



The 66 Most Asked Questions Regarding Pippin (and their answers!)

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Background

Q: What is Pippin?

A: Pippin is a multimedia player platform derived from Apple's second generation Power Macintosh hardware and system software. It is architected to achieve lowest cost while optimizing it as a playback tool for multimedia CD-ROMs initially created for the Macintosh and/or IBM compatible PC. It is intended to integrate into the home market (and probably schools) as a part of consumer AV stereo and TV environment. As such its primary display will be a TV screen. It utilizes one of the most advanced RISC microprocessor architectures in the industry today, PowerPC. Because it is derived from both the hardware and software architectures of the Macintosh it provides developers with a simple and easy porting effort to take their investment in personal computer CD-ROM content and make it available to a wider audience in a more natural environment associated with entertainment and fun.

Q: What events led to the introduction of Pippin?

A: The multimedia revolution is here! Revenue on sales of CD-ROMs for the personal computer are up sharply in 1994 as compared to the previous year. Every week there are announcements about a book publisher, Hollywood studio, music publisher or venture capital backed start up getting into the CD-ROM development/publishing business. The delivery of multimedia content (*i.e.* interactive games, interactive learning, interactive fun, interactive information delivery, interactive music, *etc.*) is currently restricted to the personal computer where connect rates for CD-ROM mechanisms are accelerating rapidly. The connect rate, or percentage of personal computers having CD-ROM drives, is rapidly approaching 100% for the Macintosh. In 1994, for the first time, the worldwide sales of personal computers (from all manufacturers) into the home exceeded 10M. However, 1994 was also the first year in which more personal computers sold into the home went into homes already having a personal computer than those in which there was no personal computer. This statistic suggests that the penetration of the personal computer into the home is entering a maturing age with an accompanying deceleration in penetration of new market spaces. In the US, more than 60% of the households have combined gross income less than \$40k per year. While most of these homes have one or more television sets, it is expected that even by 1997 the number of homes in this category with a personal computer will be well below 10%. The high barrier price of personal computers is limiting its ubiquitous penetration into homes around the world. If this trend does not reverse, it portends a limited growth for both multimedia hardware and content sales in the years to come, just as many new title publishers are entering the industry. It is essential to the long-term health of the CD-ROM title industry that the growth it is experiencing now, continue into the future.

Apple, in studying these trends, realized that for multimedia technology to reach the home ubiquitously, the entry price must be reduced substantially. Hence, it has developed the platform "Pippin" in order to optimize the features necessary for multimedia playback together with entry level prices. However, a low entry price is still not enough. The platform must be distributed by many companies which collectively can reach a much larger audience than one company alone. Therefore, Apple has chosen to make the Pippin platform available under license to manufacturers interested in building and selling their own version.

Q: How will Pippin be positioned in the market?

A: If all a family wants is the least expensive video **game** player and does not want to be able to

use their purchase for other uses they will probably be better off buying the upcoming new platforms being introduced by the video game giants Nintendo and Sega. Other new platforms such as Atari Jaguar, Sony Playstation and 3DO are all video game players and cannot be useful for much else. It remains to be seen how these platforms will hold up against the two mainstay players, Nintendo and Sega.

Apple believes that families are looking for much more than video game players today. Certainly they want to be able to play their favorite games, but they also want to communicate, learn, play interactive music, access information and much more. Pippin provides them this capability. In addition it provides them a high level of compatibility with a mainstream personal computer technology. This will provide them the knowledge that their investment in CD-ROM titles and experience will not go to waste.

Thus, **PIPPIN - IT EDUCATES, IT ENTERTAINS, IT COMMUNICATES, IT WORKS!!**

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

A: Pippin is derived from the second generation of Power Macintosh computers and thus has a common heritage. Much of the system software code, integrated circuit cells and integrated circuits come directly from the Macintosh world. Pippin is being architected, however, for optimal playback. As such it operates from a run-time version of the MacOS™ on less memory with more dedicated functions. While it is possible to add mass storage devices in the aftermarket, Pippin will ship with only a readable CD-ROM mechanism as a mass storage device.

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 the title developer can choose. Each will support a different functionality set. During the title development process the developer will decide which version they will want to use. Once the title is complete the developer/publisher will specify to the stamping production house which version of the Pippin system software it will use. In this way the end customer will not know or care which version of the operating system is bundled with their CD-ROM title. The Pippin title will run with successive generations of titles always improving in performance and functionality.

Q: Why is Apple doing this?

A: This is a logical extension of our existing technology. It capitalizes on Apple's expertise in multimedia, RISC and ease-of-use....using resources and technology that are already in place today, not an entirely new product or market concept. The architecture and business model for Pippin are designed to provide this wealth of content with a means for reaching an audience substantially larger than that which exists today. For Apple this is a strategic thrust to expand its business beyond the sales of personal computers and at the same time put the multimedia industry, currently in its infancy, into high gear. This is part of Apple's on-going strategy to expand the reach of Macintosh technology into new markets.

Q: Why now?

