FLAAR Reports
Digital Imaging, Report on Printers, RIPs, Paper, and Inks
AUGUST 2003

Deciding which Computer Platform to Select for Digital Imaging: Mac or PC?

Dell and Mac computers in the FLAAR + BGSU area of SIGGRAPH 2003

Contents

Testing and Evaluating Hardware and Software used in professional digital imaging: Scanning, Digital Photography, and Large Format Inkjet Printing

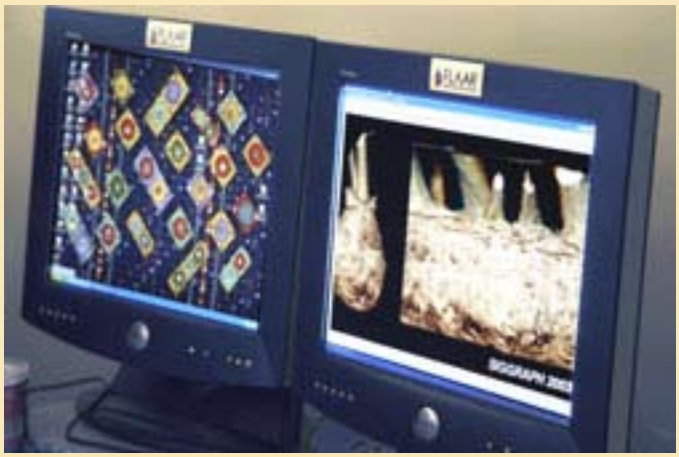
Background of this digital imaging equipment evaluation project

During May 2003 SIGGRAPH invited FLAAR at Bowling Green State University (BGSU) to participate in the Guerrilla Studio as a featured digital imaging event. The encouragement for this participation was initiated by professor Bonnie Mitchell, the College of Art, on the BGSU campus, whose building is physically adjacent to the FLAAR digital imaging facility in the Saddlemire satellite facility of the College of Technology. All of this is on the university campus in Ohio. The computer art faculty at BGSU had seen all the large format printers in their neighboring building and realized that such an impressive educational resource would benefit lots of the people who come to SIGGRAPH.

FLAAR itself had been considering appearing at tradeshows so this invitation was welcomed. We were able to obtain two sophisticated digital cameras, a $20,000+ BetterLight Super 6K and a $47,000+ Cruse reprographic scanner-camera. The BetterLight produces an image of 137 MB on up; the Cruse can produce an image of 450 MB. So suddenly we were faced with the need of some rather sophisticated computers.

During this same month our occasional contact with Dell Computers coincided with their interest in having an independent institute evaluate the benefits of Windows PC as a platform for content creation, which includes digital imaging. Since large digital image files and wide format printers both require considerable horsepower, we felt that it would be helpful to showcase dual processor workstations at SIGGRAPH alongside the high-powered digital cameras.

But the initial versions of the BetterLight panorama software and circumferential-rollout modes work only with a Macintosh. Several other pre-press digital imaging equipment also works exclusively with a Mac. Both BGSU College of Technology and FLAAR had a tradition of being about 75% Mac oriented. The College of Art favored Mac computer labs for much of their computer art classes as well.[1] So we felt it would be useful to include Apple computers at SIGGRAPH.



Dual monitors on one of the Dell Precision Workstations in the FLAAR area of SIGGRAPH 03

Nicholas himself uses a Macintosh with cinema display at all three of his offices because of the historical legacy that in past years CreoScitex scanners and BetterLight digital cameras worked only on a Mac. Today BetterLight is gradually switching to PC platform and sophisticated digital capture systems such as Cruse work only on a PC. But the main reasons for switching to PC include the fact that PCs are the standard for running the RIP software necessary for wide format inkjet printers and the noticeable trend that most of the new employees request this platform.

1. Once FLAAR found out about the high-end capabilities of the Dell Precision Workstations, we relayed these facts to the faculty of the College of Art. Between the time the SIGGRAPH phase of this project started in June-July and the first benchmarking finished in August, the College of Art switched from Mac and Silicon Graphics to Dell. In part on their own they then obtained demo units to test for themselves. When we returned from SIGGRAPH we learned that they had a truckload of Dell Precision Workstations en route to the campus.

Unfortunately obtaining computers from Apple for high-end digital imaging projects has been a challenge. None have been available in the three years that we have requested them. Mac has been focused on video for the last three years and on iPod Internet music for the last year. However ProVar LLC, a nationwide HP and Epson dealer, happened to have an interest in the wide format printer aspect of our project. ProVar LLC is a major focus of Apple products for the advertising, graphic design, and publishing markets. Thus ProVar LLC kindly made it possible to borrow a dual processor Macintosh and 23" cinema display for the SIGGRAPH event.

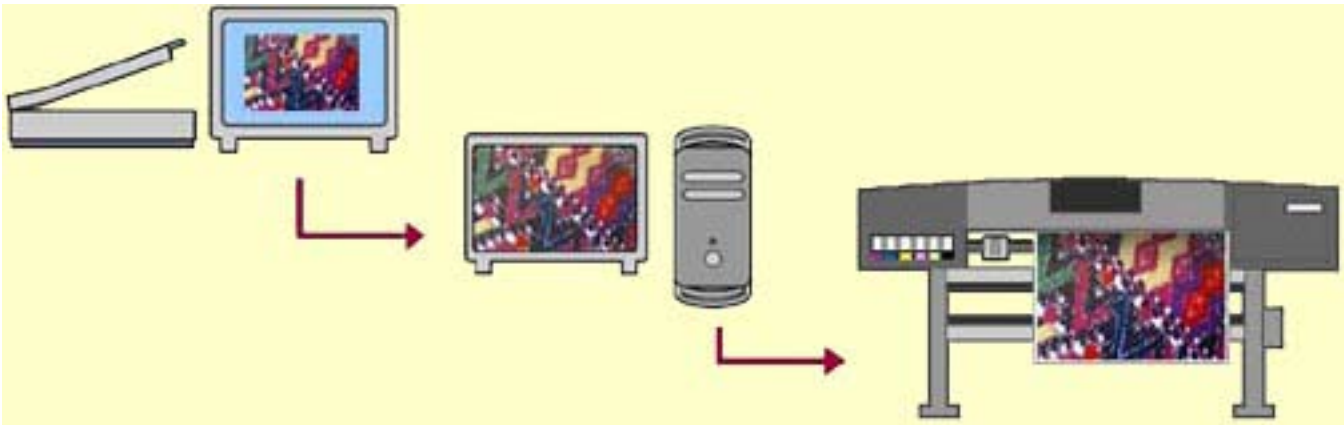
Additional background of this long range program

Some HP laser printers do not work on a Mac (you have to buy separate after-market software and cables from Strydent). HP inkjet printers offer drivers for a PC but no driver for a Mac. Hence some people are unsure whether wide format HP inkjet printers work on a Mac or not. As part of our program of public information on wide format printers, we continually test the HP inkjet printers on a Mac. If wide format printers work just fine on a Mac (which they do up to Mac OS 9; support for OS X is spotty), then we need just to explain that you still need a PC to handle the RIP software. This question comes to the fore over and over again in discussion forums. FLAAR gets this question almost daily, "I wish to purchase a wide format printer, but we are a Macintosh environment; I am unsure whether HP works with a Mac? Can FLAAR help me decide what to do?"

The snag to this question is that a large format printer ideally requires two computers: one for the digital imaging and a second separate computer to run the RIP software for the printer. So even though wide format printers on their own run just fine connected with a Mac, virtually all the leading RIP software is primarily for a PC Windows platform. Only when you know this fact does it open up opportunities for evaluating the PC platform in this arena of graphic design, photography, fine art giclée, and signage.

