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Fact or fiction?

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REVIEWED

1 GB IBM Microdrive
Palm's Tungsten & Zire PDAs
SoundBlaster Audigy 2 soundcard

Jasubhai DIGITAL MEDIA
International price: United States $5

Getting Along

"Please fax those documents across ASAP!"

"Sure thing. Uh…wait! What's the make of your fax machine?"

Thankfully, we need not worry about such unnecessary details as all fax machines use a common standard for data transmission. But left to itself, the tech industry would have made the above conversation sound more familiar than we can ever imagine.

Industry standards are critical as they assure interoperability and compatibility.

Without proper standards, any new technological advancement is limited to a particular product featuring those capabilities.

Take the case of data communications. A few years back Rockwell and 3Com touted different, competing technologies in their modems for pushing transmission speeds to 56 kbps. Without the intervention of the ITU-T in creating the v.90 standard, datacom speeds would have been limited to 33.6 kbps with us being caught in the middle of having to forcefully adopt one technology (based on what our ISP supported) in order to get a speed boost. This in turn would have limited our freedom of switching to another service provider using a competing standard.

In established markets, market leaders, based on their sheer size and the control they exercise, can split or create new standards. For instance, Intel was late in introducing the SSE instruction set for speeding up multimedia applications (AMD was the pioneer with its 3DNow! technology). But owing to Intel's market dominance, AMD is now forced to tout SSE compatibility in its processors as software vendors have adopted the Intel standard.

However, the battle for standards gains momentous proportions when it comes to the adoption of new technologies in an emerging market. The current mess of the rewritable DVD market can be squarely attributed to the lack of any industry standard with two groups trying to lobby their competing technologies to the consumer.

The one-size-fits-all solution then is to have open standards owned by vendor-neutral organisations, which anyone can use and implement. Case in point: if Wi-Fi wasn't a popular open standard, Intel could have easily created another wireless communication technology for Centrino, its next generation mobile processor technology.

It's not too late for companies to realise that open standards are the only way to avoid consumer confusion and drive innovations. Otherwise, we'll be left with the same madness of the rewritable DVD market where infighting and bickering amongst trade groups has virtually sealed the fate of this promising storage technology.

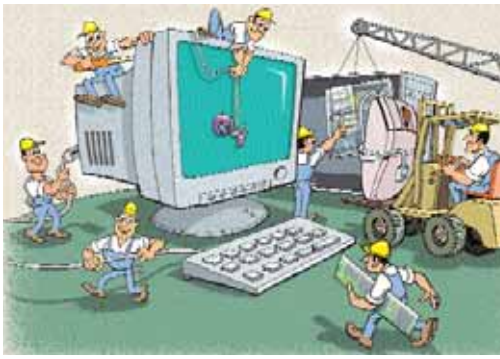
Now we can only hope that DVD's successor, be it Blu-Ray or holographic storage, will not suffer such a fate.

vinit_aggarwal@jasubhai.com

Vinit Aggarwal
Assistant Editor

"Despite being the pioneer with its 3DNow! Technology, AMD is forced to tout SSE compatibility in its processors as software vendors have adopted the Intel standard"

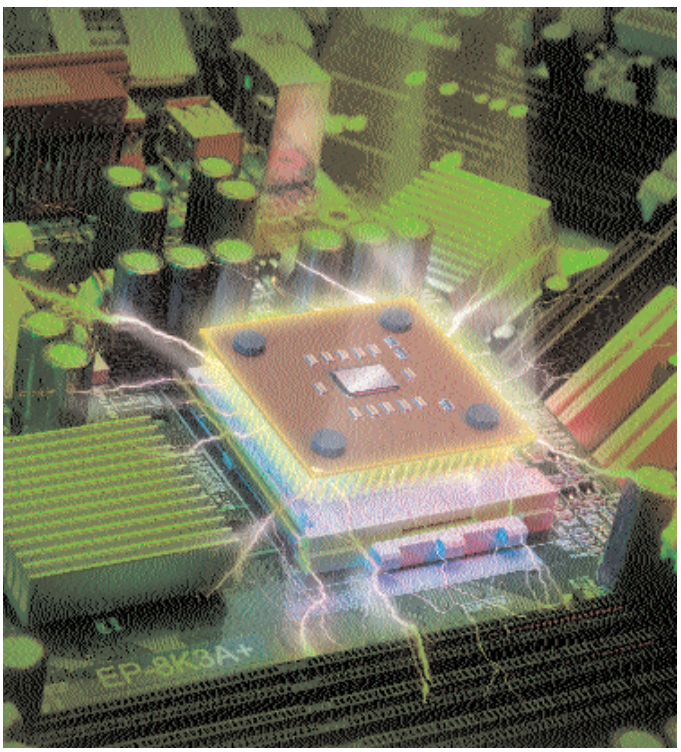
FEBRUARY 2003



▲▲97 Learn the right way to install a processor, heatsink, power supply and much more...because you can never have enough power!

86 ▶▶
The radio star has been spotted at your nearest Web site

▲▲28 Autonomic Computing promises a bag full of miracles. Will it deliver?



▲▲40 Intel? AMD? Motheboard? Processor? We got your bases covered

REGULARS

Reviewed this month

HARDWARE

Bazaar 64
- ACi Ethos 4 Laptop
- Canon ImageCLASS MPC600F
- Creative SoundBlaster Audigy2 Platinum
- Freecom FM-1 USB Stick
- HP Photosmart 130
- IBM Microdrive 1GB
- Labtec Pulse 420 2.1 speakers
- Logitech MX500 Optical Mouse
- MSI Dragonwriter 48x16x48x
- Odyssey ATX-403A Computer Case
- Palm Tungsten T
- Palm Zire
- UMAX Astra4700
- Wipro LQ 5400 Dot matrix printer
- Zenith 3 GHz PC

Motherboards 40
- ASUS A7S266
- ASUS P4B533-UAY
- ASUS P4B533-V-UAY
- ASUS P4BGL-VM
- ASUS P4S133-VM
- ASUS P4S533-VM
- ASUS P4T533-C
- ASUS P4T 533-R
- ASUS A7V8X
- ASUS P4SGL-VM
- DFI AD73 PRO
- DFI AD77-infinity
- DFI AD77-PRO
- DFI AZ30-EC
- DFI NB30-BC
- DFI NB35-BC
- DFI NB71-BC
- DFI NT72_SC
- DFI PE 21-EC
- DFI PM11-EC
- DFI PM10-EC
- Digi-link DGA-8LS533
- Epox EP-8K3A+
- Epox EP8KMM+
- Gigabyte 7VAXP-Ultra
- Gigabyte GA-8GE667-PRO
- Gigabyte GA8PE-667-ULTRA
- HIS M48-14
- HIS M48-B7
- HIS M48-DA
- HIS M50-21
- Intel D845 PEBT2
- Intel 850EMV2
- Intel D845GEBV2
- Jetway 845 LDM
- Jetway P4MFM
- Krypton M7VKQ
- Krypton U8668 Z8
- Krypton P4TDQ
- Mercury KM266
- Mercury KOB-730s-FSMx
- Mercury KT266A-FDSX
- Mercury KOB650GL NDSMx
- Mercury KOB845G-NDSMx
- MSI 845E Max2
- MSI 845PE-MAX2
- MSI KT3ULTRA2
- MSI KT4-Ultra

Processors 40
- AMD Athlon XP 1700+
- AMD Athlon XP 1800+
- AMD Athlon XP 2000+
- AMD Athlon XP 2200+
- AMD Athlon XP 2400+
- AMD Athlon XP 2600+
- AMD Athlon XP 2700+
- AMD Athlon XP 2800+
- Intel Celeron 1.7 GHz
- Intel P4 1.7 GHz
- Intel P4 2 GHz
- Intel P4 2.2 GHz
- Intel P4 2.4 GHz
- Intel P4 2.53 GHz
- Intel P4 2.8 GHz
- Intel P4 3.06 GHz

SOFTWARE

Bazaar 64
- ACT! 6.0
- RestoreIT! 3 Deluxe
- Watchdog II
- WebCafe

ON THE CD

HIGHLIGHTS

Adobe PageMaker 7.0
Size: 65 MB, Type: Trial
Mindware\Software\Multimedia

dBpowerAMP Music Converter
Size: 1.47 MB, Type: Free
Mindware\Software\Multimedia

Groove Workspace
Size: 26.92 MB, Type: Trial
Mindware\Software\Office

Harry Potter And The Chamber Of Secrets
Size: 23.9 MB, Type: Trial
Playware\Arena\Games

Hex Editor 4.0
Size: 2.70 MB, Type: Trial
Mindware\Software\Developer Tools

Live Billiards v1.3
Size: 5.89 MB, Type: Trial
Playware\Arena\Funzone

Microsoft Netmeeting 3.0
Size: 1.57 MB, Type: Free
Mindware\Software\Office

Splinter Cell
Size: 100 MB, Type: Trial
Playware\Arena\Games

Spytech Security Works 2003
Size: 3.86 MB, Type: Trial
Mindware\Software\System

UltraEdit-32 9.2
Size: 1.68 MB, Type: Trial
Mindware\Software\Developer Tools

KNOW YOUR CD

PLAYWARE\ARENA\EXTRAS

The Extras section on your Digit Playware CD brings you tools and add-ons for popular games. The Extra section within the CD features game mods, additional game maps and update patches. Get set to play with new and enhanced game levels, with patches that iron out all those bugs!

This month we bring you three bonus maps for *Warcraft III* and update patches for *Return To Castle Wolfenstein* that will update your game, adding new weapons and some bugfixes. A patch for *Soldier Of Fortune II: Double Helix Gold* that updates it to v1.03, along with three new multiplayer maps are included. We also have a patch for *Empire Earth*, which will improve your multiplayer gaming experience.

MUST-TRY SOFTWARE

James Bond 007 Nightfire

Enter the world of spies, espionage, and play with danger and gorgeous women as super spy James Bond. As Bond, players will operate in exotic locales such as the snow capped Austrian Alps and the far reaches of outer space as well as underwater in the depths of the South Pacific to defeat the evil criminal mastermind Rafael Drake, the popular head of a supposedly benign environmental organisation who is secretly bent on world domination. You have at hand 007's arsenal of upgradeable spy gadgetry and high tech weaponry with a host of exotic vehicles.

