

PowerPC

Performance Support

Resource Guide



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How can I use this guide?

This guide will:

- Help you know what you are expected to do in order to sell/support Macintosh PowerPC computers.
- Guide you to the references and information so that you can meet or beat the expectations.

For best results:

1. Read through the list of expectations for PowerPC.
2. Use the Expectations Worksheet (on the following page) and mark the areas where you know you are proficient, as well as the areas where you need study and practice.
3. Take the self-test to measure your basic understanding of PowerPC.
4. Use the Expectations Worksheet and the Learning Path charts to help you decide what to study.
5. Use the Product, Sales, and Support Guides to find the quick answers and references to the details.
6. Use the Indexes of Materials to help you find the details on PowerPC topics.

Who is supposed to use this guide?

This guide is written for any individual responsible for selling or assisting with the selling process of PowerPC (internal or external to Apple).

Expectations: What do I need to know?

Self-Test: How much do I know about PowerPC?

Instructions: This self-test has only 15 multiple-choice questions and should take you less than 10 minutes to complete. For each question, circle the most appropriate answer. Behind each answer choice is an answer reference number. To check your answers, turn to the answer reference number. After you have read the answer, follow the instructions to choose another answer or to go on to the next question.

Questions:

Q1.

PowerPC is a new line of computers that Apple Computer, is announcing. (True/False)

- A. True (Go to A1.)
- B. False (Go to number A2.)

Q2.

Which of the following items from a Macintosh computer will be compatible with Macintosh PowerPC computers?

- A. Software, SCSI devices, and peripherals (Go to A3.)
- B. Software only (Go to number A4.)
- C. SCSI devices and peripherals only (Go to number A5.)

Q3.

What are the advantages of a RISC-based computer?

- A. It runs faster and is easier to upgrade (Go to number A6.)
- B. The computer runs faster and works better with video, speech, and phone systems (Go to number A7.)
- C. It runs faster and costs less (Go to number A6.)

Q4.

Why is Apple working with IBM and Motorola on the PowerPC chip?

- A. To get chips in high volume, but low cost. (Go to number A8.)
- B. To gain chips with a scalable architecture (Go to number A8.)
- C. Both of the above (Go to number A9.)

Q5.

The die size of the PowerPC 601 is what percentage of the Pentium chip?

- A. 90% of the Pentium chip size (Go to A10.)
- B. 75% of the Pentium chip size (Go to A11.)
- C. 45% of the Pentium chip size (Go to A12.)

Q6.

What are the advantages to a smaller die size?

- A. More accurate, takes up less room, and quicker (Go to A13.)
- B. Costs less, uses less power, and takes up less room (Go to A14.)
- C. Costs less, more powerful, and easy to replace (Go to A15.)

Q7.

How much faster will new PowerPC applications run when compared to applications on a Quadra 950?

- A. Two times faster (Go to A16.)
- B. Four times faster (Go to A16.)
- C. Up to ten times faster (Go to A16.)

Q8.

What is the name of the operating system for Macintosh PowerPC computers?

- A. Motif (Go to A17.)
- B. X-Windows (Go to A17.)
- C. System 7 (Go to A17.)

Q9.

Under 68000 emulation mode, the speed of the Macintosh PowerPC computer will be comparable to:

- A. An LC II computer (Go to A18.)
- B. A Quadra 700 computer (Go to A19.)
- C. A Macintosh Classic computer (Go to A20.)

Q10.

How many model numbers have been announced for the PowerPC chip?

- A. Two (601 and 603) (Go to A21.)
- B. Six (601, 602, 603, 604, 620 and 650) (Go to A21.)
- C. Four (601, 603, 604, and 620) (Go to A21.)

Q11.

Which Bus architecture will be used in the first Macintosh PowerPC computers?

- A. NuBus (Go to A22.)
- B. PCI (Go to A22.)

Q12.

What is PowerOpen?

- A. The name of a future PowerPC computer (Go to A23.)
- B. A PowerPC operating system that runs DOS, Windows, and UNIX operating systems. (Go to A24.)
- C. An optional PowerPC operating system that supports UNIX, System 7.x, Motif, and X Windows. (Go to A25.)

Q13.

How many developers are working currently on native PowerPC applications for the Macintosh?

- A. Less than 5 (Go to A26.)

B. About 11 (Go to A26.)

C. More than 16 (Go to A27.)

Q14.

