The Developer Business Report *May 1995*

AppleDirections

Inside This Issue

Note: Pete Bickford's Human Interface column will return next month.

Apple News

Apple Ships PowerPC 603-Based Macintosh for U.S. Education Market

New 68040-Based and DOS-Compatible Systems for Schools Also Ship

Building on its preeminence in the U.S. education market, Apple Computer, Inc., has shipped the Power Macintosh 5200/75 LC computer, a unique all-in-one system intended for U.S. K–12 customers. The 75-MHz system is the first computer to use the PowerPC 603 microprocessor, which is designed to provide lower-cost RISC computing.

Apple also shipped two new additions to the Macintosh line for education customers: the all-in-one Macintosh LC 580 computer, which is based on a 66/33-MHz 68LC040 processor, and the Macintosh LC 630 DOS Compatible computer, which uses a 66/33-MHz 68LC040 processor as well as a 66-MHz 486 DX2 processor to run Windows and DOS applications.

Power Macintosh computers, well over 1 million of which have been sold since they

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Strategy Mosaic

Portrait of the Future: Learning

By Gregg Williams, Apple Directions *staff*

Part Two: Apple's Activities, Developer Opportunities

Since the earliest days of the Apple II computer, Apple Computer, Inc., has shown a deep commitment to the use of computers for learning, and Apple has identified learning as a major "usage area" that deserves special attention.

Last month, I talked about the difference between education and learning (education is what happens in classrooms, while learning is something you do all your life) and listed the four major learning markets that Apple is concentrating on: pre-K–12, higher education, home learning, and business learning.

I also talked about ACOT, the Apple Classrooms of Tomorrow. It turns out that understanding ACOT is essential to understanding Apple's support for learning today. From ACOT, educators learned something very important: that computers are effective in helping people learn, but they promote a different kind of learning, one that isn't familiar to most of today's educators and institutions. This new paradigm for learning is more interactive and experiential—that is, it involves the teacher as mentor and facilitator—and it's less passive and theoretical than the paradigm of teachers lecturing to classrooms of students.

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AppleDirections

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Editor's Note

The Reckoning

I've been meaning to tell you about a book I read a little while ago, and this month's Marketing Feature, "Marketing Multimedia: What Henry Ford Could Teach Us," starting on page 28, is finally giving me the excuse I needed. The book is David Halberstam's *The Reckoning;* it, too, talks about Henry Ford and how he built Ford Motor Company. Even though the book comprises an anecdotal history of the automobile industry, it's full of lessons we could apply to our business (or any business, for that matter). It's also a terrific read.

In *The Reckoning,* Halberstam argues that "product people"—those with a passion and vision for building cars—made Ford Motor and the rest of the U.S. auto industry, while "bean counters"—professional managers who believed less in cars and more in the bottom line—helped open the door to the crisis that befell Detroit when Japanese cars took over the market in the early 1970s.

Henry Ford is the ultimate product person in the book. He believed so strongly in the car as a car that he felt that new features, such as heaters and headlights, diminished the concept. He focused so powerfully on his passion for delivering cars his customers really wanted that he always reinvested profits back into his business. One of my favorite stories in the book is about the time Henry Ford had to be called into court and *forced* to take proceeds from the sale of stock he owned in his company.

Halberstam's villains are Robert McNamara and the "whiz kids," ivy league professional management types who came into Detroit in the 1950s, displacing the product people. The whiz kids turned Ford Motor into a place where the balance sheet replaced the new-car drawing board as the driving force. Under Ford and his successors, building great cars that people wanted drove the business; under McNamara and the whiz kids, getting the numbers right became more important than a sound product strategy.

(McNamara also pops up in what is perhaps Halberstam's most influential work, *The Best and the Brightest.* In it, the author takes a detailed look at how the United States got in over its head in Vietnam in the early 1960s. One of the architects of our Vietnam policy was then–Defense Secretary Robert McNamara, who stressed the numbers end of war—the daily body count—over an overall military/political strategy with dire consequences. But that's another very long story.)

Along the way, *The Reckoning* tells us how, sometime after World War II, Detroit decided that the best way to make money was to take the same basic car, put a new pinstripe on it, and add another $200 to the sticker price of the "new, improved" model. It talks about Detroit's notion that Americans would never buy small cars and how the assembly line, once the crowning achievement of the American auto industry, became the industry's millstone as it became impossible to retool the assembly line fast enough to keep up with the innovation coming from Nissan, Toyota, and the rest of the Japanese car makers.

If you're like me, I think you'll find that the parallels between the car industry, as Halberstam characterizes it, and today's high-tech industry are fascinating and endless. *The Reckoning* will make you think about how you balance your company's product plans and strategy with its accounting goals and bottom-line requirements. It might save you from some of the mistakes made by the auto industry barons who brazenly thought that nothing could topple them.

Will today's high-tech market leaders be overthrown as Detroit was by Japan? Is there something that today's most successful software companies are missing that some small unknown can capitalize on? I don't know, but reading *The Reckoning* just might help you find the clues to answering those questions.

Paul Dreyfus
Editor

IndustryWatch: News & Perspective

A Positive Light

Prepared by the Apple Directions *staff*

This month IndustryWatch veers slightly from its normal direction. Usually, we gather news from the computer industry that we hope will direct you to new opportunities, help you avoid mistakes, and alert you to key developments in the industry. Often, these items point toward the advantages of using Apple technology. A variety of items we recently came across shed especially positive light on Apple technology, both software and hardware; this month's column is devoted to passing those items on to you.

OpenDoc "Ideal" for Windows Developers Says *MacWEEK*

We've been saying for months that OpenDoc provides all personal computer developers a more efficient, more open compound document architecture than Microsoft's OLE 2.0. Now, people outside Apple Computer, Inc., are beginning to agree. For example, here's what *MacWEEK* had to say in an editorial on March 6:

OpenDoc is a bigger threat to Microsoft than its friends at the Department of Justice. It's an angry Judge Stanley Sporkin writ in C++.

Microsoft fears OpenDoc because if it meets its promise (a big if) it potentially undermines the company's control of developers through its market-share intimidation. . . . If [Windows programmers] can use OpenDoc to build OLE-compliant code, they can explore the advantages of the Mac without giving up the Wintel market. Such a scenario would be ideal for all developers. . . .

Implications/Opinions: We've said it before, and we'll say it again (although we expect you'll start hearing this from others): OpenDoc is a truly open component software architecture, and it's being supported by a significant group of computing firms, including Apple, IBM, WordPerfect, Oracle, Novell, and Sun. You can't lose by using it to write your software components, because those parts will also work under the OLE architecture.

One of the major advantages of using OpenDoc is that an OpenDoc part written for the Windows platform will work with any existing Windows program that accepts OLE objects. (OpenDoc parts are much easier to implement than OLE objects, which is another reason to commit to OpenDoc.) Also, the structure of OpenDoc parts is the same for both Macintosh and Windows, so you can support both platforms with significantly less than double the effort.

For more details about the advantages of using OpenDoc, see "OpenDoc *Is* Cross-Platform" in the November 1994 issue of *Apple Directions.* (It can be found on the March 1995 Reference Library Edition CD or in the collection of previously published *Apple Directions* articles about OpenDoc on AppleLink [path—Developer Support:Developer Services:Periodicals:Apple Directions:OpenDoc articles].) And, you can begin looking forward to the imminent release of the OpenDoc Parts Framework, the set of tools that will simplify the creation of new parts—especially if you plan to support both the Macintosh- and Windows-compatible markets.

The View From Microsoft: Plug and Play

While we're quoting other people, here's what Microsoft's director of Windows hardware programs, Carl Stork, told *PC World* for its March 1995 article about Windows 95 and Plug and Play (or, PnP). Eric Knorr finishes the article by quoting Mr. Stork as saying "It won't be a Garden of Eden even with all PnP hardware, but it will be better."

Implications/Opinions: If even one of the Plug and Play movers and shakers isn't unequivocally confident about the new hardware standard, we can only imagine what it will really be like when it's available. The unclear expectations for just how effective Plug and Play will be at solving some of the PC-compatible world's hardware incompatibility problems lend a lot of credence to what *MacWEEK's* editors wrote in their March 13, 1995, editorial: "What is no longer in doubt is that Apple will continue to build the superior personal computer for years to come."

P6 Versus PowerPC 604: The RISC Advantage

At a recent technical conference, Intel made public a few more details of its future x86 processor, code-named *P6.* The P6 processor will include two chips, both the processor and a level-two cache, in a single package. The processor alone has a transistor count of 5.5 million transistors, while the complete two-chip package will contain over 20 million transistors. The die size for the P6 is 306 square millimeters. Intel expects the processor to initially run at 133 MHz, deliver a SPECint92 rating of approximately 200, and dissipate 20 watts. It's expected to begin shipping in the second half of this year. Systems, both desktop and server, are expected to be available in limited quantities by the end of the year. Although Intel declined to disclose pricing, it has introduced previous processor generations at about $1,000.

In contrast, the PowerPC 604 processor, with a die size of 196 square millimeters, uses only 3.6 million transistors, has a SPECint92 rating of about 220 at 132 MHz, dissipates about half the heat of the P6, and currently sells for about $500.

Implications/Opinions: Despite the P6's large transistor count, high thermal output and unique two-chip package, we expect the P6 to become a successful high-volume processor for Intel over the long term, just as the Pentium chip has proven a success. However, P6

Apple Directions Online—June

The June issue of *Apple Directions* will be available on AppleLink, the Internet, and eWorld by May 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.

clearly shows the burden of supporting the aging x86 architecture. The fact that P6 requires so many transistors, needs an exotic two-chip package, and is even hotter (temperature-wise) than the hottest Pentium processor shows that Intel can deliver high performance only at a significant cost.

This means that RISC processors—specifically the PowerPC family—will continue to have a price/performance advantage over x86 processors. This advantage will become even more pronounced with the PowerPC 604 processor. New Power Macintosh models shipping later this year will be based on the PowerPC 604, and are expected to be available in volume long before Intel delivers the first P6 chips.

Did You Know . . .

. . . that to take advantage of many of the key features of Windows 95, such as long filename support, preemptive multitasking, and protected memory, applications must be 32-bit clean? The vast majority of current Windows applications are 16-bit clean; though they'll run on Windows 95, they won't be able to take full advantage of it.

Also, a magazine called *Windows Sources,* whose staff got its hands on a beta copy of Windows 95, recommended that users plan on increasing their RAM to at least 16 MB to take advantage of the software.

Implications/Opinions: The transition to Windows 95 is not a straight-shot sure thing, and Microsoft knows it. The longer those 16-bit Windows applications remain on the market, the longer it will be before users can fully exploit the benefits of Windows 95, and the longer it will be before many users perceive a clear reason for upgrading to the new operating system. (Aren't we glad that there are currently more than 600 native Power Macintosh applications covering every major application category?) And even if Microsoft sends out millions of Windows 95 upgrades, how many existing Windows customers will have 16 MB of memory?

Correction From Last Month

Last month's item "The Hidden Costs of Surround Video" contained several inaccuracies. First, we reported that 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." Instead, we should have said that it runs on all Macintosh systems installed with QuickTime 2.0 and a 68030, 68040, or PowerPC chip as well as on *MPC 2–compliant PC compatibles* (change in italics). Second, Microsoft has announced that Surround Video will be available for IBM PC–compatible computers by June with a Macintosh version shipping two months later. Finally, we neglected to point out that one hidden expense of Surround Video—having to use images from costly panoramic cameras rather than standard 35-mm images used for QuickTime VR—is compounded by the difficulty of digitizing panoramic images. ♣

Strategy Mosaic

Learning

continued from page 1

Schools, universities, businesses, and individuals *are* adopting computer technology to help meet their learning needs. Macintosh computers offer a better solution than competing machines to all learners, including learners who use computers to supplement traditional learning techniques.

However, Apple has a stake in educating people about this new paradigm for learning and in advocating its adoption in classrooms, businesses, and homes. People who understand the value of and need for this new paradigm will be more strongly attracted to Macintosh computers and will benefit more from using them.

Apple's efforts to maintain its leadership in learning and to help promote the use of computers for learning fall into six different categories:

- advocating for and facilitating the use of technology in the evolution of learning
- educating teachers and parents about how to procure and use computers in both home and schools
- strengthening Apple's position and visibility in the education market
- aggressively pursuing the home learning market
- continuing to develop powerful new technologies that facilitate learning
- leveraging Apple's position in education to become the leader in business learning

This article highlights the most important of Apple's activities in each of these six categories, then gives some advice to developers who want to sell to the learning markets.

Advocating Technology in Learning

At the highest level, Apple is working with the government, education "think tanks," advisory boards, business councils, and others involved in education and related matters. Here are some of the things Apple is doing:

- *The National Learning Infrastructure Initiative (NLII).* The NLII, of which Apple is a founding member, is a group of 46 leading institutions and organizations—corporations, universities, and other advocates for education—working to see how information technology can be used to address higher education's most pressing issues. The NLII is run by Educom, a consortium of over 600 colleges and universities and 130 corporate sponsors.
- *Corporate sponsorships.* Apple is a member or supporter of a number of organizations connected to learning issues—among them, the American Library Association and the American Association of Higher Education.
- *New Media Centers.* In conjunction with a consortium of partners (including Adobe Systems, Clement Mok Designs, Oracle, Sony, and the Times Mirror), Apple has helped create New Media Centers on the campuses of 52 colleges and universities, including five outside the United States. Equipped with state-of-the-art hardware and software, these New Media Centers aim to promote awareness and use of multimedia within the colleges and their surrounding communities.
- *Apple Community College Alliance (ACCA).* The ACCA is a consortium of ten community college sites, each of which is developing specialized areas of expertise using Macintosh technology. The colleges involved will then serve as model resources and training centers for community college faculty and students nationwide.

• *Leadership in legislation.* Apple takes a leadership role in advancing government legislation that will benefit schools; Apple also works to foster discussions among government, business, and educators toward improving the quality and relevance of education. For example, in 1991, Apple initiated a petition lobbying the U.S. Government to allocate part of the radio spectrum for low-power, wireless data communication. Numerous business and educational institutions and associations endorsed the petition. On February 15, 1995, the FCC unanimously voted to allocate 10 megahertz (MHz) of the radio bandwidth for this purpose.

• *Learning Technologies Program.* The purpose of this joint project between Cornell University and Apple is to teach university staff to integrate Macintosh-based learning technologies into their curricula. The program is designed and administered by the Cornell Information Technologies faculty and uses lectures, demonstrations, and hands-on workshops.

• *Intellimation Library for the Macintosh.* Apple is working with Intellimation, a multimedia educational publisher, to provide a channel for faculty developers to market and publish their educational software. The library currently features over 400 educational software products developed by educators for educators, and Intellimation publishes over 100,000 catalogs for its software and distributes them to K–12 and higher-education faculty and lab coordinators.

• *Christopher Columbus Consortium Program.* This program, which currently has 36 K–12 and higher-education partners across the United States, teams K–12 schools with leading schools of higher education. The program's purpose is to work together on issues of curriculum development and teacher training and to give teachers a forum for sharing issues related to personal computers in the classroom.

Educating Teachers and Parents

Teachers (especially pre-K–12 teachers) are influential in two directions. What they personally use (and prefer) can influence what their school buys. Also, when parents are about to buy a computer for home use and their children's education is a factor in the buying decision, they often ask a teacher's advice.

Because of teachers' influence, Apple has a vested interest in making it as easy as possible for teachers to buy Apple products, either personally or on behalf of a school. Because Apple wants to capture the home learning market, it is also interested in educating parents on the learning-related benefits of owning a personal computer. Here are some of the ways in which Apple is pursuing these goals:

• *Helping schools get equipment.* Apple offers training and information to teachers on how to apply for government money that can be used to buy computers.

• *Teaching, Learning, and Technology (TLT).* This Apple product has been available to K–12 educators since 1992. TLT is a strategic planning tool that demonstrates the benefits of technology in K–12 schools and helps educators plan the educational road map for their school and determine how technology can help them achieve their goals. They can use this product to do planning for a single school or an entire district.

• *Educating parents.* Approximately half of those buying home computers are doing so for the first time, and many of them are confused by the large number of choices available. Apple is currently working on ways to educate parents about the use of computers for home learning and should have some rather interesting announcements to make later this year.

• *"A New School of Thought."* Apple recently offered this seminar series, meant to provide guidance on integrating technology into schools, to over 20,000 school principals and technology specialists.

• *"The Best of All Worlds."* This is a free, all-day seminar that Apple is currently offering to high school educators; it explains the advantages that Apple products offer to educators who are preparing their students for a variety of career paths. By the middle of 1995, it will have been presented to over 20,000 educators in 76 cities.

• *Network Assistance Planning Kit.* This Apple product is described as "a resource for planning, designing, and supporting classroom, school-wide, or district-wide computer networks." It contains print, video, and electronic materials designed to help schools plan, budget, and implement their own networking solutions. The kit also includes one hour of toll-free consulting time with an Apple-certified network planner.

• *The Learning Center on eWorld.* The Learning Center is a section of eWorld devoted to learning topics. It includes information on grants (for both schools and students) and teaching methodology, educational materials and research papers from Apple, learning activities for parents, and "talk rooms" in which teachers and parents can share their views.

Strengthening Apple's Position

In addition to advocating the use of Apple technology in learning, Apple must work to actually sell Apple products, increase Apple's visibility in the education marketplace, and ensure that the Macintosh platform is the best one for classroom use. Here are some of Apple's activities in support of these goals:

• *Gaining market share in education.* The availability of Mac-compatible computers (the first of which are due in a few months) will increase the market share of the Mac OS platform, provide you with a larger market for your products, and strengthen Apple as a company.

The benefits of licensing the Mac OS are many, but it's sufficient to mention two of them here. First, once Mac OS–based computers are available from more than one source, corporate and other buyers who require a second source will consider buying Mac OS–based computers. Second, in the past, Apple has lost sales to education (and other) markets by not being able to satisfy demand immediately. Though Apple wants to make every sale it can, it's comforting to know that when it cannot, other vendors will help ensure that the computer purchased is based on the Mac OS, not Windows.