A: There were two key elements missing that prevented Apple from launching Pippin earlier. The first is technology. QuickTime™ has progressed as an industry standard and has developed increasingly in sophistication to the point now that it is an extremely compelling technology.

In addition, Apple had to make the transition to RISC microprocessor technology. To reach the performance necessary for game and multimedia playback RISC technology is a must. Apple has successfully made the transition to RISC.

The second major reason why Apple has waited until now is market maturity. The year 1994 will be known within the industry as the year in which Multimedia became mainstream. CD-ROM titles are being reviewed in the New York Times Book Review section. Hit titles such as *Myst*, *Rebel Assault*, *Star Trek Interactive Manual*, *Doom*, *etc.* are hitting distribution volumes ranging between .2 to >1M units. Hence, the momentum for creating the content is now in place. Pippin is designed to take this momentum of content on the personal computer and distribute in much greater volumes throughout the world.

Q: How did Apple choose the name Pippin?

A: Pippin is a type of apple. It is smaller than a mcintosh apple. Apple chose this name because it would be easily associated with Apple, Computer Inc. Moreover, Apple believes that over time Pippin will take many forms including home telecommunication devices, game players and much more. Hence, Apple did not want to choose a name that would be specific for a certain market space as it will certainly appeal to many types of consumers and be shipped in a variety of forms from many manufacturers.

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

A: Apple is integrating hardware technologies which improve the "on-screen" appearance of text on a TV screen. While the text will never be as clear as that on a computer monitor it is substantially better than anything in the video game industry today. This was done because Apple intends to encourage a wide diversity of titles to be available on Pippin, including reference titles which contain a great deal of textual information. We expect action games, adventure games, simulation, role-playing games, puzzles, reference, education, learning, interactive music and more.

Pippin is not expected to be strong in document creation or modification. Adobe Illustrator, Novell Word Perfect, Lotus 1-2-3 *etc.* are not well suited to systems without a lot of memory. Nonetheless, simple word processors, simple spread sheets, tax preparation programs, financial management tools, children's authoring tools, *etc.* should work well on a Pippin as long as there is a rewritable mass storage device, such as a floppy disk drive, that can store data files.

Q: How many Pippins will be shipped in the first year?

A: This questions begs a speculative response, in an industry which is notorious for overhype. Apple prefers not to provide additional hype to an over-hyped industry. Units will be on the shelf by Christmas 1995. Focus group studies conducted to date indicate that demand will far exceed supply by this time, so plans for restricting distribution to Japan and some parts of the US are being considered with no firm decision made yet.

Q: What division of Apple is driving the Pippin effort?

A: Apple Computer established the New Media Division two years ago with the charter of broadening the business of Apple Computer beyond traditional personal computing devices while focussing on multimedia. Within the New Media Division is the Apple Macintosh OEM Products Group, in place for two years with the mission to expand Apple's business through the embedding of its Macintosh technology into non-personal computer spaces. Pippin

represents the largest effort undertaken by this group. Prior to this time this group had been shipping Macintosh logic boards or licensing technology into medical, commercial airplane information, communications and other non-personal computer equipment. It is reasonable to expect other initiatives from the Macintosh OEM Products group to place in the future taking the platform into other non-traditional personal computer spaces.

Q: What is Apple's role in all this, short term and long term?

A: In the early stages of the program, Apple will directly assist the various Pippin manufacturers with their product designs as many are unfamiliar with the Macintosh architecture. Over time Apple's role will be to provide integrated circuit designs, firmware releases and regular system software releases to ensure consistency between manufacturers. Pippin manufacturers will be able to differentiate their products through the addition of functionality on the mother board and elsewhere in the system.

Apple will also be responsible for Developer Support, Publisher Support and Evangelism. Apple is in the process of drafting a marketing plan intended to promote the establishment of the platform. Details are not available for public release at this time.

Beyond its engineering role, Apple expects to be responsible for Developer Support, Evangelism and some level of marketing.

Customers

Q: What is in this for the customer?

A: For the first time, the customer will be able to "buy-in" to the era of multimedia and cyberspace at a low entry ticket price. The customer will be able to expand the entry system through aftermarket add-ons, accessing some personal computing capabilities if they choose. They will be able to buy the unit from a variety of companies in different configurations in a multitude of distribution channels. Their Pippins will integrate within their audio-visual consumer electronics world. In addition, it will be able to communicate and transfer files with their personal computers should they have them in their home. Finally, the Pippins with the addition of a GeoPort™ adapter or external modem will permit the customers to communicate over cyberspace.

Q: With the price of home computers declining why would someone buy a Pippin?

A: Multimedia equipped personal computers do not sell in the US below \$1,000. A sampling of ads from the weekend advertising inserts suggests that the real prices for fully configured Multimedia PCs (Macintosh or IBM compatible PC) start at \$1,350. These prices are not likely to come down over time as most users of the IBM compatible PC rely on Windows or MS-DOS. These users are expected to migrate towards Microsoft's new Windows release, which according to most reports will require substantially more memory. Apple has migrated its Macintosh line to RISC architectures which frequently require more memory. Hence, there is no reason to believe that multimedia equipped computers will break the \$1,300 barrier in the near future.