Size: 146 MB, Type: Trial
Playware\Arena\Games

Adobe After Effects 5.5

Adobe After Effects composites and creates 2D and 3D animation and special effects for film, video, multimedia and Web projects. Compositing features include unlimited layers, Beziér masks, alpha-channel controls, anti-aliasing, interlayer transfers, and the ability to mix multiple file resolutions. Special effects such as time remapping can be used to create such effects as variable slow motion, frame stuttering, playback delay, backward playback, and hold frames. Version 5.0 features non-destructive vector paint tools, of masking enhancements, new visual effects, interface enhancements, and more.

Size: 65.80 MB, Type: Trial
Mindware\Software\Multimedia

McAfee VirusScan Home Edition 7.0

The McAfee VirusScan Home Edition scans all system areas, including local and network drives, CD-ROMs, floppies, boot sectors, file allocation and partition tables, files, and compressed files. Other features include a new user interface, support for Windows XP, new Quarantine and Safe & Sound utilities, incremental DAT file updates, and a new Installation Configuration Assistant.

The latest version also includes an integrated personal firewall, intrusion detection, and protection during PDA synchronisation.

Size: 41.1 MB, Type Trial
Mindware\Software\System

Note: Due to unavoidable reasons, Crystal 3D Impact! Pro, mentioned on the CD cover, has not been included in the Multimedia section in the Mindware CD. We regret the inconvenience.

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WEB SPECIAL

Tracking The Code

Find out how teams of programmers work across the world and yet track the modifications to the code within the team.

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BY DEMAND

You get to choose what goes on Digit Interactive. This month you have chosen:

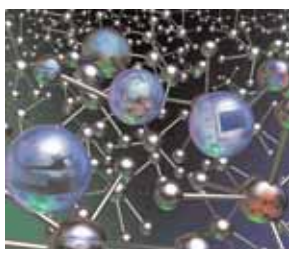
- **Netscape 7.01** (32 MB) for Mindware
- **BloodRayne Demo** (168 MB) for Playware

Expect these on the March 2003 CDs

WEB SPECIAL

Nanotechnology: Atomically Speaking

Just when you thought you couldn't shrink it further, here comes nanotechnology. It will change the way we look at medicine, engineering and soon, nearly everything in our lives. Find out how it works.



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news feed

DIGIT FEBRUARY 2003

hypethesis

Media2Go

■ What is it?

A new software environment by Microsoft for portable video players.

■ How does it work?

Media2Go is based on the next version of the Windows CE .NET OS, currently code-named McKendric. It uses the OS' unique synchronisation, user interface and media experience software technologies to provide the easiest way to enjoy video, music and pictures stored on any Windows-based personal computer on the go.

■ What does it do?

Most player devices support audio in only one format, leaving the rest of your video, music and digital photo collection stored and experienced on your PC. Media2Go offers a complete media experience support letting you play and store up to 40 GB of MPEG, MP3 and Windows Media Audio and Video formats wherever you go. It will also let you upload, store and view pictures from your digital camera. It will bring optional hardware connectivity for TV or stereo system synchronisation and a battery life of 6 hours. Microsoft is working with a variety of technology partners to bring Media2Go to customers. Intel has created an xScale-based hardware platform that is currently available.

Happy Birthday, Dear Internet

This year the Internet celebrates its 20th birthday. While some claim that the origins of the Internet actually come from Dr Leonard Kleinrock's paper on packet switching technology at MIT, in 1961, other historians would fix the year to 1969, when the US Department of Defense commissioned the ARPANET (Advanced Research Projects Agency Network). This was set up to research a communication and command network that could withstand a nuclear attack. Over the following decade, there were several interesting developments that shaped the Internet as we know it today—the advent of e-mail and the separation of the Internet from the Defense Department. Back then, the Internet used the Network Control Protocol that provided rudimentary Internetting, but was not suited for larger networks. Today, India is still waiting for a speedy access to the Net—well beyond the phone lines most of us still depend on.

SPecially bright

In a single stroke, game hardware and software giant Nintendo has banished two major concerns that hounded its newest handheld, the Game Boy Advance. Addressing a genuine shortcoming of the device, an absence of any form of screen lighting, the company has announced that come March 2003, a newer model titled Game Boy Advance SP will include lighting along the screen's edge and a funky clamshell design will protect the screen. The SP has a 2.4x1.6-inch screen and folds into a 3-inch square, about an inch thick, making it half as small as its elder sibling.

Moreover, the unit will feature another first—a rechargeable battery that is expected to power the device for 10 hours with on-screen light and 18 hours without lighting.

Nintendo has sold more than 150 million units of its various Game Boy editions and enjoys a healthy domination in the handheld gaming market. The Game Boy Advance SP is expected to arrive on international shores around the March 23.

World's Largest TFT LCD TV

Samsung has just unveiled the world's largest TFT LCD TV at iCES 2003. Measuring all of 54 inches, it gives you crisper images, higher resolutions and far less power consumption. The TFT LCD TV is a mere 2 inches in thickness and weighs 44 pounds, making wall mounting easy. It sports a resolution of 1920x1080 and 16:9 screen ratio; it is fully HD compliant and will accommodate all future changes in broadcast technology. The other performance specs are impressive too—with a response time of less than 12 ms, you will get smooth playback for all action-packed scenes. In addition, it is designed for convergence and will double up as a high-resolution WXGA PC monitor. With clear, crisp and bright images, here comes a TV set that will dominate the living room.

snapshot

High demand for Samsung colour handsets account for 10% of the 390 million handsets sold in 2002

Source: Motorola Inc

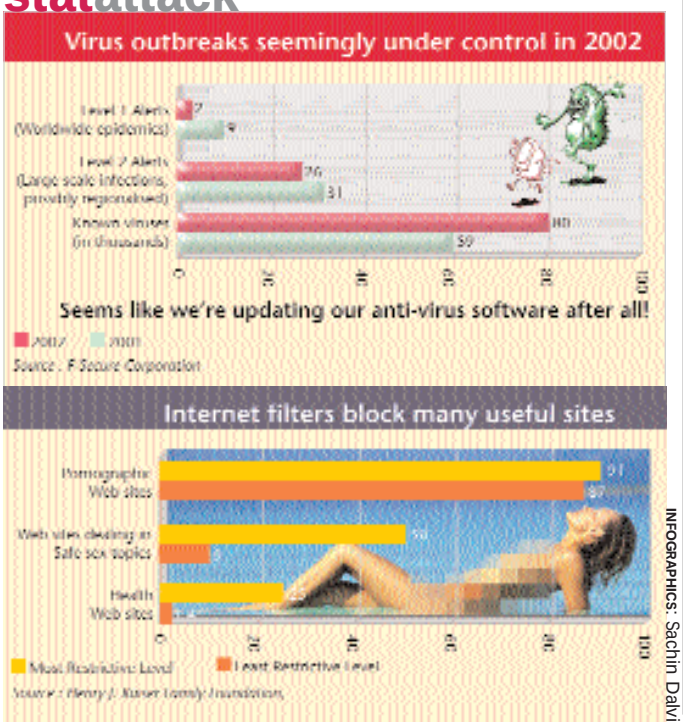
■ Sony and Toshiba license Yellowstone technology from Rambus to incorporate into PlayStation 3 ■ VeriSign to resurrect Network Solutions Inc

MPAA vs the World

The MPAA (Motion Picture Association of America) is wading through troubled waters as it finds itself engaged in more than one copyright case. It already lost a case against a Russian Software company, whose product allows consumers to turn off security settings in Adobe Systems' e-books, allowing the books to be shared between users and computing devices. Charged with violating the Digital Millennium Copyright Act, the company was cleared on all counts. The MPAA is also up against Missouri software firm, 321 Studios, alleging that the company's DVD-copying software violates established anti-copying laws. Meanwhile, lobbyists for large technology companies plan to argue against efforts in the US Congress to amend certain laws designed to broaden the rights of consumers by granting rights over digital media such as backing up DVDs for personal use, or allowing them to copy songs onto handheld devices. Although such rights are considered fair in dealing with traditional media such as audio and video tapes, the groups feel that the same courtesy should not be extended to the digital medium due to rampant sharing of files. While lobbyists from both sides agree that strict law enforcement against such digital piracy is the call of the hour, the bone of contention lies in the execution of the said measures. The RIAA (Recording Industry Association of America) intends to argue against government requirements to build locking controls into the future generation of entertainment devices. These controls will make it more difficult to share copyrighted entertainment. The group contends that the controls will be too expensive to implement, a point of view that is also shared by powerful technology groups such as Microsoft, Apple, Adobe, IBM, HP and Dell. This posturing isolates the powerful MPAA which has aggressively supported requirements for built-in controls on new digital entertainment devices.

ILLUSTRATIONS: Mahesh Benkar

statattack

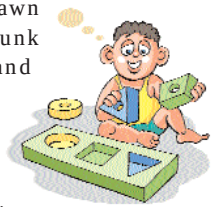


Source: IDC

INFOGRAPHICS: Sachin Dalvi

E-mail clients to filter sign-ups

Web robots are known to commonly harvest e-mail addresses, send off mailers, spawn hoards of junk messages and accumulate free accounts. Now free e-mail service providers such as Yahoo! and Hotmail use a technology developed by Carnegie Mellon University to differentiate between a bot and a human, to prevent the former from acquiring free e-mail addresses. The technology called captchas (completely automated public Turing tests to tell computers and humans apart) is based on the Turing test, which aims to differentiate between humans and intelligent computers.



Yahoo! currently uses a product called Gimpy that mangles up one word from an 850-word dictionary in such a way that only a human can identify it in the midst of distracting spots and blotches.

redalert

You've got Yaha

A new contagious variant of the Yaha virus has infected thousands of computers worldwide. The virus, dubbed W32/Yaha.M by MessageLabs, has seen its numbers explode with over 17,000 being detected by MessageLabs, making it the fifth most common virus. The worm arrives in the form of an EXE or SCR attachment in an e-mail with a variety of subjects and messages, and has its own e-mail client to mail itself, forging the 'From' address. It also attempts to close down a number of firewalls and anti-virus programs. Norton AntiVirus has an update to remove this strain. You can also download a free removal tool from ***www.bitdefender.com.***

Music virus

Security company, Foundstone, located in California, identifies MP3 and Windows Media files as Trojans that could contain malicious code that leave the owner's PC open to attack. The corrupt files show no change in audio quality. "The vulnerability lies in the Windows Shell, and Microsoft's Windows Media Player is not affected," said Microsoft in an advisory posted on its Web site. WinAmp has a similar flaw, affecting Winamp player versions 2.81 and 3.0, which allows code to run when certain multimedia tags in MP3 and WMA files are loaded with too much data.