• *Apple Education Grants Program.* To date, Apple has awarded over $25 million in grants to more than 500 schools and institutions in the United States. These grants go to groups that propose innovative uses of Apple products in learning situations; in many cases, the groups funded would otherwise have little or no access to computer technology. One area of the Apple Education Grants Program, called *Partners in Education,* grants money for projects that stress interactive and collaborative learning.

• *Apple Education Series.* Teachers are busy and often have neither the time nor the inclination to put together all the

software and hardware components of a complete education solution. Introduced in 1994, the Apple Education Series is a collection of products that give schools one-stop shopping for education solutions ranging from preschool through high school.

The Apple Education Series currently consists of 18 solutions that bundle Macintosh hardware, software, and materials that help teachers integrate computers into the classroom. In addition, computer setup and teacher training are available for selected solutions.

One of the most popular solutions, Apple Early Language Connections, is billed as "a comprehensive multisensory approach for language learning for grades K–2 that provides a balanced reading, writing, listening, and speaking curriculum."

A related product, Spanish Language Connections, provides similar support for K–2 classrooms that need Spanish instruction. (Apple recently won a Corporate Responsibility award from the National Association for Bilingual Education for the Spanish Language Connections product and its other work promoting bilingual education.)

Another solution, AppleSearch Bundle for the Internet: Workgroup Server 95, provides a hardware/software bundle that makes it easy for schools to set up their own local area networks and connect to the Internet.

• *Apple Education/Business Partnership Program.* Apple is promoting this program to businesses and civic organizations to encourage them to become more involved in local education. Through this program, organizations can purchase special hardware/software bundles, configured for various classroom uses, for donation to schools or colleges. These bundles include hardware and software from over a dozen companies, including AccuLab Products Group, Aldus Corporation, Brøderbund Software, Inc., and The Learning Company.

The Apple Education/Business Partnership Program also includes support materials that educate organizations about the benefits of partnering with local schools and present ways for them to extend their partnership past the donation of equipment.

• *Direct sales to educators.* The Apple Educator Advantage Program gives qualifying school employees a way to buy Macintosh and PowerBook computers, MessagePad devices, and Apple peripheral devices for personal use—easily and at an attractive price. (Is one toll-free phone call and next-day delivery of a configured system easy enough, do you think?) For purchasers of systems with CD-ROM drives, Apple adds a collection of eight CDs that help educators use the computer for job-related activities.

• *Mailings to educators.* Apple makes regular mailings to over 160,000 educators in the United States; the mailings include information on Apple products, services, events, and technologies. A part of this mailing is *The Apple Education Resource CD,* which includes articles, news from Apple, product reviews, ordering information, profiles of selected third-party educational products, and other support materials.

• *Collegiate Partnership Program.* To help ensure wide acceptance of Apple products throughout higher-education institutions, Apple established the Collegiate Partnership Program, which makes Apple products available to students, faculty, and staff through campus resellers in over 600 universities in the United States. Apple also has buying agreements with an additional 500 campuses and sells to another 1,400 institutions through a special higher-education catalog.

• *Advertising and public relations.* To promote public awareness of Apple's leadership in learning, Apple regularly prints education-oriented advertisements in both general-interest and education periodicals, including *Time, The Wall Street Journal, National Geographic, USA Today, Electronic Learning, T.H.E. Journal, Technology and Learning, Teacher, Vocational Education Journal, Education Week, Executive Educator, NEA Today, American School Board Journal,* and *Chronicle of Higher Education.* In addition, Apple's public relations department keeps the press, key analysts, and others informed about Apple's activities and future directions in learning.

• *Trade shows.* Apple maintains a high profile at the top K–12 and higher-education conferences in the United States. These include NECC (National Educational Computing Conference), NAEYC (National Association for the Education of Young Children), NSTA (National Science Teachers Association), IRA (International Reading Association), NABE (National Association for Bilingual Education), CAUSE, League of Innovation, SCAMC, and the National Association of College Stores.

• *Apple advisory councils.* To ensure that Apple stays in step with the needs of the learning markets, Apple has separate advisory councils for the home learning, K–12, and higher-education segments of the market. Council members include educators from schools, colleges, and research institutions across the country. They provide Apple with expertise and recommendations that factor into all aspects of Apple's learning strategy.

• *Internet presence.* To assist teachers (and anyone else) interested in Apple products and technologies, Apple has posted learning-related information within its corporate World Wide Web page, http://www.apple.com. (Click on the "Research & Technology" and "Special Communities" buttons to get to topics related to learning.) This includes materials on Apple products, programs to assist educators, and educational research.

Pursuing the Home Learning Market

Apple's overall strategy for the home learning market includes several things mentioned earlier—in particular, Apple's efforts to promote Macintosh computers to schools, teachers, and parents.

To provide further value to our customers, Apple's AppleSoft division has developed the Apple Home Learning (AHL) line of educational software, in cooperation with companies such as Scholastic, Inc., and Enteractive. AHL's curriculum-focused CD-ROM products build bridges between school and home. Products such as WiggleWorks and Earth Explorer incorporate the best of the classroom experience into software for at-home use, encourage children to learn actively, and involve parents in their children's learning.

For example, WiggleWorks encourages children to read and write through engaging electronic stories; reading, speaking, coloring, and writing activities; and collaborative parent-child activities. Earth Explorer, a multimedia encyclopedia of the environment developed with support from the National Science Foundation, combines a vast collection of articles, slide shows, and movies with powerful interactive games and simulations that help children develop a fuller understanding of our planet.

Both of these products are sold to schools, and home

versions of both will be available to parents for the Windows platform as well as the Macintosh platform. With teachers using these products in schools and recommending them for students' use at home, these products create a way for teachers and parents to work together to improve children's learning.

Developing New Technologies

Apple has long been committed to providing powerful technology for use in learning, and will continue to do so. Educators are beginning to embrace Power Macintosh computers because of the cutting-edge capabilities they makes available to learners.

In recognition of this, Apple recently announced two versions of the Power Macintosh 5200/75 LC (see the related story on page 1 of this issue). These are the first Power Macintosh computers built specifically for the education market. Over time, Apple expects the desktop line sold to educational institutions to consist entirely of Power Macintosh computers.

Apple also announced another new Macintosh computer for the education market, the Macintosh LC 630 DOS Compatible computer. Because it contains 66/33-MHz 68LC040 and 66-MHz 80486 DX2 processors, it can run Mac OS, DOS, and Windows software. With its built-in double-speed CD-ROM drive and optional video-output and TV-tuner hardware, the Macintosh LC 630 DOS Compatible computer is the most versatile computer available for the education market—and it's available to educators in the United States for under $2000.

PowerBook computers provide the full capabilities of a Macintosh computer in mobile form—a technology that is particularly popular with college students. For the benefit of students, educators, and learners everywhere, Apple will continue to incorporate compelling new technologies into upcoming mobile products.

One product coming later this year 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* and the article on page 17 of this issue.) The Pippin platform will bring a new segment of the public into the market for learning software, including people who have neither the money nor the inclination to buy a personal computer.

The set-top box (using specialized Macintosh-based hardware to provide "interactive TV" services) is another example of a new consumer-electronics device that will soon be available and which will make advanced technology and learning applications available to a broader portion of the market. Apple's efforts to expand into these and other new market segments will contribute to its visibility and leadership in learning markets.

Apple has been a leader in bringing multimedia into the mainstream, and the company continues to create products that make multimedia easier to create and view. These new products will help students evolve from passive multimedia viewers into multimedia authors. Using an authoring package along with the technologies incorporated into Macintosh computers (such as QuickTime 2.0, the video input capability of the Macintosh 630 series, and the drag-and-drop feature of the Mac OS), students, educators, and learners of all ages can create their own multimedia presentations. As Apple continues to differentiate the Mac OS, technologies such as QuickTime VR and QuickDraw 3D will make computers even more useful in helping people learn.

Establishing Leadership in Business Learning

Apple has only recently identified the business learning market as a separate opportunity, but the Learning Program Office is currently working on a long-term strategy for business learning.

Like educators, businesses are now discovering that their needs have changed. They are learning that many employees need education and training throughout their careers, that they need knowledge and skills they cannot expect to obtain in college, and that to stay competitive businesses must provide ongoing learning opportunities in the most cost-effective way possible.

This is not to say that Apple products are not being used for business learning today. Small companies and large corporations have been using Macintosh computers for business learning for years, in every location from the board room to the factory floor.

However, more and more companies are learning that custom multimedia programs (in the form of computer-based training, or CBT) are the best way to teach and educate employees. These companies are beginning to extend their use of computer-based training beyond the simple teaching of computer skills to include the teaching of core business competencies.

Macintosh computers provide the best platform for both authoring and running multimedia programs. HyperCard and the Apple Media Tool are both powerful, accessible authoring tools, and various companies sell authoring, presentation, graphics, and simulation products that can be used to create training and educational programs for employees.

In addition to computer-based training, companies are increasingly using personal computers to bring learning to employees, when and where they need it. One example of this is performance support systems, which give workers immediate access to the job-related information they need (for example, online equipment repair information for a service person in the field). Another example is "distance learning," in which a worker accesses needed information or talks to an expert from a remote location.

One innovative way that Apple is bringing learning to its own sales force is through the *ARPLE* (Apple Reference, Performance, and Learning Expert) CD. This quarterly set of three CDs includes almost 2 gigabytes of data sheets, white papers, demos, editable technical and marketing presentations, article reprints, brochures, and other sales tools. Using the built-in search engine, sales people in the field can quickly find all the information they need to educate themselves about any aspect of Apple's business and make professional presentations customized to the needs of the individual client.

What Makes Good Learning Software?

According to Molly Mount, the manager of pre-K–12 developer relations in Apple's Education Division, you should keep several things in mind if you want to create a compelling title for the pre-K–12 market (and many of these apply to other learning software, as well):

- *Go native.* More and more educators are demanding software that's PowerPC "native." Schools tend to buy the best computers they can afford in order to squeeze as many years of useful service from them as possible. The more graphics-intensive your

software is, the more it will benefit from the extra horsepower in Power Macintosh computers. You can also use that horsepower to add compelling new features (for example, QuickDraw 3D) that will distinguish you from the competition. Power Macintosh support is especially important in high school, college, and business learning software.

• *No edutainment, please.* Don't try to sell the same product to both the consumer and education markets. Educators demand software that they can justify using in the classroom, and "edutainment" products, which aren't focused to classroom curricula or district standards, don't qualify. Educators are particularly interested in software that explores contemporary, real-world issues in ways that they can tie into other classroom activities.

• *Create software that learners want to use.* One of the strongest reasons for using computers for learning is to take advantage of those features that are unique to computers: their interactivity and ability to adapt to the learner's needs, and their ability to present information using different media—graphics, text, sound, animation, and video.

Learning software should be engaging and fun. Simulating real-world processes and situations is often a good way to keep learners captivated. New Apple technologies that facilitate these goals include QuickTime 2.0, QuickTime VR, and QuickDraw 3D.

• *Teach learning skills along with subjects.* As I stated in Part One of this article, learning is now being seen as more that just the ability to absorb and recall facts. While teaching a body of knowledge, educational software should also teach critical reasoning and communication skills.

Good educational software often teaches these skills by supporting open-ended investigation, promoting independence, addressing multicultural awareness, offering opportunities for collaboration with others, and fostering creativity.

• *Support the teacher.* Teachers are naturally attracted to products that come with support materials—teacher guides, lesson plans, student worksheets, and so on. Software that is tied to textbooks or other classroom materials is also welcome.

One thing that few educational programs provide is assessment—the process by which a learner's progress is measured. Teachers will look very favorably on software that makes assessment easy—not for just one learner, but for every learner the teacher is responsible for.

• *Establish your credentials.* Just as a strong résumé helps you get a job, good credentials will help sell your software to educators. Were educators involved in the design of your software? Did any grant money help fund it? Is it based on specific education methodologies? Was it tested on the appropriate group of learners? Is it endorsed by any professional group? If you can answer *yes* to these questions, be sure you tell prospective customers. Better yet, design your product so that you can answer *yes* to these questions.

Developer Opportunities

As always, there are some steps you can take right now if you're interested in getting your slice of the learning "pie":

• The Apple Home Learning publishing program will provide selected developers with the opportunity to get their application onto store shelves. Apple's credibility in the education and home marketplaces and its resulting ability to enter emerging channels will also pave the way for the companies that work with Apple to enter those channels, later, on their own.

If you have a curriculum-focused CD-ROM product teaching skills that children are required to learn at school, Apple may be interested in publishing your product through its Apple Home Learning program. Contact Apple at AppleLink address HOME.LRNG (or Internet address home.lrng@applelink.apple.com).

• Apple has established the Education Solution Provider (ESP) program for developers of products and services for the pre-K–12 market. Joining gives you access to information and resources that will help you work with Apple and sell to the pre-K–12 market. Two of these resources in particular deserve mention here.

First, you get a list of all the Apple education sales agents; by making contact with these people, you may be able to work in conjunction with the agents to promote your products to educators and school boards.

Second, ESP keeps members informed of opportunities for working with Apple. For example, ESP lets members know when it is looking for demo versions of software to be included on the *Power Macintosh Software for Education Guide* (which is sent to 160,000 educators). ESP also announces its needs for educational software in given areas for prospective software bundles (a new Apple Education Series product, for example).

For more information on ESP, write to AppleLink address ESP.PROGRAM (or, on the Internet, esp.program@applelink.apple.com), or call 800-469-9523.

• Apple distributes a quarterly catalog, *Apple in Academe,* that includes third-party educational products. This catalog goes to over 90,000 people at 2,400 higher-education institutions. If you are interested in getting your products listed in this catalog, contact Diana Gianos at AppleLink address GIANOS (or Internet address gianos@applelink.apple.com).

Also, Computer Plus produces a catalog of Apple and third-party solutions, *Technology Solutions for Education.* Apple sales agents send this catalog to 500,000 K–12 educators twice a year. For information on having your product included here, contact John Politoski of Computer Plus at AppleLink address COMPLUS.ED (or Internet complus.ed@applelink.apple.com). The deadline for the next catalog, meant for the back-to-school market, is late May.

• Sometimes you can make an existing product attractive to the education market by creating a bundled solution to some problem or by augmenting an original product to meet the specific needs of educators. Claris, for example, has had great success with ClarisWorks for Teachers, which supplements ClarisWorks with a tutorial that covers tasks teachers are likely to perform, a teacher's workbook, and a collection of ClarisWorks templates that teachers will find useful.

A Challenging but Important Market

As I have shown, there isn't just one market for learning—there are several. The education markets (pre-K–12 and higher education) have their own standards, and products that do not meet them will not be successful there. The home learning market is closely tied to that of the schools, which makes the pre-K–12 market doubly important to Apple.

In addition, because learning is a lifelong activity, the home learning market presents an opportunity to provide leadership learning solutions for adult learners. The increasing demand for computer-based business learning

represents an unprecedented opportunity for Apple, whose technology is ideally suited for the kind of interactive multimedia applications that this market demands. Apple hopes to gain market share for Macintosh computers by becoming the dominant platform in this emerging field.

Apple has shown a strong commitment to learning for well over a decade. Through the research of the Apple Classrooms of Tomorrow, Apple has helped document the necessity of radically restructuring of the education process to meet the needs of an increasingly complex world. This research has led Apple to undertake a spectrum of activities designed to foster this restructuring and make Apple-platform products (including those of third-party vendors) the ones most often requested by educators everywhere.

The bottom line to you, the developer, is that Apple plans to build on its current success in the learning markets—and this presents you with significant opportunities to contribute to and participate in that success. ♣

Apple News

PowerPC 603-Based Macintosh

continued from page 1

were introduced in March of 1994, have sold in increasing numbers in the educational sector. With the introduction of the Power Macintosh 5200/75 LC computer, K–12 educators can now get the same high-end performance and capabilities, but at a lower price. Shipping with 8 MB of memory, a 500 MB hard disk drive, a double-speed AppleCD 300i CD-ROM drive, and a built-in 15-inch multiple scan monitor capable of displaying over 32,000 colors, stereo speakers, and microphone, the Power Macintosh 5200/75 LC computer costs $1,699 (U.S. price only). The Power Macintosh 5200/75 LC is also available in a special multimedia authoring configuration with video input and output and a TV tuner card for $2,099 (U.S. price only).

The Power Macintosh 5200/75 LC computer gives you just one more reason to "go native," especially if you develop products for the education market. All native PowerPC processor–based software products, which currently number more than 600, will run on the PowerPC 603 processor that drives the Power Macintosh 5200/75 LC computer. However, some software designed for the original PowerPC 601 chip may require optimization to work most effectively with the PowerPC 603 processor. For more information on optimizing your products for the PowerPC 603 chip, and the forthcoming PowerPC 604, see "Preparing Your Code for Future PowerPC Processors" on page 14. Existing 680x0-based products will also run in emulator mode on the new computers.

The other two systems just announced will continue to give education customers reasons to purchase your 680x0-based products. The Macintosh LC 580 computer, based on the 66/33-MHz 68LC040 processor, includes 8 MB of RAM, a 500 MB hard disk drive, a built-in 14-inch high-resolution display, stereo speakers, and a microphone. It's priced at $1,199 (U.S. price only). An enhanced configuration with a double-speed AppleCD 300i CD-ROM drive is available for $1,349 (U.S. price only). The Macintosh LC 580 can also be upgraded to PowerPC technology.

The Macintosh LC 630 DOS Compatible computer is the first system under $2,000 to provide customers with the ability to run Macintosh, DOS, and Windows-based applications. The system features two built-in processors, a 66/33-MHz 68LC040 processor as well as a 66-MHz 486 DX2 processor to run applications in Windows and DOS. Expansion options such as video input and output and a TV tuner card also make this an ideal multimedia authoring and playback computer. The system is priced at $1,899 (U.S. price only).

