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Computers Made For Music

— Apple Power Mac G5 —

Apple Computer sent us the machine that topped their line in early summer of 2004, the 2 GHz dual G5 Power Mac; since then, 2.5 GHz machines have shipped and the price of the 2 GHz model has dropped a bit.

The machine

Our G5 came with 2 GB of RAM, an internal 160 GB hard disk and a SuperDrive DVD-R burner; Apple was kind enough to provide us with Emagic Logic Pro 6 preinstalled for the purposes of the review. GarageBand, as a part of iLife, came standard with the G5 as it does with all currently shipping Macs.

As you've probably seen in the ads (and on our cover), the G5 Power Macs are imposing boxes; their large, perforated cases provide adequate cooling for the G5 processor(s) yet remain relatively quiet—we'll talk a bit about this below.

The G5 comes with three PCI-X slots for expansion cards and an AGP slot for the video card. Our card was an ATI Radeon 9800 Pro, at that time the top of Apple's range; it's considered strong enough for the most visually demanding graphics or video applications, and we certainly had no complaints with it or with the 20" Apple Cinema Display that was supplied with the G5.

The G5 is the first Apple computer to come standard with USB 2.0 and FireWire 800. There are two USB 2.0 ports on the rear panel and one on the front of the computer—USB 2.0 offers a much higher throughput than original USB 1.1 and is backward compatible.

FireWire 800 provides up to twice the data throughput of the familiar FireWire ports seen on other machines. The G5 comes with one FireWire 800 port on the rear panel and two standard FireWire (now called FireWire 400) ports, one in back and one in front.

Audio connections are analog and digital. There's a front-panel ⅛" headphone jack and rear-panel ¼" TRS analog line-level inputs and outputs. Also on the rear there's optical S/PDIF in and out (up to 24/96 for input, up to 24/48 for output). Note that this is standard equipment out of the box, not specialized add-ons for audio users! Other connections include AirPort and Bluetooth antenna jacks for use with wireless networks and devices, a Gigabit Ethernet port, and an optional modem.

Since we received the Mac under review, Apple has upgraded certain components in units shipping since then; the SuperDrive is now an 8x model rather than our 4x, and the ATI Radeon 9800 XT card now comes with twice as much RAM (256 MB rather than 128 MB). Allowing for those upgrades, ordering a Mac that's otherwise like the one under review at Apple's online store would cost roughly $3300; you could easily push the price below $2400 by going with a simpler video card, leaving out Bluetooth and AirPort capability, downgrading to a Combo drive that doesn't burn DVDs, and installing third-party RAM rather than buying it from Apple. (None of these prices include a monitor.)

Apple offers 90 days of free tech support and a 1-year warranty on this system; you can purchase the AppleCare Protection Plan that extends warranty coverage and tech support to 3 years total and includes a free copy of Micromat's TechTool Deluxe diagnostic software, for $249.

In use

In addition to the pre-installed Emagic Logic Pro 6 and the standard GarageBand we loaded a variety of other sequencer/DAW software, plug-ins, and virtual instruments onto the G5 and had a chance to play and compose music with it. Aside from encountering an unbelievable variety of installation and copy protection schemes ranging from painless to agonizingly awful (a subject for another article in itself!), we were able to experience a broad range of applications for this Mac and say a few words about its performance.

First of all, there is no question that this is the quietest Mac we've used in recent memory; its multiple small fans, each running fairly slowly and only cooling a small part of the machine's interior, seem to provide adequate cooling with a very low noise level. We did SPL measurements in a quiet (but not anechoic) room using a Terrasonde Audio Toolbox 3 (their newest model—look for a review soon), and got the following A-weighted numbers for the G5: its loudest point was just outside the rear of the case near the dual exhaust fans, with an SPL of 56 dBA; the front of the case (where cool air is pulled into the case) was at 51 dBA, and a measurement taken at a distance of one meter from the front of the case was 38 dBA, a very respectable value and just a few dBA above the room's quiescent noise level of 35 dBA. Users should note that this last number is the realistic figure for actual studio use; no one will be setting up mics next to the rear exhaust fans!