Which Macintosh computers have announced upgrade paths to PowerPC models?

A. The Quadra 610 and 650 (Go to A28.)

- B. Macintosh IIfx and vi (Performa 600) (Go to A28.)
- C. Quadra 840AV and Quadra 660AV (Go to A28.)
- D. All of the above (Go to A28.)

Q15.

The first shipment of Macintosh PowerPC computers, with no additional hardware or software, will also run DOS and Windows applications?

- A. True (Go to A29.)
- B. False (Go to A30.)

Answers:

A1.

No. Maybe that was a trick question, but there is an important distinction here. PowerPC is a chip, not a computer. It is being developed by IBM, Motorola, and Apple Computer. Any computer that uses the PowerPC chip will be referred to as a PowerPC-based computer. For more information, refer to the Sales Reference section of this guide. (Go to Q2.)

A2.

That's right. PowerPC is the name of a chip, not a line of computers. The line of computers Apple Computer is announcing will be Macintosh PowerPC computers. (Go to Q2.)

A3.

That's correct. The PowerPC-based Macintosh computer will have an emulation mode for running almost all current software. In addition, SCSI devices and other peripherals will be compatible with the new computers. (Go to Q3.)

A4.

No. SCSI devices, peripherals, and software from current Macintosh computers will all be usable on the new PowerPC-based systems. For more information on this, refer to the PowerPC Presentation. The index of materials at the end of this document will list the location. (Go to Q3.)

A5.

No. SCSI devices, peripherals, and software from current Macintosh computers will all be usable on the new PowerPC-based systems. For more information on this refer, to the PowerPC Presentation. See the Indexes of Materials at the end of this document for the location. (Go to Q3.)

A6.

While the RISC architecture does mean faster processing, there are quite a few other advantages to RISC technology. (Go back to Q3 and choose again.)

A7.

Yes. RISC technology allows software to run faster. In addition RISC allows integration with phone systems, better use of video signals, and improvements with speech, voice, and

CD-quality sound. (Go on to Q4.)

A8.

That is only part of the reason. (Go back to Q4 and choose again.)

A9.

Yes. In reality there were more reasons than just those two. Clearly, by combining efforts, PowerPC would become the largest supported RISC chip available. In addition, it meant the best chip technology could be merged with a leading operating system and human interface. Other reasons included: commercial-grade UNIX available, development tools, and a large sales and distribution network. (Go to Q5.)

A10.

No. The PowerPC chip is 120 mm² and the Pentium chip is 264 mm², making the PowerPC chip 45% of the size of the Pentium. (Go to Q6.)

A11.

No. The PowerPC chip is 120 mm² and the Pentium chip is 264 mm², making the PowerPC chip 45% of the size of the Pentium. (Go to Q6.)

A12.

Right. The PowerPC chip is 120 mm² and the Pentium chip is 264 mm², making the PowerPC chip 45% of the size of the Pentium. (Go to Q6.)

A13.

Not quite. Although the smaller chip will take up less room, accuracy and speed are not attributable to its size. (Go back to Q6 and choose again.)

A14.

Right. The smaller die size of the chip allows it to be built at about half the price (\$965 for Pentium, \$450 for PowerPC). In addition, the smaller size means the chip uses less power and can fit in smaller places. (Go on to Q7.)

A15.

Not quite. Although the smaller chip will cost less, overall power and easy replacement are not attributes of its size. (Go back to Q6 and choose again.)

A16.

All three answers fit the range. Standard applications written for the PowerPC chip will run two to four times faster than a Quadra 950. However, applications that use mathematical operations like floating point (3D and some spreadsheets) could see gains as high as ten times faster than a Quadra 950. (Go to Q8.)

A17.

System 7 is the official operating system for PowerPC Macintosh computers (even though the computer will have the ability to run other operating systems). Apple is optimizing parts of System 7 for the highest performance on the PowerPC processor. On the high end, UNIX will be available and through Insignia SoftPC will give DOS and Windows operating environments. (Go to Q9.)

A18.

No. Emulation will be much faster than that. Performance will range between a fast 68030 (Macintosh IIVx) and a fast 68040 (Quadra 800, 840AV). (Go to Q10.)

A19.

Yes. Performance will range between a fast 68030 (Macintosh IIVx) and a fast 68040 (Quadra 700). (Go to Q10.)

A20.

