher education markets. Apple also hopes to leverage its leadership in higher education into leadership in the business learning market.

A second reason for Apple's interest in learning is that customers in this usage area value the Macintosh platform's primary strengths—including ease of setup, learning, and use; reliability; and rich support of sound,

video, multimedia, CD-ROM, and networking. Because of these features, Apple should have an advantage over its competitors in selling to these customers. (You can find evidence of this preference in the statistic that two-thirds of all the personal computers in U.S. K–12 schools used to access CD-ROM titles are Macintosh computers.)

A third reason for Apple's interest in learning comes from the fact that Apple attributes a large amount of its sales—in 1994, more than 50 percent—to the learning-related markets. In addition, over 20 percent of all Macintosh home users cite education as the *primary* use of their computer.

With the expansion of the business and home learning markets, Apple expects to increase such numbers in the future. The home learning market is growing at an extraordinary pace. According to

the Software Publishers Association, home education software was the fastest growing category of software in 1994, with first quarter sales up 128 percent over the previous year. In addition, Apple's Learning Program Office estimates that, over the next three years, the purchase of computers for business learning will grow at a rate two to three times faster than the growth rate of general computer purchases in corporations. By placing special emphasis on developing the business learning market, Apple expects to gain more market share than it could elsewhere with the same amount of effort.

Learning Is Changing

The nature of learning is changing because the underlying needs driving learning have changed. The idea that a college education will provide students with a body of knowledge that

will last them for the rest of their lives is outdated.

The National Learning Infrastructure Initiative (of which Apple is a founding member) is one of numerous educational groups calling for change. An NLII report cites the following as one of many examples that support their claims:

The Big Six accounting firms have declared that no one can *master the content of their discipline in an undergraduate education. . . . The Big Six want graduates not who know everything, but who have the capacity to learn. It is difficult to think of a profession that does not share that requirement.*

The NLII notes that people do not need command of a set of facts as much as they do a more flexible set of learning skills.

These include critical reasoning skills, communication skills, the ability to find needed information, and the capacity to collaborate with others. Furthermore, job-related learning no longer takes place primarily at college by full-time students in their early twenties living on campus. The trend, according to the NLII, is toward incremental, "as-needed" learning that takes place wherever, whenever, and in whatever teaching style

the learner needs.

The NLII sees technology as an important element in solving the problems that the higher-education community faces, which include not only the need for a change in the education paradigm, but also the needs to contain the cost of education and make it available to more people.

But the fundamental question is, "What *works?* And how do we know that it works?"

Trends in Learning

Rick Spitz, vice president of Apple's learning strategy, sees four trends that will be important in the learning environment of tomorrow. Not surprisingly, they are all areas in which Apple is particularly strong, or is poised to be strong.

• *Multimedia.* Learners want it, and Apple delivers a much better multimedia experience, more reliably, than any other platform. Sales of the 630 series of Macintosh computers continue to be very strong, largely because of the variety of data types it can handle—QuickTime playback and recording, video input and output (including television), and sound.

Education studies have shown that most people learn better from experience and interaction than they do from passive receipt of abstract information (as in conventional class lectures). Simulation is another way in which computers can deliver interactive learning, and the Macintosh hardware/software architecture is particularly suited to running simulation programs that keep the learner's attention.

The Macintosh platform is, not coincidentally, the best platform for creating multimedia software. Regardless of the target platform, 70 percent of all multimedia titles are implemented using Macintosh computers.

• *Access to distributed information.* There are many forms of distributed information, and Apple offers superior access to all of them. For local access, Macintosh computers are much easier to configure for local area networks than DOS- or Windows-compatible personal computers. Of course, Macintosh computers also work well with all the major online services (including Apple's own eWorld). Today, schools can buy hardware/software bundles, including installation and training, that they can use to connect to the Internet (using the AppleSearch Bundle for the Internet: Workgroup Server 95). Soon, Apple will be offering additional solutions that make it easier for people to use the Internet.

Apple also sells solutions that help schools get networked on the local level. Dozens of schools in several Canadian school systems, for example, are using the Apple Communications Bundle (including First Class server and client software) to set up a conferencing/e-mail system that connects students and teachers within the school. In addition, it connects parents and others in the community to the school, the teachers, and the students, giving the community another way to interact in the education process.

Further in the future, Apple's new QuickTime Conferencing (giving real-time videoconferencing and collaboration capabilities) and

widespread access to the Internet will extend the reach of schools to museums, reference libraries, and "distance experts"—that is, experts in a given field that students can interact with, regardless of their physical location.

• *Mobility.* Students (especially in college) see computers more as "pencil and paper" than they do as "learning workstations." PowerBook and PowerBook Duo computers are very popular because they fulfill the computer requirement that many colleges and universities have, and they're easy for students to take with them wherever they go. Apple understands the tremendous value of having computing power with you at any time and will continue to innovate in notebook computers and PDAs (personal digital assistants).

• *New kinds of computing products for learning.* Apple is exploring new forms of products that will provide new opportunities for learning (and new markets for educational software as well). Some are in the near future, while others are further out.

One product in the near future is the Pippin platform, a CD-ROM–based stand-alone device that will bring PowerPC processor–based computing into many households. (For details on Pippin, see page 1 of the January 1995 issue of *Apple Directions.*)

With a price somewhere around $500 and a "game system" form factor, Pippin devices will find their way into the family rooms of many customers who have neither the inclination nor the money to buy a full-blown computer. Pippin will provide an entirely new platform for delivering educational titles to an entirely new set of customers.

It will probably be a long time before all students have their own personal computers. This indicates a possible market for electronic devices, inexpensive enough to be available to every student, that make a shared computer more useful. (Think of it as technological "hamburger helper," expanding the availability of the Macintosh computer in the back of the classroom.)

Intelligent Peripheral Devices (Cupertino, California) manufactures one example of such a device—AlphaSmart, a full-sized keyboard that students can use as a self-contained word processor. AlphaSmart, which sells for about $350, contains a 4-line, 40-character LCD display and runs on batteries.

AlphaSmart keyboards are inexpensive enough to supply to each student. Students can then use them for note taking and writing. When they need to print, manipulate, or store their work, they can connect their AlphaSmart to a Macintosh (through its built-in ADB connector) and import their text into any application that accepts keyboard input. In the years ahead, we may see more such products.

Answering that question takes us back a decade, to 1985. The answer will also provide some indication of the reason for Apple's good reputation in the education market.

A Laboratory for Learning About Learning

Apple has always been driven by the vision of making technology that is capable of (as an Apple slogan put it) "changing the world, one person at a time." Soon after Apple II computers became available—well over 15 years ago—forward-thinking teachers began using them in elementary and high schools, with considerable success.

As a tool that allows the manipulation and interactive presentation of information, personal computers have always held the promise of revolutionizing education. (For decades, "computerizing" has always been a magic-bullet answer for just about any problem, and education was not immune to its allure.) But academic research—even in-classroom experiments—could not offer any strong evidence for the use of computers in the classroom.

Apple had a vision—that personal computers *could* transform education. And in 1985, it decided to find out how. It started ACOT, the Apple Classrooms of Tomorrow.

ACOT's premise was simple: If computers and information access were as commonplace as pencil and paper, how would students and teachers use them? Computers were not portable at that time, so Apple had to simulate "anytime, anywhere" computer availability by supplying both teachers and students with either two Apple II or two Macintosh computers—one at school and one at home.

ACOT started in two classrooms in 1985. By 1986, it grew to seven classrooms in seven different schools that represented a broad cross-section of the U.S. K–12 population. Then ACOT watched and waited.

What Apple Learned From ACOT

The ACOT story is fascinating, but it's too long to tell here. Given here are the briefest of summary statements from David Dwyer, ACOT's distinguished scientist. (His quotes come from an excellent article, "Apple Classrooms of Tomorrow: What We've Learned," in the April 1994 issue of *Educational Leadership.*)

According to Dwyer, "Two years into the project, about 20 teachers and several hundred students had spent more time teaching and learning with technology than probably anyone on the face of the planet." ACOT verified certain suppositions about the usefulness and appropriateness of technology in the classroom:

• Technology did not isolate students.

• Children continued to find technology useful—it wasn't just a passing education fad.

• The children who used computers learned faster and scored better on tests.

But ACOT observers began to notice more subjective changes in the participating students. "Student deportment and attendance improved across all sites, and student attitude toward self and learning showed progress." Also, ACOT students "wrote more, more effectively, and with greater fluidity."

More important, ACOT observers began to notice a fundamental shift in the nature of education. According to Dwyer, "Teachers reported and were observed to interact differently with students—more as guides or mentors and less like lecturers. At times, students led classes, became peer tutors, and spontaneously organized collaborative work groups." Also, teachers began to work with each other more, planning projects that worked across disciplines and forced a restructuring of "normal" class schedules.

"A four-year longitudinal study of these students," Dwyer reported, "showed their greatest difference to be the manner in which they organized for and accomplished their work. Routinely they employed inquiry, collaborative, technological, and problem-solving skills uncommon to graduates of traditional high school programs. These skills are remarkably similar to the competencies recommended by the U. S. Department of Labor. Beyond basic language and computational literacy, they call for high school graduates to master the abilities to organize resources; work with others; locate, evaluate, and use information; understand complex work systems; and work with a variety of technologies."

As teachers and students continued to explore this new paradigm of learning, a troubling but fundamental fact became evident: This new paradigm did not mesh well with the existing U.S. education system. ACOT teachers had trouble fitting the work they wanted to do with the established procedures and priorities of the schools they worked in. They also had trouble explaining to their superiors why these new methods were, in fact, successful, and they found that traditional assessment methods didn't accurately measure student performance.

Bottom line: It became obvious that this new paradigm of learning was both useful and successful, but that teachers needed special professional development courses to learn these new teaching styles, and government and educators needed to be educated about the needs and benefits of these.

To summarize, ACOT supplied hard, empirical evidence that computers can be extremely effective in the classroom, that they accelerate the learning of skills known to be useful in the "real world," and that the current education system must fundamentally change itself to take advantage of the improvements that computers make possible.

(Before I move on, I should add that ACOT is thriving. In the past few years, it has enlarged its purpose to include professional development for teachers and the publication of papers and reports about ACOT's research and its findings. Today, three ACOT Teacher Development Centers, funded by Apple and the National Science Foundation, have trained over 800 teachers in the last 2 1/2 years. Eight more sites in the U.S. modeled after them are also exploring this new teaching paradigm and are providing professional development to teachers. Apple also has plans to take ACOT Teacher Development Centers to sites in both Europe and the Pacific region, including Canada, Australia/New Zealand, Latin America, and the Far East.)

Apple's Strategic Goals for Learning

Though the preceding sections on ACOT and the transitional state of education may seem tangential to explaining Apple's activities in the usage area of learning, I believe they are essential to doing so. The results of ACOT's explorations (which are confirmed by other sources) point to the need for a fundamental change in the way people think about education. That means that Apple must not only promote its own products and technologies, but it must also advocate a change in underlying values—because people must "buy into" those values before they can appreciate the advantages that Apple products and technologies offer.