The G5 represents a significant performance jump from the G4 Macs we've used before. It's not only far faster than any G4 out there, but there are many improvements in the machine's architecture that become

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especially apparent in dual-processor boxes. Prior G4 machines' bus speeds topped out at 167 MHz, and dual G4 Macs (and most dual-CPU PCs) had both processors share only one data bus. By contrast, each G5 processor has its own bus, running at up to 1 GHz; this means more data crunch per second, which means more plug-ins, more virtual instruments, more everything...

and hopefully less bouncing, muting, and track-freezing while trying to get stuff done.

Some of the software we tested was obviously heavily optimized for the Mac; the classic example of this, of course, is Logic Pro 6 (we reviewed Logic Platinum 6 in June 2003, before Apple bundled it with *all* of Logic's available instrument and effect modules to make Logic Pro 6 earlier this year). On the G5, Logic Pro allowed us to run multiple software synths without bogging down significantly; these included not only Emagic's own native synths like ES2, which are very efficient in and of themselves, but also powerful third-party synths like Arturia CS-80V

Mac or PC? The Debate Rages On

There are many arguments that can be made for and against moving from the PC to the Mac, or vice versa. This is a debate that is so multifaceted and so passionate that it's practically been elevated to the status of religious schism. There was a time when you had no choice—the Mac at first was the platform of choice for audio users when there was no equivalent software for the PC. But that was then—these days audio software at all levels of sophistication is available on both.

Mac lovers talk about how their machines are elegant, easy to learn, easy to set up, powerful, reliable, and possessed of unique software that will only run on a Mac. PC lovers counter by pointing out that their machines are cost-effective, flexible and endlessly customizable, powerful, reliable, and possessed of unique software that will only run on a PC. Users dispute clock speeds, megaflops, buss efficiencies, upfront and support costs, ease of use, ease of maintenance, bells, whistles, and other topics, and the debates can rise to the point of heated shouting matches, if not actual physical violence.

The fundamental difference between the Mac and the PC is that the Mac is built by only one company, Apple Computer, and there are dozens of companies building computers that can run Microsoft Windows XP, to say nothing of the common practice of users buying parts and building their own.

When you buy a Mac, it's a device that's been assembled and tested in one factory by one company's engineers, and it's very likely that when you take it out of the box and turn it on, it will work properly, and that when you add hardware or software to it that was intended to work with it, that will work properly as well. Some users will find this approach comforting in its reliability and stability; others will chafe at a perceived lack of choices and an unnecessarily high asking price to get into the game—you can't buy any new Mac (suitable for audio or not) for less than $800, and a dual-processor G5 model that's suitable for high-end audio will start around $2000 just for the computer itself.

When you buy a PC, your experience with getting it running and interacting with other products will vary strongly depending on where you bought your parts: you can spend as much or more than what you'd spend on an Apple machine to get a tricked-out and fully-tested audio PC from a high-end design company like Alienware or Digital Audio Wave, or you can save a bundle on an inexpensive machine that may never have been tested with audio applications at all and that will leave you on your own when it comes time to troubleshoot.

Learning to build, fix, and troubleshoot PCs is not impossible, but it is time-consuming and requires a fair bit of book-learning and hard work. Once you've done it, you then have the option of doing what any good do-it-yourselfer in any field can do: be your own tech support, fix problems on your own, and no longer have to pay for someone else to do it, with an attendant decrease in costs—there's no reason a competent builder couldn't make his or her own top-flight studio PC for well under $1000. But many music computer users wonder why they should have to learn that kind of stuff to make music, and are more inclined to buy a system that's simple to set up and known to work.

One factor that can make your decision for you immediately is the availability of software on only one platform. Many applications are cross-platform, and more are becoming so every day; a good example is Cycling '74's line of MIDI and audio manipulation tools, popular for many years on the Mac but now settling nicely into the Windows world. If you're working in Pro Tools, being on a Windows machine is no longer a handicap; if you want to do sound design on the Clavia Nord Modular G2, its latest software has been released for Mac OS X as well as for Windows.