All three systems were made available in early April throughout the United States. The Power Macintosh 5200/75 LC and Macintosh LC 580 computers will be featured in several product bundles in the Apple Education Series, a line of 18 product bundles that help educators integrate computers into their learning environments. The series includes bundles for early childhood learning, early language development, mathematics, business education, and a range of other educational settings; each bundle includes a Macintosh (or Power Macintosh) system as well as appropriate software, teaching materials, and, in some cases, staff development for an all-inclusive price.

Worldwide Developers Conference Preview

The 1995 Worldwide Developers Conference is fast approaching. To help you get ready for the event, to be held May 8–12 at the San Jose Convention Center, we're providing you with the following preliminary list of conference topics. This information is divided into keynote sessions and major technology tracks.

The list is current as of March 24 and is subject to change; a more detailed schedule should be released by the time you receive this issue of *Apple Directions*. The latest information about the conference is available on AppleLink (path—Developer Support:Developer Services: Events/Marcom:WWDC) or on the Internet's World Wide Web at http://wwdc. carlson.com. We urge you to consult these sources before you leave for the conference so you can make the best use of your time once you're there.

Keynote Sessions

The Apple Roadmap
Guerrino DeLuca, vice president, AppleSoft OS Marketing
Monday, Wednesday, Friday

The Apple Roadmap will be delivered in three segments, one on Monday, one on Wednesday, and one on Friday. It will provide an overview of how Apple's hardware and software technologies fit together.

AppleSoft Directions
David Nagel, senior vice president, AppleSoft Division
Monday

Dave Nagel will provide an overview of Apple's current and future system software strategies, focusing on Power Macintosh, component software (that is, OpenDoc), multimedia technologies, active interface, and communications and collaboration technologies.

Apple PC Directions
Ian Diery, senior vice president, Apple Personal Computer Division
Wednesday

Ian Diery will provide an overview of Apple's Power Macintosh strategy from a business perspective. He will detail Apple's successes to date as well as describing near- and long-term plans for future entry-level systems, high-end systems, and notebooks.

Apple Directions
Executive Panel
Friday

This session will give you an opportunity to ask questions and provide input on the strategies that you've heard about over the course of the conference.

Apple's Advantage
Friday

This session will evaluate Apple's competitive strengths in the context of the market. It will define the clear Apple advantage as well as the business opportunities for developers to take advantage of Apple's strengths.

Apple's Directions
Michael Spindler, president and CEO, Apple Computer, Inc.
Friday

Michael Spindler will close the conference, summarizing Apple's directions and the advantages of Apple technology to the market and developer community today. He'll also talk about how Apple will extend this advantage in the future.

Technology Tracks

Apple System Hardware Track
The Apple System Hardware session will provide an overview of successes to date for conversion to "native" mode Power Macintosh/System 7.5 applications, as well as directions for PowerPC and the Power Macintosh hardware platform. Strategies for the Power Macintosh hardware family, multiprocessing, I/O, and video will be previewed. Break-out topics will include the following:

- technical directions and implications for Apple's entry systems, notebooks, and high-end desktops
- Power Macintosh optimization
- cross-platform compatibility, the common hardware reference platform recently announced by Apple, IBM, Motorola, and others, and Mac OS licensing strategies
- PCI strategic and technical overview, including how to write PCI drivers (for graphics, SCSI, networking, and other purposes)
- hardware technologies such as I/O, video, DAV, PCMCIA, and wireless technology

The Apple Workgroup Servers session will provide an overview of Apple's hardware and networking software strategy for entry-level and high-end workgroups. Migration paths from the Mac OS to Netware and AIX for high-end servers will be discussed.

OpenDoc Track
Component software can simplify software for users, as well as make development faster and more cost-effective. The OpenDoc Strategic Overview session will provide an overview of Apple's vision and the market opportunity for component software and the progression of OpenDoc technology over the past year. Topics to be covered include the following:

- OpenDoc architecture overview and human interface design and usage guidelines
- programming tips and techniques for building OpenDoc parts
- working with application container libraries
- Virtual Suite extensions
- developing international solutions
- cross-platform development

Graphics and Multimedia Track
The Graphics and Multimedia Directions session will provide an overview of Apple's direction in media and type technologies, including QuickTime, QuickTime VR, QuickDraw GX, and QuickDraw 3D. It will cover successes to date, business and technical strategies, and market opportunities. The role of these products in the context of System 7.5 and future versions of the Mac OS will also be delineated. Topics to be covered include the following:

- incorporating objects, interactivity, and music into QuickTime applications
- developing QuickTime VR applications
- developing cross-platform QuickTime solutions
- QuickDraw GX for line layout, typography, and printing
- QuickDraw 3D architecture, file format, and user interface

Communications and Collaboration Track
The Communications and Collaboration Directions session will provide an overview of the strategy for communication and collaboration products, and their role in System 7.5 and future versions of the Mac OS.

Future Mac OS Track
The Macintosh OS Directions session will provide an overview of the design philosophy for the next generation of the Mac OS. It will define the key components of the system, how they fit together, and their role in the context of AppleSoft's current strategies. Other topics to be covered include the following:

- changes in the overall architecture: the process model, microkernel, file system, I/O system, and high-level toolbox
- changes in the user experience
- overall implications for existing applications
- planning for implementation today

Apple Tools Strategy Track
The Apple Tools Strategy session will provide an overview of Apple's tools strategy in various technology areas. The session will outline tools provided by Apple, as well as those provided by key third-party developers. It will also introduce the Developer Tools Expo, featuring a wide variety of third-party development tools. Other topics will include

- application developers using compilers and debuggers
- client/server tools geared at developing application databases and client/server applications
- assembling and composing solutions using scripting languages and visual development tools
- developing multimedia content titles

Apple Ships More Powerful Workgroup Servers, Faster AppleShare

Apple Computer, Inc., recently boosted the performance of its line of hardware servers by shipping three new Workgroup Servers based on the PowerPC 601 processor, the Workgroup Server 6150/66, Workgroup

Server 8150/110, and Workgroup Server 9150/120.

The Workgroup Server 9150/120 is the fastest PowerPC processor–based system available today, using the latest PowerPC 601 120-MHz processor developed by IBM and Motorola as part of the PowerPC Alliance. The Workgroup Server 8150/110 runs at 110 MHz, while the Workgroup Server 6150/66 runs at 66 MHz.

The new servers are available with the fastest version of AppleShare yet—AppleShare 4.1—which performs up to 90 percent faster than earlier versions of the file- and print-server software. "We are delivering on our commitment to increase AppleShare performance on the PowerPC platform," said Apple Busines Systems Vice President Jim Groff. "This effort will continue as we work toward a file-and-print solution that runs native on PowerPC processor–based Workgroup Servers from Apple." In addition, Apple is bundling a host of server software solutions that extends workgroup productivity for both server administrators and network users.

As a result of their speedier PowerPC processor, the new Workgroup Servers also run a variety of software solutions much faster than previous models. For example, Cumulus PowerPro 2.0.2, a client/server image database from Canto Software, Inc., runs 25 percent faster on the Workgroup Server 9150/120 than on the existing Workgroup Server 9150, and up to 450 percent faster than on the Macintosh Quadra 800. Claris FileMaker Pro Server, version 2.1, showed a 20 percent performance increase on a new Workgroup Server 9150/120 when compared to the exisiting Workgroup Server 9150, and approximately a 30 percent increase on the Workgroup Server 9150/120 when compared to a similar setup on a Power Macintosh 8100/80. In addition, new versions of Adobe Systems Print Central and Color Central, image and print server software, performed up to 40 percent faster on the new Workgroup Server 9150/120 than on the existing Workgroup Server 9150.

The new Workgroup Servers come equipped with hardware and software designed to protect server data, including digital audio tape (DAT) drives with Retrospect Remote backup software from Dantz Development Corp. and Apple RAID Software for disk mirroring. The servers also include high-capacity storage drives, including quadruple-speed CD-ROM drives and hard disk drives with up to 4 gigabytes of storage capacity.

In the United States, the Workgroup Servers are supported around the clock, 365 days a year by a technical hotline; optional accelerated service plans are also available to fit the needs of a range of customer requirements. Service agreements vary in other parts of the world.

In addition, Apple has added leading client/server productivity and server administration software tools to its Workgroup Server solutions, including Now Contact and Now Up-to-Date for workgroup contact management, calendaring and scheduling from Now Software, Inc.; Server Manager for remote AppleShare administration from Santorini Consulting and Design, Inc.; FileWave for software distribution and management from Wave Research, Inc.; Acrobat Reader for viewing PDF (portable document format) files from Adobe Systems, Inc.; and Viper Instant-Access for fast reliable access to key business information such as company telephone directories, price lists and customer contact lists from IT Design Ltd.

The new Workgroup Servers range in price from $2,549 to $8,709 (U.S. prices only). Upgrade kits, which include a higher speed logic board, System 7.5.1, Apple RAID Software 1.0.2, and other components, will be available for exisiting Workgroup Server 8150 and 9150 computers beginning in May 1995.

AppleShare 4.1 will come preinstalled on several Workgroup Server configurations, along with System 7.5.1 and Apple RAID Software, beginning in April. All PowerPC processor–based Workgroup Server and Power Macintosh customers with AppleShare 4.0.2 can inexpensively upgrade to version 4.1. Workgroup Server customers can receive the 4.1 upgrade for a nominal shipping and handling charge; Power Macintosh customers can receive the upgrade for $199 plus shipping and handling (proof of purchase required). Call 408-862-3385 for more information, or to obtain your upgrade. AppleShare 4.1 will not be available for purchase separately.

Customers interested in more information on the latest Workgroup Server solutions from Apple should contact the ABS Network Information Hotline on AppleLink (at ABS.NETINFO) or on the Internet (at ABS.NETINFO@applelink.apple.com). You can also get more information on Workgroup Server products by phoning Apple's Fax-On-Demand at 800-GO APPLE (choose option 2); or Apple's World Wide Web page at http://abs.apple.com. Outside the United States contact your regional European Apple office.

DayStar Digital Licenses Mac OS and Hardware Technology

DayStar Digital, Inc., became the latest company to announce plans to sell Mac OS– compatible computers. Last month, the manufacturer of PowerPC and 68040 upgrade boards for Macintosh systems said that it had completed a licensing agreement with Apple Computer, Inc., for use of the Mac OS and hardware components.

DayStar plans to offer a high-performance PowerPC–based workstation to what it calls the "media publishing" market—that is, professionals involved in media creation within the prepress, graphic design, illustration, 3D, multimedia, and animation industries. DayStar said their Macintosh compatibles will incorporate new PowerPC processing hardware and software technologies. Andrew Lewis, DayStar president and CEO, said the new systems will provide performance equivalent to that of a Silicon Graphics workstation.

DayStar has sold more than 100,000 processor upgrades built around both the Motorola 68040 and the IBM PowerPC processors; its upgrade solutions have won a variety of top awards from the industry journals. DayStar's current product line also includes publishing accelerators and imaging software. DayStar demonstrated a Mac OS–compatible system for media publishers at Boston's Seybold Seminars in late March.

Apple Updates Macintosh System 7.5, Delivers QuickDraw GX 1.1.1

In March Apple Computer, Inc., shipped Macintosh System 7.5 Update 1.0 and QuickDraw GX

1.1.1. These updates to the latest version of the Mac OS provide customers with usability and performance enhancements, including the following:

- improved handling of low-memory situations
- faster file sharing
- the ability to turn off the computer using the Power key on the keyboard
- addition of Macintosh Drag and Drop support to the Launcher so that it's easier to add or remove items
- a native PowerPC version of Apple Guide, Apple's new interactive online help architecture

Macintosh System 7.5 Update 1.0 also includes PowerTalk version 1.1.1, a new release of Apple's collaboration technology. The new version includes several performance improvements as well as an update to the guided tour, a new version of the direct dial-up utility, and revised versions of several PowerTalk gateways that provide interoperability between PowerTalk and communications services.

QuickDraw GX version 1.1.1 offers significant performance improvements in the areas of styled text, font downloading, dialog box speed, and management of large character-set fonts such as Japanese Kanji. The update also provides new application programming interfaces for printing, graphics and line layout.

The new QuickDraw GX also includes an improved user interface with the following features:

- an improved desktop-printer icon display during printing
- the ability to disable manual-feed alerts
- improved printing options for applications that do not take advantage of QuickDraw GX
- the N-Up extension, which allows users to print multiple pages on a single sheet of paper
- better support for encapsulated PostScript™ output, a standard requirement for many customers.

Macintosh System 7.5 Update 1.0 is provided on this month's Tool Chest Edition installment in the monthly Developer CD Series. It's also available on AppleLink (path—Support:AppleProducts: Apple SW Updates:US:Macintosh:System Software) as well as on most major online services, including eWorld, the America Online Internet FTP Gateway, CompuServe, and Prodigy. The update will also be posted on the following Apple Internet sites: Apple Computer Higher Education gopher server; ftp.support.apple.com; and ftp.info.apple.com.

Apple is now including the Macintosh System 7.5 Update 1.0 and QuickDraw GX 1.1.1 software on all computer systems it sells. Outside the United States, the System 7.5 Update 1.0 and QuickDraw GX 1.1.1 will be available in several localized versions.

Internet Server Solution for the World Wide Web

At Internet World '95 in San Jose, California, Apple Computer, Inc., announced the Apple Internet Server Solution for the World Wide Web. This new solution provides an easy, affordable way to establish a publishing presence on the World Wide Web.

The Apple Internet Server Solution is for anyone who wishes to reach the huge audience of Internet users through World Wide Web "home pages"—including businesses, K–12 schools, higher education institutions, governments, and special interest groups.

The World Wide Web is the fastest-growing part of the Internet. As of January 1995, one estimate of Web usage was placed at 35 million users, and the audience continues to grow 5 to 10 percent each month.

The Apple Internet Server Solution consists of

- a Workgroup Server (available in 6150/66, 8150/110, or 9150/120 Mac OS–based configurations)
- a CD-ROM that includes all necessary software, templates, and online documentation to prepare information for publication on the Internet and make the server accessible to others on the World Wide Web

The following software is also included with the Apple Internet Server Solution:

- MacHTTP, which turns the Workgroup Server into a World Wide Web server
- BBEdit, an HTML (Hypertext Markup Language) editor, which lets users create and edit the pages they intend to post on the World Wide Web
- NetScape Macintosh Web Client, which lets World Wide Web clients browse through information stored on any server connected to the Web
- AppleSearch 1.5, Apple's information search and retrieval software, which lets Workgroup Server managers index files on their server so that World Wide Web clients can search for information stored on it
- AppleWebSearch, which provides a gateway between MacHTTP and AppleSearch so that Web clients can find the files indexed on the Workgroup Server
- Adobe™ Acrobat for Workgroups, which allows server managers to distribute their documents in exactly the format in which they were developed; these documents are then seen this way by all Web clients on all platforms
- run-time versions of HyperCard, FileMaker Pro, and Butler SQL
- an array of Common Gateway Interfaces (CGI), which are easy-to-use applications based on AppleScript that let MacHTTP interact with other applications in predesigned ways (for example, maps can use these applications to display information about particular cities when the user clicks on city icons)
- a variety of customizable sample Web pages and forms to get users on the Web quickly

Ease of setup and use have always been hallmarks of Apple products, and the Apple Internet Server Solution provides a much simpler solution than competing alternatives. Most Internet servers today are based on UNIX® systems, which are difficult to set up and use.

Setting up Internet services using the Apple Internet Server Solution is far easier and less expensive than doing so on a UNIX server. Since the Workgroup Server hardware that is a part of the Apple Internet Server Solution uses the Mac OS, customers use the Macintosh human interface for all operations and do not have to learn UNIX.

The Apple Internet Server Solution offers another advantage over UNIX solutions: price. Internet Web servers based on commercial UNIX-based computers generally cost a minimum of $6,000; the least-expensive Apple Internet Server Solution will sell for around $2,500 in the United States (exact pricing was not available at press time). Apple is currently taking orders for the Apple Internet Server Solution and should begin shipments in May. ♣

Technology

Inside This Section

Test Lab Open to Partners and Associates

If you're a member of Apple's Partners or Associates programs, there's no better place to test compatibility than at the AppleSoft Third-Party Compatibility Test Lab on Apple's Cupertino R&D Campus.

The lab, which is about to start its fifth year of operation, has grown since its beginnings as a two-lab operation with 30 configurations of Macintosh computers. It now boasts three independent labs featuring 75 configurations. Recently the lab has added Macintosh Application Environment and Newton testing as well as ISDN lines to facilitate Internet-related testing. Staff members are always on hand to assist with configuration, debugging, and quality engineering support.

The lab is open Monday through Friday from 9:00 A.M. to 5:00 P.M. for members of Apple's Developer Programs who are developing commercial products for one of Apple's platforms. Currently no fee is charged, but lab users are required to share test data on a confidential basis. You may schedule one test session (of one or two days) per month by phoning 408-862-7175 between 1:30 P.M. and 3:30 P.M. Pacific Standard Time (Monday through Friday) or by sending an AppleLink message to TPC.LAB. ♣

CD Highlights

Tool Chest Edition, May 1995

Thanks to the miracle of modern technology (and a five-week lead time), I finally have System 7.5 Update 1.0 and Network Software Installer 1.5 for you this month. If you install the former, and are a user of the Power Mac DebugServices application, be sure to upgrade to version 2.0b14, also included on this month's disc.

You'll find the Next Big Thing in document browsing in the Utilities folder this month: Adobe™ Acrobat Reader version 2.0.1. Over the next several months, we plan to move most of the documentation on the Developer CD Series from Apple DocViewer to Acrobat format, and have included a few Acrobat documents on this disc so you can start playing with the Reader. Next month, we will include a version that can do relevancy-ranked searches across multiple documents. If you make it to the Apple Worldwide Developers Conference this year, drop by the Developer Press booth, where we hope to have several mockups of the Reference Library CD built almost entirely in Acrobat format. Use them, abuse them, and tell me what you think (just look for the goatee'd bald guy in shorts. . . .)