No. Emulation will be much faster than that. Performance will range between a fast 68030 (Macintosh IIVx) and a fast 68040 (Quadra 800, 840AV). (Go to Q10.)

A21.

Four PowerPC chips have been announced. The 601 is the first chip and will be used for mid-range and high-end Macintosh computers. The 603 is a low-cost, low-power chip for use in PowerBook computers (coming about one year after the 601). The 604 is a newer, faster version of the 601 (available about one year after the 603). Finally, the 620 is a high-end chip, competitive with any RISC vendor's chips. (Go on to Q11.)

A22.

The first generation Macintosh PowerPC computers will use NuBus. Later versions will incorporate the PCI bus structure. (Go to Q12.)

A23.

No. (Go back to Q12 and choose again.)

A24.

No, but you are close. PowerOpen is an operating system that will allow a variety of operating systems to run on a PowerPC-based computer. Motif, System 7.x, X Windows, and UNIX are the operating systems that have been listed to work with PowerOpen when it is introduced in 1994. (Go to Q13.)

A25.

Right. PowerOpen is an operating system that will allow a variety of operating systems to run on a PowerPC-based computer. Motif, System 7.x, X Windows, and UNIX are the operating systems that have been listed to work with PowerOpen when it is introduced in 1994. (Go to Q13.)

A26.

No. There are more than that. (See A27 for the real answer.)

A27.

Right. There are hundreds of developers doing some work on PowerPC products. But as of mid-October 1993, there are more than 18 developers who have publicly announced support in conjunction with Apple. Here are a few companies on the list: Aldus Corporation, Claris Corporation, Great Plains Software, Insignia Solutions Inc., Lotus, Microsoft Corporation, and WordPerfect Corporation. (Go to Q14.)

A28.

All of the computers listed have upgrade plans announced. Apple will provide upgrades for the Macintosh IIvx and vi (the Performa 600) and the Quadra 610, 650, 660AV, 800, and 840AV. The pricing and availability will be announced later. (Go to Q15.)

A29.

Wrong. The first shipment of Macintosh PowerPC computers will have no native ability to run DOS or Windows operating systems. However, Insignia Solutions Inc. has announced a version of SoftPC for the PowerPC Macintosh computer that will enable DOS and Windows applications.

That's the end of the test. If you identified areas where you need to know more, the table of contents can direct your reading. Read on in this guide for performance expectations and more information on PowerPC.

A30.

Right. However, Insignia Solutions Inc. has announced a version of SoftPC for the PowerPC Macintosh computer that will enable DOS and Windows applications.

That's the end of the test. If you identified areas where you need to know more, the table of contents can direct your reading. Read on in this guide for performance expectations and more information on PowerPC.

Recommended Learning Path – Sales and Support

Refer to the Sales and Presentation Tools section of this document for locations of all documents.

Product Reference: What does PowerPC do?

Product Description

In the first half of 1994, Apple will introduce the first Apple Macintosh computers based on PowerPC reduced instruction-set computing (RISC) microprocessors.

PowerPC technology will create the foundation for a new generation of faster, more powerful Macintosh software.

Macintosh PowerPC computers will:

- Use the Macintosh System 7 operating system
- Run thousands of Macintosh applications available today
- Support nearly all current Macintosh printers, networking cards, and other hardware accessories.
- Coexist with today's Macintosh models, including sharing data and coexisting on a network.

See the Sales and Presentation Tools section of this guide for complete sources of this information.

Technology Background

Why RISC?

RISC processors streamline the internal workings of computers. Whereas traditional (complex instruction set computing, or CISC) processors contain a wide variety of instructions to handle many different tasks, RISC processors contain only those instructions that are used most often. When a complex instruction is needed, a RISC processor builds it from a combination of basic instructions.

RISC processors are designed to execute these basic instructions extremely quickly. The performance gains achieved by speeding up the most-used instructions more than compensate for the time spent creating less-used instructions.

To date, RISC technology has been used only in systems designed for raw computational power. For example, most engineering workstations and commercial database servers use RISC processors. These computers have generally been based on the UNIX operating system and have, therefore, been more difficult to install, learn, use, and maintain than personal computer users have come to expect.

The performance improvement of successive CISC processors is leveling off, whereas RISC performance is continuing to grow. At the same time, RISC will be manufactured in high enough volumes to make it cost effective for the personal computer market.