Apple is doing literally hundreds of things to promote its vision for

learning, and I can only give a partial account of these activities here. However, Apple's efforts fall into six strategic directions:

• to advocate for and facilitate the use of technology in the evolution of learning

• to continue developing powerful new technologies that facilitate learning

• to educate teachers and parents about how to procure and use computers in the schools

• to strengthen Apple's position and visibility in the education market

• to aggressively pursue the home learning market

• to leverage Apple's position in education to become the leader in business learning

A Big Mistake

Missing next month's Strategy Mosaic would be a big mistake, because there's still a lot to say about the education market. Next month's Strategy Mosaic will look at the following areas:

• each of the six bullet points above, in detail

• what makes good educational software

• specific advice to follow if you're interested in pursuing learning-related markets

Until then, you might be interested in surfing the net to find more information on Apple's learning-related efforts. Use any Web browser program to go to location http://www.info.apple.com (which can provide you with all sorts of information). To get to the Apple Virtual Campus page, click on the following sequence of topics: Apple Web Pages, Apple Virtual Campus. To get to the Apple Higher Ed Gopher Server at the University of Minnesota, click on the following sequence: Apple Web Pages, info.hed.apple.com. ♣

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software to you. Previously, the company based its seeding on traditional engineering milestones—alpha, beta, and final (or golden master) releases. Apple's methods of seeding will now be based on addressing your needs for timely seeding of software.

Initially scheduled for a late spring release, OpenDoc has turned out to be a more complex engineering challenge than originally anticipated. For example, converting the Apple Shared Library Manager (ASLM) to the System Object Model (SOM) was more difficult than OpenDoc engineers initially expected. To keep the project on schedule, Apple has committed additional engineers and other resources to OpenDoc.

Oracle and OpenDoc

Oracle said its forthcoming visual development environment, Power Objects, will support OpenDoc for the Mac OS, Windows, and OS/2; its Cooperative Development Environment (CDE) tool set will also support OpenDoc for the Mac OS and Windows.

According to an article in the February 13, 1995, issue of *PC Week,* Oracle had been a strong member of the OLE camp, but decided to support OpenDoc because it thinks OpenDoc offers a more extensive feature set that will be attractive to customers.

The *PC Week* article quoted Dennis Moore, Oracle senior director of product marketing, as saying that "while OLE may have the dominant market share, our customers will demand the increased functionality that OpenDoc provides."

Oracle expects to ship versions of Power Objects and CDE with OpenDoc support by the fourth quarter of 1995.

Pioneer Licenses Mac OS

Pioneer Electronics Corporation recently announced that it has reached an agreement with Apple Computer, Inc., to license the Mac OS for use in Pioneer's new line of personal computers. Pioneer exhibited prototypes of the Mac-compatible computers at Macworld Expo Japan, which was held from February 25 to 28 in Chiba, Japan. Pioneer plans to sell both 680x0 and PowerPC processor–based Mac-compatible computers.

Pioneer's announcement follows similar announcements by Power Computing Corporation and Radius, Inc., in early January. (For details, see the news item on page 10 of the March 1995 issue of *Apple Directions.*)

All three announcements are the early fruit of Apple's strategy to license the Mac OS so that other companies can develop and sell Mac-compatible computers. (See also the front-page story on Apple's licensing strategy in the December 1994 issue of *Apple Directions.*)

Pioneer's plans to build Mac-compatible computers come at a good time for Apple Japan, which became the number two vendor of personal computers in 1994, second only to NEC Corporation.

Pioneer will introduce its AV (audio-visual) personal computers into the market with the aim of integrating its AV products into these new personal computers.

Pioneer believes that the integration of AV peripheral products and computers is essential to support the market's growing demand for multimedia. After considerable study, Pioneer chose the Mac OS because of its operating ease, reliability, and brand image.

Pioneer intends to sell systems under its own brand name and plans to release products this summer. Details concerning price and availability will be announced later by Pioneer.

The profile of the planned products is as follows:

• *Personal Computer MPC-GX1:* Desktop AV personal computer equipped with high-quality 3D speaker and 4.4x speed CD-ROM drive; 66-MHz PowerPC 601 chip

• *Personal Computer MPC-LX100:* Desktop AV personal computer equipped with high-quality 3D speaker and 4.4x speed CD-ROM drive; 33-MHz Motorola 68LC040 chip

• *MPC-MD15 and MPC-MD17:* Two multiscan monitors, 15- and 17-inch, with power management and on-screen control menus

• *CLD-PC 10:* Computer-controlled CLD (compact-disc/laserdisc) player

According to an article in the February 21, 1995 *San Francisco Chronicle,* Apple is growing in popularity in a market where personal computers are just beginning to catch on.

IDC Japan Ltd., a subsidiary of the market research firm International Data Corporation, is quoted as saying that personal computer shipments in Japan jumped 35.5 percent from 1993 to 1994, to nearly 3.4 million units. Personal computers are currently an $8.7 billion market in Japan.

Apple Japan reports that its sales of Macintosh computers grew 86 percent in that time period, selling over half a million units in 1994 alone. NEC saw its market share drop to 43 percent, says the *Chronicle,* while Apple Japan is in second place with over 15 percent. IBM Japan Ltd. is third ,with approximately 10 percent of the market.

The article quotes Reinier Dobbelmann, an analyst at S. G. Warburg Japan, giving Apple two advantages in the Japanese market: brand-name recognition and visibility in business. "Japanese look at Apple like Coke. Brand name is important to the Japanese; they feel they can trust the company because they know it's a market leader." Dobbelmann also said, "If you visit Japanese companies, you will see [proportionally] more Mac computers than you would in U.S. offices."

Apple Excludes Developers From Suit Against Intel and Microsoft

On February 9, 1995, Apple Computer, Inc., sued Intel and Microsoft to stop them from using several thousand lines of code from QuickTime for Windows. Apple claims that the code is being illegally used in the Intel-Microsoft program called DCI (Display Control Interface) and Microsoft's Video for Windows Developer Kit (Version 1.1D). Apple filed a complaint in the U.S. District Court in San Jose asking the court to stop further distribution of those products.

At the same time, Apple announced several steps designed to ensure that the suit doesn't affect your development efforts

(unless, of course, you happen to be one of the defendants). Most significantly, Apple will no longer charge you a licensing fee for using QuickTime technology (see the related story on page 10). Furthermore, Apple is offering amnesty to those of you who have licensed the code in question from Intel and Microsoft, provided you sign an agreement with Apple.

To answer all your questions about the lawsuit, we're providing the following letters from two Apple executives. First, AppleSoft Senior Vice President David Nagel explains the amnesty program in a letter to Video for Windows Developers. Second, Mac Platform Marketing Director Michael Mace's open letter to the computing community describes the details of the suit.

• • •

David Nagel: Letter to Video for Windows Developers

Microsoft's Video for Windows v. 1.1D contains technology pirated from Apple, and we have asked for an injunction for Intel and Microsoft to stop distribution of this version of Video for Windows. We want to stop proliferation of this illegal code immediately and avoid a situation where the potential liability and inconvenience for developers increases.

We are sympathetic to the position you are in, and want to ensure there is as little disruption as possible to your business, while at the same time we protect our technology. We are therefore offering an Amnesty Program for non-defendant developers who are either currently shipping a software product or add-on video card using Video for Windows v. 1.1D, or who have products under development which will ship within 90 days (by May 9, 1995).

The amnesty program consists of a one-time special agreement, and works as follows:

Developers who are currently shipping software or add-on video cards using Microsoft's Video for Windows v. 1.1D can continue to ship these products for the life of the product, as long as they complete this agreement for each product. This agreement must be filled out and signed by you and received by Apple by April 9, 1995. This agreement applies to software and add-on cards sold shrink-wrapped through the retail channel. Boards that are installed in or bundled with computers are not covered in this agreement. There are additional exclusions that are described in the agreement.

Developers who have a qualifying product under development that uses Microsoft's Video for Windows v. 1.1D, and have completed an agreement for such product are also covered under our amnesty program, as long as the product will ship by May 9, 1995.

Apple's amnesty program will not apply to new products or new versions of products that are released after May 9, 1995.

To be covered under our amnesty program, we are asking you to complete a one-time special agreement. This agreement can be obtained by calling Apple Software Licensing at 512-919-2645, or by sending an e-mail to sw.license@applelink.apple.com or an AppleLink message to SW.LICENSE.

Once the signed and completed agreement is received by Apple Computer, developers will receive guidelines for using our logo, indicating that their product uses Apple multimedia technology.

For questions, or further information, please contact Apple Computer's Software Licensing department at 512-919-2645, or send an e-mail to sw.license@ applelink.apple.com or an AppleLink message to SW.LICENSE.

Thank you for your assistance in this process, and we apologize

for any inconvenience this may cause.

Sincerely,
David Nagel
Vice President
AppleSoft

• • •

Michael Mace: An Open Letter to the Computing Community
(Posted to the Internet on February 9, 1995)

Today Apple added Intel and Microsoft to a lawsuit against the San Francisco Canyon Company, concerning code from Apple's QuickTime software that was pirated and used in Microsoft's Video for Windows 1.1D. We know many of you won't be happy about this (and, frankly, neither are we). For what it's worth, we apologize for any anxiety and disruption this will create. We'll do our best to reduce the inconvenience, but we felt we had no choice. Below I'll explain why we reluctantly took this step, and what we're doing to minimize its impact on computer users and developers.

What Apple Did Today
In our suit, we've asked the courts to immediately stop distribution of Apple's code in Video for Windows and other products. This doesn't require Microsoft to kill Video for Windows itself, just to pull the offending code (more on what that means below). To protect retail hardware and software developers who use Video for Windows, we're offering an amnesty program that will let them continue using the pirated VFW code at no cost, for the life of their current products, and for new ones released by May 9. We've also eliminated all licensing fees for QuickTime on both the Mac and Windows platforms.

Why Apple Did This
Although some people seem to think otherwise, we don't like filing lawsuits. They are disruptive

and expensive, and are very unpopular with customers and industry analysts. We tried very hard to avoid filing the suit, but the bottom line is that at some point you have to protect your rights.

We didn't do an aggressive job of explaining our side of the story when we filed the original Quick-Time lawsuit against Canyon several months ago. Frankly, we were still trying to figure out exactly what had happened, and the original suit was part of that process. Now that we know more, here's Apple's side of the story:

Contrary to what some have said, this is not any sort of vendetta between engineers, or a contract dispute gone bad. From our perspective, it's just plain software piracy. Canyon was under contract with Apple to help create a new version of Apple's QuickTime for Windows video playback software. Apple worked closely with Canyon to help them accelerate the speed at which images are played back, disclosing proprietary acceleration techniques Apple had developed in-house. Speed is very important because previous video products for Windows often looked more like slide shows than moving video. Canyon's contract with Apple contained prohibitions against disclosing Apple's code, and a specific clause in which they agreed not to work on any competing products.