Also, many of the Snippets have been newly revised to compile with the Universal Interfaces. Here's what else is new and revised for May.

Adobe Acrobat Reader 2.0.1

Acrobat Reader 2.0.1 is the latest version of the online viewer from Adobe. Acrobat software is based on the PostScript™ page-description language, so documents converted to Acrobat retain their original look and feel, with quality printing and viewing features. Adobe's Acrobat Reader enables users to view, navigate through, and print any PDF files provided on the Developer CD.

AEGizmos 1.4

AEGizmos consists of four libraries that provide alternative ways of building and reading Apple events and Apple event descriptors. They are faster, more memory-efficient, and often easier to use than the normal Apple event API. A new feature in version 1.4 is that AESubDescriptors data structure can now be used on entire Apple events. This version also includes other miscellaneous bug fixes.

For many common tasks, these libraries have clear advantages over the regular Apple event API:

- They run much faster when building complex descriptors.
- They use less heap space.
- They make your code smaller—and easier to write—requiring fewer calls to get things done (especially AEBuild, which can often replace an entire page of code with one function call).
- AEPrint, which displays an Apple event or descriptor in human-readable form, can be very helpful in debugging.

APDA HyperCard Toolkits

These are obsolete HyperCard XCMD toolkits that used to be sold through APDA. Although they are obsolete, they may be of interest to you if you write your own XCMDs. Keep in mind, however, that these XCMDs are not supported by Apple Developer Support, and questions about them will be rejected.

please turn to page 22

Preparing Your Code for Future PowerPC Processors

When Apple, IBM, and Motorola began designing the PowerPC processor architecture in 1991, their goal was to create a processor architecture that would meet the industry's needs through the end of this decade. So it should come as no surprise that the PowerPC 601 processor, used in the Power Macintosh computers sold today, is only the first of a series of PowerPC processors.

IBM and Motorola have successfully created the PowerPC 603 and 604 processors, which are being used in new and upcoming Apple products. Some differences exist between the PowerPC 601 processor and the PowerPC 603/604 processors. One difference—the effect of misaligned data accesses—is significant. Although the other differences probably won't affect you, you should be aware of them.

PowerPC 601—The Missing Link

The roots of the PowerPC architecture are in the POWER processor, a multiple-chip RISC processor created by IBM. The three companies in the PowerPC Alliance intended the PowerPC architecture to be the evolution of the POWER architecture, as well as the adaptation of the POWER architecture to the needs of smaller computers.

The PowerPC architecture eliminates 34 POWER instructions, but to help bring the first PowerPC processors to market quickly, the PowerPC Alliance decided to keep most of those instructions in the PowerPC 601 processor only. (For one thing, this allowed the Alliance to use existing POWER software development tools in the early days of the PowerPC 601 implementation.)

Subsequent implementations of the PowerPC architecture, including the PowerPC 603 and 604, contain several architectural changes. The rest of this article describes these changes and how they may affect you.

Data Alignment

Most RISC processors perform better when the data they access is "naturally aligned." This means that, for example, if a short integer is represented in 2 bytes of data, it is more quickly accessed if the data begins at a 2-byte boundary (an address evenly divisible by 2).

The PowerPC processor family is no exception to this rule. By assuming that data will be naturally aligned, the chip designers can make data access faster—but that also means that access to misaligned data becomes much slower. The PowerPC 601 processor does not suffer much of a performance loss, but the PowerPC 603 and 604 processors do; in one example, a PowerPC 603 or 604 may take up to 40 times longer to access misaligned data than a PowerPC 601. And it is probable that future PowerPC designs will also carry significant performance penalties for misaligned data. So this is an issue that matters.

Should you always use natural alignment for all your data? Unfortunately, it isn't that simple. Any data accessed by 680x0 code must be aligned to 2-byte boundaries. Since the Mac OS is not 100 percent PowerPC "native" (some Toolbox routines are still written in 680x0 code), data accessed by Toolbox routines should use 680x0 data alignment. However, data internal to your program should use PowerPC data alignment.

So the solution to the data alignment problem is this: Make sure that your program assumes PowerPC data alignment, and turn on 680x0 data alignment (using your compiler's alignment pragma statements) as needed. You should also ensure that float and double values (which take 8 bytes) are aligned on 8-byte boundaries.

Is Your Code POWER-Clean?

An application's object code is said to be "POWER-clean" if it doesn't include any of the POWER instructions that are not a part of the PowerPC instruction set. Apple-designed computers that use the PowerPC 603 and 604 processors contain code that emulates the removed instructions.

This emulation ensures the safe execution of programs that contain POWER instructions, but it causes such programs to run slower than they otherwise would. For this reason, it's important that your programs be POWER-clean—that way, they run optimally on all Power Macintosh computers.

Are many PowerPC processor–based programs on the market today at risk? Not really. All the major PowerPC compilers—including the MPW-based PPCC and MrC, Metrowerks CodeWarrior, and Symantec C++ 8.0 for Power Macintosh—generate POWER-clean code.

However, a few PowerPC processor–based compilers are not POWER-clean. The GNU gcc compiler generates POWER code and so should not be used for creating Power Macintosh software. The IBM xLc C compiler and xLC C++ compiler generate POWER code, but you can constrain them to produce POWER-clean code by compiling with the –qarch=ppc option. (Some developers used this compiler to create Power Macintosh applications but didn't set the option; because of this, their applications are not POWER-clean.)

Missing Registers

Another difference between the PowerPC 601 and later PowerPC processors is the former's inclusion of two internal registers from the POWER processor, MQ (multiply-quotient) and RTC (real-time clock).

The absence of the MQ register in later PowerPC processors presents no compatibility problem for POWER-clean applications, because the only way to manipulate the MQ register is through certain POWER instructions, none of which are in the PowerPC instruction set. Therefore, if your application is POWER-clean, it doesn't manipulate the MQ register.

The RTC register can be useful for timing purposes. You can't access it from a high-level language, but you can if you write assembly-language code to do so. Therefore, if you are writing PowerPC assembly-language code (which few developers should have to do), don't access the RTC register.

Cache Coherency Problems

The PowerPC 601 processor has a single cache for both instructions and data, while later PowerPC

processors (including the PowerPC 603 and 604) have separate instruction and data caches. This difference doesn't matter if your code is loaded by the Code Fragment Manager, which is the case for almost all PowerPC code.

However, if your program generates PowerPC code in memory for execution (interpreters often do this), the code may execute incorrectly because of the separate instruction and data caches.

To prevent problems, you must use the call MakeDataExecutable (defined in OSUtils.h), which notifies the system that a specified section of data is subject to execution by causing the data cache to be flushed. This degrades performance, so you should be careful to flush the data cache only when necessary.

Completion Serialized Instructions

Certain PowerPC instructions can interfere with instruction pipelining, a feature that contributes to the speed of RISC processors. Among the most often used instructions that do so are multicycle load/store string instructions and load/store multiple-word instructions. These are called *completion serialized instructions* because their execution is delayed until all previous instructions have completed their execution.

Apple is working with compiler developers to work out guidelines for the best use of these instructions. You should check with your compiler vendor for the latest information on how your development tools use these instructions. If you write PowerPC assembly-language code, you should learn more about these instructions from the *PowerPC 603 RISC Microprocessor User's Manual* and the *PowerPC 604 RISC Microprocessor User's Manual* and write your code accordingly.

For more information on these issues, see the Macintosh Technical Note named "PT38—PowerPC Compatibility and Performance Issues." It's available on the April 1995 System Software Developer CD, pathname Dev.CD Apr 95:What's New:Technical Documentation:Mac Tech Notes (Text):PowerTalk38 PPC Compat. & Perf. ♣

From the OpenDoc Human Interface Team: How to Add Content to OpenDoc

By Dave Curbow and Elizabeth Dykstra-Erickson

Many OpenDoc demos show how easy it is to add content by dragging a document from the desktop into an open document. Users like the drag-and-drop feature better than copying and pasting because they feel more in control, and one of the goals for OpenDoc is for users to enjoy what they are doing.

Recent discussions we've had with developers have shown, however, that we may have confused you into thinking that dragging and dropping is the only mechanism for getting new content into an OpenDoc document. So, in this article we'll describe all the mechanisms that are available: tool palettes, copy and paste, drag and drop, and the Insert command—from both the user and developer perspectives.

By the end of this article, you'll see how OpenDoc benefits both users and developers by allowing users to work with all the tools and features with which they are familiar.

Tool Palettes

Many of today's applications provide palettes of tools for adding different kinds of content. Tool palettes are common in painting, drawing, and other kinds of applications. For example, take a look at the tool palette from Adobe Persuasion 3.0, as shown on this page.

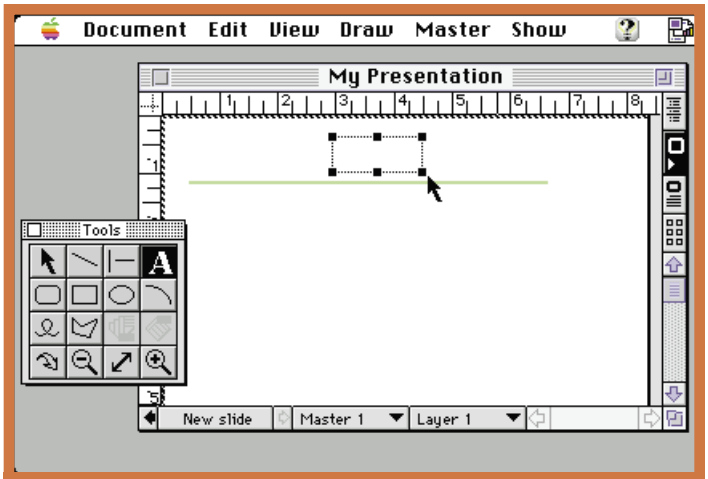
This palette contains various tools for creating and editing the contents of a drawing—line, rectangle, and oval tools. It also contains a tool for creating and editing text items.

Tool palettes work well for the task of creating new content, and we encourage developers to continue providing such tools in OpenDoc. However, we recommend a change in the implementation of these tools. Instead of reimplementing common function in your code, your OpenDoc software should use part editors already present on the user's system that perform the same functions.

For example, suppose the user is creating a slide with a hypothetical version of Persuasion implemented as an OpenDoc presentation part editor. Here's one way that the presentation part might implement the text tool: The user chooses the text tool and drags to select a region on the current slide, as shown in the screen shot "Creating a text part" on page 16. Persuasion notes the size of the region selected by the user and creates a text part of the same size within the overall presentation document. The user can then easily see it and manipulate it.

In the next screen shot, "Using the text part" (page 16), you'll see that the user has clicked inside that text part and typed some text. The border around the text part is the "active border"—it indicates that the text part is active, and that

any keystrokes made will go into this part, which is controlled by a sample text part editor we've named SurfWriter. It also indicates that menu commands apply to the content of this part. The menu bar has changed from slide-specific menus to text-specific menus—and, if you were to open the Apple menu, you'd find that the first menu command reads About SurfWriter instead of About Persuasion. Finally, note that the Persuasion tool palette has gone away because the user is now using



Creating a text part.

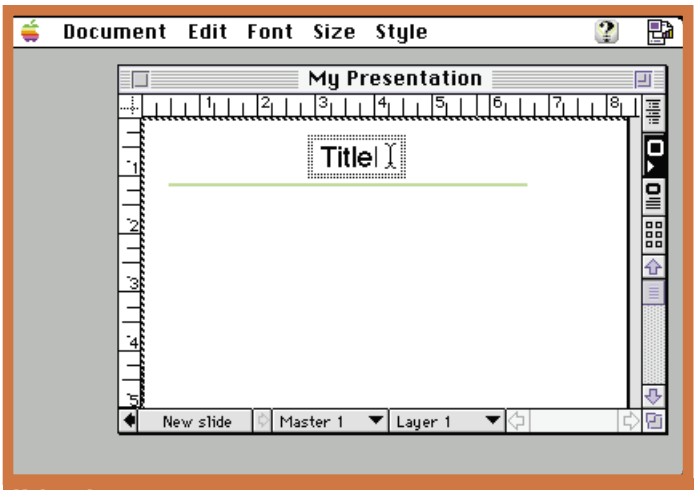
the text part editor, not the gamut of Persuasion tools.

The advantage to you is that you can concentrate on the distinguishing portion of your product, instead of providing yet another implementation of text editing. You also may be able to simplify your menus. For example, an OpenDoc implementation of Persuasion would not have a Text menu, because Persuasion would no longer supply the text functions (see the screen shot "Creating a text part"). Deleting menus from your product means that it can provide more features without resorting to hierarchical menus.

The advantage to users is that their learning time decreases: They can learn how to use one editor instead of many, and they're less likely to be confused by conflicting features of the different implementations of editors. The text functions have an entire menu bar instead of being contained in one menu. Thus, the menu structure is simpler and individual menu items are easier to find than when hidden in hierarchical menus.

Which Editor to Reuse

Users may have installed more than one OpenDoc part editor for a particular kind of content—for example, the latest version and an earlier version of a particular text editor. Or, users may even have more than one kind of text editor installed, so that they can exchange files with other users more easily. OpenDoc allows the user to specify which editor to use for particular kinds of content. This is done through the Editor Preferences control panel. So, when your OpenDoc software calls on the features of other part editors—in our example, a text part editor—make sure that it checks the user's preferences and uses the part editor listed there.



Using the text part.

Copy and Paste

Copy and Paste is another way to add content to an OpenDoc part. With today's monolithic applications, a user copies content from one document and pastes it into another, but the result from the same action in different contexts is often unpredictable. For example, if the user selects a group of spreadsheet cells and pastes them into a word processor, the result may be a table of those numbers, but not the formula. If the user pastes the same content into a drawing, they're likely to get a text item with tab-delimited text, but not the formulas. Only part of the content may be copied, and the pasted content behaves differently from the original. In contrast, when users copy and paste between OpenDoc documents, they'll get a "smart paste"—a full function copy of the original, including data, formulas, and the complete spreadsheet features.

The basic rule is that what users copy is what they should have after they paste. Note, however, that this doesn't mean that every time users paste they create a new part, with different features, inside the destination document. When the pasted content belongs to the same kind as the destination content, the pasted content is merged rather than embedded. For example, if the user pastes content from a drawing into a second drawing, the pasted content is merged into the second drawing.

Sounds easy, right? But how do you know when to have your OpenDoc software create a new part and when to have it merge the content into the current part? Suppose the user pastes content from a painting into a drawing—what should happen in this case? The user may perceive no difference in the kinds of content from a simple visual inspection, but because the content is different the painting is embedded into the drawing instead of merged.

Your editor has to determine whether the source and destination content are compatible. To help your software make this determination, we have defined several data categories for OpenDoc software—text, painting, drawing, movie, spreadsheet, controls, and so on.

When you develop an OpenDoc part editor, you determine which categories your editor supports. If the copied content and destination part are in the same category of data, your editor will then merge the pasted content into the content of the destination part. Otherwise, your editor will create a new part, and embed it. (This is described in more detail in the OpenDoc developer documentation.)

Drag and Drop

Drag and drop is another way to add content to an OpenDoc part. As with copying and pasting, dragging and dropping may either cause a new part to be embedded or content to be merged. However, drag and drop goes a bit further than today's copy and paste. When the user drags content (for example, spreadsheet cells) to the desktop, OpenDoc creates a new document. That document is of the same kind as the source of the dragged content and contains only the dragged content. This mechanism behaves like the System 7.5 clippings feature, but the document can be edited, saved, and so on. (Think of it as "Clippings—The Next Generation.")

The Insert Command

Like drag and drop, the Insert command is another way to add content to an OpenDoc part. The differences are that the user doesn't leave the document to find the content to be added, and only entire documents may be inserted. The Insert command allows the user to locate the source document using the Standard File dialog box. When the user chooses a document in the Standard File dialog box, the contents of that document are inserted at the insertion point in the active part. As with the copy and paste and the drag and drop operations, inserted contents may be embedded or merged.

Interaction With Non-OpenDoc Documents

By now you may be wondering what happens when the user copies content between OpenDoc and non-OpenDoc documents.

OpenDoc allows content to be copied from non-OpenDoc to OpenDoc documents. When the content is pasted, dropped, or inserted, OpenDoc determines the user's preferred editor for the kind of content being inserted. Sometimes translation may occur, and occasionally there may not be an editor that supports the source kind of content. Nonetheless, a part of the appropriate kind and content is embedded so that the content is not lost. The user may later install an additional editor to handle this kind of content.

Going the other way–that is, copying from an OpenDoc document into a non-OpenDoc document—OpenDoc supports the standard scrap types. However, embedded content or features not supported by the destination document will not appear in the destination document—as is the case in today's applications. (Recall the earlier example, in which cells from a non-OpenDoc spreadsheet were pasted into a drawing and appeared there as tab-delimited text without formulas.)

For More Information

Got a burning question? Need some clarification? Subscribe to OpenDoc-HI@CILabs.org and send us your questions and comments. To subscribe, send a message to ListProc@CILabs.org and include "subscribe OpenDoc-HI <your name, not e-mail address>" in the body of the message. We also check for questions on the AppleLink Human Interface Bulletin Board. ♣

Dave Curbow and Elizabeth Dykstra-Erickson are members of Apple's OpenDoc human interface team.

Editor's note and disclaimer: The examples in this article should not be taken as a commitment to any specific future products by Adobe Systems, Inc., or Apple Computer, Inc. Thanks to Adobe for permission to use Persuasion in our example.

Pippin: A New Platform for Multimedia Titles

It's no coincidence that Apple Computer, Inc., announced its new Pippin platform in Tokyo earlier this year and that the first Pippin licensee is the Japanese firm Bandai Co. Ltd. From its earliest strategizing about the low-cost CD-ROM playback device derived from Power Macintosh hardware and software, Apple has understood that Japan, currently the number two geographic market (behind the United States) for the Macintosh computer, is a logical first market for Pippin. Over the next several years, Apple and Bandai, as well as several other potential licensees, will work to create a substantial market for Pippin devices, first in Japan and then in other geographies.