Q: Will Pippin reduce the system configuration problems faced in the personal computer market?

A: Pippin is designed to behave like an audio CD Player. The customer inserts the CD-ROM into the player and it automatically boots off the CD. Because the system is erased and reloaded when a new CD is inserted, there are no files to configure, no drivers to conflict over system

resources, etc. Pippin represents the ultimate in ease of use for customers used to the problems currently plaguing the Windows™ multimedia market place. Incidentally, these problems are much less common on the Macintosh.

Q: How will Pippin be sold? In what channels?

A: These are issues for the Pippin manufacturers to comment on. Through its licensing program Apple hopes to secure multiple companies to sell into many channels worldwide.

Q: What is the retail price for Pippin?

A: Apple cannot speak for the Pippin Manufacturers as they, or their resellers, will be setting the prices. Apple has structured the business model and architecture so that our licensees should be able to reach low prices. Given its capabilities and architecture, Pippin is likely to cost more than the dedicated video game devices. Bandai Co. Ltd., the first licensee of the technology, has publicly proclaimed that their Power Player will see in the "\$500 range".

Q: Can customers upgrade their Pippins?

A: Pippin is the most expandable device in its category. The consumer can add system memory easily on the device using plastic DRAM memory cards. In addition, through the PCI-like expansion, manufacturers will be able to add other devices, including mass storage devices, graphics accelerators, compression decoders and more. Thus, by purchasing easy to add/configure add-ons, the customers will be able to retain their investment into the future.

Q: Will customers upgrade Pippin to a Macintosh?

A: Pippin cannot be made into a Macintosh. Without the availability of a high speed read/write mass storage device customers will find it difficult (at best) to utilize current "standard" personal computer applications. It would not be unfair to say, however, that Apple would like Pippin customers to also be Macintosh customers. The advantage for the customer is that their investment in titles can be played on both machines.

Q: Wouldn't customers rather view their titles on a computer screen?

A: This actually depends upon the customer and the title. The vast majority of the worldwide market doesn't own a computer monitor and is unlikely to own one any time soon. Even if a home has a computer screen, the dynamics of the home suggest that for games, entertainment, early childhood, interactive music, karaoke, digital full length movies, etc. the TV screen will be the primary viewing medium. This permits a larger number of people to interact with the screen simultaneously. This also enables customers to integrate their Pippin with their home entertainment environment.

If customers prefer, they will be able to attach a 640x480 VGA monitor to Pippin.

Pippin Manufacturers

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

A: Apple does not plan on shipping a Pippin under its own brand. One of Apple's primary goals is to see Pippin devices penetrate into as many homes worldwide as possible. For this to happen Apple will focus its energies on assisting other companies in reaching these channels as they differ from Apple Computer's existing computer reseller channels.

Q: Will Apple be the only hardware/software supplier for the platform?

A: **No!** Pippin is an open platform. Apple intends to encourage other companies to create not only differentiated Pippin systems, but also third-party aftermarket add-ons. Other companies can be expected to build upon Apple's reference design and add their own value through either cost reductions or feature innovation.

Q: How many companies will be shipping Pippins?

A: The only publicly announced company at the time this document is being distributed is Bandai Company Ltd., a major toy manufacturer and CD-ROM game title publisher in Japan. Since Apple announced the platform in Tokyo on December 13, 1994, there have been many inquiries from companies interested in taking a license around the world. As contracts are signed and companies choose to announce their intents, the developer community will be among the first to know.

Over time, nothing will limit the number of companies that will be shipping Pippin devices. Apple believes that there is sufficient demand in the US, Japan, Asia and Europe.

Q: What is in it for the Pippin manufacturer?

A: Pippin provides the Pippin manufacturers a totally incremental business opportunity. It carves out a new market space which does not exist for them today. Many companies are wishing to enter the multimedia space and Pippin provides them that opportunity. In addition, the Pippin manufacturers are realizing the many possible applications for this type of device in the home. Ultimately, the Pippin manufacturers must have a profitable business.

Q: How will the Pippin manufacturers differentiate their products?

A: Pippin manufacturers have ample opportunity to add value and differentiate themselves:

- Industrial Design,
- Lower costs from those vertically integrated manufacturers,
- Sales Channels,
- Integrated telephony,
- Superior video,
- Superior audio,
- Integrated floppy drive,
- Memory size, speed,
- more

Q: What is the approximate OEM price of Pippin?

A: This is confidential information and not available for open distribution.

Developer/Publisher Issues

Q: Why should a developer support Pippin rather than the myriad of new video game systems?