A senior Intel official met Canyon officials at the roll-out of Apple's new QuickTime for Windows. Intel subsequently contracted with Canyon to develop software that would give Video for Windows the same performance as QuickTime for Windows. The contract specified that Canyon would use the same acceleration techniques as used in QuickTime for Windows, and would deliver the program in less than seven weeks. Several thousand lines of code from Quick-

Time for Windows were included in the software Canyon delivered to Intel.

The pirated code was incorporated into a software product called Display Code Interface. DCI was codeveloped by Microsoft and Intel, and is bundled with Video for Windows 1.1D. Because of the circumstances of the code transfer from Canyon, we think Intel and Microsoft knew, or should have known, that they were getting pirated code. But we tried to use a cooperative, non-disruptive approach by filing our initial suit only against Canyon, and talking to Intel and Microsoft privately to get them to stop distributing our code.

They refused. Repeatedly.

So we were left with two options: let the two most powerful companies in the industry get away with software piracy, or go to court. We chose to defend our rights, and to attempt to bring this matter to a close as quickly as possible. It's very disappointing that we ended up in this situation, especially since Intel and Microsoft have in other situations taken a strong stand against software piracy.

What Happens Next

If Apple prevails in court, Intel, Microsoft, and Canyon will be ordered to stop distribution of the stolen code. We're also asking for damages and some other conditions. Note that this doesn't mean Microsoft has to kill VFW. The key pirated code is in DCI, which I can best describe as a software driver that lets VFW bypass the internals of Windows and write directly to the video card. This results in greatly improved performance (like the difference between a slide show and a movie), but is not essential to run VFW. In fact, DCI was not in some earlier versions of VFW.

We hope that our amnesty program will prevent major disruptions to software and

hardware developers, but there will undoubtedly be some. We're very sorry about that, but keep in mind that Intel and Microsoft helped to create this situation by continuing to distribute our code for months after we informed them that it was pirated, and asked them to stop.

Q&A

Here are a few questions that people are likely to ask.

Q: Isn't this just another effort by Apple to kill Windows in the courts?
A: No. Even if we win, we don't expect this suit to make a major change in the OS marketplace. At most, QuickTime might become more popular than VFW, but since QuickTime is cross-platform, that would not hurt the overall position of Windows. We filed the suit because we felt we were being ripped off, pure and simple.

I want to emphasize that this is very different from the Mac vs. Windows look-and-feel lawsuit that we filed in the 1980s. This is a limited case focusing on a subset of a particular product. And we can show, line by line, the Apple code that was pirated.

Q: Does this affect me if I'm a computer user who has VFW?
A: Not directly. We're not asking for a recall, for instance.

Q: Do Microsoft's applications get to participate in the amnesty program?
A: No. Microsoft had plenty of warning about this situation.

Q: The amnesty program applies only to programs released by May 9, 1995. What happens if I'm a developer creating a program that uses Video for Windows, but it will be released after that date?

A: You have several choices. First, you can switch to QuickTime for Windows. The APIs are similar, so we think 90 days is enough lead time to do this. (And we understand that a major software company is about to release tools that will make it easier to move files between the VFW and Quick-Time formats.) Second, you can ship with VFW without the offending code. It will still work, but with lower performance. The third option is that you can go to Intel and Microsoft and ask them when they will ship a version of DCI that doesn't contain pirated code. We're confident that Intel and Microsoft have the skills to do this. It will cost them some time and money, but frankly they have a lot of both.

Q: What does this mean for the overall relationship between Microsoft and Apple?
A: There's no change from our end. We cooperate with Microsoft on a number of activities that are important to computer users, and we hope to continue doing so.

Thanks for your time. We hope we can get this matter out of the way quickly, and again we apologize for any disruption this causes you.

Michael Mace
Director
Mac Platform Marketing
Apple Computer, Inc.

Apple Removes QuickTime Licensing Fee

To make your future multimedia development efforts easier, Apple Computer, Inc., will no longer charge you to distribute Quick-Time with your products.

Under the new plan, you will still have to sign Apple's licensing agreement to distribute Quick-Time with your products, but you'll no longer have to pay the $300 per year, per title licensing fee. End-users will continue to pay the nominal fees charged by online services to obtain the QuickTime extension.

You can request redistribution licenses for QuickTime 2.0 for Macintosh or QuickTime 2.0 for Windows by contacting Apple Software Licensing at 512-919-2645 or AppleLink address SW.LICENSE.

The QuickTime 2.0 Software Developer's Kit will remain available from APDA; you can contact APDA by calling 800-282-2732 in the United States, 800-637-0029 in Canada, or 716-871-6555 in other countries. Price varies depending on your location.

Mac OS Brand

Momentum Grows

Momentum for the Mac OS brand has been growing steadily since Apple Computer, Inc., introduced the new name and logo for the Macintosh operating system last September (see "Introducing Mac OS!" on page 1 of the October 1994 issue of *Apple Directions*). You may have already noticed the Mac OS logo showing up in both Apple and third-party retail packaging, advertising, and other marketing materials. Soon, new Macintosh users will see the Mac OS logo prominently displayed when they start up their systems. And this is just the beginning.

Apple will be turning up the heat on Mac OS brand awareness activities in 1995, establishing the Mac OS logo in the minds of customers as the symbol to look for on application software,

multimedia titles, and peripheral devices to indicate compatibility with Mac OS–based computers. This will be especially important later this year as third-party licensees such as Radius, Inc., Power Computing Corporation, and Pioneer Electronics Corporation begin shipping computers, based on the Mac OS that are not called Macintosh. (Only Apple's systems will carry the Macintosh brand name). Customers will need an easy way to determine that your products are compatible with these systems. The Mac OS logo is the way to do it.

If you haven't done so already, now is the time to begin planning how to incorporate the Mac OS logo into your products and marketing materials to best leverage these efforts. The rest of this article provides an overview of what

Apple is doing to promote the Mac OS brand and how third-party developers are using the logo. See the text box "How to Get the Mac OS Logo Artwork" for specific information on how to license the logo.

• *Mac OS in National Advertising.* Start looking for the Mac OS in Apple's national print advertising. A new campaign scheduled to begin appearing in dailies and weeklies starting in March will communicate the Mac OS benefits and raise awareness of the Mac OS logo. Ads will be tailored for both novice and sophisticated users. The ads are expected to run in general business publications such as *The Wall Street Journal, USA Today, Newsweek* and *Business Week;* computer trade publications such as *MacUser, PC World, Home PC,* and *Home Office Com-*

puting; and in small business publications such as *Inc., Success,* and *Entrepreneur.*

• *Small Business and Enterprise Market Programs.* In tandem with the broad national advertising campaign, Apple is targeting the small business and enterprise markets with Mac OS direct advertising and direct mail campaigns tailored for those markets. People who respond to the ads will receive a wealth of solutions-focused information showing how they can leverage Mac OS products—from both Apple and third-parties—to solve their unique business challenges.

For example, small business customers will receive a "Growing Your Business" brochure, and IS managers will receive a "Seminar-for-One" videotape addressing their specific needs. Following

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How to Get the Mac OS Logo Artwork— No Hassles, No Charge!

The Mac OS logo is an Apple trademark and must be licensed for use by third parties. Third parties worldwide (including independent software and hardware developers, multimedia title publishers, and resellers) may license the Mac OS logo for use on their packaging, in their advertising, and on their other marketing materials. The basic four-step process is as follows:

Step 1 Contact Apple Software Licensing and request a Mac OS Trademark License Agreement. Apple Software Licensing can be reached at:

Apple Computer Inc.
Software Licensing
2420 Ridgepoint Drive, M/S 198-SWL
Austin, Texas 78754
Phone: 512-919-2645
AppleLink: SW.LICENSE

Step 2 Complete the license agreement and accompanying certification letter and return it to Software Licensing. This letter certifies that your product runs with Macintosh System 7.5 and is 32-bit clean. *There is currently no licensing fee.*

Step 3 Apple Software Licensing will review your agreement and, upon its acceptance, send you the graphics standards for the Mac OS signature, the Mac OS editorial guidelines, Mac OS logo sheets, and a CD containing the electronic artwork for the logo.

Step 4 When your product is ready to ship and you've incorporated the logo in your packaging, you'll need to send Apple a copy of your product, including packaging and documentation.

distribution of these materials, customers will be invited to attend seminars at local Apple Market Centers for more in-depth presentations on how the Mac OS, combined with third-party solutions, can solve their business problems. These segment campaigns are scheduled to begin in the United States in March.

• *Mac OS Logo on Apple Retail Packaging.* Apple has already begun revising all of its retail packaging—from software to hardware and multimedia titles—to include the Mac OS logo where appropriate. These products include Macintosh System 7.5, WiggleWorks, Earth Explorer, and Apple Personal Diagnostics. In some instances, Apple applied a Mac OS sticker to the package as an interim step until the actual box art could be revised (something Apple encourages developers to consider as well). You can expect to see the Mac OS logo gain greater visibility on all Apple product packaging in 1995.

• *Mac OS Splash Screen.* In a future system update to System 7.5, users will see the Mac OS logo prominently displayed when they start up their systems. The logo will stay on screen during the "INIT parade." The splash screen will appear on Macintosh systems shipped by Apple as well as on Mac OS–based systems shipped by Mac OS licensees.

Over time, Apple will also begin updating Macintosh references (again, where appropriate) throughout the operating system. This way, a customer buying a Mac OS–based computer from Radius, for example, will not be confused by Macintosh references (for example, "Welcome to Macintosh") when, in fact, they are not using a system bearing the Macintosh brand name.

• *Mac OS Merchandising.* Apple is designing in-store merchandising materials to garner greater awareness of the Mac OS brand at the retail level. Look for

more information on this in future issues of *Apple Directions.*

• *Mac OS at Trade Shows.* If you were at Macworld Expo in San Francisco in January, you may have seen the Mac OS logo displayed on demo stations in the Apple Pavilion, as well as on third-party developers' demo stations. Expect to see greater visibility for the Mac OS brand at industry events around the world in 1995.

• *Mac OS Customer Briefings.* In an effort to educate the Apple field sales force about the Mac OS, so that they can then deliver the messages to customers around the world, Apple recently delivered comprehensive Mac OS strategy materials to all Apple field personnel. These materials included in-depth strategy presentations, solutions demos, and competitive materials. As a result, thousands of customers worldwide are being briefed on the Mac OS strategy.

• *Hundreds of Mac OS Logo Licensees.* More than 600 developers from around the world have already licensed the Mac OS logo, including WordPerfect, Lotus, Insignia Solutions, Berkeley Systems, Edmark, ACI, Dynaware, ON Technology, and Specular International. Many of these companies are already shipping products sporting the Mac OS logo on the front of their packages, and the rest anticipate doing so at the next revision opportunity.

Additional information on using the Mac OS logo, including guidelines for correctly referring to the Mac OS in written communications, can be found on AppleLink in the following locations:

• Developer Support: Developer Services: Marketing Information & Services: Mac OS Logo Information

• Apple Products: Apple Software: AppleSoft Mac OS Marketing: Mac OS Logo Information

After you review this information, if you still have general ques-

tions about using the Mac OS logo, please send an AppleLink message to MACOS.MKTG.