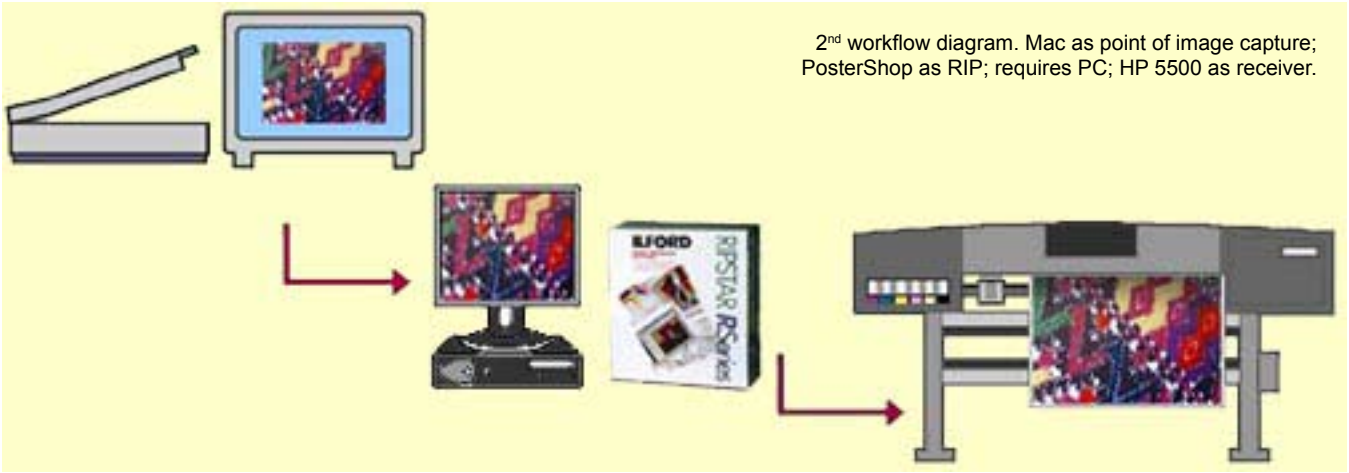
Artist Helen Golden printing her museum-quality computer art on HP 5500ps at SIGGRAPH 200

Since RIP software is not well understood by the average user, and as even fewer realize that a second computer may be needed, we felt a long range project would help to get this information out to the public. Another aspect of this program is to evaluate specifically HP DesignJet wide format printers and its "ps" RIP on a Macintosh platform (which implies using a PC for RIPing in most cases).



1st workflow: Mac at point of image capture (Creo, Fuji scanner, BetterLight camera); Mac as RIP station; HP 5500 as receiver.

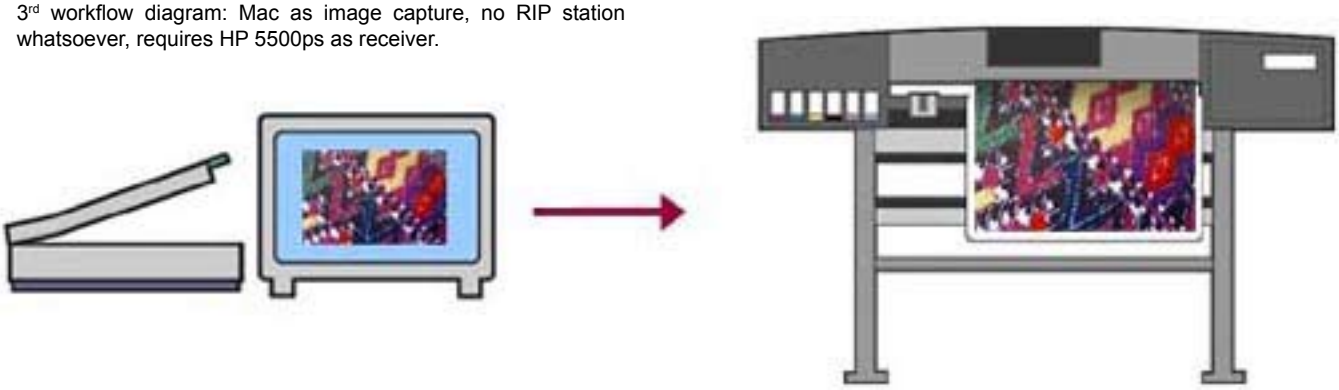
Workflow illustration by Maria Renee Ayau

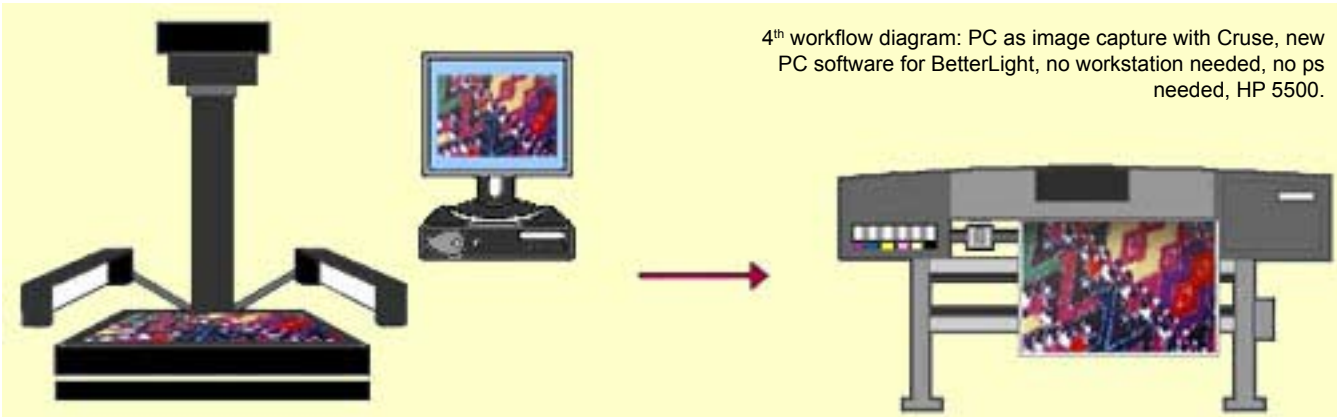


2nd workflow diagram. Mac as point of image capture; PosterShop as RIP; requires PC; HP 5500 as receiver.

Workflow illustrations by Maria Renee Ayau

3rd workflow diagram: Mac as image capture, no RIP station whatsoever, requires HP 5500ps as receiver.





4th workflow diagram: PC as image capture with Cruse, new PC software for BetterLight, no workstation needed, no ps needed, HP 5500.

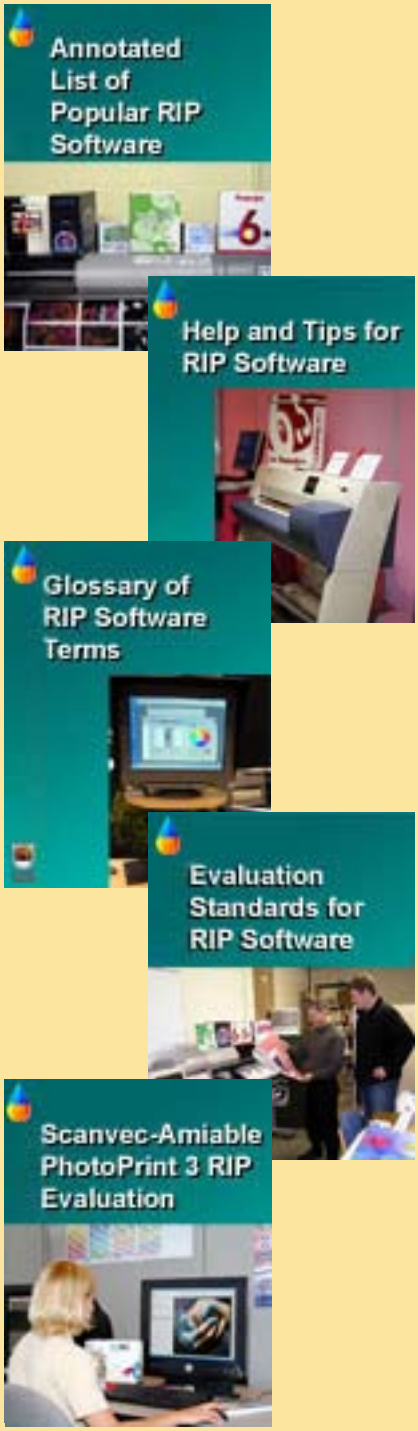
With no RIP and working only with PC driver, handling of large files would be inordinately slow, however printing very small files would be okay

5th workflow diagram: PC as image capture, PC as RIP station, HP 5500, this is the fastest of the solutions if the RIP can RIP on the fly.