See the Sales and Presentation Tools section of this guide for complete sources of this information.

More information on this topic will be included in future versions of this guide.

The PowerPC Microprocessor Family

Apple, IBM, and Motorola are working on four versions of the PowerPC microprocessor simultaneously. Each version is designed to meet the needs of a different segment of the marketplace.

The 601 will be in production in early 1994 and will be used in the initial mid-range and high-end Macintosh systems.

The PowerPC 603 microprocessor will offer performance similar to the 601 in an even lower-power, lower-cost design. These features will allow Apple to use the 603 in high-volume desktop Macintosh computers and PowerBook models.

The PowerPC 604 microprocessor will eventually replace the 601, allowing Apple to offer even better performance in mid-range and high-end Macintosh computers.

The PowerPC 620 microprocessor will be a high-end product offering premium performance and a full 64-bit architecture. It is being designed primarily for high-performance workstations and servers.

See the Sales and Presentation Tools section of this guide for complete sources of this information.

More information on this topic will be included in future versions of this guide.

Sales Reference: How will we sell PowerPC?

Product Advantages

PowerPC processor-based Macintosh systems will offer two to four times the performance of today's fastest 68040- and 80486-based personal computers.

Applications written specifically for PowerPC processors and using floating point math operations can run eight to ten times faster than today's 68040 and 80486 systems.

See Sales and Presentation Tools section of this guide for complete sources of this information.

Product Positioning

The first PowerPC Macintosh computers will be positioned as mid-range or high-end Macintosh computers.

Apple is committed to moving the entire Macintosh family to PowerPC processors. We will first incorporate the technology into mid-range and high-end models. Subsequently, we will offer PowerPC processor-based versions of all our Macintosh product lines, from Macintosh Quadra to Performa, LC, and PowerBook systems.

By mid-1994, when customers purchase a mid-range or high-end Macintosh system, they'll be able to choose between PowerPC processor-based and 680x0-based models, selecting the one that best meets their needs. Both platforms will coexist for some time.

See the Sales and Presentation Tools section of this guide for complete sources of this information.

More information on this topic will be included in future versions of this guide.

Product Availability

Information on this topic will be included in future versions of this guide.

Sales Strategy

Information on this topic will be included in future versions of this guide.

Sales and Presentation Tools

PowerPC Presentation

(Aldus Persuasion format) AppleLink path: Apple Products —> New Apple Products —> PowerPC folder

PowerPC Q&A

AppleLink path: Apple Products —> New Apple Products —> PowerPC folder

PowerPC Developer White Paper

(Microsoft Word format) AppleLink path: Apple Products —> New Apple Products —> PowerPC folder

PowerPC Customer White Paper

(Microsoft Word format) AppleLink path: Apple Products —> New Apple Products —> PowerPC folder

PowerPC for Macintosh Fact Sheet

AppleLink path: Apple Products —> New Apple Products —> PowerPC folder

Marketing and Advertising

Information on this topic will be included in future versions of this guide.

Competitive Information

Although Apple is not the only manufacturer incorporating PowerPC technology into personal computers, we are the only company that can combine this powerful new hardware with the superior user environment of System 7, the Macintosh operating system. Unlike vendors who are requiring users to switch to a new operating system to benefit from RISC technology, Apple is moving our mainstream operating system to PowerPC technology.

More information on this topic will be included in future versions of this guide.

PowerPC vs. Pentium

Intel Corporation has recently released a new CISC microprocessor called Pentium that is being used in some vendors' computers. Intel maintains that RISC technology is not necessary to provide the power required for tomorrow's desktop applications.

However, information gathered by Motorola shows that even the first-generation PowerPC 601 microprocessor has performance comparable to Pentium in integer calculations and exceeding Pentium in the floating-point calculations. Floating-point calculations are needed for sophisticated graphics, communications, and video applications.

PowerPC not only outperforms Pentium, but it does so in a smaller and cooler package. Size affects a microprocessor's cost (smaller ones cost less), while heat output affects which models it can be used in (hotter processors need more space and electrical power, which precludes their use in notebook computers).

See the Sales and Presentation Tools section of this guide for complete sources of this information.

More information on this topic will be included in future versions of this guide.

Third-Party Products

Apple has announced that an additional 37 third-party developers worldwide have publicly committed to shipping new Macintosh with PowerPC versions of their products. These applications will tap the power and performance of the new RISC-based Macintosh systems on schedule for introduction in the first half of 1994. This brings the total number of developers who have announced their support for the Macintosh with PowerPC platform to 61.