Foundstone has alerted Nullsoft which has released patched-up versions of Winamp 2.81 and Winamp 3.0 on its Web site.

■ SGI to sell a new system running Linux on as many as 64 Itanium 2 processors ■ IBM will help AMD develop future chip technologies

A class suit

Of the 16 class-action suits alleging unlawful weilding of its monopoly by Microsoft, the largest of its kind has been succesfully setteled between the software giant and the government of California. The charge that Microsoft Windows was overcharged from the comfort of its monopolistic position, was settled on the requirement that the company will offer compensation to those affected between Febuary 18, 1995 and December 15, 2001. The compensation will take the form of vouchers worth $5 to $29 that can be used to buy most hardware and software products from any manufacturer. Of the unclaimed money, one-third will be retained by Microsoft and two-thirds will go to California public schools in a mix of donated Microsoft software and cash grants.

Apple feels that such a settlement lets Microsoft off easy, pointing out that history shows that less than one-quarter of the qualifying recipients actually claim refunds, thereby reducing the real cost to Microsoft. At the same time, Apple said school donations would help Microsoft expand its market share in education—an area once dominated solely by Apple.

snapshot

680 million obsolete computers will produce 4 billion pounds of plastic and 1 billion pounds of lead in the next 5 years

Source: *Silicon Valley Toxics Coalition*

Born to consume

The annual Consumer Electronics Show saw technology being brought to the masses through handhelds, even as the PC gets comfortable as a central hub of information exchange. Significant attention was called upon Microsoft and its Smart Personal Object Technology (SPOT) as the software giant looks to appliances as a market. SPOT allows devices such as alarm clocks to run Microsoft's .Net Compact Framework and gain access to data stored on a central PC.

Also on the radar was Media2Go, a portable multimedia gadget design, jointly developed by Microsoft and Intel. Media2Go devices will have a 4-inch screen, a hard drive and controls for listening to digital music, viewing photos and TV programmes downloaded from a PC.

Sony is expected to announce jointly with SanDisk, a new version of the Memory Stick removable flash memory card format, called Memory Stick Pro. The format will offer greater capacity (up to 1 GB) at a rumoured cost of compatibility with older devices.

Also offered was the $800 Sony Clie PEG-NZ90—now with a 2-megapixel camera with flash, along with zoom and autofocus features.

Intel names mobile chip family

Intel's new range of next-generation mobile processor technology is going to be branded the Centrino. Centrino stems from a blend of the words 'centre' and 'neutrino', and with this new name and logo, Intel wants to convey flight and mobility.

Targeted at the so called thin and light notebooks, the processor itself, formerly called Banias, will now be called Pentium M. The Centrino range is scheduled to be unveiled around late March 2003, with the first Pentium M chips clocking in at 1.4 GHz. Incidentally, the Pentium 4-M, the mobile processor version of the Pentium 4, currently runs at 2.2 GHz and newer variants are expected to run at 2.4 GHz. With the Pentium M running behind its older mobile sibling, Intel has integrated a larger cache and a few other tricks to narrow down the performance gap. Intel insiders claim that the new chip offers significant advantages over the P4 Mobile chip, with extended battery life for the computing device, as well as enhanced wireless networking facility.

heroes

Streaming media

A new licensing plan from Microsoft will allow developers to create streaming software that will run on various Windows and non-Windows devices, opening up a wider market and thus, more access to varied streaming content.

Notebook computers

The first generation of desktop notebooks, offering features such as fast chips, big screens and DVD drives for relatively low prices, are selling surprisingly well. Buoyant manufacturers are launching the second generation of these machines.

zeroes

Content generators

With Windows XP Media Center Edition, which melds PVR hardware into PCs, users who have file-sharing programs like KaZaA aboard, will be able to swap as much recorded content as they like.

DirectTV

A Russian student in Los Angeles leaked out the details of the cards that access DirecTV programming to underground Web sites. People can now watch DirecTV for free.

Gamers

Games with no sex or violence will be rated age 3 plus, and there will be further ratings of 7 plus, 12 plus, 16 plus and 18 plus. All computer games sold in the European Union from April 2003 will carry these classifications

➜

Send in the clones

Clonaid is firmly in the eye of a storm after it revealed to the world the first successfully cloned human—the baby girl Eve. Born to an American couple, Eve raised eyebrows, both scientific and ethical. The cloning company was founded by Claude Vorilhon, who claims that a space alien visited him in 1973 to reveal that extraterrestrials had created all life on Earth through genetic engineering. Clonaid also announced the arrival of a future child, born to a lesbian couple.

Even as these announcements were made, visions of cloned humans and armies of cloned warriors flooded the ether. Scientists have dismissed popular myths about cloning, saying that images of an exact human replica or an army of clones is preposterous. The old nature versus nurture debate was brought to the table as those in the know explained how even identical twins have different personalities, due to the influence of the environment within which they are raised—regardless of fears felt, a clone would not be an exact replica of the person being cloned, but would be more akin to an identical twin one or two generations removed.

Gaming 101

The Guildhall, a game development course is set up in partnership with some of the biggest names in the gaming industry, including Richard Gray (Levelord) of Ritual Entertainment, id Software, Gearbox Software, Terminal Reality and Ensemble Studios in conjunction with the Southern Methodist University. The Guildhall promises to equip a chosen few with the essential skills to become serious game developers. It will hold intensive 18-month

THE GUILDHALL

certificate courses with real world curriculum that has been set in consultation with gaming industry gurus. The faculty consists of selected Southern Methodist University professors and other experts in the digital games field. The course is rumoured to be tough and only 100 students will be chosen every six months. The course will cover gaming art production, level design and software development, with project work being all-important.

Apple laptop gets jumbo screen at MacWorld

Apple unleashed a new PowerBook at the MacWorld Expo. The occasion celebrates the second birthday of the acclaimed Titanium PowerBook family. The new Mac in town comes with a 17-inch screen, weighs a little over 3 kg and when closed, sits only an inch high. It can display a 1440x900 pixel resolution and comes powered with the 1 GHz PowerPC G4 processor, has 512 MB of RAM, a 60 GB hard disk and a DVD

burner drive. It also features built-in Bluetooth, USB 1.1, FireWire 2 and the AirPort wireless networking technology. At the MacWorld Expo, Apple CEO Steve Jobs stated that Apple believes that notebooks and not desktops are the future of personal computing. Apple will also introduce a 12-inch portable that features an 867 MHz G4 and a 40 GB hard disk. It is targeted as a portable digital media studio, and it will be Bluetooth enabled, with 802.11g connectivity that promises faster speeds and better security. Both models are encased with super tough airplane-grade aluminium that is both light and durable. Both will ship starting March 2003.

IBM launches supercomputing

In an exciting new twist to supercomputing, Big Blue is now building supercomputer application hosting areas around the world, to offer customers the opportunity to use the grid. This is an example of the much-touted On Demand computing that was all set to revolutionise computing a few years ago. Under the program, IBM is building massive supercomputing grids based on hundreds of AIX-based pSeries servers and massive Linux-based xSeries server clusters. The first of these are located at Poughkeepsie, New York, with others to follow all over the world. The worldwide grid will be linked using the open source Globus grid software. Customers will get to migrate their server applications over to the IBM grid, saving enormous capital on upgrading and maintaining their existing setups. They will essentially pay only for the data processing capacity that they will utilise.

Figures for the service have not been released, but IBM maintains that pricing will depend on the quantum of processing capacity needed, the type of hardware needed, and how much work it has to put in to support the application. Currently, IBM is using hardware from its own stables, and industry analysts predict that Big Blue will consider working with supercomputing equipment from rival vendors once the On Demand initiative takes off.

■ Yahoo! forged an agreement to acquire Inktomi for $235 million ■ Microsoft Windows .NET Server 2003 changes its name to Windows Server 2003

Write on

In an ongoing bid to make its devices more accessible to the masses, the operating system subsidiary of handheld maker Palm, PalmSource, announced that it will use a handwriting recognition system in the new Palm devices. Dubbed Graffiti2, the system is based on Jot and is aimed at users who feel the old Graffiti system to be too idiosyncratic for easy use. Keyboards for handhelds are finding a greater number of consumers and newer devices from Sony, Sharp and Handspring now come with a keyboard.

Graffiti 2 supports natural handwriting as input

Michael Higashi, a director of marketing at PalmSource, acknowledged the trend, but saw no conflict between Graffiti and traditional input systems. Short bits of information favour Jot, while more involved tasks such as writing e-mail are better done with keyboards.

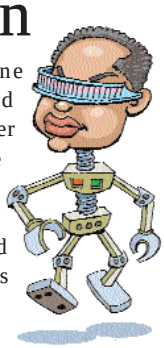
Graffiti2 is already available to licensees such as Sony and Kyocera and will be embedded into versions 5.2 and 4.1.2 of the Palm OS. It will be up to the licensees as to when they begin shipping devices that come with Graffiti 2 out of the box.

snapshot

1.5 million GameCubes, 1.4 million Xbox and 6 million PlayStation 2 sold in Europe in 2002

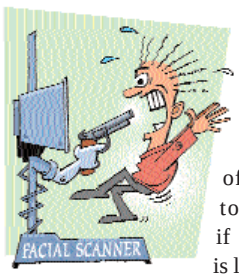
Source: *ScreenDigest & Nintendo*

Eye can walk again



Present days robots require visual cues in the form of reflective tapes or barcodes strategically placed to let them do rudimentry tasks like find their way around homes or offices. To alleviate this problem, a Carnegie Mellon University professor, Hans Moravec, has developed a set of digital cameras that will give its owners a stereoscopic vision. Based on the relative distance of the same object within the two different cameras, the designed system will calculate the distance between the said object and the robot. If an object in one camera is blocked from the other camera, or if the eyeballs are presented with a blank wall devoid of any features that aid in triangulation, Moravec's 3D grid setup comes to the rescue. The grid forms the brain behind the eyes and is made up of 32 million digital cells that are used to help fill incomplete or misleading data by means of statistical analysis and extrapolations.