This situation was inadvertently aggravated because people going to the HP web site and/or otherwise asking resellers whether they could use an HP wide format printer with a Mac were accidentally told no. The reason for this misunderstanding is because the wide format printer drivers are PC only. So if you have a Mac, there is no driver for you. But most businesses don't use a simple driver, they use a RIP. In this case a Mac environment works just fine (up to the point that you need to handle a RIP). You send your file from your Mac to either the ps version of the HP printer (ps version includes the HP RIP), or you send your file from your Mac to any RIP server (which is almost always a PC). So you can indeed use a Mac on you HP: FLAAR prints from Macintosh printers are both our facilities at two universities. It's in the RIPing that you need a PC. Apple corporation does not appear to be aware of this, or if aware have not paid heed to the situation. The reason they gave was that their corporate focus is on video (this was two years ago). Since they showed no interest, we have continued our evaluations of RIPs on PC platforms.

FLAAR has an entire series of reports on RIP software for wide format inkjet printers. This series includes FAQs, glossary, comprehensive annotated listings of all available RIP software (there are more than 80 different brands!), and a "how-to" guidebook to RIPs in general. It is in this latter publication that we discuss Mac vs PC. This has been an on-going evaluation for several years. We update this report at least every four months. If you seek help in knowing which computer operating system and platform is optimal for large format printing, this booklet is an industry standard.

Concurrent with our product comparison evaluations of RIP software, FLAAR has covered the realm of digital photography software and computer platforms for the last five years. During the last three years we have been teaching this subject internationally, in Europe at the University of Malta, for Latin America at Universidad Francisco Marroquin, and worldwide via the Internet from Bowling Green State University. Three of the reports of this long range on-going program touch upon computers (Mac vs PC) and digital imaging software (Adobe compared with Macromedia, Corel, and others).



The need for independent computer benchmarking

The impending starting date for SIGGRAPH was the factor which caused everything to happen quickly. But in fact FLAAR has been gearing up for long-range evaluation of computer platforms long before, for the simple reason that today's digital cameras produce large files. A 16 megapixel Kodak medium format digital back produces 48 MB and the new 22 megapixel Sinar-Kodak CCD sensor produces, in theory, 66 megabyte file size. We have already mentioned the 137 MB file size for the BetterLight. In panorama mode the file sizes reach over 500 MB. The Cruse produces a single photograph at 450 MB.

Estimate in your mind the kind of processing power that a computer needs to open and handle these files in Photoshop.

But it is even tougher to run these files through Raster Image Processor (RIP) software. A large file can take 3 to 5 hours to RIP, unless you have a capable computer and the right brand of RIP.

But what size, shape, brand, and specs of computer is needed for the high end of processional digital imaging?

There is a committed and very vocal contingent of Macintosh users. There is a considerably larger albeit not particularly vocal mass of users of Compaq, Dell, HP, IBM, as well as Gateway

Why Dell and not IBM or HP?

Universities simply tend to use Dell computers. BGSU is a typical example with Dell computers in almost every building on campus. I have not seen any other brand at BGSU other than Apple. The same is true at Universidad Francisco Marroquin, where FLAAR also has a research and evaluation facility. They use Dell in all offices; all the servers are Dell; most of the computer labs for the students are Dell. There are a few Macs in the architectural department. Actually FLAAR probably has the largest contingent of Macs on campus.

Dell Precision 650 workstations in classroom for computer art classes, College of Art, BGSU. As true at most universities, the ITS department provides tech support only for one brand of PC. Any department that selects an alternative brand has to provide their own tech support. Same policy is in effect at the other university where FLAAR concurrently has its other office

The other reason the benchmarks of the current FLAAR+BGSU project have Dell as representative of Windows PC and not Gateway, HP, or IBM, is that we don't know a soul at any of those other companies. We know the Dell folks because they are the ones who come to both BGSU campus and UFM campus.

A further reason is that we are not aware of IBM or HP having a special interest in specifically high-end digital imaging and content creation. IBM and HP appear more geared to number crunching for large Fortune 500 companies. Gateway gives the impression of being for SOHO and home use.

The fallacy of benchmarking "equal" computer platforms

It has been the tradition for years to do benchmarking on equal computer platforms. If one computer has a 120 GB drive, the other one in the comparison supposedly must have as close to that as possible.

Of course what people forget is that this equalization hobbles the fastest and best computer from the start.

So we decided to benchmark the way a corporate purchasing department might do it, or at least the way a savvy buyer of high end digital imaging equipment would think. It would be silly to say, “well, let me debilitate one brand and then decide whether I want that or the other brand whose top model is apparently weaker than the other brand.”

In real world buying patterns a knowledgeable buyer will look for two factors: the most capable computer, and then weigh in the cost. Not everyone can afford the most capable computer.

Since we had the two absolutely best digital cameras available worldwide (BetterLight and Cruse) we felt it only appropriate to have the two best contenders which would be Dell to represent Windows PC platform, and naturally Apple to represent the able competition. Linux and Sun’s Solaris operating systems do not run Adobe Photoshop and therefore most people in digital imaging do not even consider a Sun workstation. The heady years of Silicon Graphics workstations and their enviable blue machines disappeared over the last several years when Intel and now AMD chips caught up and surpassed the proprietary chips which SGI used to use.

The Mac and Dell will be benchmarked for those who are oriented to such comparisons. However the benchmarking is only one aspect of an overall program of on-going evaluation.

AMD

We would have been interested in testing workstations with AMD chips but do not have any connections with a key decision maker in that company, nor in any computer manufacturer who favors AMD chips such as ABS, Polywell or Sys. The impending starting date for the SIGGRAPH tradeshow put a limit on that phase of our project and we felt that Intel processors were more than adequate, being an international standard.

Mac G5

Since the new Mac G5 won’t be ready until August and will be in short supply into the autumn, and as SIGGRAPH was in July, it was not realistic to include discussion of a Mac G5. Plenty of people already have Mac G4 platform and will continue to use them for years to come, so benchmarking a G4 still has historical validity.

A further reason for waiting to include the Mac G5 are the questions raised over whether the test results paid for by Apple incorporated were based on a secretly tweaked system. www.extremetech.com/article2/0,3973,1136018,00.asp has openly published a penetrating report, “Apple Benchmarking Raises Questions.” That author also suggests that AMD may beat Apple on producing a functioning 64-bit computer that is actually shipping. Despite prominent displays

Dr Nicholas Hellmuth with his favorite 22” LCD monitor on a Mac G4, FLAAR office at Universidad Francisco Marroquin, Guatemala. Nicholas likes Mac monitors but is dubious about any benchmarking claims by manufacturers themselves, “They only cite figures that obviously favor their products and make them look better than the competition they fear.”

of the logo “now shipping” on all Apple and Mac-related web sites in actuality we understand that in most cases Apple missed shipping dates promised in August but G5s are expected in September. AMD has announced their 64-bit personal computer for late September, so clearly the rush is on. It is only a matter of time before Intel, and hence before Dell, IBM and HP, offer comparable computers. However unknown is when the software can take advantage of this class of processor. Nonetheless, Steve Jobs definitely scored a major international psychological coup by being “first.”