But sometimes the work you want to do with your computer is dependent on a particular application—maybe it's what you must use to create product that's compatible with the people for whom you're creating music, or maybe it's the platform your creative partners in other studios are using, or maybe you have a track record with a particular app and don't want to switch gears. That can make your decision very easy.
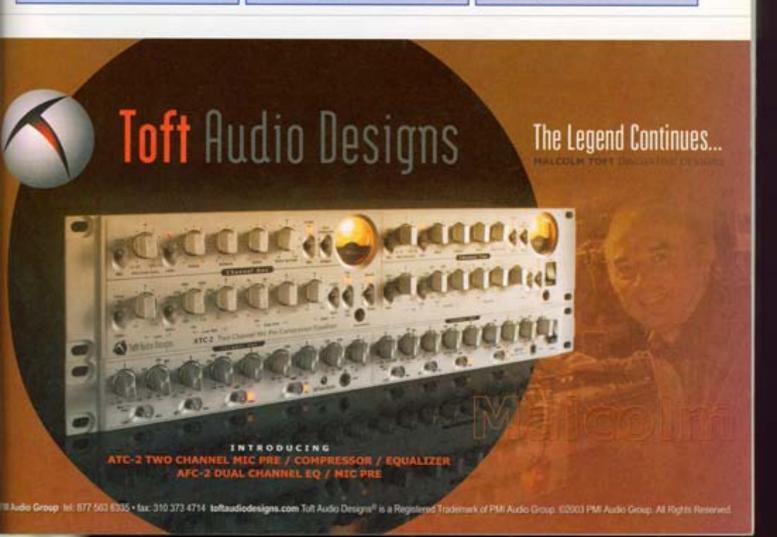
Another way to choose is to look around you at the people who work with computers in your life, even if they're not musical collaborators. Do you know someone who's really good at setting up and using the Mac? Or someone who routinely builds his own PCs with good success? If that person is willing to help you learn what you need to know, that can be a good incentive to go one way or the other. You should, of

course, consider the computer you may already be using for email, business, or Web surfing—that particular machine may not be a good choice for turning into an audio box, but if you're familiar with how it works, you may not want to jump platforms when you add a second computer to do music.

Most significant in today's world is a tendency to have multiple computers in a single studio, each to do what it does best. We have a forthcoming article on networking computers for music work; at least one method we'll discuss is to connect Macs and PCs seamlessly. So you want to play orchestral sound sets in GigaStudio but feed them into an Altiverb representation of a famous opera house? Or use Numerology to compose ambient music and have it control a Windows-only VST instrument? You'll need both machines working in tandem. Yes, it doubles your costs and your learning time... but it more than doubles your flexibility. You may find, as many have already, that the choice between Mac OS and Windows is no longer a choice you have to make—your choice may involve which model of each platform you should buy.

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(see last month's 'Showcase Of Sounds'), reFX Vanguard, Camel Audio Cameleon 5000, Native Instruments Reaktor 4, and Ohm Force Symptohm:Melohman. These were run in AudioUnits format, with the VST-only offerings converted to AU via FXpansion's VST-AU wrapper.

Another heavy hitter on the Mac-only front is MOTU Digital Performer 4.12 (reviewed May 2004). This audio/MIDI 'killer app' has recently been refined to make the most of dual-processor G4 and G5 machines, and we found it to work gloriously well on the dual G5, enabling us to add impressive numbers of plug-ins, including the very powerful Altiverb convolution reverb from Audio Ease. We were able to load and run eighteen different stereo reverbs as inserts on a multitrack playback without raising the CPU meter above about halfway. That's impressive, even allowing for the fact that Altiverb 4 is significantly more efficient than its predecessors.