Macintosh Application Environment Version 2.0 Announced

Apple announced Version 2.0 of Macintosh Application Environment (MAE)—"the virtual Macintosh for open systems"—at the UniForum '95 trade show in Dallas.

A complete Macintosh environment in an X Window, MAE gives UNIX® workstation users the ability to run standard off-the-shelf Macintosh applications directly on their systems. New features include support for AppleTalk and MacTCP, substantial performance gains, and the incorporation of several handy Macintosh System 7.5 features. MAE supports two platforms—Sun Microsystems SPARCstations running SunSoft Solaris 2.3 or later, as well as Hewlett-Packard Series 700 workstations running HP-UX 9.0X.

MAE 2.0 will create significant opportunities for Apple, particularly in the corporate, government, and higher education markets. It is estimated that 70 percent of MAE 2.0 business will be volume deals signed with many of Apple's largest customers.

MAE 2.0 will provide Apple with the opportunity to penetrate departments in which we have little or no presence. This "Trojan horse" approach will give Apple the opportunity to sell Power-Book computers and other Apple products—as well as to strengthen the value of Macintosh platform—in those accounts.

The following are some of MAE 2.0's key new features:

• AppleTalk & MacTCP support. MAE 2.0's new, built-in AppleTalk capabilities make it easy to share printers, files, and e-mail with other MAE and Macintosh users on a network. Now, UNIX workstations can integrate more tightly with Macintosh-based administrative systems. Support for MacTCP allows access to the Internet and TCP/IP-based applications.

• Dramatically improved performance. With the inclusion of dynamic recompilation in Version 2.0, MAE now provides an average of 50 percent faster performance than Version 1.0.

• Seamless integration between the Macintosh and UNIX environments. With MAE, you can cut and paste text and graphics between UNIX and Macintosh applications, open UNIX files (including NFS-mounted volumes), access UNIX applications through the Macintosh graphical interface, and use systems services (such as PostScript printers on the UNIX network).

• System 7.1 Enhanced by System 7.5 features. While MAE provides the Macintosh System 7.1 environment in an X Window, Version 2.0 supplements this interface with the inclusion of several handy Macintosh System 7.5 features, including Stickies, WindowShade, and Find File.

• Other MAE 2.0 enhancements include dynamic resizing of the Macintosh X Window, support for Macintosh sound-based applications, improved remote file access under the Network File System (NFS), and inclusion of the QuickTime Player and the HyperCard Player. ♣

Technology

OpenDoc Classes Available

With OpenDoc being released soon, (see the related news story, "OpenDoc Slated for Fall," on page 1), now's the time to learn OpenDoc. Apple has two options for you: Developer University classes and a series of OpenDoc Coding Retreats.

The Developer University "Programming With OpenDoc" class prepares you to be a fluent OpenDoc programmer. During this course, you create OpenDoc "parts" while learning OpenDoc concepts and architecture, exploring the user interface, and using the underlying technologies. You also learn how to adapt existing rendering, event-handling, and file-I/O code to the OpenDoc model.

The four-day course is available for $1,600 and will be given at two sites on the following dates:

April 3–6	Cupertino, CA
May 15–18	Cupertino, CA
June 26–29	Portsmouth, NH

You can register for a class or receive a fax of a complete course outline by calling 408-974-4897, or by sending an AppleLink message to DEVUNIV (on the Internet, devuniv@applelink.apple.com). We've also posted information on the Internet as a World Wide

CD Highlights

System Software Edition, April 1995

This month's disc features System 7.5 in 31 different localizations, including Chinese (both Simplified and Traditional), Korean, and Ukrainian. System 7.1.2 is provided (when available) for those languages for which System 7.5 has not yet been localized. You'll notice that U.S. software is now shuffled in with the rest of the world, by language; look for the folders within the Worldwide System Software and System Extensions folders on this disc for English, U.S.; English, British; and English Int'l.

And, speaking of system software, last month's Question o' the Month remains posed: Does anybody out there need to access the Developer CD from a System 6 machine? Drop me a line at dev.cd@applelink.apple.com if you do, and tell me your story. . . .

In addition to all of that system software, here's what else is new and revised for April.

AlwaysPreview

This simple application demonstrates how to force the preview-enabled mode by installing a modal dialog filter procedure in the Quick-Time CustomGetFilePreview routine.

Debugging Modern Memory Manager

This package contains a debugging version of the Modern Memory Manager. When installed on Power Macintosh computers, it allows you greater control in detecting and eliminating Memory Manager bugs.

The debugging version of the Modern Memory Manager screens all handles passed to it, checking them for validity. It offers options for robust heap validation before and after every call and filling of disposed

blocks with garbage. It also provides a control panel that allows for dynamic enabling and disabling of the debugging features.

Developer Notes Update

This folder features a developer note for the Macintosh 630 DOS Compatible computer, a Macintosh computer with a built-in 486-type microprocessor. This developer note describes the DOS compatibility features of this computer and the way DOS software can communicate with Mac OS software.

Dylan Update

This folder contains MacMarlais 0.5d28, an update to the Dylan Related folder on the February 1995 Tool Chest CD. This is a port of the UN*X program Marlais (version 0.5.4) to the Macintosh. Marlais is a language not unlike Dylan. MacMarlais provides a multiple-window, text-editing environment for creating Marlais programs.

Inside Macintosh Errata Update

This technical note documents errors or omissions in the book *Inside Macintosh: Files.*

Inside Macintosh Update—Thread Manager

This document describes how you can use the Thread Manager to provide threads, or multiple points of execution, in an application. You can think of the Thread Manager as an enhancement to the Process Manager, which still governs how applications work together in the Macintosh multitasking environment. Before reading this document, you should already be familiar with the concepts

The Joys of Disambiguating, Part Two

By Peter Bickford

I've long felt that a good interface designer is 90 percent conservative hard-liner and 10 percent blue-sky dreamer. The idea is that most of our time ought to be spent taking the existing interface and making it work, instead of whipping up neat-o-keen interface widgets that users have to figure out before they get any work done. Nevertheless, there comes a time when even the most cautious designers meet a problem that can't be solved adequately using the tools the interface gives us. When this happens, we have two choices: get a new problem (sadly, not always an option), or get new tools.

Last month, I brought you the first part of an adventure I had a few years back in creating a new interface element to help users (especially data-entry personnel) quickly choose a single item from a list that might contain hundreds of choices. The classic example is choosing a part number for a purchase order. To solve this problem, I borrowed from earlier work by Jef Raskin to create the "disambiguating text field," a text-entry field that contained a spring-loaded list of the available choices. When the user would type characters in the text field, the scrolling list would automatically highlight the first item that matched what was being typed. As soon as the desired item was highlighted, the user could simply tab out of the field; the field would then fill in with the selected item, and the scrolling list would disappear:
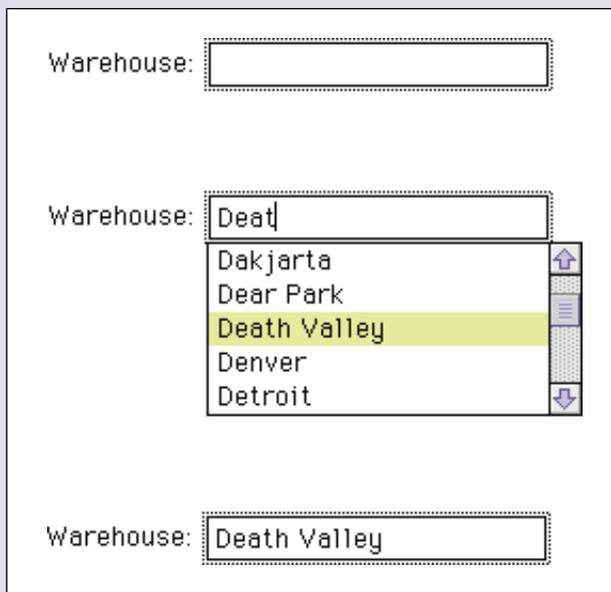
I managed to mock up a quick prototype and was amazed at how quickly I was able to select from lists of part numbers, city names, and secret Apple project code names. Little did I realize how far I was from actually being finished with the design. . . .

"What *Is* That Thing?"

It's probably a good time to point out that the original disambiguator didn't look anything like the previous screen shot. It was just a regular text box with a scrolling list that sprung out of nowhere and scared users silly. Although at first it was sort of amusing to watch my test subjects' eyes bug out, it became clear that I needed to give some sort of warning that the field they were tabbing into was not a regular text box.

Rule #1 of designing new interface elements: If your interface element is going to do something different, make it look different.

On a white board, I worked up a number of possible appearances for the interface element and asked users how they thought the element I had drawn might behave, and how they might work with it. As it turned out, the users had absorbed more of the "visual language" of the Macintosh than I ever would have expected.

In my first ideas, I played with various drop shadows and arrows, in an attempt to show that this field could present a list of choices:
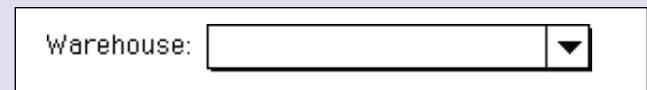
Unfortunately, users would see the drop shadow or arrow and guess that the interface element was some sort of pop-up field. This led them to want to click on the field (a good start), but they expected a menu to appear—not a scrolling list. Similarly, they expected to have to hold down the mouse button until the list appeared, instead of simply clicking to activate the field, as I intended.

I next played around with various other types of controls, including the "up/down" arrows:
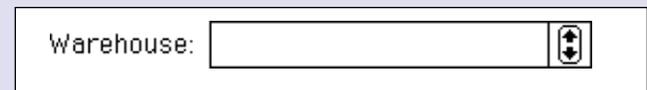
. . . and various "scrolling list" icons:
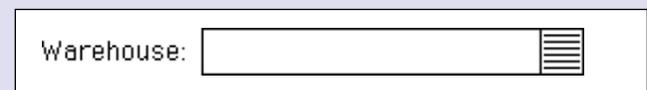
. . . which mostly just left users wondering, "What's that icon thing on the right?" Even if I had found the ideal "list" icon, however, I was starting to note other patterns in what people would attempt with the designs:

1. Any design containing a recognizable "icon" or other control was thought to be two items instead of one. The users would invariably decide that they were meant to type in the text field, then click the "icon" to pull up the list.

2. Any design in which the text field contained any sort of beveling or drop shadow made people decide that they must use the mouse to work with it—they didn't expect to be able to use the Tab key to move into it.

These patterns narrowed my choices considerably. Moreover, I was limited to designing in black and white, as this new interface element had to be usable on all types of systems. I then tried various heavy borders on a basic text box only to have it mistaken for a pop-up menu, and dotted borders that users took to mean the field was disabled. Eventually, my friend Keith Stattenfield nailed it when he suggested drawing a second, dotted ring around the text box:

Warehouse: [   ]
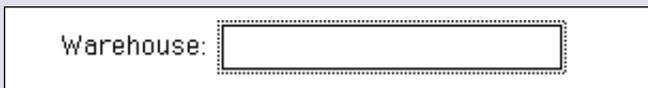
Although there might be other solutions, the new design worked because it fulfilled two important goals. First, it was different enough that users knew it was "special" somehow. This was essential in making users expect the element to do something different, and remember that difference the next time they saw a similar field. At the same time, users saw the distinctive inner rectangle and surmised that whatever this new element did, it probably had a lot in common with a regular text box. In other words, they expected to be able to enter it either by tabbing or clicking, to type characters into it, and so on.