A:

- *It's Easy to Develop Titles!*
Developers using a Macintosh to develop their multimedia content for Macintosh computers will find it relatively simple to edit their titles to play on Pippin.
- *Its Development Environment is Familiar and Inexpensive!*
Pippin titles have already been created on Power Macintosh AV computers using such tools as Apple Media Tool, Macromedia Director, MetroWerks CodeWarrior, Adobe Photoshop,

Radius Video Fusion, *etc.*

- ***It's a Low Risk Investment!***
Having just released a hot CD-ROM title for the Macintosh and/or IBM compatible PC a developer faces some choices. Should the developer modify their title to run on one of the new video game platforms having a questionable business opportunity? Or should the developer invest in creating the hot new follow-on CD-ROM title before their competition copies them? With Pippin, the developer can port their title to a TV entertainment environment with minimal investment and minimal risk.
- ***It's Feature Rich!***
Pippin offers a superior video architecture, a superior sound architecture, a superior RISC microprocessor, a faster memory architecture, a more flexible I/O architecture, *etc.* than a video game machine. It is even more capable than most personal computers in the market today.
- ***It has Superior On-Screen Text Performance!***
Pippin integrates a proprietary digital filtering technique which improves the visibility of text on a standard TV screen. While this technology cannot duplicate the viewing quality of a computer monitor, it is a significant improvement over what exists today.
- ***It's Communications Ready!***
Through GeoPort™ and the Telephone Manager developers have the richest environment for integrating both digital (ISDN or PBX) and ordinary analog telephony into their gaming, merchandising or other multimedia content. Modems over the serial port will also be available.
- ***It's Expandable!***
Through the built-in Peripheral Components Interface PCI and ADB there is the capability for third parties to sell a variety of attachments designed for the personal computer industry.

Q: Why should a publisher support Pippin?

A:

- ***It's an Open Platform!***
Pippin's business model and architecture encourages both original equipment manufacturers and third party hardware providers to differentiate and add their own unique value to the architecture.
- ***It Will be Sold by Multiple Manufacturers!***
To ensure greatest global market penetration, lowest costs and quickest innovation on the platform.
- ***It's the Ultimate in Ease of Use for the Customer!***
As many publisher's learned during 1994, publishing CD-ROM titles on the IBM PC is often associated with customer complaints and a high return rate. While the Macintosh is certainly much better in this regard, Pippin represents the ultimate in ease of use. The customer takes the CD out of the "jewel case", inserts into the mechanism and starts the player. There are no files to configure or transfer, meaning lower aftermarket support costs.
- ***It reduces the inventory and SKUs!***
Because Pippin titles will also run on a Macintosh computer, with its more than 4M installed base of CD-ROM ready systems, the publisher and retailer can simplify the number of versions of a title they publish and stock on the shelves.

Q: What should developers do if they prefer to approach Pippin cautiously?

A: Obviously, Apple would like to see developers become active regarding Pippin development. However, at a minimum Apple recommends that developers start making their titles "Pippin ready". What Apple means by that is that it be created in a fashion that only requires a remastering later when it is decided to release the title for Pippin. Hence, developers should examine the TV screen performance of their titles via a Power Macintosh AV to make sure that there aren't any overscan problems (i.e. all hot spots and graphics appear within the TV screen) and that the color palette is consistent. Developers should eliminate use of the hard disk for caching their code.

Q: Will Apple charge the publishers a royalty per title?

A: Yes, but details are available under a confidentiality agreement.

Q: What type of contract will be required of developers? What is the business model?

A: Apple has been in deliberate discussions with a number of developers and publishers with the intent of seeking a fair business model that reaches the proper balance between the needs of the developers, publishers, Pippin manufacturers, Apple Computer and, of course, the end customers. Apple believes that it has derived a fair title royalty model. Apple learned quickly from the developers/publishers that they had concerns not only about the amount of the title based royalty, but also the terms and conditions associated with the other platforms. Apple, with the cooperation of these developers/publishers, has derived terms and conditions which deal with:

- royalty amount,
- method of payment,
- timing of payment,
- returns,
- promotional CDs and more.

Apple provides these details to interested parties only under a confidentiality agreement. Apple has a standard "no upfront fee" contract under development and review. This provides the publishers the rights to include the system software on their titles at a fee and under terms and conditions specified in the contract. There is no money exchanged at the time of signing the contract.

While it is not mandatory for developers/publishers to become members of the Apple Multimedia Program (AMP), Apple strongly urges companies interested in developing titles for Pippin or Macintosh to enroll. Details are provided later in this document.

Q: Will CD-ROM titles created for Pippin run on future Pippin systems like in the personal computer market or will they only survive single generations of systems like the proprietary video game market?

A: Apple believes that this is one of the inherent advantages of Pippin and its architecture. Existing proprietary video game platforms run game titles which operate on one generation of architecture but not on subsequent generations; Nintendo 8 bit NES cartridges don't work on the 16 bit SNES, Sega Genesis cartridges do not run on the Saturn, etc. Apple Computer has a long history of providing developers a consistent application programmer interface API that carries their applications/titles from generation to generation of its personal computers. This track record is the best in the industry resulting in one of the smoothest transitions of

microprocessors CISC to RISC (680x0 -> PowerPC). Apple through its control of the system software, firmware and integrated circuits, expects to maintain this track record going forward with Pippin. The only times when the Macintosh has had difficulty with this had been when developers have chosen to ignore the API and write directly to the hardware. Developers will certainly have that option with Pippin. While it may improve their performance, the developer will be engaging in this activity at his/her own risk as it may not work on future generations of Pippin. More importantly it may not work on multiple manufacturer's versions.