Apple is working closely with more than 200 developers worldwide on porting their existing 680x0 Macintosh applications to the PowerPC architecture, resulting in "native" applications featuring breakthrough performance. (A native application is an application that has been recompiled for the PowerPC chip. Native applications take full advantage of the superior speed of PowerPC technology.) Apple expects hundreds of leading native third-party products to be available for Macintosh with PowerPC systems.

"PowerPC is receiving overwhelming developer support across all of our key markets, including publishing, education, multimedia, technical markets, and general business/productivity" said David Nagel, senior vice president and general manager of the AppleSoft Division. "Customers of all types will benefit immediately from the increased power and performance made possible by native applications. Customers will further benefit as developers innovate new features and functionality enabled by the horsepower of RISC combined with the familiar, easy-to-use Macintosh interface."

Many of the developers who have announced their support to date, demonstrated prerelease versions of their native applications on prototype Macintosh with PowerPC computers for the first time on the MacWorld trade show floor, showcasing the significant performance gains users should be able to achieve with native applications in the future. Apple anticipates the Macintosh with PowerPC platform will offer up to four times the performance of today's fastest 68040 and 80486 systems, and as high as tenfold for applications that use floating-point mathematical calculations.

For more information on this subject, use AppleLink path:  Employees —>  Hotlinks and see the article summarized from PR Express.

More information on this topic will be included in future versions of this guide.

Technical Reference: What are the product specifics?

Technical Specifications

This information is confidential and cannot be released until after product introduction.

Support Issues

Upgrades

In anticipation of the debut of our next-generation PC platform, Macintosh with PowerPC, Apple has announced how current Macintosh customers can upgrade to PowerPC technology. The plan is to offer both logic board and processor upgrades based on the PowerPC 601 chip for a wide range of Macintosh systems. The upgrades are designed to provide current Macintosh customers with access to the power and performance of the new PowerPC technology.

Both the logic board and processor upgrade products are designed with the PowerPC 601 chip to provide two to four times the performance of the existing Macintosh models when running native applications.

Logic Board Upgrades: Apple expects to provide logic board upgrades for the Macintosh Quadra 840AV, 800, 660AV, 650, and 610 models, the Macintosh Centris 660AV, 650, and 610 computers, and the Macintosh IIvx, vi, and Performa 600 products. Additionally, owners of the Apple Workgroup Servers 60, 80, and 95 will be offered logic board upgrades to PowerPC processor-based systems, which will run a version of the Macintosh System 7.0 operating system for the PowerPC processor.

Logic board upgrades will provide these existing Macintosh models with the full functionality of PowerPC technology. Dealer installation is required.

PowerPC Upgrade Cards: Apple plans to offer a lower cost processor upgrade card for the Quadra 950, 900, 800, 700, 650, and 610 models, as well as the Centris 650 and 610 computers.

This processor card will provide customers with a low-cost upgrade option that is also user-installable. The processor upgrade card takes advantage of the Processor Direct Slot (PDS) in these Macintosh 68040-based systems. With the addition of this processor upgrade, systems run at twice the speed (megahertz) of the Motorola 68040-based system they are upgrading. For example, a 25-MHz system will run at 50 MHz with the addition of the PowerPC processor upgrade.

Upgrade Summary:

	Logic Boards	Upgrade Card
Quadra 900, 950	N/A	OK
Quadra 840AV	OK	N/A
Quadra 800	OK	OK
Quadra 700	N/A	OK

Centris/Quadra 660AV	OK	N/A
Centris/Quadra 650	OK	OK
Centris/Quadra 610	OK	OK
IIvx, IIvi, Performa 600	OK	N/A

Availability and Pricing

Apple plans to ship the PowerPC technology upgrade products simultaneously with the introduction of the new Macintosh with PowerPC systems in the first half of 1994. Macintosh desktop upgrade products are expected to range in price from less than \$700 to \$2,000.

Apple and Third-Party Options

Apple continues to work on upgrades for other Macintosh models. In addition, Apple is working in conjunction with selected third-party developers to provide an array of options for customers to upgrade to PowerPC technology. In November, 1993, Apple announced a licensing agreement with DayStar Digital, under which DayStar plans to develop a high-performance processor upgrade card for the Quadra 650, 700, 800, 900, and 950 systems, and the Macintosh Centris 650.