Rule #2 of designing new interface elements: Try to use the existing design language so that users can guess how your element will behave.

User Testing, Round Two: How Should It Work?
Once the basic visual design was in place, it was time to try a working model out on real users. My plan was to have data-entry staff try using the disambiguating text field in filling out a thick stack of order forms I had prepared. As soon as the first prototype was ready, I popped out of my cube and began hunting for test subjects. Our department's administrative assistant, Suzanne, had the bad luck to be walking by just then. Within a minute or so she had been conned into "helping advance the state of the user interface" and was busily entering forms.

When she got down to the first disambiguating text field on the form, she tabbed into it and the scrolling list popped down. I hadn't warned her what would happen, and she paused for a moment, saying something like, "Hmm . . . this is new. . . ." Within a few seconds she had figured out that she could type into the field, and that the scrolling list would follow her selection. "Neat!" she remarked.

I felt vindicated.

Then she pressed the Return key to "accept" her selection.

Having always known that real users wouldn't think of using anything but the Tab key to move from field to field, I was utterly unprepared for this. Having crashed my prototype, the very real Suzanne cheerfully went on her way, and I began coding a new version. My brilliant prototype had survived for less than 30 seconds after being exposed to an actual user.

The second prototype lasted almost a minute before the user, another administrative assistant, pressed the Enter key to accept her selection.

So it went all day long. At least six rounds of coding, testing, and recoding went by as I discovered the importance of supporting the arrow keys to move up and down, double-clicking in the list to choose a selection, and so on. After a few more days, I had a design that was ready for the next stage.

Meet the Experts
Of all the ways there are of finding trouble spots in an interface, none is quite as successful as running it past a good interface designer. Luckily, at Apple we had no shortage of these, and in those days we would get together on Thursday mornings for "WHIM" (the Working Human Interface Meeting). These tended to be rather high-spirited affairs, the highlight of which was playing a sort of masochistic show-and-tell with our latest projects.

It's no secret that we interface designers can be a rather opinionated lot, and often have so much valuable insight on designs that it becomes impossible for us to keep it to ourselves. Any programmers who have worked with such designers can be forgiven if they feel a certain amount of wicked glee at the thought of me having to present my own work to a room packed with some of the most . . . insightful . . . people in the business.

Thus it was that one Thursday morning I brought in the disambiguating text field. I had never succeeded in finding a less obscure name for the new interface element, and, as it turned out, it had the very positive property of holding everyone silent for a few minutes as I explained what the name meant and showed what it did. Inevitably, however, the firestorm began. Every nuance of the visual and mechanical design was scrutinized and critiqued. Design assumptions and testing results were questioned. At the time, it felt like a cross between a Senate confirmation hearing and being worked over by the 49ers offensive line. When the dust had settled, however, the review process had managed to make several subtle but incredibly important changes to the design.

Among the changes was ensuring that the text in the text box always stayed in sync with the list selection. So, for instance, if the user clicked or used the arrows to move the list selection, the box text should immediately update and highlight to match:

Warehouse: [**Death Valley**]
Dakjarta
Dear Park
Death Valley
Denver
Detroit
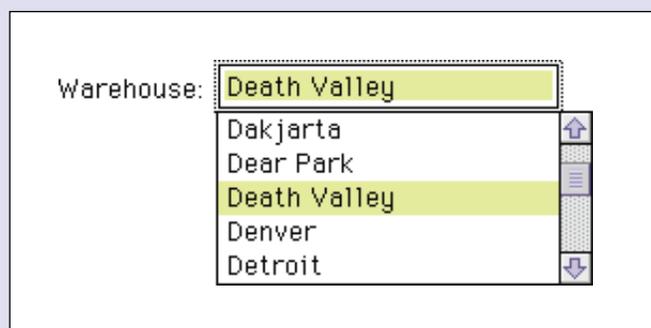
It's worth pointing out that this is probably the sort of change that no amount of user testing would have uncovered—but

once the change was made, the benefits became obvious to everyone.

User Testing, Round Three
The third round of user testing was the most extensive, but it yielded the least data.

One of the few surprises came in the way we handled errors. Previously, if the user was typing along and began typing a word that was not in the list (for example, D-E-A-S in the above list), the computer would beep once and the erroneous letter would not be accepted by the computer. Unfortunately, this led a sizable number of our users to conclude not that they were typing an erroneous name, but that their keyboard had suddenly broken itself. After all, whenever they pressed a key, nothing appeared and the computer just beeped. The solution, it turned out, was to show the character they typed for a split second, then take it away, leaving only the valid part of what they had been typing.

In the final round of testing we also conducted speed trials, comparing disambiguating text fields against other existing selection methods for long lists (selecting from a newly displayed dialog box with a scrolling list, using pop-up menus, and so on). Happily, the disambiguator won on speed by a wide margin.

Advice for the Inventive
No matter how cool the disambiguating text field (or any other novel interface element) may be, keep in mind that it's one more thing for your users to learn. If for no other reason, it's better to use the existing interface elements in the vast majority of cases.

If you need to go beyond the standard interface, make sure you do it right. Give your new element a unique appearance, but try to get some leverage from the existing visual language. Pay attention to all the details of the visual and mechanical design. Finally, keep prototyping and testing until you get it right. The burden of design will be on you, but maybe your new interface element will give you the one new tool you need to solve your users' problem. How well you do that is your ultimate measure of success.

Till next time,
Doc
AppleLink: THE.DOKTOR

Next Time: The Return of Your Letters!

Peter Bickford is a valued member of the ABS User Experience Group. He is happy to offer a copy of "The Joy of Disambiguating: The Technical Note" to anyone else whose mission in life is helping people fill out forms more efficiently.

Introducing Macintosh Programmer's Toolbox Assistant

Faster Access to *Inside Macintosh*

In response to your requests for a faster way to access the information in *Inside Macintosh,* last month's Reference Library CD included the Macintosh Programmer's Toolbox Assistant. This new electronic version of *Inside Macintosh* contains core material from the current printed version of the series. Using the Quick-View hypertext engine licensed from Altura Software, the Macintosh Programmer's Toolbox Assistant (MPTA) provides extensive hypertext linking, a wicked fast search engine, and features that can place routines and data structures directly into your source code.

What MPTA Provides
The previous Apple CD-ROM version of *Inside Macintosh* presents the contents of *Inside Macintosh* in DocViewer format, which provides text search capabilities, bookmarks, and other features. MPTA takes the best of these features and adds hypertext linking, more extensive browsing, and a compiled database of indexed terms, and uses the QuickView hypertext engine, licensed from Altura Software.

The Macintosh Programmer's Toolbox Assistant contains the same core information as the paper version of *Inside Macintosh,* including data structures, constants, types and variables, functions, routines, and resources. It also contains alphabetical cross-references for all routines, error codes, resources, managers, and other items. What MPTA does not include from the book version of *Inside Macintosh* is the overview material, such as the "Using" and "About" sections. It is also structured differently, organized by manager, not function. So if you are working exclusively with the Sound Manager, TextEdit, or International Resources, you can access listings of the routines and data types included in only those portions of the Macintosh API.

MPTA provides greatly expanded browsing capability by means of its extensive hypertext linking that brings you, with a mouse click, directly to the routine, constant, or data structure you want to access.

Best of all, MPTA has been compiled and optimized for rapid searching. For example, a search for the common term *Macintosh* yields over 5,000 entries—and QuickView finds them all and lists them in barely a second.

Using MPTA
MPTA provides numerous search options, including the ability to use complex Boolean search parameters and search by multiple terms. When items are located, MPTA highlights the item (see the figure on page 17, "MPTA highlighting," for an example of a completed search). In this instance, MPTA located occurrences of the ColorTable record in QuickDraw by searching for the

term "color" wherever it appeared together with the term "PixMap." These occurrences are highlighted in reverse video for quick identification.

When displaying information on data structures, resources or routines, MPTA includes all text and illustrations from *Inside Macintosh,* and adds such information as the names of any appropriate "include" files (useful for C programmers), the corresponding page number for the paper version of *Inside Macintosh,* and the name of the Toolbox manager to which the item belongs (as well as a hypertext link to that manager).

A very useful feature of MPTA is a Copy Template command, which allows a programmer to copy the content of a routine directly onto the Clipboard. Using simple tools and scripts, MPTA puts a new menu, titled MPTA, in the MPW menu bar. From the MPTA menu, you can choose Look Up to search in an MPTA database, or Template to select a routine and place it directly into your MPW source code. In the future, Apple hopes to provide this kind of integration capability for other development environments, such as CodeWarrior from Metrowerks.

MPTA provides "See Also" notes, which are pop-up items that contain pointers to relevant routines or data structures. You can also create your own personal notes by clicking on the icon of the paper with the turned-up corner (it looks like a note icon). MPTA stores your notes on your hard disk, either with the databases (if they are on the hard disk), or in a Preferences file (if you access the databases from a CD-ROM drive).

MPTA Databases
MPTA comprises nine databases; you may copy onto your hard disk either the single database version,

or any of the nine individual databases:

- Macintosh Toolbox
- Devices
- AOCE
- Operating System
- Mutimedia
- QuickDraw GX
- Text and Imaging
- Networking and Communications
- PowerPC

If you are running the single database version and want to narrow your search, you can choose to search in selected topic groups, as shown in the figure "MPTA databases" on page 18.

Maximizing MPTA for Your Needs
To maximize speed, you should copy the QuickView application and the database version you want to use onto your hard disk.

The single database version MPTA takes up approximately 32 MB. If your disk space is limited, or you only work on a certain area of the Macintosh operating system (perhaps just text and the Macintosh Toolbox), you can install only a few databases and the QuickView application, which (depending on which databases you install) might require less than half the disk space. If disk space is very limited, you can run just QuickView from your hard disk, and access the databases from a CD-ROM drive, but naturally that decreases performance considerably if you are running an older, single speed CD-ROM drive.

How to Get MPTA
Macintosh Programmer's Toolbox Assistant is published by Addison-Wesley Publishing Company and Apple Computer, Inc. It will be available by the time you receive

the April 1995 issue of *Apple Directions,* and it is included in the standard Apple developer mailings—Partners, Associates, and subscribers to the Developer CD Series will receive this as part of their subscriptions. It will also be available on E.T.O. (Essentials•Tools•Objects) #17 and future versions of MPW Pro, both of which you can order from APDA. In addition, you can also find MPTA in bookstores or order it from APDA for $99. (For APDA ordering information, see page 24.)