Q: When can a developer secure a development system?

A: **Today!!** A Power Macintosh AV will enable a developer to start their title development process. By late summer Apple will have engineering versions of Pippin available for developers to test their titles on directly. At the May World Wide Developers Conference (WWDC), Apple will publicly disclose how these units will be made available and how we will assist developers in their porting efforts.

Q: How easy/hard is it for a developer to create a title?

A: Creating a Pippin title is no more difficult that creating a Macintosh title. Many titles will only need to be remastered with the system software.

Q: What do you mean by "choice for the developer"?

A: Apple will be releasing continual updates to its Pippin system software through its relationships with the commercial stamping operations. Technical details related to each new release will be provided through developer support regularly. The developers will be able to choose which releases they wish to integrate with their title depending upon the nature of the title and how important communications, QuickTime VR, 3D, voice recognition, etc. are important to the title. Obviously integrating all these technologies will have a major impact on memory requirements so developers will need to pick and choose carefully. Hence, the developer will have the freedom to choose from Apple's added technology, purchase a 3rd party's added technology or develop its own.

Q: How many titles will be available at intro?

A: Apple announced the Pippin platform in Tokyo on December 13, 1994. Apple is aware of more than 25 developers already creating new titles for the platform. Evangelism and Developer Technical Support are getting fully staffed as this note is being released so the amount of activity should start increasing.

Q: What kind of developer/publisher endorsement for the project is Apple experiencing?

A: Apple is seeing real enthusiasm. As an example, Apple hosted a Developer's Workshop in Tokyo on December 15th. Invitations for the conference were sent out only 3 weeks in advance of the conference. Apple expected about 150-200 people to attend. More than 750 people attended the conference, with being turned away due to a lack of room.

Simon and Schuster Interactive has publicly stated that it will port its titles to Pippin. Endorsements have been coming from other publishers as well, but have not been publicly announced as of yet.

Q: What about marketing and trademarks?

A: Apple is in the process of finalizing a marketing plan for the platform, but will rely on each Pippin manufacturer to enunciate their differentiation in the market place. Apple will be

working with both the manufacturers and developers/publishers in co-marketing activities. Details regarding these programs are still be worked out and will be made available later this year (1995).

Apple has registered the name Pippin and is in the process of test marketing a logo. After the logo is registered it will be required to appear on all Pippin hardware and compatible CD-ROMs. Developers/Publishers will have the freedom to use the name Pippin as a compatibility mark if they wish.

Q: What about censorship?

A: Apple has no intention or desire to enter the business of regulating an industry which should be encouraged to exercise freedoms needed by the creative artists which Apple wants to evangelize onto the platform. Apple will abide by whatever ratings systems are regulated by governments. Apple, where reasonable, will endorse those systems which reduce excessive oversight and permit the freedom to the artists.

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

A: Yes, however, one of the key goals of the program is to ensure compatibility. Experienced Macintosh developers will most likely find it no more difficult to maintain compatibility between Pippin and Macintosh vs. one Macintosh computer and another. In some cases a host adapter card may be needed for specific features first introduced on Pippin. For the first generation of Pippin there is only one hardware feature not commonly found on a Macintosh computer:

Dual Frame Buffer

Pippin will support both 8 and 16 bit video. For 8 bit video there will be a dual frame buffer that is intended to assist frame to frame animation.

Technical Issues

Q: Will Pippin titles play on a Macintosh?

A: Yes, Pippin titles will play on Macintosh computers. If the titles are 68k based they will play on both Power Macintosh and 68k based Macintosh computers. If the titles are written in native PowerPC code they might also play on both platforms depending upon whether or not the developer chose to code in fat binaries or not.

Q: Will Macintosh Titles play on a Pippin?

A: Yes, if the title is restamped with the Pippin system software. For some titles other modifications may be required, see below.

Q: Will DOS/Windows Titles play on a Pippin?

A: Yes, but with much more modification and recompilation as compared to Macintosh titles.

Q: Can Pippin be turned into a Macintosh?

A: No. While customers will be able to expand it through the addition of mass storage devices, codecs, video inputs, *etc.* it will remain a run time environment fundamentally more limited than a Macintosh.

Q: What must an experienced Macintosh title developer do in order to port a title to Pippin?