Biometrics Benched for Super Bowl



In the Super Bowl 2003 in San Diego, authorities are sidelining controversial biometric security systems in favour of hundreds of human agents. The facial scan technology weeded 19 offenders from over 1,00,000 people in the 2001 Super Bowl. The computer matches facial scans taken from cameras located at strategic points, against databases of known offenders. There are too many false alarms if the threshold level is low and no matches if the threshold levels are maintained high enough.

quoteworthy

"The import of those products would be an act of piracy. The industry is regretful that these absolutely piratical products are being released''

Neil Turkewitz, Executive Vice President International of the RIAA, strongly advocating copyright protection

"There is no business justification; I did it because people should have the choice to run the software they want on the hardware of their choice...I don't think when you buy a car, they should tell you what brand of gas to put in it."

Michael Robertson, CEO of Lindows, upon revealing himself as the anonymous donor of $200,000 in prize money in a contest to translate Linux to Xbox

tomorrow'stechnology

See the light!

First the incandescent bulb, then fluorescent lights, and now dispel the darkness with light-emitting diodes (LEDs). In LED territory, the sickly green glow is a thing of the past—today's LEDs are bright white, use 10 per cent less power than incandescent bulbs but generate the same apparent illumination with negligible heat, and can last up to 20 years.

Already, cities around the world are replacing incandescent traffic lights with arrays of LEDs. Besides this, LEDs are also being used in bicycle lights and camping equipment. Two products from Princeton Tec (***www.princetontec.com***) are already available—the Attitude with three ultra-bright white LEDs and 150 hours of burn time costs about Rs 1,000, while the Impact II with a single LED and 75 hours of burn time costs about Rs 1,500. Both measure 5 inches long, use four AAA batteries and work underwater up to a depth of 500 feet.

For the outdoors types, Petzl (***www.petzl.com***), offers a variety of LED headlamps. In the meantime, Boston-based Colour Kinetics (***www.colourkinetics.com***) is providing a more affordable product line, Sauce, that makes available LED night lights and bulb replacements.

■ Microsoft scores one on Nokia by unveiling new cellphone software based on a faster version of Code Division Multiple Access technology

Renaming Tux

Dear Vinit Aggarwal,
Your January 2003 editorial neatly puts into place the need of the hour—branding and selling Linux. During the early 1990s, well before Windows 95 was released, Marty Taucher, Director of Public Relations at Microsoft, pointed out that an exhaustive research by Microsoft revealed that home users wanted an enjoyable and friendly OS. This is precisely what Linux flavours must offer their potential users to become a formidable alternative to Windows. Linux needs to be branded, and in a hurry. And the time is just right, now that excellent user-friendly versions of Linux have been released.

Krishnakumar J. Rao
Via e-mail

digit

Dear Krishnakumar,
Yes. The current brand values of Linux present an interesting challenge for its evangelists—low cost, stability, security and flexibility aren't good enough to popularise Linux on the desktop. A change in the user perception that Linux is not friendly and is only for geeks is urgently needed. And with the release of desktop environments such as KDE and Gnome, the OS has indeed matured to a level where a new PC user would not feel intimidated. However, changing perceptions requires a concerted, well-orchestrated marketing endeavour, which is easier said than done.

Stop repeating yourself!

Dear Digit,
I would like you to note one point in your December 2002 issue. Even though the issue was good overall, it 'boasted' of the word 'boasts'. Please try to go easy on that word in the future.
Your reader,

Shrinidhi Rao
Via e-mail

digit

Dear Shrinidhi,
We didn't realise that we were repeating ourselves so much. Obviously, repeating any word over and over again sounds repetitive and could lead to angry letters from our readers, where we are pointedly told to stop repeating words that make us sound repetitive. Believe me, we never intended to repeat that word so many times as to be considered repetitive :)

Play wary

Dear Shri Aggarwal,
I have been buying your magazine for quite some time and I have an unpleasant experience to share with you. After having installed a game from the Playware CD, my computer developed a serious problem. All icons displayed themselves in an enlarged form and the application windows were not visible in the screen area. I had to call a service engineer, but nothing worked and I had to reformat my disk to get rid of the problem. This experience has deterred me from buying your magazine in the future.

Aditya Rath
Via e-mail

digit

Dear Mr Rath,
We sympathise with your unfortunate experience. We try our best to check every software application that's provided on the Digit CDs, but we cannot guarantee that they will work on every PC. Even though it's possible that the game you installed could have played havoc with your system configuration, it's highly unlikely. Your problem sounds more like a simple condition of the game changing your desktop resolution to a lower setting, which in no way requires reformatting and reinstalling Windows. In any case, if you could send us the name of this truant game, we will investigate it further to avoid similar goofs in the future.

Make a wish

Sir,
Based on the graphics chips review carried out by Digit in the August 2002 issue, I went to purchase a new video card. But the whole exercise left me perplexed. While Digit only focused on the graphics chipsets and their performance, the cards available in the market have different features such as TV-In/Out, S-Video and Composite connectors, TV tuning, video capture, etc. I expect Digit to do a more comprehensive review of graphics cards inclusive of such add-ons or at least an explanation and review of these features.

Ajay
Via e-mail

digit

Dear Ajay,
You are either a mind reader, or just plain lucky! In any case, we are doing a comprehensive graphics card test next month, which should answer all your questions. In the meantime, could you predict which country will win the Cricket World Cup this month?

digit READER POLLS

Your vote counts

Q. What would you like featured in the 'Off the Shelf' section?

Sci-fi movies	Sci-fi books	Edutainment CDs
60%	5%	35%

Look ma, they even plan on having film reviews in Digit!

This month's question:

Would you like detailed and more game reviews in 'Off the Shelf', instead of the game feature in Arcade?

*Log on to **www.thinkdigit.com** and vote on it*

A raging issue

Hi Vinit,
I'm a recent subscriber to Digit. You have a great magazine and I feel sad to have joined the tech bandwagon this late in the day. In the December issue, Chirag had written that he doesn't feel like giving his old issues to the *raddiwallas*. Well, I'm dying to get my hands on as many issues of Digit as I can. Is it possible to exchange magazines between readers or could I get them directly from Digit? I'm sure there must be many like me craving for back issues. Please suggest a solution.

Bhavin Kenia
Via e-mail

Dear Vinit,
I am an ardent fan of Digit and I have been reading it for more than two years. I have a hoard of your magazines which I do not wish to throw away. Kindly suggest a means of exchanging these magazines so that it may be of use to someone else.

Prashanth K.S.
Via e-mail

digit
Dear Bhavin and Prashant,
We didn't realise that Chirag's letter would evoke such a response. Our inbox has been flooded with hundreds of similar requests and thus we've decided to let technology come to the rescue: jump to *www.thinkdigit.com/magexchange* if you wish to either donate or locate older issues of Digit with other members of the Digit fraternity.

One man's horror...

Hi Vinit,
In your January 2003 issue's '13 Scariest games ever!' article, you missed out *Heretic* and *Hexen*! How could you? But to add insult to injury, you even added *DOOM 2*! I was astonished to see that my all-time favourites were out of the list. *Heretic* was more hellacious than any of the *DOOM* games.

Arkopal Bhattacharya
Via e-mail

digit
Hi Arkopal,
While we agree that both *Heretic* and *Hexen* were immensely enjoyable (not to forget *Heretic 2*), we cannot believe that those games scared you! Chicken! No really, how old are you?

Magic today, Technology tomorrow

Hi Vinit
I have been a regular reader of your magazine since the past two years. While reading the article 'Computing for Absolutely Everybody' in the December 2002, issue I thought, can there be a device—a type of scanner wherein you feed the pages of a book or just point it to anything and it reads or tells you what it is? Something like this would be helpful for the blind and it could serve as a teaching aid for kids—a child could point the device to a bird and the device would teach it to say 'this is a sparrow'.

Lavin V. Mansukhani, Pune
Via e-mail

digit
Hi Lavin,
As far as reading out pages from a book is concerned, there are Text-to-Speech engines that can effectively read out any scanned document, but the entire process is slightly convoluted. The question then is: are there tools that can scan and read text from books on the fly? I'm sure such devices do exist, and if any of our readers know about them, please let us know. However, a device that automatically recognises anything it scans seems like magic right now. But, like all technologists, we believe in magic.

New and improved

Dear Vinit,
It is very surprising that a magazine like Digit does not have an online subscription service. The current means of using the subscription form in the magazine is not only time consuming, but also unsafe (it's not recommended to give out credit card details in postal communication). Please look into this matter and try to start an online subscription service as soon as possible.

Arun Grover
Via e-mail

digit
Dear Arun,
Apparently, your e-mail did the trick. We have finally succumbed to the fact that there are indeed readers out there who want to purchase Digit online. Visit *www.thinkdigit.com* for more details.

Short Bytes

Sharp shooters

Vinit,
Looking at the Digit Diary pictures in the December 2002 issue, I'm glad that you mentioned that the pistols used were toys. Else it looks like the staff members are killing each other!

Doctor Pulin Sonowal
Via e-mail

Don't worry doc, the Digit folks are relatively harmless. Even though we tend to get on each others nerves, we know where to draw the line.

Aur Malayalam mein kehte hai...

Dear Vinit,
I am a Keralite and we say *adipoli* when we like something. This package consisting of a bunch of papyrus that reaches me every month is damn *adipoli*. Keep up the great work and convey my regards to the entire team.

Roshan Kolar
Via e-mail

Balle balle, Roshan! I'm a Punjabi and that's how we express our excitement.

Where am Me?

Hi,
Both the December 2002 and January 2003 issues were brilliant. But why did you ignore Microsoft Windows Me in January's Tips & Tricks section?

Sanjay Bhagwat
Via e-mail

Because it sucks! Any self-respecting computer user will not be caught dead using Windows Me.