Irrespective of whether it is faster or slower than a Dell, there are people who prefer to use a Mac. I use exclusively a Mac here in Guatemala, at BGSU and in my apartment-office in Germany. However I am no Mac addict, nor even fanatic, and I have bought PC-Windows computers for all the graphic design staff who have requested one. Both of the artists from the art department who work in the FLAAR offices are dual-platform capable but one definitely prefer her PC.

Comparisons of Computer Brands for Digital Imaging

Computers for Digital Photography and Running Wide Format Printers

Photographers dedicate an untold amount of hours agonizing over which brand and model camera they will select. Actually, the majority of the people paying $800 for the FLAAR course on digital photography do so in order to learn from Professor Hellmuth what camera he recommends. Seeking help in choosing a wide format printer often leads to hiring a consultant for assistance. Over 500,000 people a year come to FLAAR to ask questions regarding what wide format inkjet printer, inks, paper, or RIP software to buy. All this suggests that people dedicate considerable time, effort, and research before they decide which camera or printer platform to select.

Yet when people go to buy a computer they tend to make the mistake of heading to Office Depot or Best Buy, and go low bid.

Hence, we figured that we ought to extend our programs of comparative evaluations of equipment to assist people in learning the pros and cons of the various makes and models of computer systems that handle digital images. Since digital imaging assumes a need for quality, this requires a monitor as good as the camera and printer. You cannot judge your image if the monitor is all flicker, flimmer, and fuzziness.

Your choices

I am not familiar with any normal digital camera or wide format printer that works with a Sun workstation or any other Unix machine of that class. Only one or two RIP software packages work on any Unix software. The last version of Adobe Photoshop that I saw for Unix software was probably version 3 for an SGI, in the years when their indigo colored dream machine was the awe and envy of everyone in imaging. I felt exhilarated to have used one for an hour in 1996 at the National Museum of Japan. Then there was a period when SGI was not much more than a Wintel clone.

Currently no Intel-chip machines are listed in their workstations, which means that no Adobe products or really any scanning or digital photography software works on them. Today, SGI is not much more than a shadow of their former existence. Intel and AMD processors have reached the point they are faster than the legendary Silicon Graphics computers of recent history. Indeed, the art department on our campus just finished taking out every SGI computer in the lab and replacing them with impressively powerful Dell Precision workstations.

So today, the choice is between Mac platform and Windows-PC. Within Windows, your choices are the AMD chip or Intel. At least there is rivalry, since that keeps the prices down.

Since color management is a key part of digital imaging workflow it is worth pointing out in this section on “Your Choices” that today a PC handles color management just fine. This is because color management has long ago gone far beyond Apple ColorSync. 10 years ago ColorSync was all that was available; that’s why publishers and graphic designers all used Mac computers. But today ColorSync has become democratized and gone over to the International Color Consortium, which is not allied with Apple or with PC in particular; ICC is neutral as far as I can see. So you can handle a color managed workflow on any modern PC. All you need is an X-Rite or a GretatgMacbeth spectrophotometer and ICC color profile software such as Monaco Systems “Profiler” and you are all set.

Processor choices

Intel is the #1 processor and always has been. Therefore, AMD has to try harder, which they do, often successfully. Popular PC magazines often award the kudos to AMD, while during other months, to Intel.

Dell 460 workstation

Intel processors are found on:

- Compaq
- Dell
- Gateway
- HP
- IBM

AMD processors are found on:

- Polywell
- Sys
- ABS

Motherboard

You have to be savvy to figure out the options in motherboards. My PhD is not in computer science, but the motherboard speed of Apple computers seemed like a crawl, especially the previous five years, especially compared with the motherboard speed of any PC. Of course, Apple will tell you that their speeds have a Velocity Engine so the superior numbers of a PC do not count. But anyone who studies advertising slogans can detect the unlikelihood of that. The first Apple motherboard that has serious speed is that of the new G5. But this fact does not help the thousands of people who bought Mac G4 systems; indeed thousands of these G4 computers are still being offered for sale.

In recent years, Intel itself has gotten into the motherboard business. A Fortune Magazine tech writer recommends an 800 MHz bus. We certainly agree with its list of goodies:

- Six USB 2.0 ports
- Five PCI card slots
- Serial ATA (SATA)
- RAID support

among other notable features.

Case

Here I will hand it to Apple; they have the best design for a case, bar none. The top front door on the Dell 650 feels like it will eventually get broken if someone is in a hurry. Plus, after years of working with a Mac, I do not see why anything should have to be opened to get access to a CD drive.

Show pic of close up of the Dell front door (top half of front of the computer)

Hard Drives

Apple gets points subtracted for eliminating SCSI prematurely along with extra minus points for why (to be cool). The political reason appeared to be trying to push FireWire and USB before PC got them. Of course, PC adapted FireWire as IEEE 1394. Then PC even moved to USB 2.0 long before Mac, who did not include USB 2 because the PC already had it.

G5s are also catching up with PCs with Serial ATA hard drives. Current Mac G4's only have parallel ATA hard drives. So here again, PC appears to be more advanced in what it takes to provide superior performance. But since Apple is more effective in PR than the more traditionalistic PC manufacturers, the Apple PR has covered over the fact that PC's in year 2003 are ahead in virtually every respect. It was not until September 2003 that the Mac platform caught up, with their innovative G5 system. Indeed in the advertising for the G5 they had to state how much better it was than their own G4; this was especially apparent in Mac Addict magazine (yes, there actually is a magazine of this name). If the G4 was so slow, why did no one say so before the G5 came out? Of course people like me, who use only a Mac, never noticed the speed difference personally, since we never saw independent tests comparing apples to oranges. PC advertisements never adequately explained such things as the benefits of Serial ATA and USB 2, both of which came first in PCs, including Dell. Mac magazines are far more successful in keeping their faithful indoctrinated.

Here is one portion of the FLAAR facilities at Universidad Francisco Marroquin. That mural-sized picture of the volcano-rimmed lake is a digital photograph with a special pano version of the Dicomed, by Nicholas Hellmuth, about 230 MB in file size. His more recent photographs with the more advanced BetterLight Pano/WideView system range in size from 300 to over 500 MB in file size. This size image moves faster in a RAID system. We hope eventually to undertake benchmarking evaluations and show test results.

RAID system in Nicholas's office in Germany. Here it is an external RAID; all it takes is two or more identical disks, preferably SCSI. FLAAR buys these from MegaHaus in Texas; the same company as Dirt Cheap Drives. Don't worry, they are all the top brands; only the prices are low.

RAID System

RAID systems offer speed and reliability to any power user who deals with lots of large files, especially lots of 500 MB panoramic photographs such as those which we have in the FLAAR Photo Archive.

Years ago a RAID system required complex software and special enclosures. Today you get everything of what you need for a RAID system already built into a Dell Precision Workstation.

We intend to work on producing a FAQs on RAID systems so that content creators will understand why this is an advantage. As far as I know, there is no built-in RAID capability on any Macintosh computer. Not even in the specs for the Mac G5 is there any reference that I could find so far to SCSI, much less to RAID.

Floppy Drive, Zip, etc.

No floppy drive is needed for power users.

We have experienced defects with most Iomega products, especially Jaz and Zip. Hence, we do not see any reason to risk that brand: besides, Zip disks have always been overpriced.