Your Feedback Matters
MPTA is designed as a reproducible, updatable product, but it requires your help to evolve. While a lot of time and effort and developer input went into this project, no one at Apple expects it to be perfect or exactly what you might need yet; so
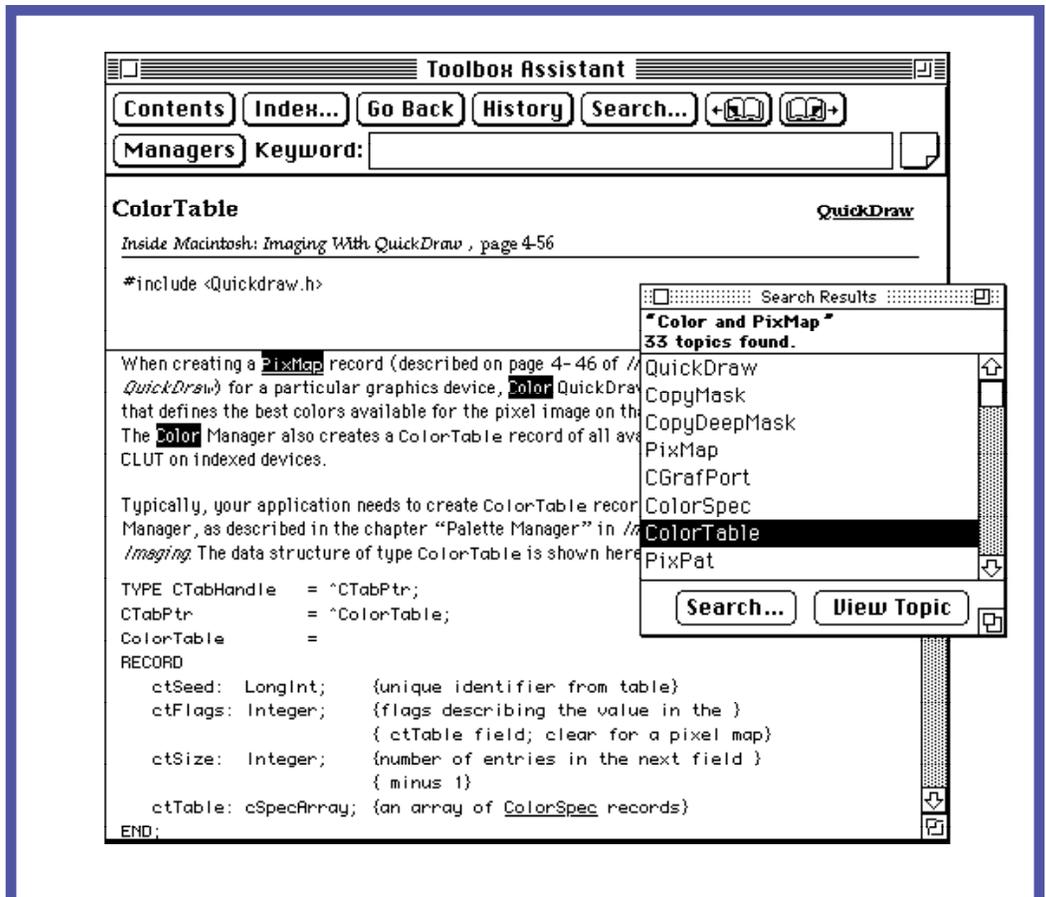
MPTA highlighting. MPTA highlights all occurrences of the text it finds.

we're relying on your feedback to make it better. Most important, we need to know that MPTA is worthwhile for you and that it does in fact make your work more productive. If we hear from you, we'll have a better chance of securing the resources to continue to provide you with this product.

You can send us electronic mail at AppleLink address DPFEEDBACK, or at Internet address dpfeedback@ applelink.apple.com; or you can write to Apple Developer Press, 1 Infinite Loop, M/S 303-4DP, Cupertino, CA 95104. ♣
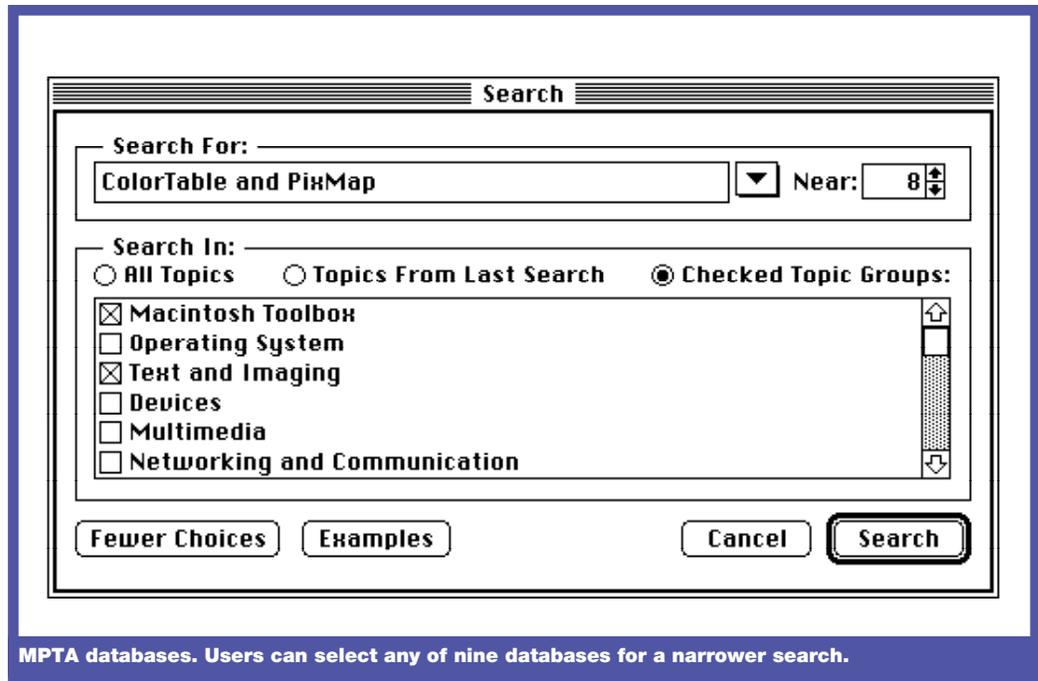
MPTA databases. Users can select any of nine databases for a narrower search.

OpenDoc Classes
continued from page 13

Web page. You can find it by going to location http://info.apple.com. Then follow this path: Apple Web Pages; Apple Computer, Inc.; Apple Developer Services; Developer University.

Apple is also hosting a large number of OpenDoc Coding Retreats, which offer you a chance to get hands-on experience creating OpenDoc parts, with one-to-one help from Open-Doc engineers. These retreats are open to developers who plan to market an OpenDoc part by early 1996. Apple will be hosting Open-Doc Coding Retreats worldwide on the following dates:

March 20–22	Nice, France
Apri 12–14	Boston, MA
May 22–24	Chicago, IL
June 12–14	Cupertino, CA
July 3–4	TBD, Europe
July 11–13	TBD, Puerto Rico
July 19–21	Cupertino, CA
Sept 18–20	TBD, Europe
Oct 23–25	Cupertino, CA
Nov 13–15	TBD, Europe

For more information, send e-mail to Patty Walters at AppleLink address P.WALTERS (or at Internet address p.walters@ applelink.apple.com). Additional retreats may be scheduled; Patty Walters will have the latest information on the overall retreat schedule.

Which should you attend? For best results, both! Plan on attending the Developer University class first. The DU class is very thorough and will give you the fundamental information you need to start leveraging OpenDoc in your software designs. The course provides prewritten sample code in its course material that is used to illustrate various features in the API.

In contrast, the OpenDoc Coding Retreat gives you hands-on experience writing to the Open-Doc API with your own code. Technical support is provided, but little time is spent in lecture: Instead, you spend the time developing your own part designs. The

Coding Retreats are fun, fast paced, and technically challenging. (They also tend to run around the clock for the full three days.) And junk food is usually in ample supply at these "code-a-thons."

Release 16 of MPW Pro and E.T.O.

In case you haven't checked out the latest releases (Release 16) of MPW Pro and E.T.O. (Essentials•Tools•Objects), we think you ought to. They contain a wealth of tools you can use to enhance your software development efforts.

Included in Release 16 of both MPW Pro and E.T.O. are the following:

• *The first beta release of MrC and MrCpp, new C and C++ compilers for developing "native" Power Macintosh applications.* These compilers operate up to four times as quickly as the

native version of PPCC, Apple's first C/C++ compiler for Power Macintosh, and produce high-quality code comparable to any produced by other current Power-PC compilers.

• *An alpha release of the PPCLink, the MPW-based linker for development of native Power Macintosh applications.* This version is a native tool and is considerably faster than the previous version; in addition, it can now generate executable applications directly, saving the lengthy conversion step that was previously necessary.

• *Version 1.1 (final) of PPCAsm, the PowerPC assembler.* This assembler now supports symbolic debugging.

• *A beta release of MPW p2c, an Object Pascal-to-C/C++ source-code translation system.* This handy tool facilitates the translation of procedural or object-oriented Pascal code into C and C++ code.

• *Version 3.1.2 (final) of MacApp.* MacApp is the leading Macintosh application framework for creating 680x0-based Macintosh

CD Highlights

in *Inside Macintosh: Processes* and *Inside Macintosh: Memory.*

Read this document if you are interested in developing an application with more than one thread (called a *threaded application* in this document). If your application uses no Thread Manager functions, the Process Manager treats it as a single-threaded application (called a *nonthreaded application* in this document).The Process Manager does call the Thread Manager at launch time to create the main thread for the application, but it does this transparently and in no way affects the performance of your application.

This document begins by describing the advantages of using threads in an application context. It describes the scheduling model that the Thread Manager provides, the context information that the Thread Manager saves when it switches one thread out and another one in, and thread stacks. It then shows how to
- create threads and thread pools and set them up to run
- turn scheduling on and off
- work with stacks
- create dialog boxes that yield control to other threads
- pass information between threads
- install custom scheduling and context-switching functions
- use threads to make asynchronous I/O calls

Mac Tech Notes Update 04/95
Technical notes are a collection of short (and not-so-short) articles dealing with specific development topics. New and updated notes for April 1995 include

- AO03—AOCE AppleTalk Address
- NW29—File Sharing 7.6.1
- PT38—PPC Compat. & Perf.
- PT39—The DR Emulator
- TB33—Color, Windows & 7.0

MIDIConverter
MIDIConverter is an application for converting general MIDI files (file type 'Midi') to QuickTime movie files. To convert, just select the MIDI files and drag them on top of this application icon. When the conversion is done, the movie files can be found in the original file folder.

ShrinkWrap 1.3
ShrinkWrap is a utility for creating and mounting DiskCopy images. It can also mount DART disk images and can utilize the StuffIt Engine for compression. See the file ShrinkWrap Read Me for more information.

Note: This is *not* an Apple product. It is provided on an "as is" basis. Apple Computer, Inc., is not responsible for any problems you may encounter in its use.

Thread Manager Extension 2.1
The Thread Manager is a System 7 extension that allows applications to make use of multithreading within their application context on all Macintosh platforms. Version 2.1 supports both 680x0 and PowerPC processor applications. Please read the file Software Licensing Info for information on contacting the Apple Software Licensing Group.