The most important thing you need to know about Pippin is that your existing Macintosh CD-ROM–based entertainment, education, and other multimedia products will run on it, usually with very little alteration. Many CD-ROM titles written for IBM PC–compatible computers will also run on Pippin, although they require a little more work to be able to do so. What this means is that Pippin will expand the market for your current products, since the platform is intended to sell to customers who have never purchased computers before.

Put simply, that's the Pippin developer story—all you need to do is make sure your current products work with Pippin, and you'll be able to sell them to increasing numbers of customers. What's the catch? you might be asking. Well, as we see it, there's very little catch. To reassure you, this article provides details about the Pippin platform, first to explain why Apple is confident about the platform's market opportunities in Japan, and then, through a series of frequently asked questions about Pippin, to help you understand the platform and what you'll need to do to be sure your products work with it.

Why Japan?

One reason Apple is targeting Japan with Pippin is that Japanese consumers tend to be more gadget-conscious than consumers elsewhere. Many consumer electronics products initially sell well in Japan and catch on later in the United States and other markets. With products ranging from VCRs to Nintendo games, Japanese consumers bought more units than their American counterparts during the first year of the lives of many consumer electronics products.

Several distinct aspects of the Japanese personal computer market also convinced Apple that Japan is particularly receptive to a dedicated CD-ROM player. Japan has long been driven by market dynamics very different from the United States and Europe. The lack of standard ways of handling Japanese language processing, for example, forced each hardware manufacturer to develop proprietary operating system extensions that made for multiple incompatible PC platforms and a fragmented software market that continues to this day.

The most popular PC platform, the NEC PC9801, has a 40 percent share of the Japanese market, but is not fully compatible with the

DOS and Windows machines sold by other manufacturers such as IBM, Fujitsu, or Compaq. The so-called Wintel standard—that is, PCs running the Windows operating system and being driven by an Intel x86 microprocessor—that accounts for 80 percent of all personal computers in the rest of the world barely outpaces the 16 percent Macintosh market share in Japan.

In the multimedia era, Japan's fragmented market works strongly in Apple's favor. Frustrated Windows users in the United States complain about difficulty in getting a multimedia title to run with so many hardware and software combinations. Developer opportunities in the numerically larger market for DOS/Windows multimedia systems are often offset by the higher costs of supporting a fragmented base of incompatible sound and graphics cards, CD-ROM drives, and CONFIG.SYS options.

This situation is compounded in Japan, where the combinations of DOS/Windows multimedia systems are multiplied even further. Because of all the complexity, Japanese customers have learned to expect far more integration between hardware and software than their U.S. counterparts; just as there are very high sales of dedicated word-processing machines and, of course, video game machines in Japan, there's also demand for a dedicated multimedia title player. Pippin is Apple's answer to that demand.

Developer interest in the Pippin platform has been very high in Japan. In December 1994, Apple Japan invited interested developers to a half-day conference to explain Pippin and its business opportunities. The conference sold out within two weeks, and attendance was higher than at any other Apple-Japan sponsored developer event: more than 700 people came to hear about Pippin and its first licensee, Bandai.

Bandai is a highly appropriate first partner for Pippin because of its strong presence in the toy market—in Japan and around the world—through such famous characters as Mighty Morphin Power Rangers and Sailor Moon. Virtually every Japanese kid under 18 owns several of these Bandai licensed products. Bandai's annual revenues of about $250 million make it the third largest toy company worldwide (after Mattell and Hasbro), and the biggest toy company in Japan. Bandai has used its clout in the toy industry to make inroads in the video game industry, especially through its Dragonball game, one of the most popular Nintendo games.

Bandai expects to throw the full weight of its marketing power behind its Japanese Pippin devices, the first of which is due by the end of this year. Bandai has publicly stated its goal of shipping 500,000 Pippin devices in the first year.

We expect there to be an early opportunity for selling CD-ROM–based products to the nascent, but potentially explosive, Japanese Pippin market. If you have a multimedia product that you want to sell in Japan, you'll want to give serious consideration to making a Pippin version as soon as possible to take advantage of the new market. If you don't know how to make the Japanese version yourself, contact Apple for an introduction to one of the many Japanese companies that can localize it for you. (Contact information is given in "Getting Started/Developer Support," at the end of this article.)

The following Q&A tells you more about the Pippin platform and what you'll need to do to get your products ready to work with it. A list of resources to help you get started with Pippin product development appears at the end of the Q&A.

Background

Q: What is Pippin?

A: Pippin is a multimedia player platform derived from Power Macintosh hardware and system software utilizing a PowerPC 603 processor. It is designed to achieve lowest cost and serve as an optimal playback tool for multimedia CD-ROM discs initially created for the Macintosh computer, IBM PC–compatible computer, or both. It does not include a keyboard or monitor; it will use a TV screen as its primary display. (For Pippin specifications, see the box "Pippin Technical Specifications" on page 21.)

Q: What type of CD-ROM titles will work on Pippin?

A: Apple is encouraging developers to make a wide variety of titles available for the Pippin platform, including reference titles containing a great deal of textual information, action games, adventure games, simulation, role-playing games, puzzles, education and learning titles, music, and more. The platform is primarily intended to run Macintosh titles.

Pippin is not intended to run standard productivity applications. Nonetheless, simple word processors and spreadsheets, as well as some tax preparation programs, financial management tools, children's authoring tools, and other scaled-down software should run on a Pippin device that is expanded with a rewritable mass storage device, such as a floppy disk drive, that can store data files.

Q: What add-on accessories will be available for Pippin when it's introduced?

A: At introduction, there will be an external floppy disk drive, keyboard, mouse, external ink jet printer, and a GeoPort telecom adapter for analog phone lines. The base Pippin units will ship with an accessory kit including a single input controller device. Other add-on devices, including hard disk drives, PCMCIA slots, and MPEG2 compressor/decompressors, will be provided by third parties at a later date.

Pippin Market Position

Q: How will Pippin be positioned in the market?

A: Apple believes that families are looking for much more than video game players currently offer. Consumers want to be able to play their favorite games, but they also want to communicate, learn, play music, and access information. Pippin provides them with these capabilities. In addition, it gives consumers a high level of compatibility with mainstream personal computer technology. Current Macintosh CD-ROM multimedia titles will run on the Pippin platform with little modification; many PC-compatible CD-ROM multimedia titles will also run on Pippin, although they will require some redesign and a more involved porting effort.

Q: What is the difference between Macintosh and Pippin technology?

A: Pippin technology is derived from Power Macintosh computers. Much of the system software code, integrated circuit cells, and integrated circuits come directly from the Macintosh world. Pippin is being designed, however, for optimal playback. As such, it operates from a run-time version of the Mac OS on less memory and with more dedicated functions. While it is possible to expand Pippin capabilities with a mass storage device, Pippin will ship with only a readable CD-ROM mechanism.

Customer Issues

Q: What's in this for the customer?

A: For the first time, customers will be able to jump on the multimedia and Internet bandwagons

at a low price. They will be able to buy the unit from a variety of companies, in different configurations, and in a multitude of distribution channels. Pippin devices will integrate with other audio-visual consumer products, and units equipped with a GeoPort adapter or external modem will permit communication over networks.

Q: With the price of home computers declining, why will customers buy a Pippin device?

A: Multimedia-equipped personal computers generally sell for at least $1,000 in the United States—considerably more in other parts of the world. A sampling of ads from the weekend advertising inserts suggests that the real prices for fully configured multimedia computers (Macintosh or IBM-compatible computers) start at $1,350. These prices are not likely to come down much further over time.

Q: What is the retail price for Pippin?

A: Apple cannot speak for Pippin licensees, who will set their own prices, but the business model and architecture should enable licensees to reach prices well below $1,000. Given its capabilities and architecture, Pippin is likely to cost more than the dedicated video game devices. Bandai, the first licensee of the technology, has announced that their Power Player Pippin device will sell in Japan for about ¥50,000 ($500 U.S.).

Q: How easy will Pippin be to use?

A: The Pippin device is designed to behave like an audio CD player. The user inserts the CD-ROM into the player, and it automatically starts up from the CD. Because the system is erased and reloaded when a new CD is inserted, there are no files to configure, no drivers to fight for system resources, and so on. In other words, users should never face the kinds of problems currently associated with running multimedia titles on DOS- and Windows-based personal computers.

Pippin Manufacturers

Q: Will Apple ship a Pippin device under its own brand?

A: Apple does not plan to ship a Pippin device under its own brand. Instead, Apple will focus its energies on assisting other companies in reaching home entertainment retail channels, which differ from Apple's existing computer reseller channels.

Q: How will the Pippin manufacturers differentiate their products?

A: Apple expects Pippin manufacturers to differentiate their products by making variations in a number of areas, including the following:

- industrial design
- cost
- sales channels
- integration of telephony and other features
- video quality
- audio quality
- floppy drive integration
- memory size
- performance

Developer/Publisher Issues

Q: I've heard that I'll have to pay Apple a royalty for my Pippin titles. Is this true, and how much will it cost?

A: Yes, there will be a royalty for Pippin titles. Apple is developing a standard contract for Pippin publishers, which will provide you the rights to include the system software on your titles. If you're interested in pursuing Pippin development, Apple can give you details about the agreement, which defines royalty amount, method and timing of payments, return handling, and other conditions, after you've signed a confidentiality agreement.

Q: How many titles will be available when the product is introduced?

A: Apple is currently aware of more than 25 developers creating new titles for the Pippin platform. Apple is gearing up its Pippin evangelism and developer support, so Pippin activity will soon increase. Simon and Schuster Interactive has announced that it will port its titles to Pippin. Other publishers have endorsed the platform, but haven't made any public announcements yet.

Q: Will Apple help licensees and software developers market Pippin devices?

A: Apple will work with both the manufacturers and developers/publishers in comarketing activities. Details about these programs will be made available later this year. In addition, Apple is currently test-marketing a logo, which will be required to appear on all Pippin hardware and compatible CD-ROM discs.

Technical Issues

Q: When can I secure a development system?

A: Today. A Power Macintosh AV system will enable you to start the development process. By late summer, Apple will have engineering versions of Pippin available for you to test your titles.

Q: Will it be a lot of work for me to create a title?

A: Creating a Pippin title is no more difficult than creating a Macintosh title. Most titles will only need to be remastered to include system software. Both 680x0 and "native" Power Macintosh software will work with Pippin, since Pippin will include the Power Macintosh emulator that runs virtually all 680x0-based software. To take full advantage of Pippin's PowerPC 603 RISC microprocessor, however, your 680x0-based titles will have to be ported to run in native PowerPC mode. Also, existing Macintosh titles may need slight modification to work optimally on the Pippin platform. (For more details, see "Getting Macintosh Titles Ready for Pippin," later in this article.)

Q: If there is no hard disk, how is the system software distributed?

A: The system software will be stamped together with the title during the mastering process. Over time, there will be a number of Pippin system software releases from which title developers can choose. Each will support a different set of capabilities. During the title development process, you'll be able to decide which version to use. Users will not need to know which version of the operating system is bundled with their CD-ROM title.

Q: To what extent will customers be able to upgrade Pippin devices? Can they ever be turned into complete Macintosh computers?

A: System memory can be added to a Pippin device using plastic DRAM memory cards. In addition, through PCI-like expansion cards, users will be able to add other capabilities to their Pippin devices, including mass storage, graphics acceleration, and improved decompression. However, no amount of expansion will turn a Pippin device into a full-blown Macintosh system.

Q: Are there features in Pippin that don't exist in the Macintosh?

A: For the first generation of Pippin devices, there will be only one hardware feature not commonly found on a Macintosh computer: a dual frame buffer. Pippin will support both 8-bit and 16-bit video. For 8-bit video,

Pippin will employ a dual frame buffer to assist frame-to-frame animation.

Q: Will CD-ROM titles created for Pippin be like personal computer software and run on future Pippin systems?

A: One of the inherent advantages of the Pippin architecture is that today's titles will run on tomorrow's systems. Today's game titles operate on one generation of architecture but not on subsequent generations; for example, Nintendo 8-bit NES cartridges don't work on the 16-bit SNES, and Sega Genesis cartridges do not run on the Saturn. Compatibility will be a primary goal of the Pippin platform; by writing to the APIs (application programming interfaces) defined in *Inside Macintosh,* you'll be able to assure that the titles you create for the first generation of Pippin devices will work with later devices, as well.

If you write directly to the Pippin hardware, you may gain a performance boost, but you'll risk having the software not work on future Pippin generations. Also, since multiple vendors will release Pippin devices, software that hits the hardware of one vendor's device may not work on another's device.

Q: Will Pippin titles play on a Macintosh?

A: Yes, Pippin titles will play on Macintosh computers. If the titles use 680x0 code, they will play on both Power Macintosh and 680x0-based Macintosh computers. If your title exists in both 680x0 and PowerPC versions, you may be able to create a "fat binary" version that will play on both platforms.

Q: Will Macintosh titles play on a Pippin device?

A: Yes, if the title is restamped with the Pippin system software. For some titles, other modifications may be required. (These modifications are described in the next section, "Getting Macintosh Titles Ready for Pippin.")

Q: Will DOS/Windows titles play on a Pippin device?

A: Yes, but with much more modification and recompilation than required with Macintosh titles.

Getting Macintosh Titles Ready for Pippin

Q: What do I have to do to get my Macintosh titles ready to work with Pippin?

A: There are three primary areas you need to be concerned about:

- *Video.* Pippin will support NTSC, PAL, S-video, and VGA video formats, although it's assumed that televisions will be the most commonly used monitors. Therefore, you need to take into account issues related to overscan and the color palette. To find out how your title will appear on a TV screen, you should play it using NTSC/PAL video on a Power Macintosh AV system connected to a TV screen. Pippin employs a flag that tells the hardware to automatically scale images from the commonly targeted 640-by-480 RGB video screen to a TV screen.
- *No hard disk or floppy disk.* Although users will be able to expand Pippin devices with hard disks or floppy disk drives, you should assume your Pippin titles won't be able to use a mass storage device. This means you won't be able to cache sound or video clips on a hard disk in order to make a title appear to run faster. To help compensate for this, the first Pippin devices will use quadruple-speed CD-ROM drives.

The absence of the hard disk also affects the way Pippin will store user preferences and store/restore files for resuming games. Pippin will include a 64 KB minimum nonvolatile memory bank to compensate for the lack of a mass storage device. Your titles will need to keep preference and store/restore files to a minimum size.

- *Limited system memory.* Although Pippin memory will be expandable (we're not sure yet how much), the first Pippin devices will ship with 6 MB of memory. You need to plan on the system and video requiring *at least* 2 MB, leaving something under 4 MB for application software. To be on the safe side, your Pippin title should require no more than 3.5 MB to run well.

Q: Will Pippin run both 680x0 and PowerPC processor–based code?

A: Pippin will be driven by a PowerPC processor, but its system will employ the 680x0 emulator, enabling it to run both types of software. To be sure your titles run on Pippin, Power Macintosh, and 680x0 Macintosh systems, we suggest you compile your code as fat binaries using the most recent Power Macintosh compilers. Native PowerPC versions of the most popular current multimedia authoring tools, Macromedia Director and the Apple Media Tool, automatically compile code into fat binaries.

Q: Do I have to do anything special to optimize my code for the Pippin device's PowerPC 603 processor?

A: Unlike the first PowerPC processor—the PowerPC 601—the PowerPC 603 chip used by Pippin no longer supports any of the instructions employed in the the original IBM POWER architecture on which PowerPC is based. If your code addresses these instructions, it may suffer significant performance loss. To be sure your code is optimized for the PowerPC 603 chip, be sure to use the most recent versions of both authoring tools and compilers, which have eliminated support for the POWER instruction set. (For more information about optimizing code for the PowerPC 603 processor, see the article "Preparing Your Code for Future PowerPC Processors" on page 14.)

Q: What can I do to be sure that text in my titles looks good?

A: The appearance of text on a TV screen will never be as good as on most computer monitors. To compensate, Pippin's video processor uses special signal-processing circuitry to improve screen performance. Especially with text-heavy titles, Apple suggests that you avoid using any text smaller than 12 points.

Q: Should my Pippin titles employ floating-point operations?

A: Just as with any native Power Macintosh application, floating-point operations can substantially boost performance. If you use the floating-point unit for Pippin software, however, you'll want to stick to single precision, if at all possible. In future versions of Pippin, double precision may only be emulated, adversely affecting any software that uses double precision. Also, be sure to adhere to the API guidelines in *Inside Macintosh.*

Q: How will Pippin handle fonts?

A: Roman fonts will handled in much the same way they're handled by Macintosh systems. For Japanese, Chinese, and other 2-byte fonts, Pippin stores bit images of the fonts in ROM.

Q: Without a hard disk or floppy disk drive, how will Pippin handle drivers for expansion devices?

A: Initially, Apple will bundle some drivers with the system software code. If your title needs to provide support for certain devices, you should include drivers for them as system extensions (INITs) with the title. Over the long

term, Apple will design automated means for loading drivers from the devices themselves.

Getting Started/Developer Support

Q: How can I get started with Pippin development? What steps will Apple take to support Pippin developers?

A: Perhaps the best way to get started is by joining the Apple Multimedia Program (AMP), if you're not already a member. The annual fee of $300 entitles you to a rich source of literature that includes technical guides, resource references, marketing surveys, and more. Future Pippin developments will be first communicated through the AMP mailing list. To enroll, contact AMP by telephone (408-974-4897), fax (408-862-7602), AppleLink (DEVSUPPORT), or e-mail (devsupport@applelink.apple.com).

Apple has also created a group address that it will use to keep developers updated regularly. To be included, send your inquiry to pippindev@apple.com.