Our main cross-platform DAW for testing purposes is Steinberg Cubase SX (now at version 2.2); as with Logic Pro and Digital Performer, we found ourselves able to create large arrangements of live VST synths and tweak them in real time without having to resort to track freezing or rendering. We were able to run eleven instances of CS-80V without pegging the CPU meter, the best result by a hair for any system we looked at in this series of tests.
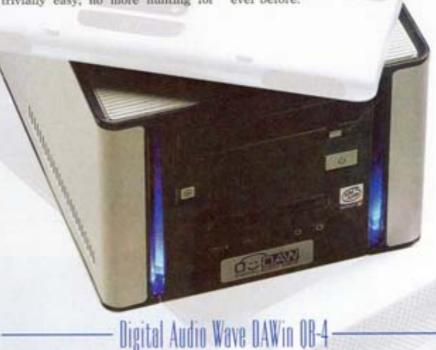
Short form? Apple says this machine can handle most audio chores up to the highest pro level, and we see no reason to disagree.

During the test period so far, we've looked at a variety of familiar and new hardware and software products; some of the new products' results will appear in reviews in forthcoming issues. For now, we can say that we no longer experienced the performance bottlenecks that used to annoy us when running many of these apps on our old test Mac (a 700 MHz single-processor eMac). We expect that we'll eventually come up with projects that are too big for the G5 to handle, but we haven't yet.

Perhaps the one way in which our test machine could be significantly improved for heavy recording projects would be to add a second internal ATA hard drive. The G5 architecture provides separate access busses for two ATA drives internally, so data moves on and off the disk much more quickly than in older designs; we imagine that larger multitrack projects would benefit significantly in terms of track count from this arrangement, whether in native apps like Digital Performer or Logic Pro or in DSP-assisted apps like Digidesign Pro Tools TDM. Note that the new G5 case design makes adding a hard disk trivially easy; no more hunting for cables and flailing with drive sleds and set screws!

Is the dual G5 for you? That question hinges primarily on another: are you or aren't you already a Mac user? If you aren't, then you'll need to consider all the reasons to start working with a Mac vs. staying with a PC (see the sidebar 'Mac or PC?'). But if you are, then the significant investment embodied in the dual G5 represents an equal return in power and flexibility. Anything that a Mac could do to date can now be done more quickly, better, and more silently than ever before.

Digital Audio Wave DAWin QB-4

The 'QB' in the name of this desktop audio PC stands for 'Quiet Box,' and they're not kidding. This is the quietest Windows machine we've ever used, and there's no compromise in the power it offers for audio work. It is also quite affordable, representing a remarkable price point for a preconfigured audio PC.

The QB-4's enclosure is made by Antec; it's the Aria, a small-format case that creates what we feel is a very good compromise between small size and expandability. Many of the very small desktop cases (often called Shuttle cases, after the company that popularized them) are restricted to one or two motherboards that are sized to fit them, and may have few or no full-sized slots for PCI cards, limiting expandability; the Aria case, while slightly larger (8" H x 10.5" W x 12.5" D), can take a wide variety of motherboards, and has room inside for up to three full-sized PCI cards plus the video card. Users interested in sound cards that come with daughterboards for sync, MIDI, or track-count expansion will be interested in such a design, as a single card slot can't accommodate such systems.

The actual guts that go into the case are highly configurable by the user; Digital Audio Wave offers a comprehensive range of options, from CPU choices and speeds to peripherals, extra features, connectivity, and more. Our machine, priced at $1399 from Digital Audio Wave, had the following specs: an Intel Pentium 4 processor with HT (hyperthreading, a technology that allows a single P4 to act in some applications like a dual processor) running at 3.2 GHz with an 800 MHz frontside bus, 1 GB of RAM, two onboard 7200 RPM drives (one 80 GB IDE drive for system software and apps, one 120 GB Serial ATA drive for audio files), an 8x DVD±R burner, and an ATI Radeon 7000 video card with 64 MB of RAM and dual monitor support. We added our own LCD monitor, using the video card's VGA output; its other port is DVI for digital monitors.

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It came packed with all the documentation for all the selected peripherals (including the Microsoft keyboard and scroll mouse), as well as install CDs for whatever utilities were bundled with it, a data sheet with general instructions for best performance, and a master recovery DVD in case you need to restore your system.