There appears to be zero consistency with Macintosh drives. They had DVD-RAM one year (we liked that) but then the next model it was something else. DVD-RAM disks no longer fit in the next model at all. Apple attempts to make their drives sound unique, like "Super Drive" so you never know if they are compatible with anything else. It would make more sense if Apple would realize that most large corporations have some PCs no matter how Macaholic they are. I have over a dozen Macs in my office and have not the foggiest idea what kind of drives they have, since it always seems to be some "cool" name. As we mentioned earlier, your scanned files and your digital photos are all just pixels. They could not care less whether they are in a Super Drive or a Pooper Drive. They prefer to be in a DVD or CD drive so they can be moved easily among platforms without guesswork.

Iomega Zip disks are good examples of flawed technology

CD, DVD, DVD+ vs. DVD-

We prefer DVD-RAM, but it is hard to find any computer with that pre-installed. DVD-RAM has a cassette protecting the entire DVD-RW disk that is inside. Otherwise, it is very easy to scratch the delicate surface of any CD or DVD. They become unreadable in seconds. New software supposedly allows reading damaged CDs; we definitely need to get that to try it out.

Some computers use DVDplus (DVD+) and others use DVDminus (DVD-). There are a host of other distinctions (such as the aforementioned DVD-RAM in its thicker holder).

Video card

The extra RAM on today's video cards are mainly for gaming. Although we do not do gaming, we selected the nVidia offering with 128 MB to be the most compartible with comparing with Mac in benchmark tests. You can also select a video card that allows you to receive TV signals on your computer monitor (such as ATI Radeon All-in-Wonder 9700 Pro)

Keyboard and Mouse

The hockey puck-shaped mouse of the early G4's is an embarrassment best left unheralded. Another non-functional such accessory is the cordless mouse of Microsoft which failed to work when an Iomega Zip drive was installed. Otherwise, I prefer a mouse with scrolling dial. Don't get any old-fashioned mechanical mouse with a ball; the ball gets gunked up and fails to roll. Switch to laser mouse; they don't require a mouse pad either, though a pad helps a bit on some surfaces that the laser can't read from.

What Compaq offers as workstations

Compaq offers the 8000T series of systems that include a Pentium 4, 3.2GHz processor with Hyperthreading. Hyperthreading is a new technology that provides an increased speed for the user as the system can handle two sets of instructions at the same time, meaning an increase in the ability to multitask.

- Dual 120GB Serial ATA hard drives
- Competitive pricing
- Outstanding performance, ok design and features
- Few options of monitor (biggest is 17")
- 128MB ATI Radeon 9800 Pro graphics card, which just so happens to be the highest-performing graphics card we've seen in a system to date. (Handles gaming)
- No room for expansion

The focus is put on the home-office needs
$3237.99

Comments: we do not have favorable experience with lower-priced entry-level Compaq computers in our own office. Others tell us similar stories. It may be that the higher end Compaq are better, but until we can document that we would not ourselves risk buying another of this brand. We assume quality will increase as a result of fusion with HP, but have no way to know for sure.

What HP offers as workstations

What Hewlett Packard offers is the pavilion a250y series. Complete with a Pentium 4 processors with HyperThreading up to 3.2GHz and up to a three-year warranty. $2399.98. The downside is that HP only provides a monitor up to 17" for this series. If you did not know where to look you would think that was it. Sort of basic computers but nothing out of the ordinary.

Most computer companies never advertise their high-end workstations in popular computer magazines. Even on their websites, it is not easy to find the truly powerful workstations. On their website, the HP xw8000 is priced at "from $1,809" but in fact fully loaded it is $10,067; a model HP workstation xw6000 is $11,577.

Actually I had no idea whatsoever that HP sold workstations of this class until I saw them at SIGGRAPH. Hardly anything on the HP web site would suggest that they sold into such an innovative market as 3D-generated art, video editing, and digital art. That has previously been a sanctuary for Macintosh or SGI (Silicon Graphics).

HP offers the “plus” version of DVD, so DVD+RW

What Dell offers as workstations

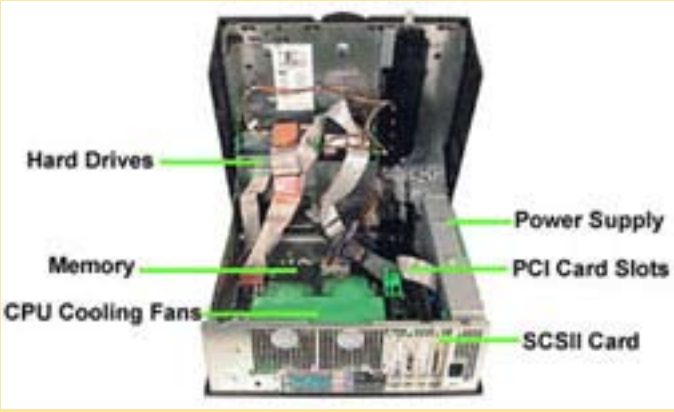
This company offers an Intel Xeon, 3+-gigahertz processor. Dell is useful for computer aided design programs. This system is called the Precision series of workstations. We acquired their comparable model two years ago. Liked it very much, so now have three more of the current models with Intel’s Newest Xeon Processor at over 3+ GHz. The specs in brief are:

- Dell Precision Workstation 650, dual processor 3.06 GHz, 2 GB RAM, dual 20” flat panel LCD monitors, four ULTRA 320 SCSI 15,000 rpm hard drives forming a Level 0 RAID system.
- Dell Precision Workstation 360, single 3.06 processor, 2 GB memory, 120 GB hard drive.
- Dell Precision Workstation 450, dual processor 3.06 GHz, a whopping 4 GB RAM, two 146 GB SCSI 10,000 rpm hard drives to form RAID level 0

The speed of Intel processors inches up every month or so. That is the difference with Macs. For many years the Mac processors from Motorola crept up embarrassingly slowly. It was not until Apple switched to the new IBM processor for the new G5 that speed was significantly increased. But the Mac G5 is not yet proven in the marketplace and we are not aware of software that can specifically take advantage of its alleged speed. Besides, the Mac G5 dual processor model is reportedly not to be available until late in September.

Hyperthreading technology is available with all Intel Xeon processors with Intel motherboards.

Dell 360 Workstation



Dell 450 Workstation

What Gateway offers as workstations

Gateway also offers the Pentium 4, 3.2-gigahertz processor with hyperthreading technology. The Gateway 700XL systems

Advertise better graphic performance with their 875 chipset 256MB NVIDIA GeFORCE™ FX 5900G ULTRA AGP (“blazing speed” and supports dual monitors)
Completely customizable
5 PCI and 1 AGP expansion slots for upgrading
A 22” flat screen monitor is advertised for a limited time only, otherwise, the biggest offered is a 20”.
$4,978.97

Corporations tend to opt for Dell, HP, or IBM; less likely for Gateway. A savvy individual power-user would probably tend to think of Dell, or maybe Polywell to get an AMD chip. I don’t envision too many digital content creatives having other brands in their short list.

What IBM offers as workstations

This is another company that offers the Pentium 4, 3.2-gigahertz processor
Intellistation M Pro 6219 minitower

- 36.4 GB hard drive
- 3072 MB of DDR memory modules
- The processor is not upgradeable.
- 20.1” Monitor
- $8,237.10

You would have to know beforehand that IBM offers a really fabulous high dpi monitor, the T-220 and now the T-221.

What Polywell offers as workstations with AMD processor

Polywell is brand that is offered through computer magazines. Polywell came out with the Poly Station 2020A, which includes Dual AMD processors. This company is one of the few that offers a 22” Flatscreen Viewsonic.. The company also provides custom computers to fit unusual needs of users. Polywell creates computers for the home-office, as well as for Computer Aided Design and video editing.
$8,460.00

We see Sys and ABS so seldom that we have no realistic way to judge their offerings.