See the Sales and Presentation Tools section of this guide for complete sources of this information.

More information on this topic will be included in future versions of this guide.

Software Compatibility for Today's Products

Today's Macintosh applications should run, without modification, on PowerPC processor-based Macintosh models. We expect their performance to be surprisingly responsive. Of course, performance will vary dramatically based on the application and other factors. For example, applications that rely heavily on Toolbox routines will run at higher speeds than those that don't. In actual use, performance will range from a fast 68030- to a 68040-based Macintosh.

You can find a list of third-party software compatibility with PowerPC for specific products using the following AppleLink path: Support —> Tech Info Library —> type **PowerPC** or the name of a specific product. This list contains only the information supplied to Apple by third-party developers and may not be a complete list.

See the Sales and Presentation Tools section of this guide for complete sources of this information.

More information on this topic will be included in future versions of this guide.

Development Tools

Apple has released a series of developer products that will accelerate the availability of native applications for its next-generation of PowerPC

microprocessor-based personal computers and servers. Apple announced its Macintosh on RISC Software Developer's Kit (SDK), which includes all tools and documentation necessary to create new applications or port existing Macintosh applications to run native on future Apple PowerPC processor-based systems. Apple has also introduced the Macintosh with PowerPC Starter Kit and a comprehensive, self-paced training course titled Programmer's Introduction to RISC and PowerPC. Additionally, Apple is offering a bundle that includes the SDK and training course along with a new native PowerPC development environment, CodeWarrior, from Metrowerks.

These new tools enable software developers to begin adapting their applications to run native on PowerPC microprocessor-based computers using current Macintosh development systems, before Apple PowerPC processor-based systems become available in the first half of 1994. A native application is an application that has been recompiled for the PowerPC microprocessor. Native applications take full advantage of the superior performance of PowerPC technology.

Macintosh on RISC SDK: The Macintosh on RISC SDK is an MPW-based (Macintosh Programmer's Workshop) environment that runs on a 68020, 68030, or 68040 Macintosh and generates native code for Macintosh with PowerPC microprocessor-based systems. The comprehensive, cross-development environment enables developers to jump start the application development process. As soon as Macintosh with PowerPC processor-based systems become available, developers can finish the port by testing and debugging their native Macintosh with PowerPC applications.

Macintosh with PowerPC Starter Kit: The Macintosh with PowerPC Starter Kit introduces developers to the basics of the Macintosh with PowerPC. It includes a collection of documents for general information as well as detailed technical documentation about both the PowerPC microprocessor and System 7 for Macintosh with PowerPC.

Programmers Introduction to RISC and PowerPC: Apple's Developer University course "Programmer's Introduction to RISC and PowerPC" introduces developers to the technical issues associated with RISC and PowerPC microprocessor technology. The format is an interactive, multimedia CD-ROM designed as a self-paced learning tool. It prepares developers for recompiling existing code for the Macintosh with PowerPC while enhancing speed and portability, as well as writing new code for Macintosh with PowerPC.

Metrowerks CodeWarrior: CodeWarrior is the industry's first native development environment for the PowerPC microprocessor-based and 680x0 microprocessor-based Macintosh. With quick turnaround time and an integrated user interface, CodeWarrior enables programmers to quickly and easily develop applications for both platforms using the same source code base. CodeWarrior comes in three versions: Gold, Silver, and Bronze. The Gold version is the most comprehensive and includes development releases of C, C++ for the 680x0 Macintosh and for the Macintosh with PowerPC; a development release of Pascal for the 680x0 Macintosh; and C and C++ cross-compilers. The Silver version supports native PowerPC microprocessor development only, and will be released when Apple ships Macintosh with PowerPC systems. The Bronze version, available now in prerelease form, supports 680x0 development only.

Pricing and Availability

The Macintosh on RISC SDK is being made available at this time in prerelease form, with an automatic upgrade to the final version at no additional charge. It includes a nondisclosure agreement, which the user agrees to by opening and using the product.

CodeWarrior Gold is also being made available at this time in prerelease form, with an automatic upgrade from Metrowerks to the final version at no additional charge.