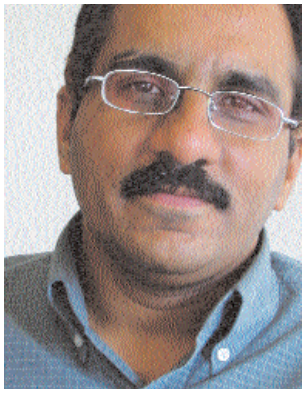
Goof Ups

■ In the January 2003 issue on page 52, we incorrectly awarded the Best Performance logo to Canon LBP 1120. It should have been placed near the winner, the Canon LBP 1210.

Notice any goof-ups? Write to goof@jasubhai.com

Send your letters marked 'Readers Letters' to the Digit office:
D-222/2, MIDC, TTC Industrial Estate, Om Sagar Building, Nerul, Navi Mumbai 400 706,
Phone: 022-7629191/9200 Fax: 022-7629224
E-mail: readersletters@jasubhai.com

Bridging the Thinking Divide



Leslie D'Monte
Managing Editor, Digit

> Such controversies will keep arising. It's only shortsightedness that can prevent anybody from seeing this

Did you ever move the consumer court just because your neighbour bought a 21-inch TV for less than what you paid for your 14-inch TV a couple of years ago? Or did you ever think of demanding a refund from Intel or AMD when their latest processors made your computer (purchased hardly a year ago) look like a joke when playing *Quake III Arena*? Obviously not. You simply wrote-off the investment and accepted the fact that technology will continue to advance.

Business houses and the powers at the Centre think differently. For instance, rapidly-advancing technology is continuously offering us cheaper ways of communication. Hotmail made even a giant like Microsoft sit up while making online communication a treat. But instead of embracing these new ways to narrow the communication gap (read 'Digital Divide'), powerful lobbies, bureaucrats and politicians feel threatened. They raise countless objections despite realising that the consumer can benefit. We can hardly forget the endless wait for Internet telephony, which DoT and VSNL (now under the Tata umbrella) unsuccessfully tried to block, citing potential loss of revenue.

The unwarranted controversy on the mobile front is just another example. There are about 10 million mobile users in the country. Mobiles are now even being used by fisherfolk in Kerala to know the rates at which fish is being sold in the main market. The middlemen, thus, can't take them for a ride. We all use SMS and know how frustrating it is when we can't get our message across. MMS, WAP and other value-adds now promise to bring information at our fingertips when on the move. Mobiles have thus become an important tool to bridge the 'Digital Divide'. Equally important are the fixed lines in our homes and at the countless STD booths.

But here you have basic operators who offer WLL (with Code Division Multiple Access (CDMA) technology) and cellular operators (using GSM or Global System for Mobile communications) warring over how their business interests need to be secured. This, while holding subscribers to ransom. What else does one make of the fact that thousands of cellphone users had to suffer for over 48 hours in Delhi because of the tussle over interconnection charges. Hutchison and Airtel claimed that MTNL had blocked calls from their networks to its own and vice versa, while MTNL accused them right back. Though the issue was sorted out, the act reflects the callousness of the parties towards consumers, which is simply unpardonable.

The WLL players are in a position to offer cheaper cell services. The cellular operators will be forced to reduce tariffs, make incoming calls free and add other freebies to stay in business. The technology permits it and the consumer stands to benefit.

The limitation, as seen, is not with the technology but with the government's thinking. Fixed line operators are allowed to use WLL technology to offer mobility within a single billing area (SDCA or short distance calling area), broadly equivalent to a single town or city. However, they have not been allowed to offer mobile services with roaming facilities. Cellular operators point out that about 90 per cent of all existing cellular subscribers in India do not use roaming facilities or move outside their SDCAs. Besides, if multiple subscription services (MSS) are allowed whereby a subscriber can roam to other short distance calling areas, there would be a further problem. MSS would be as good as full roaming, the cellular operators decry. But if we could use this facility to make a cheaper call, wouldn't we?

Cellular operators also resent the fact that they pay Rs 1.20 to fixed line operators for every call made from a cellphone without a reciprocal commitment from limited mobility operators. This is sure to be sorted out. But they are also complaining about the 'exorbitant' licence fees they had paid at the time of procuring licences (they now have a revenue-sharing agreement with the government). Cellular operators want a 'level playing' field with basic operators. We can't bear the brunt as the government cogitates the right stance.

As of now, mobile to mobile incoming calls have been made free and further benefits are in the offing. The fact remains that the choice and adaptation of newer technology is increasingly forcing companies to modify their business models. Bottomlines of companies are bound to be hurt. They can't be expected to keep quiet when they perceive government policies working to their disadvantage. Such controversies will keep arising. This time it's over telecom. In the coming months, it will be over some other technological innovation. It's only shortsightedness that can prevent anybody from seeing this. It's critical, therefore, that the government seriously contemplates on how to bridge this 'Thinking Divide' between itself, business interests and consumers. And yes, meanwhile it can address the more critical issue of adding more spectrum to unclog the choking cellular networks so that you and I can phone without a 'Network Busy' message.

Autorun

ILLUSTRATIONS: Mahesh Benkar

The stress has always been on flexing more and more computer muscle. However, a welcome shift in thinking is taking place. Researchers are now working on designing and building computing systems that are capable of running, healing and protecting themselves

Ganesh is fuming. His hard disk has crashed. He's struggling to retrieve his precious data. You can almost hear him swear: "Aaargh! One more time and I'll throw away this blasted box." This refrain is nothing new to a computer user. Even Richard Feynman, in his Lectures on Computation, summed up Von Neumann computers by saying, "the inside of a computer is as dumb as hell, but it goes like mad!" Never mind the context, but even as processors keep adding more hertz by the day, somebody's OS keeps playing truant, another's modem continues gargling to no end without a decent handshake. A third is forced to stare mindlessly at an 'invalid error'. Now, while geeks and vendors can give you sermons on how to solve these problems, that's not how lesser mortals would like a computer to behave. And that's no constructive way to spend our waking time either.

If only computers could behave like our bodies do by way of the Autonomic Nervous System (ANS) which, among other things, automatically handles basic functions such as breathing and digestion. It maintains the temperature at 98.6 degrees Fahrenheit and rids the body of heat by shuttling blood from the internal organs to the skin. The ANS tells the heart to maintain the right number of beats. If the blood pressure drops, the ANS changes the resistance of the veins because 70 per cent of circulating blood is in the veins. If only computers could act likewise and main-

info Similar to IBM's autonomic computing is Hewlett-Packard's Planetary Computing. Researchers at HP's laboratories in Palo Alto, California, are designing a 50,000-node programmable data center that is physically wired once, but can be rewired programmatically. A data centre control system will determine what's available and then install, configure, deploy, monitor and assure services worldwide. This system will be self-monitoring, self-healing and self-adapting

tain, diagnose and heal themselves.

Somebody has been listening hard. IBM, for instance, had launched an 'autonomic computing' initiative in its research division in 2001. Big Blue is already working on the next generation of computing which it calls 'autonomic' because it believes the computer must act like our autonomic nervous system.

The autonomic computing project is based on the concept of SMASH—Simple, Many and Self-Healing. This concept was applied in Deep Blue, the IBM computer that beat chess champion Garry Kasparov at chess a few years ago. IBM's present project, Blue Gene, an MPP (massively parallel processing) computer designed to map genomes, builds on Deep Blue but is larger and more sophisticated.

Autonomic Computing at Work

A student of the Archbishop Moeller High School, Cincinnati, walked up to the school IT administrator Keith Schaeper, with a corrupted operating system. The laptop was as good as useless. Nothing would run. Keith used Xpoint's software, and had a fully operating laptop in about three-and-a-half minutes. Corrupted operating systems, disabling viruses, and the like are now heartburns of the past for the students of this school. With nearly 1,000 laptops in use by students and faculty, the task of protecting and managing each laptop is daunting. Keith has deployed all the laptops with Xpoint's Managed Recovery Software for the client. Each laptop contains a generic image for that system, as well as a backup of the system with all personalised settings.

IBM has collaborated with Xpoint to add Rapid Restore to its PCs. Now, with just the push of a button (the [F11] key), IBM ThinkPads and NetVista desktops can automatically reimage themselves and restore user data. According to Xpoint, this PC is a managed recovery solution designed to protect the software image running on the client system, as well as user data files. The PC can restore the system from the IBM Service Partition on the client system hard disk drive, often in as little as 15 to 20 minutes. Local recovery is made possible through an [F11] function key system recovery option that provides diskette-less managed recovery. The PC helps manage and quickly restore all client systems operating in the field, while enabling end users to manage their own backup and recovery.

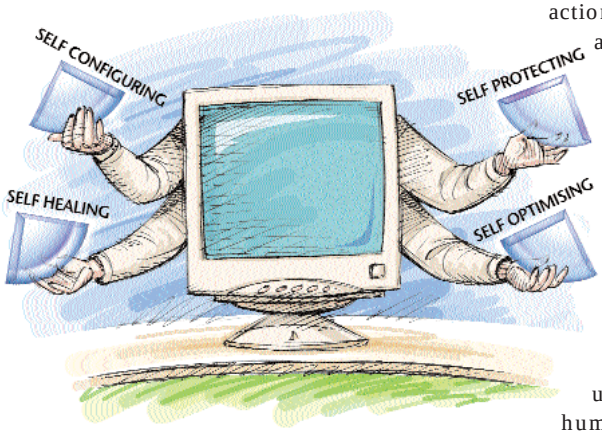
The PC enables the user to have up to five levels of backup and recovery options. A key feature of this product is the ability of end users to recover from simple mistakes. For example, a user may have created a critical document, which was later corrupted or deleted by mistake. With this PC, the user can find the lost file (as long as it was created prior to the last backup) and restore the individual file using the Windows Explorer interface. After the backup and IBM Service Partition has been set up, protection is automatic. Backups will commence based on the default schedule, which can easily be adjusted to a customised time and frequency. In addition, an on-demand backup feature provides instantaneous backup when an important file must be protected.

Key characteristics

Autonomic computing innovations are based on the four key characteristics of self-managing computing systems: self-configuring, self-healing, self-optimising and self-protecting. The architecture envisioned by IBM begins with the premise that implementing self-managing attributes involves an intelligent control loop. The autonomic manager is a component that implements the control loop. This loop collects information from the system, makes decisions and then adjusts the system as necessary. An intelligent control loop can enable the system to do such things as:

Self-configure: It's the ability to dynamically configure itself on the fly and with minimal human intervention. The loop will begin installing software when it detects that software is missing.