Summary comments on computer brands

I don’t see many universities featuring Gateway or Polywell; IT managers tend to prefer Dell, HP, or IBM. Universities and museums that I know use Dell, in large part due to price, experience, and service. It is not easy for other brands to break into these markets either. The IT departments on these campuses are pretty much already aligned with Dell.

It is interesting to note that Mac G5 will add HyperTransport. Sounds suspiciously like Hyperthreading, which is already present on PC’s, long before Apple.

Monitors

We have other FLAAR reports which go into more detail on monitors, such as our report on computers for RIP software or computers for digital photography. Basically Apple offers their nice 20" and their superb 23" cinema display. We hope they last longer than the several defective 22" Apple cinema displays we had. Anyway, for the year they lasted, we liked them very much.

Mac G4 used to benchmark against Dell. The Apple web site claims their computer is 32% faster but our independent tests in the FLAAR lab at Bowling Green State University casts serious doubts on such claims. The BGSU tests documented that three different models of Dell computer beat this dual processor Mac G4 on every test we did, using Adobe Photoshop, Adobe Illustrator, in a real-life environment

Dell seems to offer the widest range of monitors and the most brands (in addition to their own Dell-branded monitors). It is my impression that quality has improved as well. Text on a Dell monitor two years ago could not yet match the quality of text of an Apple 22" cinema display. And I hear that the 23" cinema display is even better. But the newest Dell LCD monitors that we received look very nice indeed. As we get to know them better we can update this report.

We are interested in trying out the IBM T-221, in testing the LaCie in comparison with competitors, in seeing the expansive Mitsubishi, and generally in learning more about the Sony and Totoku as upgrades for the ViewSonic brand. Originally we bought only ViewSonic until we got two demo models from them that were not as good as we expected. Then we ended up with more ViewSonic monitors (new) at our university in Guatemala. They had too much flicker. I am writing this on a Dell monitor; fabulous quality and no flicker. Seems to be a 21" CRT model. Very nice.

NEC-Mitsubishi

If you wish to amaze your friends and embarrass your enemies, try putting the 40-inch LCD monitor from NEC-Mitsubishi on your desktop. The resolution is a modest 1280 x 768 dpi (as compared to 3840 x 2400 for high definition LCDs at 22 inch size). But a 40-inch monitor is so large you won't tend to get close enough to see the pixels.

This macho monitor costs roughly $ 5,799.

Totoku

When I first saw the IBM T-220 monitor, it immediately struck me that this was TWICE the high-definition of the much-touted Apple HD 23" cinema display. Now Totoku has a similar monitor, the CCL901. At a list price of almost $9,000, it better be good, and from what I have seen it is. Totoku seems to be the original equipment manufacturer in Japan for comparable monitors sold under ViewSonic, IBM, and other brand names.

Closing Observations

In most departments, at both universities, when new computers are purchased, they tend to be a higher percentage of PC and fewer other makes or models or platforms. Usually it is entire computer labs, previously another platform, that get replaced with Dell computers. At both universities in the last year,

the labs in the same building or adjacent building to the FLAAR facilities requested Mac at the beginning but were changed to be Dell when the purchasing departments saw either the difference in specs or the difference in price.

Summary

The origin of this excursion into evaluating computer platforms began as part of a program to evaluate specifically HP wide format DesignJet printers and its “ps” RIP on a Macintosh platform. Some HP laser printers do not work on a Mac. Hence some people are unsure whether an HP inkjet works on a Mac or not. As part of our program of public information, we wish to test the HP printers on a Mac, and if it works just fine, to get this information out to the public.

Dual 22” Apple Cinema displays are one reason why FLAAR still uses Macintosh computers. Shown here at Universidad Francisco Marroquin; however the university itself uses about 90% Dell computers in departments other than FLAAR

The second focus of this long range program of evaluating Mac and PC computer platforms is to assist people who need to select one, the other, or both, when they use an after-market RIP software with their wide format printer. RIP software requires its own independent computer to serve as a RIP server (printer server). Thousands of people a year buy wide format printer RIPs and few of have a reliable or independent source of factual information on what kind of computer they really need. We have learned that some RIP vendors do not explain that their RIPs really work better on a dual processor computer. Sales reps are probably nervous that they will lose the sale of the RIP if the buyer thinks they may also have to buy an expensive computer too. Since FLAAR does not sell hardware or software, neither printers nor computers nor RIPs, we can be a source of independent documentation. Of course once end-users learn what they need, then they are more confident in buying, so overall the FLAAR program of education is beneficial for everyone. Neither end user nor sales rep should fear learning the whole story of what to actually expect. Realism is an infamous trait of FLAAR reports.

The invitation to be featured at SIGGRAPH in late July 2003 brought all our past interests in Mac and PC together. The Mac and Dell were benchmarked for those who are oriented to such comparisons. The benchmarking is only one aspect of an overall program. Irrespective of whether it is faster or slower than a Dell, there are people who prefer to use a Mac. I personally use exclusively a Mac at the university in Guatemala, at BGSU and in my apartment-office in Germany. Our reports are intended to speak to, and interact with, people of both platform preferences.

It is worth noting that if you work extensively on the Internet, that Windows PC can handle longer file names. We had to switch from using all Macs over to using primarily PCs to handle long web page names. So month by month the advantages of using a modern Windows PC overcome the hallowed legacy of Macintosh of earlier years.

In a nutshell, PCs have caught up, and with USB 2, Serial ATA hard drives, faster processors, RAID system built-in, and hyperthreading capability, are ahead of Apple computers in virtually all aspects.

But I will admit the Apple case design is cool. But in a collapsing world economy, being cool is no longer enough. The whole Macintosh tribal mystique, complete with Evangelists, is a notable cultural phenomenon too. I have two degrees in Anthropology, including one from Harvard, so I have experience in cultural studies and proselytizing too. My PhD was on pre-Columbian indigenous religious iconography (of the 4th-7th century Maya civilization of Guatemala), so I know a bit about evangelists. Indeed several pleasant Apple evangelists dropped in to the FLAAR portion of the Guerrilla Studio at SIGGRAPH. I believe that any faith is best served by open discussion of the facts of the matter, rather than mantra. Besides, statistically, I have bought more than my share of Apple computers since 1997; I would estimate about 20 actually, of which most from 9600 onward are still being used. I look forward to trying out a G5 but feel that it's only a matter of weeks before an AMD chip equals or surpasses that, and then only a matter of months before Intel catches up in their usual manner, by exceeding everyone else on processor speed. So it will be an exciting year for digital imaging.

None of this changes the facts: if you are in high-end digital imaging which involves large format inkjet printers, a dual processor PC will tend to do a better job, especially with RIP software. RIP software is also where your color management is handled. With today's aftermarket ICC color profile software such as Monaco Profiler, it works just fine on any PC. The old-fashioned assumption that you are supposed to have ColorSync to do color management is one of those outmoded tidbits that was true 6 years ago. Besides, if you need sophisticated color management, CRT monitors color balance better, and Apple no longer offers CRT monitors at all.

Recommended Sources for further Information

If you are curious about a RAID system, you can obtain these from MegaHaus, e-mail rgroover@megahaus.com. He can also provide a RAID system for your Macintosh. We recommend SCSI 320 system. Robert Groover can explain this to you. Please realize, however, that MegaHaus handles only storage, monitors, and related accessories: they do not sell scanners or wide format inkjet printers. They are, however, one of the largest suppliers of hard drives and storage devices in the country.

For Dell computers, we do not have any one particular store since they are handled regionally and if you are at a university or in a corporation you already have an assigned regional rep.