You can get a QB-4 from Digital Audio Wave with only slightly lighter specs than these—a 2.8 GHz CPU and a different drive configuration, for example—at prices as low as $999. This represents a tremendous value for the audio PC buyer; you can get a system that's optimized and tested for audio use for no more than you'd spend on a general-purpose PC from a major vendor. Added value comes in the form of a 3-year system warranty (lifetime for memory), and lifetime toll-free telephone tech support—a remarkable offer indeed.

Options

There are many hardware options that can be bundled with the computer; there's room in the case for up to three hard disks, plus any sort of optical drive from a simple CD-R burner to our topnotch DVD±R. The QB-4 lineup includes, as standard equipment, an 8-in-1 memory card reader built into the front panel of the case, two FireWire 400 ports and six USB 2.0 ports (one FireWire and two USB 2.0 on the front panel), standard PS/2 keyboard and mouse sockets, front-panel mic input and headphone output on ⅛" jacks, and rear audio in, out, and surround jacks on ⅛".

The QB-4 is available with a wide variety of audio cards, including offerings from RME, Lynx, M-Audio, Creamware, and others; there's a full list of options on the company website. We did all of our tests with an M-Audio FireWire 410 interface box (reviewed May 2004) and a Novation Remote25 USB MIDI controller (review forthcoming).

The system, as supplied, was set up with Windows XP Home Edition and preloaded at our request with two applications: Cakewalk SONAR 3.1 Producer Edition and Cakewalk Project5. (Note that the cost of the music apps is not reflected in the price of the computer; you can buy preconfigured systems from Digital Audio Wave, but you'll be responsible for the cost of the apps themselves.) We loaded up some CPU-hungry soft synths to test the system's limits: Ohm Force Symptohm: Melohman, Arturia CS-80V, GMedia ImpOSCar, and Native Instruments Absynth 2. We also added Steinberg Cubase SX 2.2 as a crossplatform VST host application.

In use

Out of the box the QB-4 came fairly well tweaked for high-speed audio. We started by turning off the fancy desktop display and graphics in favor of a plain blue screen, then

dug deeper to see what sort of software settings were chosen by the programmers.

The Services Panel (see Bill Stunt's 'Windows XP: Optimizing For Audio,' April 2004) had a few of the defaults reset to get them out of the way for higher performance, but nowhere near as many as a hardcore tweaker would do. The choices we did see, however, seemed good ones.

We found that in the Processor Scheduling screen (right-click on My Computer, select Properties, click on the Advanced tab, select Performance Settings, and click on the Advanced tab), performance was optimized for background services rather than programs. This is the correct setting for

audio work; "background services" includes moving data in and out of your audio and MIDI interfaces, and letting that be overridden for programs' sake can lead to audio glitches.

We also found that the *paging file*, a virtual memory space on a hard disk that's used as if it were RAM, was set up as a 2 GB allocation of a 4 GB partition called F:[SWAP] on the same physical disk drive as our D:[AUDIO] volume.

Paging files are controversial these days among PC audio geeks; some experts ("Like me," says Devon) believe they're not necessary if you have more than 512 MB of available RAM, but others leave them on just because (a) some apps require them and (b) *really truly* turning them off requires some deep-down registry hacking that is definitely not for amateurs. Which gives better performance? Some power users say that having one is a big win, others offer proof that *not* having one is a big win, still others notice no difference.

If you're of the "have one" school, though, having a 2 GB paging file on its own partition, which Digital Audio Wave warns you to leave alone and not disk-optimize as you use and maintain your PC, is a good way to handle the situation for newcomers (and many non-newcomers). Should it be on the system-software disk since the audio-storage disk gets slammed hardest during multitrack recording? We don't have enough data to make a guess.

The QB-4 came set up with two different Device Profiles, entitled "Multimedia" and "Pro Audio." When the QB-4 is turned on, you're offered a choice to boot into one or the other configuration before the machine times out and picks whichever one you've chosen as default. The only real difference between these two setups is that Pro Audio has networking completely turned off, which some users feel improves efficiency of RAM usage.