Self-heal: This is the ability to detect improper operations and initiate corrective action without disrupting system applications. Corrective action could mean that a product alters its own state or influences changes in other elements. Day-to-day operations do not falter because of events at the component level.



Self-optimise: This is the ability to efficiently maximise resource allocation and utilisation to meet the users' needs, with minimal human intervention. In the near term, self-optimisation addresses the complexity of managing system performance.

Self-protect: The goal is to provide the right information to the right users at the right time through actions that grant access based on the users' role and pre-established policies. It can detect hostile or intrusive behaviour as it occurs and take autonomous actions to make itself less vulnerable to unauthorised access and use, viruses, denial-of-service attacks and general failures. Self-protection is also about recognising and dealing with overload conditions that could jeopardise the integrity of the system.

Is it already here?

Some steps toward autonomic computing have already been taken. Take the case of Symantec with their Live Update feature. The company needed to rapidly update its customers' data and software to recognise the latest viruses. So it established a database from which all users could do a 'live update' of their system, thus ensuring that each customer would have the latest virus protection. "Live update decreases the

need for human intervention, provides a valuable service and lowers the total cost of ownership, thus making PCs more valuable as information resources in our lives. You can see what autonomic computing has already created," asserts J. Gerry Purdy, Principal Analyst, MobileTrax.

One may also recall Fox Broadcasting's coverage of Super Bowl XXXVI in February 2002, wherein Fox's information technology team relied on self-diagnosing, self-healing IBM technology to supply viewers with statistics, fast facts and graphics. The on-site network at the Superdome helped Fox provide up-to-the-minute research, script and graphics preparation, and network management. The servers featured technologies from IBM's Project eLiza autonomic computing initiative to make computers self-diagnosing and self-healing. And the personal computers include a patented technology that helps computer users recover more easily from a crash due to a corrupted application or operating system, relying on data stored on a separate area of the hard drive.

Then, the ThinkPad of the future is expected to automatically establish the settings needed to connect to a network, enumerate the connection options and renew connections as users move around, without any user input.

IBM's investment in autonomic computing includes Client Recovery and Rescue, which would help people recover data and continue some operations even after a catastrophic PC failure such as a broken hard drive. Another is Distributed Wireless Security Auditor (DWSA), which allows PCs in the same location to work together to detect dangerous 'rogue' security risks in wireless networks, saving hours of manpower. And a third, Instant Connections, automatically detects wireless and wired networks and configures the PC to work with them, saving people from having to remember server addresses and wireless protocols. IBM expects to introduce some of these innovative technologies in 2003.

What some critics question is whether this is really the beginning of autonomic computing or mere business hype over a few great features. The fact remains that complete autonomic systems do not yet exist.

How Grid Computing comes into play

IBM has been a leader in Grid computing. It is then but logical, to inspect the relationship of Grid computing with autonomic computing. Grid computing harnesses unused processing cycles of all computers in a network for solving problems too intensive for any stand-alone machine. The SETI (Search for Extraterrestrial Intelligence) @Home project is a familiar name in this regard. As federated systems emerge, new standards and policies will be required, and each element—processor, storage, network, software—becomes an autonomic computing element.

Meta Group views parallel processing as part of a larger body of processing concepts that we call 'federated computing'. This also includes peer-to-peer processing (as done by Gnutella and others), instant messaging and other systems that enable computers to work together without a server in the middle. Federated computing helps break complex problems into discrete tasks, which can be farmed out to multiple machines.

If autonomic capabilities are to be extended across the Internet, you need a set of open protocols. These open protocols allow the various systems around the Internet that are participating in this autonomic initiative to be able to collaborate and share information, identify denial of service attacks, identify any failures, and start routing things around.

This is where Grid computing comes in, because it is the open protocols of the Grid running on every single system that enable 'intelligent' management capabilities to cut across different systems. Using these Grid protocols, IBM avers, it can realise this vision of creating, over time, an increasingly self-managing infrastructure.

info Sun Microsystems plans to introduce the N1 initiative, an OS for data centres that turns the whole network into a computer

Simply 'intelligent machines'?

Yes and no. In a sense there's nothing new about many of the elements of autonomic computing. Those working with complex adaptive systems, using ants, agents or evolution, or pursuing other biological metaphors such as artificial immune systems, embryonics and cybernetics, will find a familiar ring. One can also relate it to terms such as 'intelligent machine' and 'artificial intelligence'.

IBM, on its part, clarifies that if 'intelligent machine' means one that embodies human cognitive powers, the answer is no. But if that term is taken to mean systems that can adapt, learn and take over certain functions previously performed by humans, then autonomic computing does involve the idea of embedding this kind of intelligence in computing systems.

As for Artificial Intelligence, some

info

John Kubiatowicz (Dr Kubi) and his team at the University of California, Berkeley, are working on a huge data store called OceanStore—a part of Dr Kubi's 'introspective computing' research. Dr Kubi speaks about extending hardware and software design so that systems can continuously monitor themselves and adapt to changing circumstances. In effect, they become self-evolving

involving new ways to apply control theory and control laws, can provide insight into how to run complex systems that optimise to their environments. But autonomic computing does not require the duplication of conscious human thought as an ultimate goal.

For painless computing

The autonomic thrust has largely stemmed out of the looming shortage of people trained to manage computer systems. According to some estimates, it would take 200 million information technology workers using today's technology to support 1 billion people using computers at millions of businesses around the world. Computer firms believe it's time to make computer systems bear the cost of their own complexity, hiding it within themselves and taking responsibility for its management.

This is the crux of its Manifesto: focusing on the efficient use of silicon is not necessarily the most efficient way forward. It is aiming to bring about a world of self-managing systems and a self-managing infrastructure. "The growing complexity of the IT infrastructure threatens to undermine the very benefits information technology aims to provide. Up until now, we've relied mainly on human intervention and administration to manage this complexity," the manifesto reads, adding: "Unfortunately, we are starting to gunk up the works."

With autonomic computing, you will initially see more systems that serve you—your bank, your ISP, your travel agent. "Sorry, our systems are down" will be heard less often. Autonomic features are expected to gradually appear in client-level devices so that your individual PC will complete for itself many of the tasks that currently make you a part-time administrator.

According to the Meta Group, the real challenge to get these processors to work together is software. Extending capabilities that exist on one platform to others and defining system management identities and relationships are some of the major hurdles to autonomic computing.

What's the future of autonomic computing? Says Purdy, "One clear area is the wireless realm where autonomic processes will help maintain our future cell phones as they become more data centric. We'll also see the concept of 'live update' extended to 'over-the-air' synchronisation, thus allowing our contacts and appointments to be kept up to date as we roam about. We'll also see more home and office systems connected to outside information resources so that monitoring and maintenance of our physical infrastructure will occur within the next 25 years. In a way, we'll begin to view the systems around us as more intelligent and reliable."

The challenge of personal autonomic computing is to simplify and enhance the end-user experience. Computing, as dictated by this concept, should be able to delight the user by anticipating their needs. One only hopes that the concept becomes real and not just an overblown dream.

LESLIE D'MONTE

Siemens MOBIC T8II ▶▶
Stay connected

This rugged Web Pad enables local and world-wide access to an intranet or the Internet. It is ergonomically designed, with a touch screen and additional function keys, and a high-resolution TFT display which is easy to read even in poor light. It uses the standard Windows CE operating system, together with Internet Explorer and JAVA Virtual Machine as basic software. A battery module ensures that it can work throughout a standard shift. MOBIC accepts a wide variety of PCMCIA cards. It can also use pluggable radio cards, wireless LAN or GSM. Plus there are expansion options such as a barcode reader, printer, keyboard or additional memory.

Web site: https://mall.ad.siemens.com/de/guest/index.asp?lang=en&aktPrim=0&nodeID=9300349&display=C

dig it!

You can look and you can drool, and with the right kind of money, maybe even have!

◀◀ Sony Ericsson P800
Say it with pictures

The P800 is an advanced, open, pen-based smartphone. It is based on Symbian OS v7.0 and features a large, 208x320 pixel flip open (208x144 pixels flip closed) colour touch-screen, a built-in camera and a multimode browser.

Not only can you capture images, but you can also send them via all the standard protocols supported by Symbian OS such as MMS, e-mail and Bluetooth. What's more, with support for GSM 900, 1800 and 1900, GPRS and HSCSD, the P800 works across the five continents.

Besides its imaging capabilities, the P800 sports a multimode browser featuring WAP 2.0, HTML, xHTML and i-mode. Plus it has full PIM functionality, some games and a host of third-party applications and services.

Web site: www.sonyericsson.com/P800/

The Olympus C-400 Zoom ▶▶
Silver beauty

This elegant-looking, full featured 4 Megapixel digital camera is lightweight and user-friendly. While it offers advanced features such as Multi-Point Spot Average Metering, Super Macro focusing and Histogram in Shooting and Review modes, amateurs can shoot using its Automatic and Scene Program modes. Advanced photographers will appreciate the wide assortment of lenses, external flashes and the highly precise Manual control.

Web site: www.olympusamerica.com

◀◀ Panasonic SV-SD50
Wear your music!

This audio player is so compact and light that you can actually wear it around your neck! It supplies up to 30 hours non-stop play on one AAA battery and also has a range of digital music choices with decoders for MP3, WMA and AAC formats. Also featured is Panasonic's Media Manager software, making it extremely easy to organise your music, create playlists and transfer music to your e.wear. Here's to non-stop music while you do the thing you do!

Web site: www.panasonic.com

Sony DCR IP220 ▶▶
Cool cat

This sleek, 2 Megapixel CCD camcorder uses MICROMV technology to deliver exceptional video and still image quality that can be directly e-mailed or posted to the Net, using its Bluetooth capability. Other cool features include Hologram AF laser focusing, and NightShot which allows you to use the IP220 as an infrared sensor for night time video capture. It supports USB and FireWire and its 2.5-inch SwivelScreen colour LCD mounted on the back makes it even easier to see the action as it happens.