A: Apple Computer is architecting Pippin with the primary goal of making it easy for those developers already creating content for the Macintosh and IBM PC to port their titles to Pippin. There are three primary areas that developers should be concerned about:

1. Video

Pippin will support the following video formats - NTSC, PAL, S-Video & VGA. Pippin will be marketed and sold with the idea that the TV will be the primary viewing screen of choice. Hence, developers should take into account issues related to overscan and the color palette. In order to ease the transition for developers, Pippin will integrate hardware that automatically scales the video screen from the usually targeted 640x480 RGB video screen to a TV screen. During the re-mastering process we will include a flag that will indicate to the hardware that it must scale the images. **Apple therefore advises all developers to purchase Power Macintosh AVs and play their titles over the NTSC/PAL video from the AV card. They can then see how their title performs on a TV screen, both from the perspective of overscan as well as color palette. If the title looks good over the AV card into a TV screen, it will look good over Pippin!!**

2. No hard disk or floppy

While Pippin permits the expansion of a hard disk or floppy disk mechanism, the developer should not assume that one will always be present. The impact to the developer's title will come in two ways. Firstly, **developers will not be able to cache sound or video clips on a hard disk in order to make the title performance appear faster.** This is the reason why Apple chose to specify a 4X CD-ROM drive from the outset of the platform.

The developer will also feel the absence of the hard disk as it relates to storing configurations in the preferences folder of the system folder or storing "store/restore" files for being able to resume games. **Apple is specifying a 64 kbyte minimum non-volatile memory bank on the platform in order to accommodate the "store/restore" files, which are typically <2 kbyte in size.** We urge developers to strive for keeping these files to a minimum size.

3. Limited System Memory

While Pippin will enable the users to expand system memory through the aftermarket addition of plug-in memory modules (not SIMMs), the base Pippin will ship with 6 MB of total memory. Approximately 2 MB are used by the system and video, leaving approximately 4 MB for the title program. At the time that this document was written the system software was not Golden Master so the final actual memory size available to the developer was not ready. At this juncture, Apple is advising the developers to target their titles so that they occupy a maximum of 3.5 MB.

Q: Should developers target their titles for 680x0 or PowerPC based machines?

A: Pippin is a PowerPC based machine, but integrates the 680x0 emulator into the system. Hence this question is more relevant to understanding the Macintosh marketplace rather than Pippin. Apple highly recommends that all developers compile their titles as "fat binaries" using the most recent compilers running on the Macintosh. The most popular scripting tools (Macromedia Director and the Apple Media Tool) have native PowerPC versions which automatically compile into "fat binaries". Titles created in this way will run on Pippin, Power Macintosh and Macintosh computers.

Q: What about the POWER instruction support ?

A: **Apple highly recommends that all developers upgrade to the most recent**

versions of both scripting tools and compilers, as they have eliminated support for the "Power" instruction set which was part of the original IBM POWER architecture. Some of these instructions are not supported by PowerPC processors. As such titles using these instructions may suffer a major performance hit.

Q: What about telecommunications?

A: Over the high-speed serial port, standard external modems can be supported. These will be provided by several different third parties. Driver software will have to be integrated onto the CD either by Apple or the developer. Apple cannot integrate all the modem drivers onto the system so it will have to be making some near term choices. More significantly, Pippin will have an integrated GeoPort™ connector on its base unit. This permits the attachment of a lower cost GeoPort™ adapter that uses the high speed RISC processor as a data pump for the external DAA. GeoPort™ APIs will be available later on this year in May 1995.

The telecommunications capabilities will provide Pippin customers access to both On-Line commercial services such as Prodigy™, America On Line™ or Apple's own e•World™. Apple will encourage these popular On-Line companies to make their services accessible through Pippin.

Whether it is interactive gaming over the public network, access to internet/cyberspace, online networks, *etc.* communications will be a fundamental part of the Pippin architecture permitting a level of person to person interaction that could only be achieved through a personal computer today.

Q: What about interactive TV services over Pippin?

A: Pippin has no ability, as shipped, to receive video data streams in either analog or digital form. It is possible, however, that at some point in the future that capability could be added through the integrated expansion capability of Pippin. Apple has a separate effort in the interactive TV space. It shares a great deal, architecturally, with Pippin thereby ensuring a smooth transition between Apple's platforms ranging from desktop through Pippin and into ITV.

Q: What about 3D and graphics acceleration?

A: Today the Macintosh Computer relies on rendered 2D QuickDraw for its underlying graphics architecture. Apple is fully cognizant of the fact that many of the video game players have dedicated 3D engines which accelerate the rendering of computer generated 3D textured graphics on their platforms. Apple has invested in numerous 3D rendering software (*e.g.* QuickDraw 3D) and hardware technologies and has many of them working in our laboratories, although not yet shipping in products. Developers can expect Apple to integrate these or 3rd party technologies into future generations of Pippin. Moreover, being an open platform, Apple will encourage 3rd parties to add value in the aftermarket with their 3D environments. Finally, no one should underestimate the performance of the PowerPC, the most advanced RISC architecture available in today's competitive microprocessor market.

Q: What type of security will be integrated into Pippin?

A: Pippin will integrate a complete security system between the platform and the CD-ROM titles. This will be completely transparent to the developer and customer.

Q: Will CD-ROM titles using a lot of text, like reference titles, appear OK on Pippin?

A: Apple Computer believes that on-screen text performance is important to the success of Pippin.

Text appearance on a TV screen will never be as good as computer monitors, however Apple is integrating special signal processing circuitry into the Pippin video processor that improves on screen performance. Apple recommends that developers avoid using text sizes below 12 point. Apple has examined both roman and kanji fonts at 12 points and finds the text readable.