Coming Next Month
The return of the HyperCard Toolkits; the very latest fashions from the Rinaldi Collection; and, assuming the Dance of the Lawyers comes to a successful conclusion, a preview of the Document Reader of the Future.

Alex Dosher
Developer CD Leader

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applications and native Power Macintosh applications. Also included is an early, prerelease version of MacApp 3.5, which adds support for AppleScript, PowerTalk mailers, and Macintosh Drag and Drop.
- *Version 2.0.1 (final) of Ad Lib.* Ad Lib is a powerful user-interface editing tool for building views for the MacApp 3.x application framework. It replaces the ViewEdit application that was formerly provided with MacApp.
- *An alpha release of the Code Fragment Manager (CFM) run-time software for 680x0-based Macintosh systems.* CFM-68K supports the development of shared libraries and drop-in code modules for 680x0-based applications using programming techniques similar to those used today for development of native Power Macintosh applications. (For more on CFM-68K, see "The New Macintosh Run-Time Environment," on page 13 of the January 1995 issue of *Apple Directions.*) Prerelease versions of MPW compilers, linkers, and debuggers that support the CFM-68K run-time software are also included.
- *An alpha release of the System Object Model (SOM) run time software.* SOM is an object-oriented programming technology for building, packaging, and manipulating binary class libraries. SOM is an ideal choice for developing an object-oriented programming interface to a shared library since it enables binary compatibility between releases.

MPW Pro, priced at $495 (price for the United States only) is provided on a CD-ROM and comes with a development environment, compilers (C, C++, Assembler), debuggers, and testing tools for development of 680x0- and PowerPC processor–based Macintosh software. It also includes three introductory tutorial manuals and complete electronic documentation. Updates from previous versions of MPW Pro are U.S. $195. Upgrades from older MPW-based products (MPW Development System, MPW Development Environment, or Macintosh on RISC SDK) are U.S. $295.

Subscriptions to E.T.O. include three issues per year of the E.T.O. CD-ROM. The initial subscription price is U.S. $1,095; renewals are U.S. $400. E.T.O. includes all the MPW Pro software as well as Symantec C++ for Macintosh from Symantec Corporation, an electronic version of the *Inside Macintosh* programming reference, and a complete suite of 25 printed reference manuals.

Both MPW Pro and E.T.O. are available immediately through APDA, Apple's source for development tools and related programming products. For APDA ordering information, see page 24. ♣

Business & Marketing

Developers Confident About Macintosh

Confidence about the Macintosh platform is high among U.S. Macintosh developers. That's the overall conclusion of a new study recently commissioned by Apple Computer, Inc., of developer's views on the market and current and future prospects for Macintosh development.

The study was conducted by researchers at Griggs-Anderson, a Portland, Oregon–based research firm, who conducted lengthy phone interviews with high-level decision makers at a random sampling of U.S. Macintosh development firms. Commercial developers made up the majority of the sample (71 percent), followed by multimedia developers (19 percent) and in-house developers (8 percent). The remaining 2 percent came from higher education and training.

Fully 97 percent of those surveyed said they plan to continue their Macintosh development efforts for the next two to three years; 85 percent intend to develop new Macintosh products.

The reason developers are bullish about the platform is that, by and large, they think it's better business to develop for the Macintosh than for Windows. Nearly half those surveyed (45 percent) said that Macintosh products offer higher profit margins than do products developed for Windows, while 23 percent said Windows-based products offer higher margins. Also, 43 percent find that it's more expensive to develop for Windows than for the Mac OS (33 percent think it's more expensive to develop Mac OS products). And 79 percent said it's more expensive to provide

end-user support for Windows-based products, whereas only 4 percent have experienced higher end-user support costs for their Mac OS products. (See "The Business of Developing, Macintosh vs. Windows" on this page.)

The vast majority of those polled for the survey develop products for other platforms in addition to their Mac OS development efforts. Seventy percent said they were developing for Windows, 29 percent for DOS, and 20 percent for UNIX.

We'd like to know if you agree with these conclusions. Please send your comments by AppleLink to A.DIRECTIONS.

The graphs below show how developers interviewed for the study compared developing for the Mac OS with developing for Windows. ♣

The Business of Developing, Macintosh vs. Windows

Which platform do you think is more expensive to develop your products for?

Unsure 7%
Both the same 17%
Windows 43%
Macintosh 33%
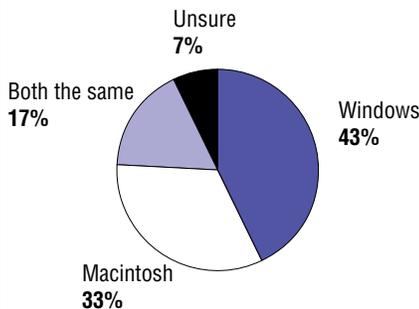
For which platform is it more expensive to provide end-user support?

Unsure 3%
Both the same 14%
Macintosh 4%
Windows 79%
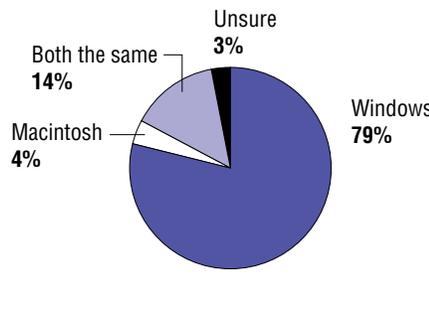
Which platform offers a higher profit margin opportunity for your applications?

Unsure 5%
Both the same 23%
Windows 26%
Macintosh 45%
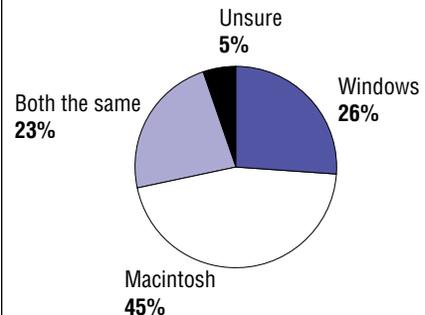
Source: Apple Computer, Inc., © 1995

These charts show how Macintosh developers rate business aspects of Macintosh and Windows development.

The Soul of the New Macintosh

Faith in the Macintosh Platform = A Good Business Proposition

By Kris Newby

It's hard to discuss computing platforms without the conversation taking on a religious tone. Witness IBM's television commercial in which nuns compare OS/2 Warp to Microsoft's upcoming operating system. Or the fact that Apple employees who promote Macintosh technologies are called *evangelists.*

Having a firm grasp of why *your* religion—the Macintosh platform— is "insanely great" is useful in helping you formulate—and sell—your long-range product plans. Perhaps we're preaching to the choir, but this article attempts to quantify why the 11-year-old Macintosh platform provides you with a robust foundation for product differentiation, cost-effective multi-platform development, and an easy entry to new markets.

The Macintosh Advantages

All of you in the Macintosh choir undoubtedly have your own reasons for believing in our platform. Here are the "top six" advantages that we think collectively make the Macintosh platform a great investment of your development dollars. (While these advantages may be obvious to you, please pass them on to others in the development community who aren't believers in the Macintosh religion yet!)

• *The best consumer platform.* Because of the Macintosh computer's superior ease-of-use, this platform is well positioned for wide acceptance in rapidly growing consumer markets.

• *An attractive branding proposition.* The next wave of computer buyers will base their purchase decisions more on brand name and reputation than technology. Apple's well-known logo and identity will provide developers with branding and comarketing opportunities.

• *A robust foundation for innovation.* Apple Computer, Inc., will continue to aggressively improve and expand the Macintosh platform, providing you with many technological innovations that will help you differentiate your products.

• *Lower testing and support costs.* Because of the tight integration between Macintosh hardware and software and this platform's ease of use, Macintosh developers benefit from the industry's lowest testing and support costs.

• *Easy entry to other platforms.* Apple is working hard to provide Macintosh developers with tools and application programming interfaces (APIs) that will make it easy to move programs over to other platforms, thus reducing per-title development costs.

• *A less competitive market.* Many developers have found that it's less expensive and easier to get visibility in the tighter, word-of-mouth-driven Macintosh market.

The "harmonic convergence" of two other important movements within Apple make the outlook of this platform better than ever. First, Apple is midway into the complete renewal of the Macintosh hardware and operating system. What started with System 7 and Power Macintosh will continue with a next-generation operating system that promises to keep Apple technology far in advance of the competition. You benefit from a turbo-charged foundation for your applications today without the hassles of backward incompatibilities.

Second, within Apple, there's a company-wide crusade underway to help third-party developers. Apple's number one priority this decade is to increase the Macintosh installed base, an effort that will directly improve your revenues. And there are numerous initiatives in progress that aim to make it easier for Macintosh products to get retail shelf space and to make Macintosh software development more efficient.

One Million Power Macs and Growing

It's not uncommon for industry analysts and journalists to take a quick look at the overall PC-versus-Macintosh installed base numbers and dismiss the Macintosh platform as a "niche player." But closer scrutiny reveals another story: The outlook for the Macintosh platform is very promising, and there's plenty of money to be made in this market.

First, Apple's successful transition to the RISC architecture is yielding impressive results. Apple has already shipped 1 million RISC-based Power Macintosh computers, just ten months after introduction. And according to Jim Gable, Power Macintosh product line manager, Apple is currently selling more RISC-based computers each month than are all other RISC-based computer manufacturers combined. More important, RISC technology has enabled Apple to build lines of computers with better performance than comparable Intel processor–based computers. In fact, a January 1995 study by Ingram Laboratories found that Apple's newest Power Macintosh systems outperformed Windows-based computers that had equivalent clock-speed Pentium processors by an average of 38 percent. This technological advantage should definitely help convert performance-sensitive Intel-based computer customers to the Macintosh platform.

Many of the leading Power Macintosh developers are reporting sales growth ranging from 25 to 100 percent, fueled by the increasing demand for their native Power Macintosh titles.

Novell, Inc., developer of WordPerfect, a word processor with more than 17 million copies sold worldwide, commented: "WordPerfect is experiencing more than a 25 percent increase in sales of its Macintosh products over the same quarter a year ago," said Dave Harding, WordPerfect product marketing manager. "Our customers have given us high marks for delivering native applications that take advantage of System 7.5 capabilities."

According to ACI US, a leading relational database developer for the Macintosh: "Since the introduction of the Power Mac native version of 4D and 4D Server, our sales have increased 27 percent," reports Susan Tussy, director of sales at ACI US. "The response from our customers has been tremendous. Hundreds of calls requesting product updates have flooded into the ACI sales department."