Web site: www.sony-vaio-uk.net

DANGER AHEAD

Ergonomics, the applied science of equipment design, is working hard to take the stress off our working lifestyles

Aditi stretched back in her chair and shut her eyes. She put down her specs and massaged the bunched up muscles in her neck; that nagging pain in the neck had spread to the middle of her back. She cracked her knuckles and flexed her fingers. Her eyes were burning. "Ah well! A good night's rest and cold pad for the eyes will take care of that." Thinking this, she shut down her PC and picked up her bag to go home.

Sounds familiar? This probably describes how most of us who spend long hours sitting in front of the computer feel at the end of the day. We are slowly waking up to the fact that our stressful work habits may be the cause of the constant discomfiture we feel but can't put our finger on. Statistics show a rise in health hazards related to a sedentary life spent at the desk, usually in front of the computer—of all occupational illnesses, musculoskeletal disorders rose from 18 per cent in 1985 to 52 per cent in 1989 and 56 per cent in 1991. Other studies show that 31 per cent of medical claims made by employees pertaining to a computer environment involved back strain. The medical compensation caused by these and other work-related health hazards exceed $100 billion annually in the US alone.

This awareness has given rise to the study of ergonomics: the bio-technology working towards reducing the stress caused by our daily tools of work to maximise productivity and reduce operator fatigue and discomfort. Ergonomic disorders such as Carpel Tunnel Syndrome (CTS), various tendon disorders and lower back injuries are among the most-rapidly growing recordable injuries and illnesses. Thus, increasingly more number of organisations and users are opting for their equipment to be designed and arranged to facilitate a healthy and efficient working environment.

In an environment where computers are used, ergonomics is applied to the physical design of the peripherals that we come in direct contact with, such as the keyboard, screens and the mouse. And this wave of change in work environments has come around the right time. The hazards of constant computing and addiction show

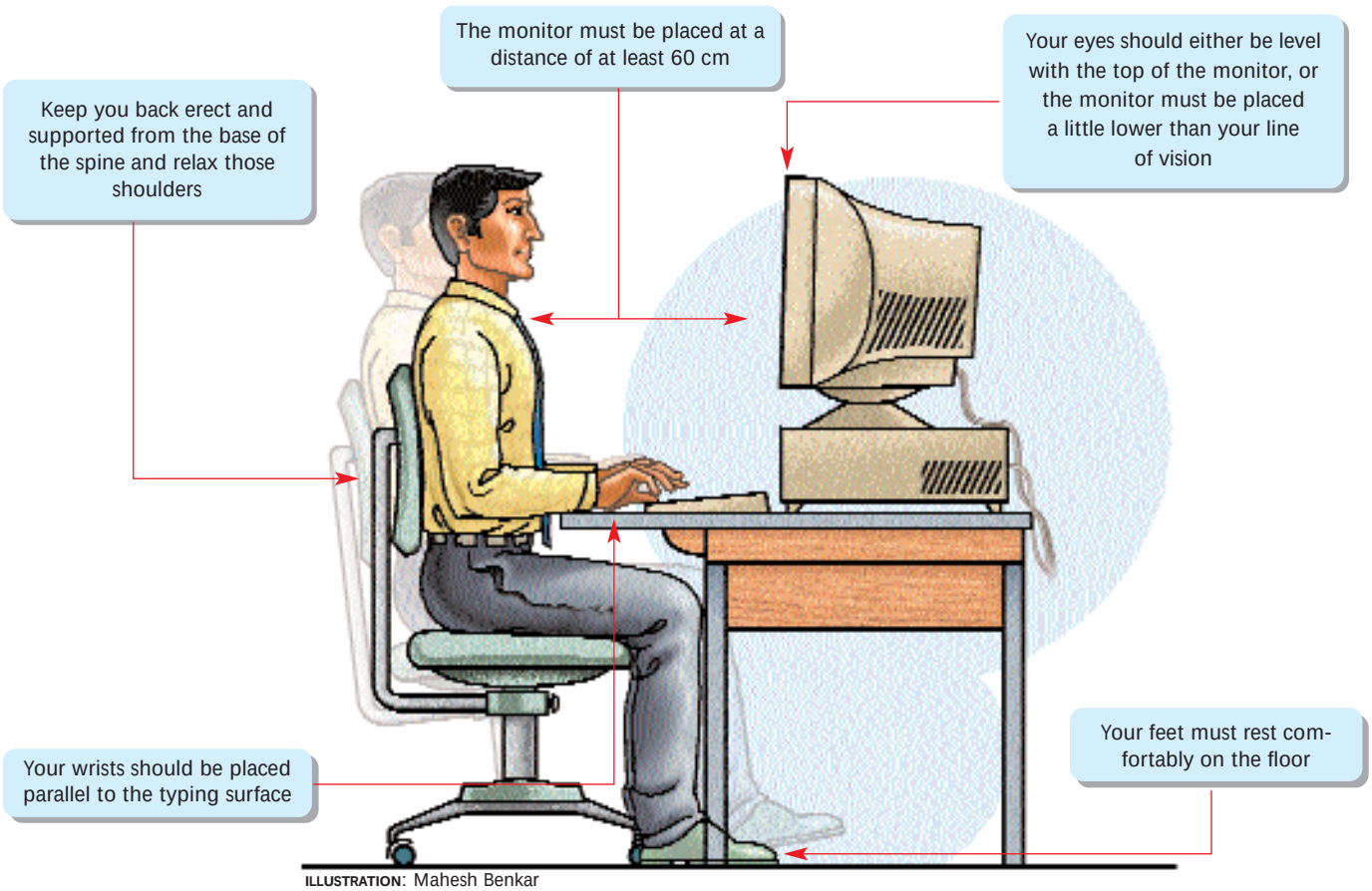


ILLUSTRATION: Mahesh Benkar

up as negligible symptoms, but snowball into more serious health complications.

Occupational hazards

Nirav Shah is a standard 10 student who was exposed to computers as early in life as post-primary school. His parents, like most others, wanted their child to get a headstart in life. Today, they are quite perturbed by his hyperopic eyesight, amply evident by the growing thickness of his spectacles. Nirav spends most his time glued to the PC and shows all the symptoms of eyestrain caused by overexposure to the electromagnetic radiations emitted by the monitor—irritation in the eyes, strain, blurred vision, redness and burning.

> "Extreme cases of RSI can lead to permanent tissue damage and disability"

Dr Prakash Nelapana
PRACTISING HOMEOPATH

The eyes are the first to get affected by prolonged computing and the spinal cord comes a close second. Cervical Spondylitis is a disorder pertaining to the neck—inflammation of the vertebrae manifests as pain and stiffness. This, according to Dr Prakash Nelapana, a homeopath based in Mumbai, is the most common ailment among computer users. The usual culprit is the monitor, especially when placed at an improper level. Another common ailment is positional backache, which Dr Nelapana terms as Lumber Strain and believes it to be caused by improper chairs found in most offices (*see box, 'The Workaholics Guide to Healthy Computing'*).

Other persistent health hazards are Carpel Tunnel Syndrome (CTS) and Repetitive Strain/Stress Injury (RSI). PC users most commonly complain of numbness or pain, anywhere from the shoulders to the joints of the fingers, weakness at the wrist, clumsiness while handling or holding things and nocturnal awakening. These are the symptoms of CTS—the inflammation of the tendons of the hand, brought about by repetitive activities involving the hand or wrist such as using the keyboard and the mouse over a prolonged period of time. Studies have shown that CTS comprises 13 per cent of all workplace injuries.

RSI is a more chronic ailment caused by overstrain that can develop unnoticed

The Workaholic's Guide to Healthy Computing

The Do's and Don'ts of long term computing sessions

- The shoulders should be relaxed; allow your elbows to swing free.
- Keep your wrists straight and parallel to the table.
- Pull your chin in to look down upon the monitor; do not propel your head forward. The distance between the monitor and your eyes should be around 60 cm. Don't slouch or slump forward; instead try leaning back in the chair.
- Alter your posture from time to time. Make sure that the small of your back is supported at all times.
- Take regular breaks every two hours—stretch your arms, neck and shoulders, and walk around. Flex your fingers by contracting and then stretching them out rapidly.
- Maintain a healthy diet and drink plenty of water.
- Look away from the monitor to a blank space after every 45 minutes and blink your eyes at regular intervals to avoid dryness.

Ergonomic Devices

The chair, mouse and the keyboard are the primary area where ergonomics should be applied in a work environment. Anti-glare screens meant to be placed on the monitor screen reduce the glare inherent in CRT displays that strain the eyes.

Monitors should be placed to offer a straight line of sight. While the most common arrangement is on top of the table, submerged monitors that are placed within the table, such as in the case of newsreaders and bank officials, need the user to look down upon the screen, thus relaxing the neck muscles. Keyboards and mice are the source of RSI and CTS, hence it is important that you choose one that minimises the stress on your wrists and shoulders. Most keyboards today, such as the ones from Logitech and Microsoft, come with palm rests that support your wrists. The buttons should be soft to touch and not require too much pressure. The customisable buttons, if any, should be placed within reach of the fingers. Curved keyboards, termed as Natural Keyboards, are ideal since they adapt to the natural positioning of the palms. Other ergonomic options are split keyboards, such as the Comfort Keyboard, which can be separated into two or more parts, but they are not easily available. These are adjustable in height, can be rotated and tilted up to 90 degrees for maximum comfort. Small keyboards made for laptops should be avoided.

A submerged monitor is the ideal way to place the device

The Comfort Keyboard splits into three levels that can be customised for the user's comfort

The mouse can also be an area of weakness because of the strain it puts on the wrist and the finger joints. The mouse should be large enough to fit snugly into the palm and raised enough from the centre so that the wrist is parallel to the surface area on which the mouse is placed—it should not require the wrist to be rested on the table. The buttons should not to be too tacky and soft to press; a scroll wheel is advisable. Ideally, the mouse should be customisable for both left and right hand users and hence it should be symmetrical. The extra customisable buttons should be placed neither too near, nor to far and many come with a palm rest.