Q: What about MPEG support?

A: MPEG can and will be supported through aftermarket PCI attachments. These may not be available, however, at the time of introduction of the first Pippin products. Apple chose not to support MPEG hardware on the motherboard of the base system as it added too much cost.

Q: What about Floating Point operations?

A: The PowerPC offers one of the best floating point capabilities among the RISC processors in its class and we welcome developers to take advantage of it. If developers should opt to use it Apple has two recommendations:

- Stick to single precision if at all possible. In future versions of Pippin, the double precision may only be emulated and hence performance will be adversely affected.
- Adhere to the API guidelines in "Inside Macintosh".

Q: What is the operating procedure for a Pippin?

A: The customer will turn on the power and depress a button that will either open the lid to the CD-ROM mechanism or release the tray. The CD-ROM will be loaded and the system software will immediately boot into the system memory off the CD-ROM. As the system is loading there will be animated graphics on the screen to indicate to the customer that something is going on. Once the system software is loaded, the title loads. Once the user is finished playing the title, they will eject the CD-ROM. As this is done the system software is erased so as to eliminate issues related to versions and rewriting over the system during boot of the next title.

Q: How will Pippin handle fonts?

A: Roman fonts are handled in much the same way as a Macintosh handles them today. For Japanese, Chinese and other "double byte" fonts, Apple will be storing bit images of the fonts in ROM. Again, accessing these will be transparent to the developer.

Q: Without a floppy or hard disk how will third parties integrate drivers for their aftermarket devices?

A: In the short term (1~2 years) Apple will bundle some drivers with the system software code. Developers wishing to provide support for certain devices should include those devices as INITs with their titles. Long term, Apple will be architecting automated means for loading the driver from the devices themselves.

Q: How can someone expand something on Pippin in the aftermarket?

A: Apple will be utilizing a connector scheme that brings out the electrical signals consistent with the Peripheral Components Interface PCI. The connector does not permit existing PCI cards to plug in as these are inconsistent with the form factor and type of customers Apple expects to purchase Pippins. However, Pippin and its eventual 3rd party value adders will be able to capitalize on the rich source of PCI based silicon that will pervade the electronics industry.

Q: Can a keyboard, monitor or mouse be added?

A: Yes, and so easily a child could do it!

Q: What about FireWire™, will it be available on the first product?

A: FireWire™ was developed by the same organization, Macintosh OEM Products, that is developing Pippin. Given that the consumer electronics industry has embraced FireWire™ as its digital interconnect of choice as it goes digital, we can expect to see Apple integrate FireWire™ into future versions of Pippin, however, Apple is not releasing a firm schedule at this time.

Q: What exactly will be included with a Pippin?

A: This will be specific to each manufacturer. The features that, at a minimum, will be common to each version of Pippin is listed separately.

Q: What kind of input device will be standard?

A: Input devices will vary between Pippin Manufacturer. Apple has been conducting global focus group studies on this issue. Obviously developers need to know which buttons, knobs, etc. will be consistent between machines. Apple will be specifying this to both the manufacturers and developers by May at the latest.

Q: What add-on accessories will be available for Pippin at introduction? At a later date?

A: At introduction, there will be an external floppy, 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 that will include a single input controller device. Other add-on devices including hard disks, PCMCIA slots, MPEG2 codecs, etc. will be available later in time. Apple will not make commitments as to when they would be available as many of these will be supplied by third parties.

Developer Support & Next Steps

Q: What steps will Apple be making over the next year in terms of developer support?

A:

- **Apple New Media Forum: World Tour '95**
Beginning in May Apple's New Media Division will be hosting a worldwide tour through the US, Japan and Europe providing an opportunity for developers to attend, ask questions and secure more information regarding several of Apple's multimedia technologies including: QuickTime, QuickTime VR, Pippin, Interactive TV and more. Dates, locations and registration information is provided below:

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 call:	408-974-1323
FAX:	408-974-1862
ALINK:	NM.TOUR
Internet:	nm.tour@applelink.apple.com

- **US WorldWide Developers Conference**
Between May 8-12 Apple will host its annual World Wide Developers Conference WDC in San Jose. Apple will, for the first time, host a specific Multimedia Developer track, linking those topics felt most relevant to CD-ROM title developers. There will be a dedicated session for Pippin. Dates and registration information can be secured by contacting the following names/phone numbers.

San Jose, CA May 8-12, 1995

For more information:

FAX on Demand 800-770-4863(N. America calls)
FAX on Demand 415-637-2607(International calls)
Hotline 415-705-8054
AppleLink Look in WWDC Folder

- **Japan Developers Conference**
Apple will hold its annual Japanese developer conference in the first half of July in Tokyo. As in the US, Apple will for the first time provide a specific track suited for CD-ROM multimedia title developers with a specific session for Pippin.