Beginning in May, Apple's New Media Division will conduct briefings in the United States, Japan, and Europe to expose developers to more information about Pippin and other Apple multimedia technologies, including QuickTime, QuickTime VR, and interactive TV. Here are dates and locations for these briefings:

- Cannes, France, May 3–4, 1995
- Los Angeles, CA, June 5–6, 1995
- New York City, NY, June 14–15, 1995
- Tokyo, Japan, TBD, 1995

For information, or to register, call 408-974-1323, send a fax message to 408-974-1862, send an AppleLink message to NM.TOUR, or send e-mail to nm.tour@applelink.apple.com.

In addition, the Worldwide Developers Conference will offer a specific multimedia developer track for the first time, linking those topics most relevant to CD-ROM title developers. There will also be a dedicated session for Pippin. The conference will be held May 8–12 at the San Jose Convention Center. To register, see this month's WWDC preview on page 9.

Apple will hold its annual Japanese developer conference in Yokohama (near Tokyo) July 3–7. This event will also provide a specific track suited for CD-ROM multimedia title developers and a specific session for Pippin. For more information about this event, send e-mail messages to takeuchi2@applelink.apple.com.

Apple welcomes your suggestions about what you'd like to receive from Apple to help you get started with Pippin titles. Send your ideas by e-mail to pippindev@apple.com.

Q: What type of support is available from outside Apple?

A: Most third-party tool providers have their own support organizations. For a list of the third-party providers and their products, phone numbers, and addresses, contact Redgate Publications and ask for their publication *The World of Macintosh Multimedia* (Redgate Communications Corporation, 660 Beachland Blvd., Vero Beach, FL 32963; phone 407-231-6904). Also, *New Media* magazine regularly publishes a guide to multimedia development tools (New Media, P. O. Box 1771, Riverton, NJ 08077-7371; phone 609-786-4430).

Q: What if I'm having trouble getting the information I need about Pippin, or I need to talk to someone right away?

A: To meet your needs for instantaneous information about Pippin, Apple is building Pippin evangelism and technical support organizations. Until those are in place, you can contact Richard Sprague, Manager, International Developer Marketing (phone 408-974-4111; fax 408-446-9154; AppleLink SPRAGUE1; e-mail rik@apple.com) or Eric Klein, Macintosh Entertainment Evangelist (phone 408-862-8030; AppleLink KLEIN.E; e-mail klein.e@applelink.apple.com).♣

This article was assembled by the Apple Directions staff with the assistance of Richard Sprague.

Pippin Technical Specifications

Hardware

- 66-MHz PowerPC 603 RISC microprocessor
- Superscaler processor, three instructions per clock cycle
- 8 KB data cache and 8 KB instruction cache
- IEEE standard single and double precision floating-point unit
- 6 MB of combined system and video memory
- Quadruple-speed CD-ROM drive
- 64 KB SRAM store/restore backup
- Video:
  - 8-bit and 16-bit video support
  - Dual frame buffers for superior frame-to-frame animation
  - Support for NTSC and PAL composite, S-video, and VGA (640 by 480) monitors
  - Up to 16.7 million colors
- Audio: stereo 16-bit 44-kHz sampled input and output
- Telephony: GeoPort-ready
- Controllers:
  - Support for up to four simultaneous players over Apple Desktop Bus (ADB)
  - Will support standard ADB keyboards and mouse devices with connector adapters
- Data I/O
  - One standard serial communication port
  - "PCI-like" expansion for adding a floppy drive, a hard disk drive, graphics accelerators, codecs, and so on (not available at introduction)

Software

- Run-time environment derived from the Mac OS
- Integration of QuickTime 2.0 and native PowerPC version of QuickDraw GX
- Reduced system memory footprint (computer-specific features removed)
- Disk-resident system stamped on CD with title
- System startup from CD
- Pippin system software upgrades released through CD-ROM stamping operations
- Developers free to choose from menu of system software upgrades
- 680x0 emulator
- Macintosh Toolbox intact
- Localized bitmapped fonts
- Reduced Macintosh system ROM footprint

CD Highlights

continued from page 13

Debugging Modern Memory Manager

This package contains debugging version 1.0.2 of the Modern Memory Manager. Once installed on Power Macintosh machines, it allows you greater control in detecting and eliminating Memory Manager bugs.

The debugging Modern Memory Manager screens all handles passed to it, checking them for validity. It also offers options for robust heap validation before and after every call and for filling disposed blocks with garbage. It provides a control panel that allows for dynamic enabling and disabling of the debugging features.

Version 1.0.2 fixes the debugging Modern Memory Manager so that it now works properly when virtual memory is enabled.

Gestalt Selectors List 2.8

This document lists all selectors known to the creator of Gestalt Selectors List 2.8 for use with the Gestalt Manager. These can include selector codes installed by Apple system software or by your software. The information in this list is useful to programmers who use the Gestalt Manager with their software (even using externals, as with HyperCard, 4th Dimension, and so on).

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

GXifier

The GXifier automatically adds tables to TrueType fonts that allow those fonts to be used more effectively with applications that support GX typography. This application requires QuickDraw GX; you can open the document "About the GXifier" in SimpleText if QuickDraw GX is installed.

Int'l Developer Contacts

This folder contains a list of contacts for international developer programs and services, in Microsoft Word and Adobe Acrobat formats.

Mac Tech Notes Update 05/95

Technical notes are collections of short (and not-so-short) articles dealing with specific development topics. This month's new and revised notes include

- OS 07—System 7.5 Update 1.0
- OV 21—System 7.5
- SD 01—GetCompressionInfo

Network SW Installer 1.5ZM

The Network Software Installer provides the latest release of AppleTalk version 58.1.5, including updates for all of the Apple Ethernet and token ring products. New for this release is the inclusion of the LaserWriter Bridge control panel to allow access to a LaserWriter connected to the LocalTalk port while actively connected to an Ethernet or token ring network. See the Read Me file for a list of known conflicts and interaction issues.

PCCTS 1.31

PCCTS (the Purdue Compiler-Construction Tool Set) is a public domain tool set consisting of a parser generator called ANTLR and a lexical analyzer called DLG. ANTLR accepts a grammatical description for an input language and generates a recursive-descent parser in C or C++ to recognize sentences in that input language; DLG is used to break up the input stream of characters into a token stream.

ANTLR combines the flexibility of hand-coded parsing with the convenience of a parser generator. ANTLR has many features that make it easier to use than other language tools. Most important, ANTLR provides predicates, which let you systematically direct the parse through arbitrary expressions using semantics and syntactic context; in practice, the use of predicates eliminates the need to hand-tweak the ANTLR output, even for difficult parsing problems. ANTLR also integrates the description of lexical and syntactic analysis, accepts LL(k) grammars for $k>1$ with extended BNF notation, and can automatically generate abstract syntax trees.

While PCCTS is a free tool set, it is actively supported by Terence Parr of Parr Research Corporation. Contact parrt@acm.org for information, or join other PCCTS in the comp.compilers.tools.pccts USENET newsgroup. Their ftp site is everest.ee.umn.edu in pub/pccts.

Power Mac DebugServices 2.0b14

This folder contains the Power Mac DebugServices application, version 2.0b14. Power Mac DebugServices 2.0b12 is not compatible with Macintosh System 7.5 Update 1.0. You need to upgrade to Power Mac DebugServices 2.0b14. This version of Power Mac DebugServices may not work with hosts earlier than those found on E.T.O. 16. If you encounter a problem using Power Mac DebugServices 2.0b14 with your development environment, please contact the manufacturer of your development environment.

Rinaldi Collection

This folder contains a wide variety of HyperCard XCMDs and XFCNs, in both French and English. Most of them are also compatible with SuperCard.

ShrinkWrap 1.3.1

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 ShrinkWrap Read Me file for more information.

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

System 7.5 Update 1.0

Update 1.0 is a set of software enhancements that improves the performance and reliability of Macintosh computers running system software version 7.5. When installed after Macintosh system software version 7.5, this update provides enhancements to the system software—including the Launcher, system extensions, control panels, and applications—and provides solutions for problems encountered by some Macintosh users. See the file System 7.5 Update 1.0 Read Me for details.

Coming Next Month

Considering all of the time I shall be spending preparing for, attending, and recovering from the WWDC, I'll probably just recycle March's disc and hope no one notices.

Alex Dosher
Developer CD Leader

Business & Marketing

Market Research Monthly

Opportunity for Macintosh Sales to PC Customers

When Apple Computer, Inc., introduced the Power Macintosh computer just over a year ago, one of Apple's goals was to sell the new RISC-based systems to customers looking to switch from DOS and Windows. We don't yet know how many of the approximately 1.5 million Power Macintosh systems sold so far have been bought by previous purchasers of IBM PC–compatible computers. However, we can tell you that there remains an enormous opportunity for Apple to sell Power Macintosh computers to current PC customers in the United States.

The reason? Vendors of IBM PC–compatible systems don't enjoy anywhere near the

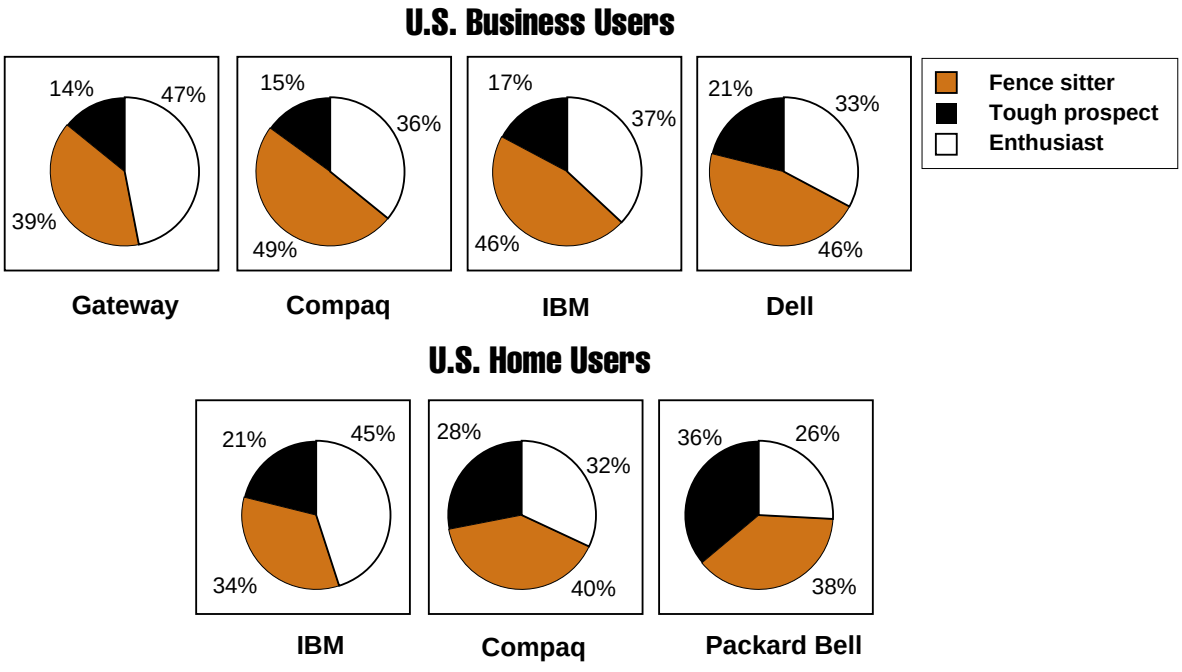
Inside This Section

Low Loyalty Among PC Customers

As part of its *Home and Business Desktop Brand Tracking Research* study, completed in September 1994, Apple asked customers of a variety of PC-compatible computers to rate their preference for their current computer systems. According to their answers, the customers fell into one of the following three categories:

- "enthusiasts"—customers with a strong preference for the brand they're currently using
- "fence sitters"—customers with some preference for their current brand, but an equal or stronger preference for another brand
- "tough prospects"—customers with little or no preference for their current brand

This graph illustrates the low loyalty felt by PC customers in the U.S. home and business markets for their current computer brand.



Source: Apple Computer, Inc. © 1995

kind of loyalty that Apple's customers feel for the Macintosh platform. Low brand loyalty among purchasers of IBM PC–compatible computers means that those customers are open to buying other alternative systems. Power Macintosh systems, which promise advanced RISC performance, competitive cost, and compatibility, will remain an attractive alternative.

Recent studies conducted by Apple indicate just how soft brand loyalty is in the DOS/Windows world. To measure brand loyalty, Apple asked a selection of Macintosh and PC customers in the United States to indicate how much they prefer the brand of computer they're currently using. In both the U.S. business and home market segments, fewer than half of DOS/Windows users indicated a strong preference for their current systems, while more than half indicated they preferred another brand at least as much as the one they purchased. (See the data in "Low Loyalty Among PC Customers," on page 23.)

By comparison, 63 percent of current U.S. Macintosh customers polled by Apple said they were Macintosh enthusiasts and that they strongly preferred the Macintosh brand to any other systems they looked at.

In the U.S. home market, 66 percent of Macintosh customers called themselves Macintosh enthusiasts. In the PC-compatible world, the brand rating the highest loyalty was IBM; 45 percent of its home customers said they are enthusiasts about IBM systems. Only 32 percent of Compaq home customers consider themselves enthusiasts, while 26 percent of current Packard Bell home customers are enthusiastic about their computer brand.

Brand loyalty follows a similar pattern in the U.S. business market, where 62 percent of Macintosh customers are enthusiastic about the Macintosh computer. On the PC side, 47 percent of Gateway customers are enthusiastic about their own brand; that number drops to 37 percent for IBM customers, 36 percent for IBM customers, and 33 percent for Dell customers.

In other words, more than half of all the DOS/Windows customers covered under the study find another brand at least as appealing as the brand they are currently using.

According to current estimates, the overall U.S. PC-compatible market includes more than 50 million customers. Extrapolating the data, we think it's possible that at least 25 million current users of PC-compatible computers would be willing to switch to another brand of computer. Apple still expects that Power Macintosh systems, with their performance and ease-of-use advantages over DOS/Windows systems as well as their DOS/Windows compatibility, will be very attractive purchase options for many in the PC-compatible U.S. market. ♣

Special Marketing Report

Opportunities in the Newton Software Market

By Kris Newby

There are now *three* things you can count on—death, taxes, and the fact that each new generation of computers will be smaller and more powerful than the last. The smallest computers, commonly referred to as *personal digital assistants* (PDAs), have actually been around for many years—on television. Those fictional "beam me up" *Star Trek* tricorders and *Earth2* computer headsets have set customer expectations for PDAs—anything less than seamless connectivity, an unobtrusive form factor, and a friendly interface, will be met with disappointment. Now it's up to the computer industry to meet these expectations.

Today the demand for Newton PDAs is growing at a steady rate, and industry analysts and developers continue to be optimistic about the future. Most believe that mass market acceptance of these small computers is not a matter of *if,* but *when.* In this article we share Apple's perspective on Newton market opportunities, as well as developer advice on designing and marketing Newton software.

The First-to-Market Advantage

The PDA installed base is admittedly modest compared to the number of desktop computer users. But a quick look at PDA market growth projections shows that there's an attractive upside potential for entrepreneurs willing to make an early investment in this market: Forrester Research of Cambridge, Massachusetts, estimates that annual PDA shipments will grow almost 1300 percent in the next five years. And it doesn't take a rocket scientist to see that you can build a respectable business around selling software to those 4.8 million PDA users. (See the graph on page 25 for annual PDA market growth estimates.)

While everyone from media moguls to former real estate developers flocks to the multimedia market, you can get in on the ground floor of the relatively uncrowded Newton PDA market. The advantage to being one of the pioneers in this emerging market is that it's much easier and less expensive to get market share early on than it is when the market is mature. Early market entrants benefit from name recognition, word-of-mouth referrals, and a mature product line, all of which make it easier to attract distributors and new customers when the market matures.

"We were attracted to the Newton because it was a chance to enter a software market where there was a level playing field," said JB Parrett, president of True North and developer of the highly rated Gulliver travel assistant. "In two to three years, the PDA market will really take off, and by starting early in the game, we hope to be one of the developers best positioned to profit from this growth."

Of course, entering any emerging market involves a certain amount of risk. But by developing for the Newton platform, you minimize this risk. First, the Apple MessagePad is the PDA market leader with 57.7 percent of the 1994 PDA market share (source: BIS Strategic Decisions), and Apple Computer, Inc., is committed to getting this market going. Second, you can build a Newton software business with far less upfront capital than you'd need to enter the extremely competitive Macintosh and Windows markets. Newton applications can be developed in much less time than the average Macintosh or Windows application—most of the developers we interviewed created their first product in about six months—so you can quickly get your first product to market and get revenues flowing into your venture.

Another advantage to developing for the Newton platform is that your programmers will be gaining valuable experience in writing software for smaller computers. The skills that you must master in Newton software development—designing intelligent, menu-driven interfaces ("active assistance"); designing smaller interactive applications (as with OpenDoc); and manipulating wireless communication protocols—are guaranteed to be relevant in the coming decade.