We did run into one serious glitch when installing software and getting up and running: Cubase crashed on launch because of a conflict between the motherboard's onboard audio driver and DirectX 9.0b. After many phone calls we finally shipped the QB-4 back to Digital Audio Wave and had

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them reformat the system completely, installing Cubase along with a reinstall of SONAR and Project5 and verifying that everything worked. (They had to update the audio driver and take DirectX back a step to version 9.0a.)

Note that this was done entirely at Digital Audio Wave's expense and turned around in only two days. We asked if a non-magazine-editor customer would get this level of service. Digital Audio Wave's response was that any problem of this nature that couldn't be solved by telephone support would be handled in just this way. We think that speaks volumes about the satisfaction level Digital Audio Wave intends to instill in their user base. When the machine came back, it booted and ran everything flawlessly and we were able to perform our tests in the time remaining before we went to press.

Antec claims that the Aria is the quietest PC case in the world; we can't verify that, but we could see for ourselves that Digital Audio Wave placed the QB-4's internal wiring to allow maximum airflow for low-speed cooling from its Coolermaster CPU cooler. Our SPL measurements with the Terrasonde Audio Toolbox 3 were impressive. At one meter from the front of the case, we measured 38 dBA SPL, equal to the performance of the Apple dual G5 and far quieter than our test eMac. Right at the front of the case, SPL was 54 dBA; at the rear fans this number rose to 64 dBA, still quieter than our eMac. When we tucked the QB-4 under our desk, the noise was deadened to the point that it could only be heard if every other machine in the studio was turned off. Now *that's* quiet.

The simplest setup one might have with a machine like this one is for basic personal recording: two or four tracks at 24-bit/48 kHz, maybe with a couple of plug-ins for sweetening. We set up Cubase for four-track input with two reverbs and were able to record easily with the CPU meter sitting at about 10%. Note that audio tracking for big projects would be aided by the fact that this box came with two hard drives, but for the small number of tracks we recorded, even a single drive wouldn't have trouble handling this much data.

The real acid test for CPU power is virtual instruments, and our other test consisted of layering multiple VST Instruments for simultaneous control from our MIDI keyboard until the CPU meter pegged out. We were able to get nine copies of CS-80V running under Cubase with a peak CPU load of about 80% when playing dual-layered four-voice chords; we started seeing CPU "clipping" when we added a tenth CS-80V. So CPU power limits won't be a problem unless you're way into heavily layered synth textures, and those are usually built up track by track rather than played all at once.

Summing up, we came away highly impressed with the QB-4 and with Digital Audio Wave. Their systems give you great setup and unbelievable aftermarket support for a cost barely exceeding that of a non-audio PC from a faceless vendor who doesn't care if nothing works. For that reason alone, they're well worth a close look.

Alienware Ozma-m Mobile Studio

Alienware enjoys a street reputation for tweaked-out gaming machines with sci-fi looks and hot specs. The company has now released a series of machines for audio tweakheads, the latest model being its first foray into audio laptop PC design: the Ozma-m. We looked at its suitability not only for CPU-crunching plug-in and virtual instrument use, but also for practical portable recording.

Laptop PC users are divided in their preferences for CPU chips. Some prefer the Pentium M for its quiet, cool, battery-friendly operation (and claim that it performs as well as a P4 that has twice its clock speed), while others want the Pentium 4 chip normally used in desktop units. The Ozma-m is designed for the latter crowd, and provides a big, roomy platform for desktop-style computing that just happens to fold up and fit into a (large) shoulder bag.

Our test model, which Alienware tells us would cost an end user roughly $2700, was a 3.4 GHz machine with 1 GB of memory, with an American Megatrends BIOS on an Alienware Area-51 motherboard with an ATI Mobility Radeon 9600 video adapter with 128 MB of RAM. The machine included a 7200 RPM 60 GB hard drive, a DVD reader/CD-RW combo drive (user-swappable with a second internal hard drive for recording applications if desired), and a huge internal battery as well as an inline power adapter for AC use.

I/O ports included a single Type II PC Card slot, an SD/MMC card reader slot, S-Video, VGA and parallel ports, 10/100 Ethernet, a modem, and ⅛" jacks for a