Yokohama, Japan July 3-7, 1995

For more information:

Internet: takeuchi2@applelink.apple.com

- **“Primer for Pippin”**
By late June, Apple will release a book it is creating entitled “Primer for Pippin”. It is intended as a technical introduction to Pippin and its architecture targeted to the developer community.
- **Others**
Apple is considering other activities such as a specific course for Pippin title development as a part of its Developer University. We welcome suggestions from developers as to what they want to see from Apple. They should be directed to our electronic mail address: pippindev@apple.com.

Q: What type of third party support is available?

A: Most of the third party tools providers have their own support organizations. In order to secure a list of all the third party tools together with their products, phone numbers and addresses we urge interested parties to fax or write to RedGate Publications and ask for their most recent copy of “The World of Macintosh Multimedia”. Also New Media Magazine regularly publishes a “Tool Guide” of Multimedia Development tools.

Redgate Communications Corporation
660 Beachland Blvd.
Vero Beach, FL 32963
407-231-6904

New Media Magazine
P. O. Box 1771

Riverton, NJ 08077-7371
JCI Customer Service - 609-786-4430

Q: What is the best way to get started?

A:

- **New Media AMP Program**

If you are not yet a member of the Apple Multimedia Program (AMP) it is highly recommended that you enroll. The annual fee is \$300 and this entitles you to a rich source of literature that includes technical guides, resource references, marketing surveys and much more. Information about Pippin developments will be first distributed through the AMP mailing list. Developers can enroll by contacting the following addresses.

AMP Program

Facsimile	408-862-7602
Telephone	408-974-4897
AppleLink	DEVSUPPORT
Internet	devsupport@applelink.apple.com

- **Internet Address**

Apple has also created an group address that it will use to keep developers updated regularly. Please send inquiries to pippindev@apple.com.

- **Developer Technical Support**

Finally, we urge developers to enroll in Developer Technical Support. By enrolling you not only get access to online technical support from Apple Computer, but you can choose from a number of courses being offered by Developer University.

Developer Program Hot Line 408-974-4897

AppleLink	DEVSUPPORT
Internet	devsupport@applelink.apple.com

More recently Apple's Developer Services has opened an ftp site on its World Wide Web pages. It can be accessed through <http://www.info.apple.com/dev> and the ftp site at <ftp://ftp.info.apple.com/Apple.Support.Area/Developer> ("underscore")Services. These services are also available through eWorld™ and AppleLink. The ftp site makes available demos, software, tools, technical documentation and other application development information. Specific content includes all issues of Develop (complete with sample code), all issues of Apple Directions, APDA® catalogs for ordering development products, Developer University demos, complete sample code and demos, system software extensions and header files. Technical documentation consists of Inside Macintosh, Macintosh Technical Notes, Macintosh Developer Notes, Apple Events Registry and suites, ABS Technical Notes, peripherals documentation and human interfaces.

- **Evangelism & Developer Marketing**

Apple is building a Developer Support organization. Questions should be addressed to:

Mr. Richard Sprague

Manager, International Developer Marketing
Phone 408-974-4111
FAX 408-446-9154
AppleLink SPRAGUE1
Internet rik@apple.com
or

Mr. Eric Klein

Macintosh Evangelist
Phone 408-862-8030
AppleLink KLEIN.E
Internet klein.e@applelink.apple.com

Technical Details

Hardware

- 66MHz PowerPC 603 RISC Microprocessor
 - Superscaler, 3 instructions per clock cycle,
 - 8 kByte data and 8 kByte instruction caches
 - IEEE standard Single & Double Precision Floating Point Unit
- 6 MB combined System & Video Memory , advanced architecture
- 4X CD-ROM drive
- Aftermarket easy memory expansion cards
 - 2, 4 and 8 MB increments
- 64 kbyte SRAM Store/Restore Backup
- Video
 - 8 bit and 16 bit video support
 - Dual Frame Buffers for superior frame to frame animation
 - Support for NTSC & PAL composite, S-Video and VGA (640x480) monitors
 - Up to 16.7M colors
- Audio
 - Stereo 16 bit 44 kHz sampled output
 - Stereo 16 bit 44 kHz sampled input
- Telephony
 - GeoPort™ ready
- Controllers
 - Supports up to 4 simultaneous players over Apple Desktop Bus, ADB
 - Will support standard ADB keyboards and mice with connector adapters
- Data I/O
 - 1 standard Serial Communications port
- Aftermarket Expansion
 - "PCI like" expansion for adding floppy drive, hard disk drive, graphics accelerators, codecs, etc. (Not available at introduction!)

Software

- Run time environment derived from Mac™OS
 - Integrates QuickTime™ 2.0 and PPC native version of QuickDraw
 - Reduced system memory footprint - (computer specific features removed)
- Disk resident system stamped on CD with title
 - System boots off CD
 - Pippin system software upgrades released through CD-ROM stamping operations
 - Developers free to choose from menu of system software upgrades
- ROMs
 - 68k emulator
 - Macintosh Tool Box intact
 - Localized bit mapped fonts
 - Reduced Macintosh System ROM footprint

CD Formats Supported

- Standard audio CD
- other formats in market studies