If you are interested in Macintosh computers, and especially if you use them associated with large format inkjet printers such as Epson or Hewlett-Packard DesignJet, we recommend ProVar LLC. That's where we just bought our 23" Apple HD cinema display from. Contact is Tim Hassett, TimH@provarllc.com.

Bibliography

Peter LEWIS, an article on how to build the most powerful home/office computer possible with the technology at hand during August 2003. Fortune Magazine web site, www.fortune.com/fortune/peter-lewis/0,15704,466480,00.html

Sources and Resources on the Internet

There are probably over 100,000 pages on computers, monitors, and related topics on the Internet. Hence we do not attempt to list this range of resources. Instead we list the occasional item that caught our special attention.

www.asus.com.tw/inside/Techref/p3b-1394.htm (An excellent description of IEEE-1394, known to Macintosh users as FireWire.)

www.sgi.com (Web site of Silicon Graphics).

We also assiduously read various MacWorld, MacAddict, PC World and other PC magazines over a several month period.

Acknowledgements

We thank US Electronics for providing four Totoku 20 and 21" CRT monitors. We thank Dell for providing three powerful Precision Workstations for our booth at Siggraph as well as for our long-range program in testing equipment for high-end large format digital imaging. We thank Hewlett-Packard, large format division, Barcelona, Spain, for providing seven HP DesignJet printers, essentially one of every model over the last four years, so that we can evaluate them. We thank ProVar LLC for arranging the loan of an Apple G4 with 23" monitor for Siggraph.

Please Note

This report has not been licensed to any printer, RIP, media, or ink company to distribute. So if you obtained this from any company, you have a pirated copy. Also, since this report is frequently updated, if you got your version from somewhere else, it may be an obsolete edition. FLAAR reports are being updated all year long, and our comment on that product may have been revised positively or negatively as we learned more about the product from end users.

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Your only assurance that you have a complete and authentic evaluation which describes all aspects of the product under consideration is to obtain these reports from FLAAR at Francisco Marroquin University, via www.wide-format-printers.NET

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If you intend to quote any portion of a FLAAR review in a PowerPoint presentation, if this is in reference to any product that your company sells or promotes, then it would be appropriate to license the report or otherwise notify us in advance. FLAAR reports are being updated every week sometimes, and our comment on that product may have been revised as we learned more about the product from end users. Also, we noticed that one company cited the single favorable comment we made on one nice aspect of their printer, but neglected to cite the rest of the review which pointed out the features of the printer which did not do so well. For them to correct this error after the fact is rather embarrassing. So it is safer to ask-before-you-quote a FLAAR review on your product.

Appendix A

The Apple web site used to claim that it's G4 could beat a Dell. But we organized a test at Bowling Green State University undertaken by Brent Cavanaugh. All three Dell workstations surpassed the dual processor Apple computer by notable amounts. Unfortunately Apple sent an inadequate amount of RAM, only 512, so the test tried to take that into account. Anyway, the Apple web site has removed their claims on their G4. Actually most Mac magazines are now coming out to say how poor the Mac G4 was in comparison with the G5. Interesting that not many Mac magazines admitted this when the G4 was all they had to offer.

We use both Dell and Mac computers at FLAAR in two of our offices (Ohio and Universidad Francisco Marroquin in Guatemala). In Germany Nicholas has just his faithful Mac 9600 and a G4 with 22" cinema display.

Description	Dell Precision™ Workstation 360 Minitower
	
Computer	Intel® Pentium® 4 Processor, 3.00GHz, 512K / 800 Front Side Bus
2nd Processor (Must match speed selection above):	Our test unit has one processor
Memory	2GB, DDR333 SDRAM Memory, NECC (4 DIMMS)
Keyboard	Enhanced Performance, USB (8 Hot Keys)
Monitor	Dell UltraSharp™ 2000FP 20 inch Flat Panel Monitor (20.0 inch vis)
Graphic card	nVidia, QuadroFX 500, 128MB, dual monitor VGA or DVI/VGA capable
Boot hard drive	146GB Ultra 320 SCSI, 1 inch (10,000 rpm)
Floppy drive	3.5 inch 1.44MB Floppy Drive
Controller Card	U320 SCSI Adapter with RAID 0 at No extra charge
Operating system	Microsoft® Windows® XP Professional, SP1 with Media using NTFS
Mouse	Logitech® , USB, Optical (2-button, w/scroll)
CD ROM/DVD ROM	4X DVD+RW/+R AND 48X CDROM with Roxio® Easy CD Creator and DVD Decode
Speakers	No Speaker, this is a workstation not a toy.
Productivity Software	Dell Precision Workstation
Hardware Support Services	3Yr Parts + Onsite Labor (Next Business Day)
Optional Support Services	Gold Technical Support, Precision, 3 Years
Installation Services	No Installation
Energy Star™	Energy Star™
Price	**$4,600.00**

Description	Dell Precision™ Workstation 450 Desktop
	
Computer	Intel® Xeon™ Processor, 3.06GHz, 512K Cache
2nd Processor (Must match speed selection above):	Intel® Xeon™ Processor, 3.06GHz, 512K Cache
Memory	2GB, DDR266 SDRAM Memory, NECC (4 DIMMS)
Keyboard	Enhanced Performance, USB (8 Hot Keys)
Monitor	Dell UltraSharp™ 2000FP 20 inch Flat Panel Monitor (20.0 inch vis)
2nd Monitors	Dell UltraSharp™ 2000FP 20 inch Flat Panel Monitor (20.0 inch vis)
Graphic card	nVidia, QuadroFX 500, 128MB, dual monitor VGA or DVI/VGA capable
First Hard Drive	146GB Ultra 320 SCSI, 1 inch (10,000 rpm) for PERC3
2nd Hard Drive	146GB Ultra 320 SCSI, 1 inch (10,000 rpm)
Floppy drive	1.44MB FDD, Full-size, no-bezel, F3 bay-1ST SOURCE
Operating system	Microsoft® Windows® XP Professional, SP1 with Media using NTFS
Mouse	USB, Logitech, 2 button OPTICAL w/ scroll
CD ROM/DVD ROM	4X DVD+RW/+R with Roxio® Easy CD Creator and DVD decode
Productivity Software	Dell Precision Workstation
SCSI/RAID	U320 SCSI Adapter with RAID 0 at No extra charge
Hardware Support Services	3Yr Parts + Onsite Labor (Next Business Day)
Energy Star™	Energy Star™
Optional Support Services	Gold Technical Support, Precision, 3 Years
Installation Services	No Installation
Other Options	1394 Controller Card
Price	**$8,399.00**

Description	Dell Precision™Workstation 650
	
Computer	Intel® Xeon™ Processor, 3.06GHz, 512K Cache
2nd Processor (Must match speed selection above):	Intel® Xeon™ Processor, 3.06GHz, 512K Cache
Memory	2GB, DDR266 SDRAM Memory, NECC (4 DIMMS)
Keyboard	Enhanced Performance, USB (8 Hot Keys)
Monitor	Dell UltraSharp™ 2000FP 20 inch Flat Panel Monitor (20.0 inch vis)
2nd Monitors	Dell UltraSharp™ 2000FP 20 inch Flat Panel Monitor (20.0 inch vis)
Graphic card	nVidia, QuadroFX 500, 128MB, dual monitor VGA or DVI/ VGA capable
First Hard Drive	36GB Ultra 320 SCSI, 1 inch (15,000 rpm) for PERC3
2nd Hard Drive	36GB Ultra 320 SCSI, 1 inch (15,000 rpm)
3rd Hard Drive	36GB Ultra 320 SCSI, 1 inch (15,000 rpm)
4th Hard Drive	36GB Ultra 320 SCSI, 1 inch (15,000 rpm)
4th Hard Drive Bracket	4th Hard Drive Bracket, SCSI, Gray
Floppy drive	3.5 inch 1.44MB Floppy Drive
Operating system	Microsoft® Windows® XP Professional, SP1 with Media using NTFS
Mouse	USB, Logitech, 2 button OPTICAL w/ scroll
CD ROM/DVD ROM	4X DVD+RW/+R with Roxio® Easy CD Creator and DVD decode
Speakers	Internal Chassis Speaker, Dell
Productivity Software	Dell Precision Workstation
SCSI/RAID	Integrated U320 SCSI controller with RAID-0,64b PCIx (optional)
Hardware Support Services	3Yr Parts + Onsite Labor (Next Business Day)
Optional Support Services	Gold Technical Support, Precision, 3 Years
Installation Services	No Installation
Energy Star™	Energy Star™
Price	**$8,769.00**