The Macintosh on RISC SDK, Macintosh with PowerPC Starter Kit, the Programmers' Introduction to RISC and PowerPC, and Metrowerk's CodeWarrior Gold are available worldwide and can be ordered through APDA, Apple's source for developer tools. The SDK (delivered on CD-ROM) has an APDA catalog price of \$399, the Starter Kit at \$39.95, the Programmer's Introduction at \$150, and CodeWarrior Gold at \$399. APDA can be reached in the United States at (800)2822732, in Canada at (800) 637-0029, or internationally at (716) 871-6555.

Apple is offering a bundle including the Macintosh on RISC SDK, the Programmer's Introduction to RISC and PowerPC, and Metrowerk's CodeWarrior Gold for a price of \$849 through APDA.

Prices will vary outside the United States and customers are urged to contact their local Apple subsidiary for pricing and availability information.

For more information on this subject, use AppleLink path: Employees —> Hotlinks and see the article summarized from PR Express.

More information on this topic will be included in future versions of this guide.

Index to Materials: What's available by topic area?

Product Information/Positioning

Macintosh with PowerPC Presentation (Why PowerPC from Apple) (Aldus Persuasion format)

Macintosh with PowerPC Summary — Positioning Macintosh with PowerPC versus IBM PowerPC Products (MacWrite format)

PowerPC Presentation (Aldus Persuasion format) — AppleLink path: Apple Products —> New Apple Products —> PowerPC folder

PowerPC Q&A — AppleLink path: Apple Products —> New Apple Products —> PowerPC folder

PowerPC Developer White Paper (Microsoft Word format) — AppleLink path: Apple Products —> New Apple Products —> PowerPC folder

PowerPC Customer White Paper (Microsoft Word format) — AppleLink path: Apple Products —> New Apple Products —> PowerPC folder

PowerPC Fact Sheet — AppleLink path: Apple Products —> New Apple Products —> PowerPC folder

PowerPC Fact Sheet — One double-sided card with information, PowerPC facts, and upgrade information. Located in October Mailbox.

PowerOpen

PowerOpen Presentation, Apple Computer, Inc. — AppleLink path: Developer Support —> Developer Services —> Periodicals —> Apple Directions —> Apple Direct May 1993 —> News

Morgan, Cynthia, "Hybrid fruit of Apple, IBM and UNIX is sweet in PowerOpen architecture," *Government Computer News* July 5, 1993 v12 n14 p31(2).

Emigh, Jacqueline, "Enterprise '93: PowerOpen Association revs into high gear," *Newsbytes* June 21, 1993

Foley, Mary Jo, "PowerOpen OSs due in '94," *PC Week* August 16, 1993 v10 n32 p11(1)

Technical Information

Various articles and responses — AppleLink path: Support —> Tech Info Library

Kerr, Monta, “Developers given glimpse of Mac PowerPC in action,” *Computing Canada* May 25, 1993 v19 n11 p2(2)

Slater, Michael, “PowerPC—your next PC processor?” *Computer Shopper* August 1993 v13 n8 p64(3)

Duffy, Caroline A., “PowerPC success hinges on ports to operating systems,” *PC Week* June 28, 1993 v10 n25 p120(1)

Canon, Maggie, “PowerPC prophecies,” *MacUser* October 1993 v9 n10 p23(1)

Developer Information

Apple Developer University self-paced PowerPC courses, available through APDA.

Inside Macintosh – RISC System Software to be published by Addison-Wesley Publishing Company in early 1994; preliminary confidential version available from Apple Computer as of 11/10/93

The Macintosh on PowerPC folder on AppleLink path: Developer Support —> Developer Services —> Macintosh on PowerPC

Audio and video tapes from the 1993 Worldwide Developers Conference PowerPC sessions.

Market Research — AppleLink path: Developer Support —> Developer Services —> Periodicals —> Apple Directions —> Apple Directions August 1993

Product Reviews

Information on this topic will be included in future versions of this guide.