Apple's Newton Strategy

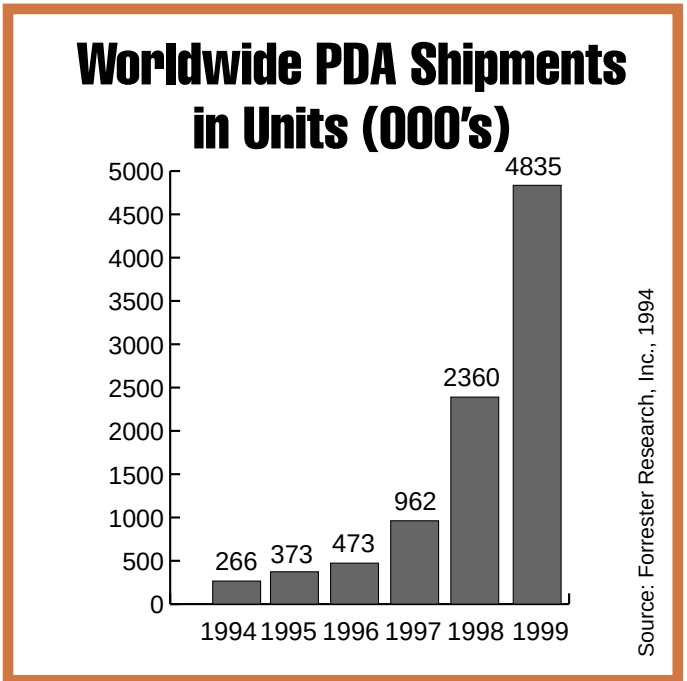
It's been almost two years since the first Newton device—the MessagePad 100—rolled off Apple's assembly line, and as you might expect, Apple is in the process of adjusting its product line and marketing strategy. Apple's first priority is to incorporate customer and developer feedback into future Newton technology, specifically by improving the software, hardware, and developer tools. The recently introduced MessagePad 120 is a step in the right direction, with improvements such as more RAM (2 MB), an improved PCMCIA (Personal Computer Memory Card Industry Association) slot that accommodates higher power demands, and improved screen clarity. Future MessagePad models will have features that help you create better products faster, including the following:

- *Cross-platform development tools.* The Newton Toolkit for Windows will ship later this year, enabling you to develop Newton applications in the Windows environment. This should make it easier for you to create a wide variety of Newton-based solutions targeted at the large Windows market.
- *Better desktop connectivity.* To make it easier for you to create solutions that allow Newton devices to access information from desktop computers, Apple will release a set of desktop integration code libraries in mid-1995. Apple is also working with third-party vendors to help increase the number of desktop connectivity products on the market. This improved connectivity should entice more desktop computer users to buy Newton devices.
- *Enhanced communications.* A new modem enabler will allow customers to use a pop-up list to select different modems.
- *More wireless communication options.* Apple has been working with third-party communications providers for more than 18 months to facilitate the development of wireless solutions based on Radio Frequency (RF) packet, analog and digital cellular, and one-way and two-way paging and infrared (IR) technology. Apple is also working with PCMCIA data/fax modem vendors to provide customers with modem setup packages for cellular communication. Other communication options include the Apple Mobile Message System, a wireless communication system that lets users of notebook computers and PDAs receive one-way wireless page messages; a PowerPC "native" mode communication driver for Newton-based products from ARDIS; a PCMCIA Type II wireless local area network solution from Dayna Communications; and in Germany and the United Kingdom, connection kits for wireless transmission of e-mail and facsimile messages. All of these enhancements will help you create the seamless go-anywhere software solutions that will help increase the functionality and popularity of Newton-based devices.

On the marketing side of the business, Apple hopes to increase demand for Newton products with a new direct response marketing campaign. New ads will be more solutions-oriented than previous ones, and they will be placed in key horizontal and vertical market publications. (See the article "Newton Hits the Vertical Markets," *Apple Directions,* March 1995, for details on target markets.)

The first ad in this new campaign, an informative four-page "advertorial," will run in the May and June issues of *Sales Management* magazine. Ad readers can call a number to receive a demo disk and information on Newton-compatible software solutions. This collateral was designed to quickly educate readers on the benefits of Newton PDAs and create more demand for your software solutions.

Apple will also regularly promote the wide distribution of Newton software solutions guides, the first of which will appear as an insert in *Intelligent Newton* magazine. Developers interested in having their product information included in upcoming solutions guides should watch for more information in the Newton developer monthly mailing. (To learn about Newton developer programs and mailings, see the news article in *Apple Directions,* January 1995, page 9.)



PDA market growth projections show there is an attractive upside potential for early entrants.

Targeting the Mobile Professional

The best strategy for success in today's Newton software market is to create products that appeal to the largest group of Newton users—mobile professionals. These Newton "early adopters" frequently work away from the office, they place a high value on optimizing their time, and they're eager to try new technologies. A large percentage of these users work in sales, law, medicine, or finance.

Your software products should address the problems that these users face—the difficulties of working while traveling, keeping track of business and personal expenses, paying bills while out of town, keeping on top of multiple e-mail and voice mail accounts, tracking billable hours, and accessing reference materials while on the road, to name a few.

If you currently develop Mac OS or Windows software that sells to this audience, you may want to consider creating a complementary Newton product that leverages the mind share and loyalty of your installed base. For example, if you sell a meeting scheduler for desktop computers, you could create a complementary Newton product that enables users to update their calendars while on the road. If you have a brainstorming product, you could create a simpler Newton version that lets users capture their ideas while they're out of the office, then download this information to their desktop computer later.

The first major Mac OS/Windows developers to release companion Newton products are Intuit and Symantec. Intuit will be shipping Pocket Quicken with the MessagePad 120 and Symantec will be shipping a Newton version of their best-selling contact manager, ACT!

"We see Newton as the mobile component of our overall sales force automation strategy," says Jeff Cable, product manager at Symantec. "A key feature in this product is its desktop synchronization: Users can plug a Newton into their desktop computer and our product will make sure that updates made on either system are incorporated."

Here are some specific Newton software categories that Apple believes will be the most lucrative in the next year or two.

• *Sales automation.* There's a need for Newton applications that help salespeople spend less time on administrative tasks so that they can spend more time selling. These businesses are also looking for products that improve the flow of information from a salesperson to a distributor or manufacturer.

• *Mobile professional productivity.* More productivity software is needed for professionals who place a high value on timely information and efficiency. These users are likely to buy applications that help them do things like organize personal information, find restaurants on business trips, file expense reports, and check stock prices.

• *Information collection and retrieval.* The need for good data collection and retrieval products spans a broad range of industries. From retrieving stock quotes to collecting data on glacier movement to signing up university students for classes, Newton devices are being used by people who have to spend a large part of their day out of the office. Forms automation, an important subset of this category, is an easy area in which to sell solutions, because the end-user benefits are so easy to quantify: By automating forms and data collection, businesses benefit from reduced data entry and printing costs, faster response time, and more flexibility in modifying forms.

• *Reference content.* In the near term, content providers should have the best luck creating products that appeal to mobile professionals. These might include sales force reference materials, medical reference books, management advice, and so on. Content tools such as Bookmaker facilitate the porting of content over to this platform, and adding interactivity to Newton content provides users with incentives to buy your products rather than conventional books.

• *Communications.* This important class of utilities—more specifically e-mail, online service gateways, groupware, and collaboration aids—will eventually help the PDA market take off. There's still an urgent need for more of these software solutions.

The Art of Newton Software Design

When programming for an emerging platform, you aren't always able to learn from your predecessors. You're often the one who has to experiment, push up against the limits of the hardware

How to Publish Through StarCore

StarCore is a group within Apple Computer that publishes software and content titles for the Newton platform, as well as desktop extensions for both Macintosh and Windows-based computers.

StarCore works with third-party developers on a royalty basis, much in the same way that book publishers work with authors. Interested developers submit ideas or prototypes to StarCore, then a committee selects products that work best with their product line. A developer whose product is accepted is paid an advance that's subtracted from future royalty revenues. StarCore also provides packaging, manuals, localization, software quality testing, marketing, and end-user support for the product.

"Right now we're looking for business productivity Newton applications that appeal to mobile executives, as well as desktop connectivity and electronic messaging products," says Sam Parker, StarCore producer. "It's extremely important that these products are easy to use and run with no additional work on the part of the user."

The biggest advantage to working with StarCore is that your software will be marketed alongside Apple's MessagePad products. StarCore products are featured in the flip-book attached to Apple's MessagePad point-of-purchase stand and are often shelved in the StarCore display stand. In addition, you gain access to StarCore's international network of authorized Newton resellers. StarCore provides distribution in 120 countries through both traditional and emerging channels such as online marketing and direct fulfillment.

Mark Spector, director of product development at HealthCare Communications, talked about how StarCore helped them market FilePad, their first Newton commercial application: "FilePad took six months, four programmers, and one full-time marketing person to launch; and we couldn't have done it without StarCore. Since it was also our first horizontal market product, we just didn't have the marketing resources to give it visibility across markets outside of the health-care industry."

Developers interested in submitting products to StarCore can send an inquiry to AppleLink address STARCORE (Internet address starcore@applelink.apple.com).

and software, and define the "rules" of a new type of user interface. On the Newton platform, you're faced with two challenges: limited memory and the absence of a keyboard. Because of these constraints, Newton developers need a well-thought-out product plan and a thorough user testing process.

Here's some product design advice from a few experienced Newton developers:

• *Paul Smith, president and CEO of Holosoft.* "Carefully explore the Newton application programming interfaces (APIs) and all portions of the operating system *before* you start coding. We've found that speed is our number one challenge, so we've optimized performance by proactively managing memory and carefully organizing the structure of persistent object storage."

• *Vidal Graupera, cofounder of Iambic Software.* "We learned as we went, and it took us about six months to develop our first product, TimeReporter. As with any new platform, you have to leave time for experimentation in order to be successful."

• *JB Parrett, president of True North.* "My advice to new Newton developers?—test, test, test. The user interface is the weak link in many Newton applications. Make user testing an integral part of your development cycle, and use Macintosh user interface guidelines where they apply."

Developers we interviewed think that Newton development is much easier and faster than developing for other platforms. With the help of the Newton Toolkit development environment, you can design a simple Newton application in about six months or even less. In fact, one developer, Katherine Lothes of Sunburst Communications, developed the core of her Newton-based teacher assessment tool in two months.

Marketing on a Shoestring Budget

Though larger developers, such as Intuit and Symantec, have begun entering the Newton market, you can still get a lot of visibility with relatively low start-up and marketing costs. Iambic Software, creator of StarCore's top-selling products, Action Names & Agenda and TimeReporter, is run by two people who hire outside programming help. True North is a two-person company run out of New Hampshire. Pensee, the company that created the Newton titles Zagats hotel and restaurant reviews and Fortune 500: Guide to American Business, has two employees who live in different states. One of the things that all of these developers have learned in the Newton market is how to develop and market their products on a shoestring budget.

One strategy that's worked for many Newton developers is to build their business around both commercial *and* custom software development. Today there's demand for developers who can create custom Newton solutions and this type of work can help pay the bills until the commercial market reaches critical mass.

True North decided to launch their first commercial product, Gulliver, after years of custom software development for the U.S. Department of Defense. Their president, JB Parrett, talked about what he learned when they ventured into the commercial side of the business. "Today we advertise through user groups, America Online, AppleLink, CompuServe, the Internet, *Intelligent Newton* magazine, and *Pen Computing.* For new Newton developers, I'd recommend taking a more cost-effective approach by marketing through online services and PR. We've found that a press release solicits more response than any single ad."

Traditional marketing methods, though more expensive, also work with Newton's ever-growing retail presence. Newton products and software can be purchased at major computer resellers and consumer electronics stores including CompUSA, Circuit City, The Good Guys, and Egghead Software. Newton products are sold through traditional Apple dealers, and there are even four all-Newton product stores in New York City, San Francisco, Toronto, and soon, Los Angeles. Almost all of the major Macintosh mail order catalogs sell Newton software, including *The Mac Zone* (Bellevue, Washington), *MacMall* (Torrance, California), *MacConnection* (Marlow, New Hampshire), *ComputerWare* (Palo Alto, California), and *MacWarehouse* (Lakewood, New Jersey). In addition, a lot of Newton users buy software directly through online services.

Many new Newton developers have gotten a jump start in the market by publishing their products through StarCore, Apple's in-house Newton software publishing group. (See the box "How to Publish Through StarCore" on page 26 for program details.) Working with StarCore enables developers to enter this market with smaller up-front marketing costs. And by letting StarCore handle the marketing and end-user support of their products, new Newton developers can focus their efforts on building up their product line.

The Newton Window of Opportunity

The Newton commercial software market provides you with a window of opportunity: For a limited time you'll be able to enter this promising market with very little capital and competition.

JB Parrett sums it up with the attitude of many developers who are already in the Newton market: "This is a pivotal year for the

A Newton Case Study: Geo Systems

Geo Systems, based in Lancaster, Pennsylvania, is a good example of a large company that is making the most of its vertical market expertise by moving into a new area—commercial software. This company uses its cartographic skills and map assets to create IBM-compatible map-related software products, custom routing solutions for large businesses, and now a line of four Newton-based travel guides.

Their latest Newton products, Michelin Paris and Fodor's Guide to Europe, include the travel information found in the paper versions of these guides, along with a search engine that enables users to search for hotels, restaurants, and tourist attractions according to personal preferences. The software then directs users to their desired destination with maps and written directions.

"We decided to introduce a line of Newton products," said Nancy Flood, product manager at Geo Systems, "because we knew that our travel guides would fill a need of PDA users. These people frequently find themselves on the road, and they need to quickly locate destinations in unfamiliar cities."

Geo Systems' latest Newton product took six months to develop from start to finish. They used Bookmaker and NewtonScript, as well as a custom search and routing engine to create their finished product. It is currently being published by StarCore.

Newton, and I'm optimistic about the future, especially with the availability of Newton-based products from Motorola, Panasonic, and others."

Today, the Newton software market is just about the only game in town in which a two-person venture can launch a commercial software product in six months. What's more, this platform provides you with a chance to "boldly go where no programmer has gone before" in defining new ways for users to interact with computers. A bet on the Newton market is a good bet. Users want smaller, more intuitive computers, and the Newton platform, as the market leader, is a great place to start. ♣

[Editor's note: To find out more about Newton developer programs and Developer University classes, call 408-974-4897.]

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Marketing Feature

Marketing Multimedia

What Henry Ford Could Teach Us

By Nicholas Donatiello, Jr., President and CEO, Odyssey

It seems to me exceedingly appropriate that we focus on the marketing of multimedia. So much has been said of late about the technology of new media. In fact, technology's ability to do so much challenges marketers more than ever before. Do we try to sell what we can build or do we try to build what we think we can sell? For me, the answer is always the same. If you build it first and then worry about how to sell it, what you have is a hobby. In business, you build what you can sell. Period.

A commitment to building what we can sell, rather than the other way around, leaves us with the obvious question: What new media products and services can we sell, and to whom?

What Henry Ford Could Teach Us

It is this question that leads me to Henry Ford. Too often the genius of Henry Ford is mistakenly thought to be the genius of an inventor. But Henry Ford did not invent the automobile: When Ford first moved to Detroit in 1891, factories in France were already producing cars commercially on a regular basis. Ford would not produce his first automobile for another five years, and the Model T was still 17 years in the future.

Likewise, the idea that Ford created the moving assembly line so that he could produce the most inexpensive automobile on the market has events out of order. When Ford introduced the Model T, plenty of less expensive cars were already available. But despite its cost, the Model T was selling extraordinarily well, and Ford created the moving assembly line because he couldn't figure out any other way of keeping up with the constantly doubling demand. Coming some five years after the 1908 introduction of the Model T, the assembly line was an outgrowth of Ford's marketing success, not the cause of it.

No, contrary to common perception, Henry Ford, although mechanically talented, was not a great inventor—he was a great marketer. Why was it that he was able to sell so many more cars than anyone before him ever dreamed possible?

Henry Ford succeeded for one simple reason—he was the first person to figure out what a car really was.

That may sound silly in 1995, but in 1908 it was sheer brilliance.

At the time, there were lots of competing ideas about why someone might want to buy a car. Most car makers thought the automobile was simply a horseless carriage for the rich, a way to commute status. For these marketers, it didn't matter that you needed a chauffeur to keep it running—their target customers could easily afford one.

If you build a product first and then worry about how to sell it, what you have is a hobby. In business, you build what you can sell.

Other automobile marketers believed they could sell cars by pointing out that if you owned a car you could do things you had never done before. You could more frequently visit relations who lived in the next county. You could go into town more often, and you could travel to distant places.

Still others sold their technology—touting bigger gears, more cylinders, or whatever.

But Henry Ford figured out that growth in the automobile market would come not because a car was a status symbol, not because it was a way to do things you had never done before, not because it was a technological toy. Growth in the automobile market would come because a car was, quite simply, a way of more easily doing things you had to do every day—a way to get to work more easily, or to town or to church; a way to carry things you had to move from one place to another; a way to make the life you had easier, better.

Once Ford understood this simple concept, he saw the right answers to many questions that perplexed other car makers. First, he knew that everyone could use one—not just people who were rich or wanted to travel great distances. He knew how heavy, or light, it should be. He knew it had to be easy to maintain. He knew how high off the ground to make it, how fast, how strong, how reliable.

The Model T, what it was and how it was sold, embodied this understanding. Ford's success was assured.

So What Is New Media?

If we are asking ourselves, "What new media products and services can we sell and to whom?", Henry Ford would make us ask first, "What is new media?" Fundamentally, what are we marketing?

We already understand why businesses buy personal computers. They want a productivity tool, a faster or cheaper way to do something they're already doing, or a way to do something they couldn't reasonably do before.

But what about consumers in their homes—what are they buying? Odyssey's research indicates that until recently, business needs were driving home computer purchases. People were getting home computers in large measure so that they could do work at home. Even now, nearly two-thirds of home computer users say that the home computer is used for business purposes at least some of the time.

Today, however, multimedia computers, CD-ROM discs, and online services are expanding the role of the personal computer, and this change has enormous implications for marketers of everything from hardware to content.

To see clearly where the home computer fits in and where it's going, we need to examine multimedia computers in the context of changes taking place in the way that consumers obtain and use entertainment and information in their homes.

First, it is important to recognize that we are only at the beginning of a long process of redefining at-home entertainment and information in the United States. This process, which is likely to take 15 to 20 years to complete, will involve all kinds of new media delivered on a wide variety of platforms, from the personal computer to screen phones to interactive television. There is one reality we will be able to count on during this period: What is true about the market today, here at the beginning of the process, will not be true at the end.

One of the reasons we know we're at the beginning of the phenomenon is the relatively low market penetration of products such as CD-ROM drives and online services. Even personal computers, which are much more prevalent, cannot claim anywhere near the market penetration of telephones or televisions, or even cable TV.