COMPARISONS			
Description	Dell Precision™ Workstation 360 Minitower	Dell Precision™ Workstation 650	Dell Precision™ Workstation 450 Desktop
Computer	Intel® Pentium® 4 Processor, 3.00GHz, 512K / 800 Front Side Bus	Intel® Xeon™ Processor, 3.06GHz, 512K Cache	Intel® Xeon™ Processor, 3.06GHz, 512K Cache
2nd Processor (Must match speed selection above):	Our test unit has one processor	Intel® Xeon™ Processor, 3.06GHz, 512K Cache	Intel® Xeon™ Processor, 3.06GHz, 512K Cache
Memory	2GB, DDR333 SDRAM Memory, NECC (4 DIMMS)	2GB, DDR266 SDRAM Memory, NECC (4 DIMMS)	2GB, DDR266 SDRAM Memory, NECC (4 DIMMS)
Keyboard	Enhanced Performance, USB (8 Hot Keys)	Enhanced Performance, USB (8 Hot Keys)	Enhanced Performance, USB (8 Hot Keys)
Monitor	Dell UltraSharp™ 2000FP 20 inch Flat Panel Monitor (20.0 inch vis)	Dell UltraSharp™ 2000FP 20 inch Flat Panel Monitor (20.0 inch vis)	Dell UltraSharp™ 2000FP 20 inch Flat Panel Monitor (20.0 inch vis)
2nd Monitors		Dell UltraSharp™ 2000FP 20 inch Flat Panel Monitor (20.0 inch vis)	Dell UltraSharp™ 2000FP 20 inch Flat Panel Monitor (20.0 inch vis)
Graphic card	nVidia, QuadroFX 500, 128MB, dual monitor VGA or DVI/VGA capable	nVidia, QuadroFX 500, 128MB, dual monitor VGA or DVI/VGA capable	nVidia, QuadroFX 500, 128MB, dual monitor VGA or DVI/VGA capable
First Hard Drive		36GB Ultra 320 SCSI, 1 inch (15,000 rpm) for PERC3	146GB Ultra 320 SCSI, 1 inch (10,000 rpm) for PERC3
2nd Hard Drive		36GB Ultra 320 SCSI, 1 inch (15,000 rpm)	146GB Ultra 320 SCSI, 1 inch (10,000 rpm)
3rd Hard Drive		36GB Ultra 320 SCSI, 1 inch (15,000 rpm)	
4th Hard Drive		36GB Ultra 320 SCSI, 1 inch (15,000 rpm)	
4th Hard Drive Bracket		4th Hard Drive Bracket, SCSI, Gray	
Boot hard drive	146GB Ultra 320 SCSI, 1 inch (10,000 rpm)		
Other Options			1394 Controller Card
Floppy drive	3.5 inch 1.44MB Floppy Drive	3.5 inch 1.44MB Floppy Drive	1.44MB FDD, Full-size, no-bezel, F3 bay-1ST SOURCE
Operating system	Microsoft® Windows® XP Professional, SP1 with Media using NTFS	Microsoft® Windows® XP Professional, SP1 with Media using NTFS	Microsoft® Windows® XP Professional, SP1 with Media using NTFS
Mouse	Logitech® , USB, Optical (2-button, w/scroll)	USB, Logitech, 2 button OPTICAL w/ scroll	USB, Logitech, 2 button OPTICAL w/ scroll
CD ROM/DVD ROM	4X DVD+RW/+R AND 48X CDROM with Roxio® Easy CD Creator and DVD Decode	4X DVD+RW/+R with Roxio® Easy CD Creator and DVD decode	4X DVD+RW/+R with Roxio® Easy CD Creator and DVD decode
Speakers	No speaker, this is a workstation, not a toy.	Internal Chassis Speaker, Dell	
Productivity Software	Dell Precision Workstation	Dell Precision Workstation	Dell Precision Workstation
SCSI/RAID		Integrated U320 SCSI controller with RAID-0,64b PCIx (optional)	U320 SCSI Adapter with RAID 0 at No extra charge
Controller Card	U320 SCSI Adapter with RAID 0 at No extra charge		
Hardware Support Services	3Yr Parts + Onsite Labor (Next Business Day)	3Yr Parts + Onsite Labor (Next Business Day)	3Yr Parts + Onsite Labor (Next Business Day)
Optional Support Services	Gold Technical Support, Precision, 3 Years	Gold Technical Support, Precision, 3 Years	Gold Technical Support, Precision, 3 Years
Installation Services	No Installation	No Installation	No Installation
Energy Star™	Energy Star™	Energy Star™	
Price	**$4,600.00**	**$8,769.00**	**$8,399.00**

Technical Specifications	Power Mac G4
Processor	1.25GHz PowerPC G4
L3 cache:	1MB DDR SRAM
System bus	167MHz
Memory	512MB PC2700 (333MHz) DDR SDRAM; 2GB maximum(2)
Hard disk drive	80GB Ultra ATA/100; 7200 rpm(3)
Optical drive	Combo (DVD-ROM/CD-RW)
Graphics support	ATI Radeon 9000 Pro with 64MB DDR SDRAM and full dual display support
Expansion slots and bays	Four open full-length 64-bit, 33MHz PCI slots; AGP 4X slot with graphics card installed; four DIMM slots; four internal hard drive bays (one occupied); two optical drive bays (one occupied)
Ports	Two FireWire 400, four USB ports (two on system, two on keyboard), front headphone minijack and speaker, rear Apple speaker minijack, analog audio line in and analog audio line out minijacks, ADC and DVI connectors for dual display support
Networking	Built-in 10/100/1000BASE-T Ethernet, AirPort ready(4), v.92 56K modem (5)
System software	Mac OS X v10.2 „Jaguar‰, Mac OS 9
Software	Mail, iChat, Safari, Sherlock, Address Book, QuickTime, iLife (includes iTunes, iPhoto, iMovie and iDVD), iSync, iCal, DVD Player, Classic environment, Acrobat Reader, Art Directors Toolkit, EarthLink, FAXstf, FileMaker Pro Trial, GraphicConverter, Microsoft Office v. X Test Drive, OmniGraffle, OmniOutliner, QuickBooks for Mac New User Edition, and Developer Tools
Hardware accessories	Apple Pro Keyboard, Apple Pro Mouse, USB keyboard extension cable, DVI to VGA adapter, modem cable
Limited warranty and service	Your Power Mac G4 comes with 90 days of telephone support and a one-year limited warranty. Purchase the AppleCare Protection Plan to extend your service and support to three full years. Only the AppleCare Protection Plan provides you with direct telephone support from Apple technical experts and the assurance that repairs will be handled by Apple-certified technicians using genuine Apple parts. For more information, visit Apple support or call 800-823-2775.
Internet access	All models also include 30 days of free Internet service through EarthLink. Internet access requires a compatible Internet service provider; fees may apply
Service and support	90 days of free telephone support and one-year limited warranty

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