Competitive Topics

Macintosh with PowerPC Summary — Positioning Macintosh with PowerPC versus IBM PowerPC Products (MacWrite format)

Stam, Nick, "Inside Pentium," *PC Magazine* April 27 1993 v12 n8 p123(8)

Patch, Kim, "Intel digs in for CPU battle," *PC Week* May 24, 1993 v10 n20 p157(2)

Garry, Greg, "Who'll inherit the PC legacy?" *Digital News & Review* May 3, 1993 v10 n9 p1(2)

Dvorak, John C., "Breaking Windows," *MacUser* September 1993 v9 n9 p368(1)

EDGE: Work-Group Computing Report July 26, 1993 v4 n166 p2(1)

Casselman, Grace, "Motorola undercuts Pentium with PowerPC pricing policy," *Computing Canada* June 7, 1993 v19 n12 p36(1)

Gillen, Al, "Motorola prices PowerPC," *MIDRANGE Systems* June 8, 1993 v6 n11 p13(1)

Dvorak, John C., "The PowerPC: for once a non-Intel chip looks like the winner," *PC-Computing* September 1993 v6 n9 p111(1)

Strattner, Anthony, "PowerPC to face off against Intel/Microsoft juggernaut," *Computer Shopper* August 1993 v13 n8 p61(1)

Index to Materials: What's available by source location?

ARPL CD-ROM

October Internal and Partner versions

PowerPC Customer White Paper (Microsoft Word format)

PowerPC Presentation (Aldus Persuasion format)

November Apple Internal version

PowerPC Q&A — Document answers the most-asked questions regarding PowerPC and its implementation by Apple.

PowerPC Performance Support Resource Guide (Microsoft Word format) — A copy of this document.

PowerPC Fact Sheet (PageMaker format) — A two-page document with information PowerPC facts and upgrade information

December Internal version

Macintosh with PowerPC Presentation (Why PowerPC from Apple) (Aldus Persuasion format)

Macintosh with PowerPC Summary — Positioning Macintosh with PowerPC versus IBM PowerPC Products (MacWrite format)

Apple Mailbox

August Field Mailbox

PowerPC Customer White Paper (Microsoft Word format)

September Field Mailbox

PowerPC White Paper (Microsoft Word format)

October Field and Reseller Mailbox

PowerPC Fact Sheet — One double-sided card with information PowerPC facts and upgrade information

November Field Mailbox

PowerPC Q&A — Document answers the most-asked questions regarding PowerPC and its implementation by Apple.

PowerPC Performance Support Resource Guide (Microsoft Word format) — A copy of this document

PowerPC Audio Tape — Recorded answers to the most commonly asked questions about PowerPC

AppleLink

Path: Apple Products —> New Apple Products —> PowerPC folder

Path: Apple Sales & Mktg. —> Presentations Library —> Apple Products —> Desktop CPUs

Path: Apple Sales & Mktg. —> Apple Programs —> PowerPC Transition

Path: Developer Support —> Developer Services —> Macintosh on PowerPC

Path: Support —> Tech Info Library

Periodicals/Journals

Canon, Maggie, "PowerPC prophecies," *MacUser* October 1993 v9 n10 p23(1)

Casselman, Grace, "Motorola undercuts Pentium with PowerPC pricing policy," *Computing Canada* June 7, 1993 v19 n12 p36(1)

Duffy, Caroline A., "PowerPC success hinges on ports to operating systems," *PC Week* June 28, 1993 v10 n25 p120(1)

Dvorak, John C., "Breaking Windows," *MacUser* September 1993 v9 n9 p368(1)

Dvorak, John C., "The PowerPC: for once a non-Intel chip looks like the winner," *PC-Computing* September 1993 v6 n9 p111(1)

EDGE: Work-Group Computing Report July 26, 1993 v4 n166 p2(1)

Garry, Greg, "Who'll inherit the PC legacy?" *Digital News & Review* May 3, 1993 v10 n9 p1(2)

Gillen, Al, "Motorola prices PowerPC," *MIDRANGE Systems* June 8, 1993 v6 n11 p13(1)

Kerr, Monta, "Developers given glimpse of Mac PowerPC in action," *Computing Canada* May 25, 1993 v19 n11 p2(2)

Patch, Kim, "Intel digs in for CPU battle," *PC Week* May 24, 1993 v10 n20 p157(2)

Slater, Michael, "PowerPC — your next PC processor?" *Computer Shopper* August 1993 v13 n8 p64(3)

Stam, Nick, "Inside Pentium," *PC Magazine* April 27, 1993 v12 n8 p123(8)

Strattner, Anthony, "PowerPC to face off against Intel/Microsoft juggernaut," *Computer Shopper* August 1993 v13 n8 p61(1)

Audio/Video

Audio and video tapes from the 1993 Apple Worldwide Developers Conference, PowerPC sessions.

Training

Apple Developer University self-paced PowerPC courses, available through APDA.