Bottom line, the Power Macintosh, along with Apple's licensing

plans, will increase the number of customers for your products. But no need to wait, because the Macintosh market provides developers with a strong business proposition today. Here are the facts: According to International Data Corporation (IDC), Apple sold 4,125,000 personal computers worldwide in 1994, a 12 percent increase over the previous year. This brings the Macintosh installed base number up to around 17 million, said Michael Spindler at the January 1995 Apple shareholder's meeting. What's more, Apple is number one in the consumer and education markets, with 18.7 and 50.9 percent of these markets, respectively, according to the 1994 Dataquest report, *A New Model for the PC Industry.*

Another way to look at installed base numbers is from the perspective of "multimedia-ready" systems. A healthy 20 percent (3.5 million) of all CD-ROM–equipped computers shipped in the third quarter of 1994, according to the Software Publishers Association. This percentage should continue to increase as Apple begins shipping all Performa computers with built-in CD-ROM drives later this year. Subtract out the number of DOS systems that are incapable of running today's graphics- and sound-intensive software, and the installed base gap narrows further. And from a development perspective, the Macintosh is a multimedia industry favorite: *New Media* magazine's February 1995 analysis of multimedia development platforms awarded the Power Macintosh top honors (tied with the SGI Indy), beating out Pentium-based and Sun systems.

The Most Personal Personal Computer

Looking at the computer industry as a whole, the Macintosh is the personal computer most likely to appeal to the fastest growing segment of computer purchasers—the mainstream consumer. This new breed of purchasers won't know or care about the difference between RAM and ROM, and they'll need computers that are as easy to use as toaster ovens. This crowd won't buy based on bus speed as much as brand name. They'll look for easy-to-use computers from manufacturers they can trust. And their computer-purchase decisions will be based heavily on ease of use, reliability, and protection from obsolescence.

Today the Macintosh is in the fortunate position of being the easiest computer to learn, use, and support—both in the minds of consumers and researchers. Apple's ease-of-use résumé includes studies such as these:

• The Mac OS is nearly twice as efficient to learn and use as the Windows operating system. (Arthur D. Little, Inc., 1994)

• The five-year cost of owning a Macintosh with System 7 is nearly $6,500 less than a comparable Windows-based computer. (Gartner Group of Stamford, Connecticut, May 1993)

• The PowerBook computer ranked highest in customer satisfaction among notebook computer business users. (J.D. Powers, 1994 Notebook Computer End-User Satisfaction Study)

Moreover, the Apple logo is one of the most recognized icons in the world. In an independent study of corporate logos conducted by the Schechter Group, a corporate ID consulting firm in New York City, the Apple logo scored first in recognition: fully 96 percent of the general public recognized the logo, based on a sample of 1800 people. (Even Captain Dan, Forrest Gump's friend, bought Apple stock based on logo appeal.)

Another thing that the Macintosh has working for it is a solid 11-year reputation of quality and ease of use. And thanks to Apple's early investment in the K–12 education market, Apple has a large following of loyal users nearing an age at which they'll be making their own computer buying decisions.

All of this boils down to a bright future for Macintosh computer and software sales. The next-generation Macintosh will be the most personal personal computer, with the easiest-to-use interface, the best media-rich environment, and the most tightly integrated communications and collaboration capabilities—important features for the emerging class of consumers.

The Technology Fast Track

One of the strongest reasons to maintain a strong alliance with Apple is that it keeps cranking out innovations that help you differentiate your products. Throughout its 19-year history, Apple has pioneered or popularized an amazing number of innovations. The list includes the graphical user interface (GUI), visual programming, built-in networking, plug-and-play peripherals, API-based software development, integrated multimedia, built-in color calibration, dynamic memory allocation, and the groundbreaking concept of long filenames, to name a few. Not only have these innovations made computers accessible to more users, but they've upped the technology ante in the personal computer industry.

The technologies that Apple has brought to market have launched entirely new markets and created many developer millionaires. For example, the introduction of the first LaserWriter printer, with the help of Aldus Corporation, helped get the desktop publishing market started. Market partnerships with Microsoft helped popularize the concept of spreadsheets. HyperCard enabled thousands of nonprogrammer content providers to author software. And most recently, QuickTime has helped catalyze the multimedia market.

QuickTime technology is a key component of Avid Technologies' product, Avid Videoshop, an easy-to-use video editing application. "The best thing about developing for the Macintosh is that we get QuickTime 2.0 functionality without any additional work," says David Yett, Videoshop's product manager. "It's nice to know that audio and video support are there at the OS level and that we don't have to code these parts ourselves."

Apple continues to extend the Macintosh software architecture and "share the wealth" with developers. Recent technologies that Apple has essentially given away include Macintosh Drag and Drop, QuickTime GX, Apple Guide, and, soon, QuickDraw 3D and OpenDoc.

For those of you with a pioneering spirit, this is a great time to be a developer. Computer, television, and telephone technologies are converging rapidly, and you have the opportunity to help define and refine how these systems will interact. And as a Macintosh developer, it's almost guaranteed that you'll get early experience using emerging technologies, as Apple adopts intelligent agents, 3-D graphics, video conferencing, interactive television access, and online service navigation facilities. You'll be able to use the Macintosh platform's built-in technologies to differentiate and innovate.

Lower Testing and Support Costs

Because of the tight integration between Macintosh hardware and software and the platform's ease of use, most Macintosh developers

benefit from the industry's lowest testing and support costs. Many developers find that supporting the Windows platform, with the added complexity of multiple hardware manufacturers and sound and video cards, is considerably more difficult.

Chris Calande from Bit Jugglers talks about how this affects developers: "Testing Windows products is a real burden to small developers. Because of the compatibility issues on this platform, we have to organize huge beta test groups and buy one of each of the major Windows media cards for internal testing."

David Yett, product manager for Avid Videoshop, adds, "One of the factors that we have to weigh when developing multimedia products for Windows is that our support costs will increase. But let's face it, the Windows market is huge and hungry for video editing products, and as a multimedia developer, you can't bet on one horse."

Another area where Macintosh developers realize a significant savings is in the area of product internationalization. Because of WorldScript, the system-level worldwide language support built into the Mac OS, you can rapidly enter international markets with very little incremental work. By writing to WorldScript APIs, you can quickly localize products for 1-byte and non-Roman 2-byte languages.

Brian Coleman, director of International Sales and Marketing at Abacus Concepts, talks about his experience with WorldScript. "Because we followed all the rules in making our Statview product WorldScript-savvy, we saved hundreds of lines of code when we localized our U.S. version into Japanese. Other than translating all our English screen text into Japanese, we only had to change five lines of code to create the final Japanese version."

Easy Entry to Other Platforms

There's no denying that developing on multiple platforms minimizes risks and reduces per-title development costs. Recognizing the importance of cross-platform development, Apple currently has multiple efforts underway to help you more easily "develop once and deliver to many." Today the Apple Media Tool and QuickTime 2.0 for Windows can help you deploy your multimedia content to the Windows market. And in the future, the OpenDoc component software architecture will enable you to quickly create OpenDoc "parts" for multiple platforms, including Windows.

Perhaps the most significant platform opportunity will result from Apple's licensing of the Mac OS to other personal computer vendors. Through a phased approach, Apple will first license System 7.5 and key elements of the PowerPC processor–based hardware architecture to select companies. The first licensee is expected to ship a Mac OS–compatible product this April. Over time, Mac OS technology will be licensed to a wide variety of hardware vendors. Apple is also working with IBM and Motorola to define a PowerPC processor–based hardware reference platform that will have a standard set of specifications and designs. By allowing hardware vendors to build Mac OS–compatible computers, your pool of potential customers will grow more quickly.

And looking ahead, recent alliances and technology investments aim to provide you with an easy path to two emerging platforms: the new Pippin multimedia CD-ROM platform and interactive television. The Pippin system is designed to offer consumers affordable high-performance CD-ROM–based systems or education and entertainment. This Power Macintosh–based technology will be broadly licensed to third-party manufacturers, and Macintosh developers will be able to move their content over to this platform with very little work.

Big-Fish Marketing

Though it's hard to quantify, many developers who sell both Macintosh and Windows products feel that in the Macintosh market you're a "big fish in a small pond" and it's less expensive and easier to get attention.

Chris Calande of Bit Jugglers agrees: "As a small developer, I think it's easier to sell Macintosh products than Windows products because of the strong Macintosh mail-order channel. With two phone calls you can reach two resellers that own 75 percent of the Macintosh mail-order business. In the DOS/Windows

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35 Damn Good Reasons to Develop for the Macintosh Platform

1. The best consumer platform
2. QuickTime VR
3. Don't have to write to an interface called Bob
4. E•T•O—Essential Tools and Objects
5. Developer coding retreats
6. User interface guidelines
7. An attractive branding proposition
8. Plug-and-play
9. Pinball at Apple's Worldwide Developer Conference
10. Only two types of CD-ROM drives to support
11. The Mac OS Software Development Kit
12. OpenDoc is an *open* compound document architecture
13. A robust foundation for innovation
14. Apple Guide
15. Better multimedia for both developers and customers
16. Stickies
17. Graphing Calculator
18. Technical Note #31
19. Lower testing and support costs
20. *develop* magazine
21. Code Fragment Manager
22. Power Macintosh computers
23. Easy entry to other platforms
24. WorldScript product localization
25. QuickDraw GX
26. ColorSync
27. 32-character filenames
28. Multiple screen support
29. Apple logo recognition
30. Big-fish-in-small-pond marketing
31. The upcoming Copland OS
32. Metrowerks' Code Warrior
33. HyperCard
34. Apple's commitment to open software architectures
35. Macintosh Drag and Drop

market the mail-order channel isn't as significant, so you need to get your products everywhere in the retail channel. The problem is that it's very expensive to do this, both in terms of manpower and capital."

Bud Smith of Apple's competitive analysis group talks about how the Macintosh and Windows markets differ: "In the Macintosh market, mail order sales and word-of-mouth marketing are much more important than in the DOS/Windows market. On the DOS/Windows side, retail sales are key. But there are so many more titles to compete with, that developers basically have to throw their title into the retail channel and wait to see if it sinks or swims. You can make these differences work for you. One approach that's worked for many

small developers, such as the creators of Myst, is to introduce a product on the Macintosh first, then let it build up an enthusiastic following while working on the technical challenges of a DOS/Windows version. This enables developers to use their Mac sales figures, reviews, and awards to get the attention of DOS/Windows distributors and users."

Apple is also trying to help third-party developers sell products into the retail channel by increasing its in-store merchandising efforts and building recognition for selected third-party titles. At the end of last year, Apple launched five retail promotions and four CD-ROM–based catalogs aimed at helping Macintosh software gain retail shelf space and sales momentum. (For details, see

"Apple Initiatives Boost Third-Party Software Sales," *Apple Directions,* January 1995.) Many of these initiatives are continuing on into 1995, and new ones, such as an Egghead software promotion, are being initiated.

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The Soul of the New Macintosh

Though the outside of the Macintosh computer has changed very little over the last eleven years, inside it's essentially a new machine. With the transition to a RISC architecture, innovations to the Mac OS, and efforts to make it easier to develop software, the Macintosh provides you with more opportunities than ever. And no matter what claims are made by competing platforms, Macintosh offers an easy-to-use,

robust foundation for innovation *today,* with a promising outlook for the future.

A religion is defined as "a belief pursued with zeal and devotion." The Macintosh "religion" is based on the belief that innovation and change, as difficult as they sometimes are, are healthy for the computer industry and our society as a whole. So if innovation is what keeps you coming to work every day, as a Macintosh developer you're in right place at the right time. Keep the faith. ♣

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