Now, I know a lot has been said about this last holiday season and the huge number of personal computers that were sold. But we need to keep these numbers in perspective. Even if the industry sells a million personal computers in the United States, and all of those computers go into homes that did not previously own a computer, the market penetration of personal computers still only goes up one percentage point. Of course, what actually happens is that manufacturers sell millions of personal computers in any given six-month period, but only a portion of those go to consumers (as opposed to businesses), and only a portion of those going to consumers go to homes that did not previously have a computer. All of which is to say that outside of some unforeseen major market shift—such as prices dropping to $200 or personal computers suddenly becoming as easy to use as telephones—market penetration rates will not undergo quick, dramatic changes. Everyone involved in this market has to stop believing all the hype and exercise some patience. Slow, steady growth can be very powerful and very profitable.

So what did happen during the 1994 holiday season? Recently, Odyssey completed the field work on our most recent *Homefront* study. Preliminary indications are that during the last six months, personal computer market penetration increased from 27 percent of U.S. households to about 31 percent; modem penetration went from 14 percent of U.S. households to 16 percent; and CD-ROM drive penetration increased from 6 percent of all U.S. households to 9 percent. Interestingly, penetration of online services, which was 6 percent of U.S. households last summer, has remained about the same: Roughly 7 percent of all U.S. households have an online service. (See the chart "Market Penetration of New Media Products" on this page.)

We know from history that it is possible to make a great deal of money from a relatively small portion of the population, so none of this is a commentary on whether the online business or the CD-ROM business is a "good business." What the research does tell us is that there has not been a major sea change in at-home entertainment and information. All of the silly media hype notwithstanding, the first piece of context we need to keep in mind is that we are just at the beginning of a phenomenon.

Second, we must face the reality that entertainment is the 3000-pound gorilla in U.S. living rooms. Information, although important to many, takes a back seat. This reality comes through in all of Odyssey's research. It doesn't say information is unimportant, but it is certainly less important than entertainment.

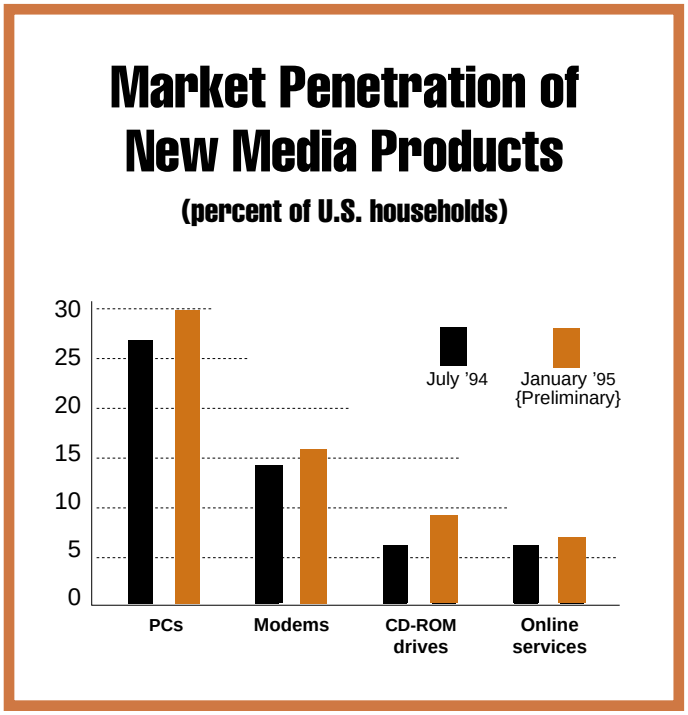
Third, we need to keep in mind that most Americans are dissatisfied with their current at-home entertainment and information options—and this primarily means dissatisfaction with television. Odyssey's research clearly shows that most Americans are dissatisfied with both the programming television offers and with the way it is delivered.

Fourth, it is this dissatisfaction, and the concurrent desire for better at-home entertainment and information options—not technology—that creates the market for new media products and services.

Finally, and most important, what constitutes "better" at-home entertainment and information options will vary by market segment.

A Heterogeneous Market

This last point—that what constitutes "better" will vary by segment—deserves special attention. Unlike Henry Ford at the turn of the century or even General



Motors in the 1950s, we are not selling into a market whose consumers share a homogeneous set of values and attitudes. The country no longer resembles the America of Donna Reed and Beaver Cleaver. The market for new media will not be immune to the diversity that dominates our culture.

In fact, just as television in the 1950s capitalized the country's desire for conformity, new media at the turn of the next century will leverage our diverging attitudes and tastes and even our individuality.

Odyssey's work demonstrates that in this market attitudes will be much better predictors of behavior than other, simpler measures such as demographics or past buying patterns. In fact, our work reveals the existence of six distinct attitudinal segments in the market for new media, which Odyssey has labeled "New Enthusiasts," "Hopefuls," "Oldliners," "Independents," "Surfers," and "Faithfuls."

Some segments that are similar demographically have very different views of at-home entertainment and information and are looking for different benefits from new media. Likewise, segments that are very different demographically share many of the attitudes that are likely predictors of behavior in this new market.

The research also indicates that the benefits that will attract some segments to new media will be precisely the same ones that turn other segments off. This poses a great challenge to marketers. They simply have to approach the market in a targeted way, both in terms of the products and services they offer and in the way they market them.

If we step back and look at the general landscape of at-home entertainment and information, we see that entertainment is the dominant factor in the equation; that most people are dissatisfied—some even very dissatisfied—with the major source of home entertainment, namely television; that Americans are seeking "better" alternatives; and that what constitutes "better" will vary by segment. These facts, all derived from Odyssey's research, lead to one inescapable conclusion: Growth in multimedia personal computers, CD-ROM discs, and online services is happening and will happen because these technologies offer an alternative to television.

So if we're answering Mr. Ford's question, "What is new media?", the core of the answer is simple: New media is an alternative to television.

What does all this mean for marketers of multimedia computers and related products and services? Here are five broad implications.

Brands Will Be Exceedingly Important

Because we are at the beginning of a phenomenon, consumers are looking for ways to make choices in an uncertain environment. Normally in such a situation consumers use brand names as a guide. Unfortunately, the computer industry has done an exceedingly good job of training consumers to ignore brand signals rather than training them to seek them out.

For instance, what other consumer industry can you think of that routinely uses the term *clone* to describe its products? Imagine that you walk into Foot Locker and the salesperson says, "You see all those running shoes on the wall there? They're all clones."

What consumer would respond by saying, "Oh, then I don't want those expensive Adidas running shoes, just give me the clone."

"Which clone?"

"Oh, it doesn't matter."

The problem is that manufacturers have been busy impressing business customers with their hot, new technology. They're too focused on the tangible, on what is in the box; how fast it is, how big it is, and so forth. The culture of too many hardware manufacturers rejects the idea that intangibles matter. And they're wrong. Personal computer companies must start tying their brand names to the attributes consumers care about: reliability, ease of use, protection from quick obsolescence, immunity from shifting technological standards, and so on.

We're headed for a world in which consumers care more about who you are than what technology your machine has. Good technology will be the cost of admission to the game; it will not determine who wins.

And don't think this is only about hardware. Software and content companies need branding strategies just as much, if not more. Did you ever try to choose among similar CD-ROM products based on what's on the box? It can't be done. Consumers need brand names that signal quality, ease of use, and compatibility. Because it will be impossible for large numbers of consumers to participate in the market without this, some brand names will eventually emerge to give consumers the signals they are looking for. The only question is, will yours be one of them?

The Next 31 Percent Won't Look Like the First 31 Percent

One reality you can count on is that the next 31 percent of U.S. households that get on the home computer train will be very different from the first 31 percent. They're going to be less likely to be using personal computers at work every day. They will probably be at least somewhat less educated, somewhat older, and somewhat poorer. They won't be as experienced with technology, and they will almost certainly be more afraid of it.

If the personal computer industry continues to focus only on selling computers to people who look like the people who already have them, they might be able to squeeze out another ten or so percentage points of market penetration. But even if the replacement market keeps personal computer sales brisk, if the goal is like Henry Ford's—a machine for the great multitude—then changes will have to be made in everything from the way the machines are built and sold to the way they are set up and serviced.

The Purchase Process Must Be Simplified

I received a phone call a few months back from a football coach at my alma mater. He told me that he and his wife had concluded that they needed to buy their first home computer, mostly because they felt they wanted to give their young children the opportunity to start early. He wanted my advice.

In so many ways, he is representative of the next wave of home computer buyers. He's college educated, but he doesn't use a computer at work and he doesn't understand the technology. He has some sense of why he wants a computer—he even had a list of tasks he wanted to be sure he could accomplish.

This poor guy had been shopping the newspaper ads, and could not make heads or tails out of the absurd, jargon-filled marketing materials being thrown at him. "Why are some MB numbers really big and some really small?" he asked. "What is a CD-ROM drive, and what can we do if we have one that we can't do if we don't? What's the difference

between a 386 and a 486? If letters come after it like *sx* or *dx,* what does that mean? What does M-H-Z stand for?"

If you think these are unreasonable questions for an educated person to be asking given the current state of the market, you should give up now, because you simply don't get it. Human beings are not born knowing the difference between RAM and disk. And they certainly shouldn't have to understand that, or much else, to buy a computer.

The purchase process absolutely, positively must be simplified. Hardware manufacturers selling into the home market have got to stop focusing on what their machines have and start focusing on what they can do. Brand names are an essential part of accomplishing this, but alone they are not enough.

Again, if you think this is just a hardware problem, you've never gone into a software store and read the hardware requirements off the sides of CD-ROM boxes. These content providers have at least six different ways to say the same thing and every one of the six is incomprehensible to the average college-educated person.

If New Media Is an Alternative to Television, It Should Start Acting Like It

Multimedia computers and all the related products and services compete with television. This fact emerges loud and clear from all of Odyssey's research. It's real. And the sooner everyone in the multimedia computer business comes to grips with it, the sooner they can start dealing with the implications.

An entire article could be written on this topic alone, but here are a few implications to get your thinking started:

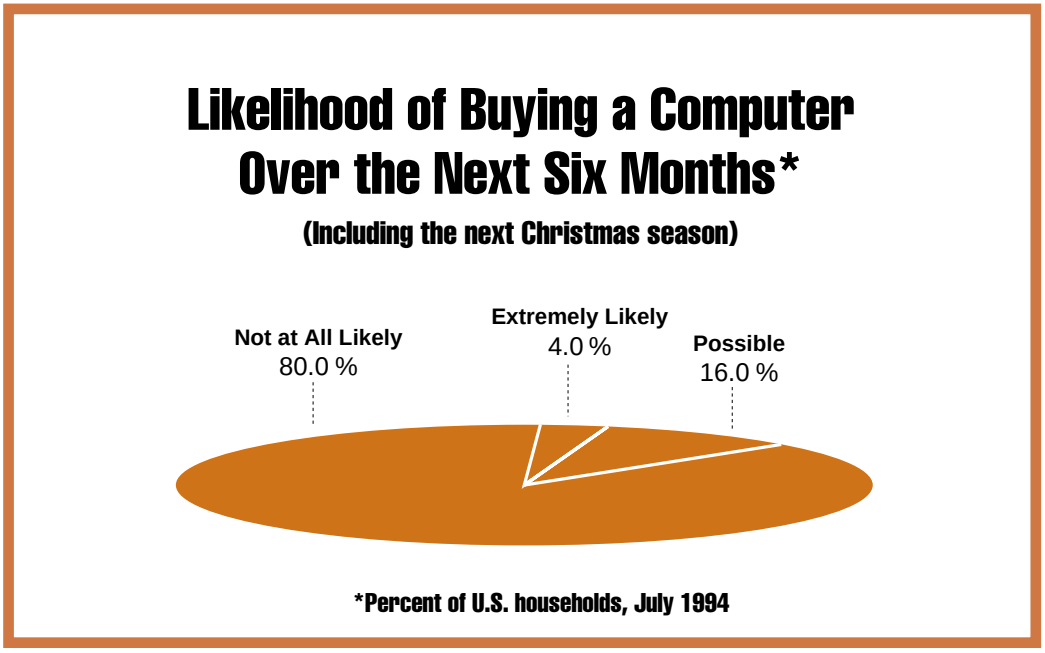
- Advertising will have to play a role. Consumers simply want more new media products and services than they can afford. Advertising has played an important role in almost every other entertainment and information medium in history—from radio and television to newspapers and magazines. The economics of those businesses required it and the economics of new media require it as well.
- The software model of content may be the wrong model for the new multimedia world. Why does it have to come in a box that you buy and own forever? Other entertainment doesn't work this way. If you want to see a movie or watch a television show, you might rent it, but you don't buy it. And you certainly don't spend $50 or $60 to get it. Perhaps another model, such as the video, book, or magazine subscription model, makes more sense.
- The distribution system for content needs to reflect its competition with television. The distribution system consists not only of the place where people purchase content (or rent it or obtain it free), but also of how they choose. Consumers need help choosing; they need guideposts to lead them to what they believe is important. I've already discussed the role brands can play, but there are other ways as well: endorsements, awards, money-back guarantees, packagers, demonstrations, and so on.
- The customer support system has to reflect the "I want it now" nature of entertainment. There are thousands of stories. Here's my most recent: A few weeks ago, I was having a problem with my laptop computer. I knew it was just a simple little switch-setting type of problem, but despite an engineering degree in systems and 20 years of computer programming experience, I couldn't figure it out. So I called the technical support line of the manufacturer—one of the top three computer manufacturers in the country. I was on hold, listening to elevator music, for over two hours and finally had to give up. I tried again the next day, and with less patience, gave up after 90 minutes of the slow version of "I Got You, Babe." This is a disgrace and it cannot continue. This doesn't happen when I call my discount broker, or Procter and Gamble's hotline, or American Express. If there's ever to be a widespread consumer market for multimedia personal computers, this situation must be changed.

Targeting Is Key

Targeting will be an absolutely essential part of any optimal marketing program. There are many levels to targeting, and I've already talked about the importance of understanding the different attitudinal segments in the marketplace when choosing how and what to communicate.

But there are other types of targeting as well. Consider the fact that last summer, as part of Odyssey's *Homefront* study, we asked consumers how likely they were to purchase a personal computer in the next six months, including the coming Christmas season. Only about 4 percent of all U.S. households said they were "extremely likely" to purchase a computer in the next six months. By contrast, a full 80 percent of households told us they were "not at all likely" to buy a computer in the next six months. (See the chart "Likelihood of Buying a Computer Over the Next Six Months" below.)

Now the good news is that 4 percent represents almost 4 million households. The bad news is



that finding these 4 million households among the other 92 million in the country is like finding a needle in a haystack. The way to keep from wasting millions on people who are unlikely customers is targeting. Marketers must understand who the likely purchasers are, what might motivate them to go out and buy a personal computer, what kind of computer makes sense for them, and what kinds of media allow you to reach them most cost-effectively.

Here are three things to keep in mind. First, I don't know about you, but 4 percent doesn't shout broadcast television advertising to me. Even if you use mass media, you need to augment it with heavy doses of targeted media. Second, please don't make the mistake of relying solely on demographics. For instance, "New Enthusiasts" are far more likely to be future purchasers than "Independents," even though both groups are upscale families. Moreover, these two groups will be attracted for different reasons. Third, I used a hardware example here, but the *Homefront* numbers for CD-ROM drives, CD-ROM titles, modems, and online services lead to the same answer: Careful targeting can make your marketing dollars go a whole lot further.

Nothing Is Forever

Finally, we should learn from Henry Ford's failures as well as his successes. In the early 1900s Ford had figured out that cars were a way to more easily do tasks you had to do every day. They weren't about status. Cars weren't about things you had never done before, and they weren't about technology. But by the end of the second World War, Ford had gone from being precisely right to being precisely wrong—not because he changed his point of view, but because he failed to.

Once cars became ubiquitous, their role changed. By the mid-1940s, cars were about status. General Motors capitalized on this and convinced consumers that they needed to be constantly trading up their automobiles, from Chevys to Pontiacs to Buicks to Cadillacs. As David Halberstam writes in his book *The Fifties,* "the buyer was supposed to covet an ever showier, ever more expensive car; as such a car was not a permanent possession, it was an economic benchmark on life's journey to the top."

Henry Ford's failure to see this change in what an automobile was nearly drove the Ford Motor Company into bankruptcy.

Like the car business, the market for new media will also have generations. What constitutes new media will change and grow over time. Unfortunately, in new media the generations may last only 4 or 5 years instead of 40 or 50 years. But the rules are the same: If you want to get to the next phase of the market, you have to go through the current phase first. This is why marketing new media will be a never-ending two-step process: First, answer the question "What is new media?" And second, be smart enough to know the answer won't last.

So with this caveat, I encourage you to think about where this market is today and where it is going, and to make those realities major factors in your decisions. You are selling an alternative to television. Not a replacement for television, but an alternative to it. What will make that alternative appealing will vary by segment, and marketing efforts—both in terms of message and medium—must reflect this variation.

In the process, you are creating a consumer market. A consumer market where brands matter. A consumer market where the buyer lacks technical knowledge. A consumer market notable not for its sameness but for its diversity. For those who can act on this simple concept, success will surely follow, just as it did for Henry Ford. ♣

This paper is adapted from a breakfast symposium speech presented by Nicholas Donatiello, Jr., President and CEO of Odyssey at Multimedia World in San Francisco, California. Odyssey is a market research firm dedicated exclusively to understanding consumers and new media. Each year the firm undertakes multiple large national studies aimed at understanding what consumers are doing for entertainment and information in their homes and what they want to be doing in the future. This includes the largest independent research study of consumers and new media, which involves 28 focus groups in 14 cities and a detailed national survey of 4,000 consumers. Odyssey also conducts Homefront, *a twice-yearly national survey of 1,500 households focused on obtaining thousands of statistics about what is actually happening with personal computers, CD-ROM technology, and online services in the home. For more information about Odyssey and its products, or for additional reprints of this paper, please call 800-742-1792.*

Editor's Note: Many thanks to Chris Okon, of Okon New Media, for sharing research and insights from a forthcoming market research report entitled New Media Market Trends (sponsored by the Multimedia Business Development Group, New Media Division for the Apple Multimedia Program), that aided in the development of last month's article, "The Soul of the New Macintosh."