The Logitech MX 700 cordless optical mouse is a healthy gaming option

> "The most affected victims of computer hazards are children"

Dr Kishore Shah
MEDICAL PRACTITIONER

over the years. Capillaries carry blood to muscles and tendons. As tense muscles squeeze (like when bending the finger or the wrist), blood flow to the affected area slows down. When the blood flow stops, a muscle has enough energy stored to cope with the tension for a brief while. Once this is expended, the muscle switches to an inefficient form of energy supply. Once this too is over, lactic acid builds up in the muscle, causing pain and fatigue. In a reflex reaction called the splinting reaction, the neighbouring muscles tense up, triggering a self-sustaining pain cycle. The pain can also migrate from one part of the limb to another. Over time, the strained muscles turn hyper-sensitive and develop specific tender points called myofascial trigger points. The inadequate blood supply causes numbness and tingling. On account of larger nerves being squeezed, the tingling and numbness is more defined.

The tell-tale signs of RSI are pain, stiffness, swelling, numbness and tingling in the hands, wrists, elbows, shoulders, back or neck. RSI is common not only among those who use the PC, but also those who employ long periods of steady hand movement, such as musicians and sportspeople. It is common with work that demands repetitive grasping, turning and twisting, like while using the computer keyboard or operating a power tool. Stressful wrist and neck positions, as those faced by desk workers, serve only to aggravate the potential for damage.

Prevention better than cure

With computers becoming an integral part of our work implements, prevention is the only course. Denial of the early-stage symptoms, according to Dr Nelapana, is one of the main causes that aggravates the condition. Precautionary measures need to be interwoven into our daily lifestyle and methods of working. This is where ergonomic devices come in. These devices are specially designed under medical observation to reduce stress upon the concerned body part and reduce the chances, if not prevent the possibility of any injury. While awareness of the benefits of using, say, an ergonomic mouse or keyboard is not widespread, most dealers stock the whole gamut of devices.

Mr Sandeep Parasrampuria, director of BestIt, a vendor of ergonomic devices affirms, saying, "No one comes in looking specifically for an ergonomic device. The health benefits have to be pointed out as one of the additional features." (*See box, 'Ergonomic devices'.*)

Another precaution, which is ignored as much as it is stressed upon, is to develop a healthy lifestyle and work environment. A balanced diet, regular exercise, proper ventilation, and breaks to stretch and give the eyes some rest go a long way in letting us savour our working moments.

The line between dedication and addiction is a fine one and can be easily crossed. While technology continues to open new frontiers, it brings with it newer hazards. Just as with life, the universe and everything beyond, the beige box needs a healthy serving of salt.

RACHANA SANGHANI AND MITALI PAREKH

Keep your Eyes Open

You need to see the doctor if you have...

- Persistent pain or spasms in the wrist and fingers that spreads to the arms, especially the one you use the most, that is, right arm for right-handers and left arm for left-handers.
- Tenderness and pain in the neck, shoulder, upper back, upper arm, elbow, forearm, wrist or fingers.
- Swelling of hands or forearms.
- Difficulty using your hands for general tasks and experience loss of grip.
- Unusual sensations that may include numbness, tingling, stiffness, very cold sensations, tremors and burning in the fingers, hands, wrists, elbows or arms.
- Decreased sensitivity and motor control in your fingers, hands, wrists, elbows or arms.
- Sudden locking up or freezing of fingers, hands, wrists or elbows.
- Tired, aching, heavy, red, watery and irritated eyes.
- Blurring and loss of focus.
- Insomnia, fatigue and if any of these symptoms cause you to wake up at night.

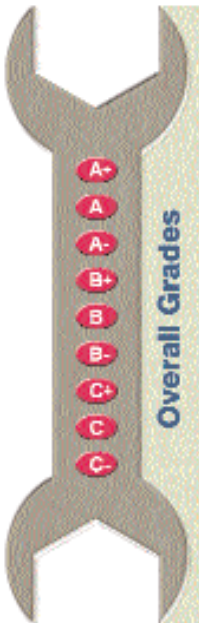
How we Test

It looks good and the technology is glitzy, but does it do the job?

The Digital Media Test & Research Centre (DMTRC) conducts a series of elaborate tests to evaluate the merit of each hardware and software product. To ensure that our readers have all the information they need to make an informed buying decision, engineers at DMTRC evaluate and review the latest hardware, software and technology services in accordance with the most up-to-date evaluation processes and methodologies used around the world.

Comparison Tests

We use a dual rating system, the first of which is applied to the Comparison Tests in which we compare the performance of products within a particular category.



Each product is evaluated under different parameters such as performance, value for money, features, warranty and support, etc.

Weightages are then applied to the various test parameters according to their importance for that particular category of products.

These weightages are then used to arrive at an overall grade for each individual product. An overall grade of A+, therefore, indicates that the product is close to perfection.

The Awards

Digit awards outstanding products by selecting a Best Performance and Best Value winner in each comparison test. The winner of the Best Performance Award will be the product that scored the highest in the performance segment of our tests. This award represents the best performing product in our tests and doesn't factor in any other parameter such as value for money, features, support, etc. The winner of the Best Value Award will be the product that scores the highest in our value for money parameter which is derived taking into account the ratio of a product's performance and features to its price. The product winning this award offers good performance at a great price.

In Bazaar

The second part of the rating system is used to evaluate individual hardware and software products in the Bazaar section. The evaluation covers parameters such as performance, ease of use, value for money and the build quality/features of the product in question and then arrives at an overall rating.

Here each of these parameters is given a weightage of 25 per cent and is rated on a scale of 5, which is represented by arrows (▶).

The greater the number of arrows, the better the product. This simple five-point rating system is designed to give you an easy-to-interpret assessment of a product. For example, a product that receives an overall score of five arrows signifies an outstanding buy!

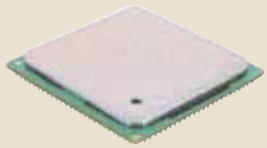
The 5-point Rating System used in Bazaar	
▶▶▶▶▶	**Excellent:** a brilliant combination of price, performance and features—far beyond expectations
▶▶▶▶▶	**Good:** a good buy, better than most products in its category
▶▶▶▶▶	**Average:** reasonably competent but nothing spectacular about the product
▶▶▶▶▶	**Mediocre:** does not live up to expectations, needs improvement in many areas
▶▶▶▶▶	**Poor:** has serious drawbacks and needs improvement before it can be used for its target application

Digital media TEST & RESEARCH CENTRE

In Test this Month

Our cover story this month presents you with a comprehensive analysis of the processors and the motherboards available in the Indian market. We have tested

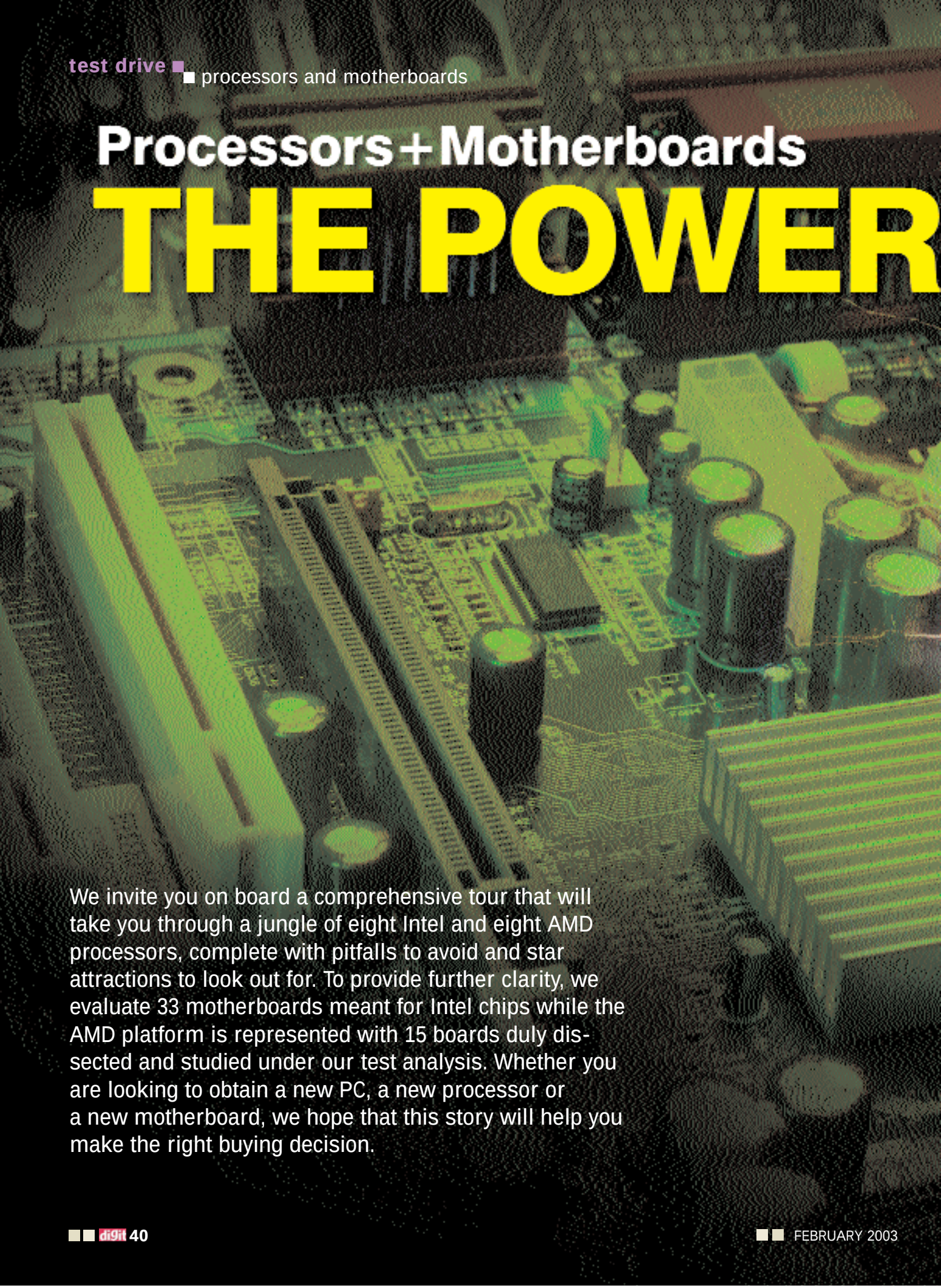
a total of 48 motherboards and 16 processors, covering both the Intel and the AMD platforms. The test analysis will help you make the right decision whether you wish to buy a processor, a motherboard or are looking for a complete solution involving both these essential components.



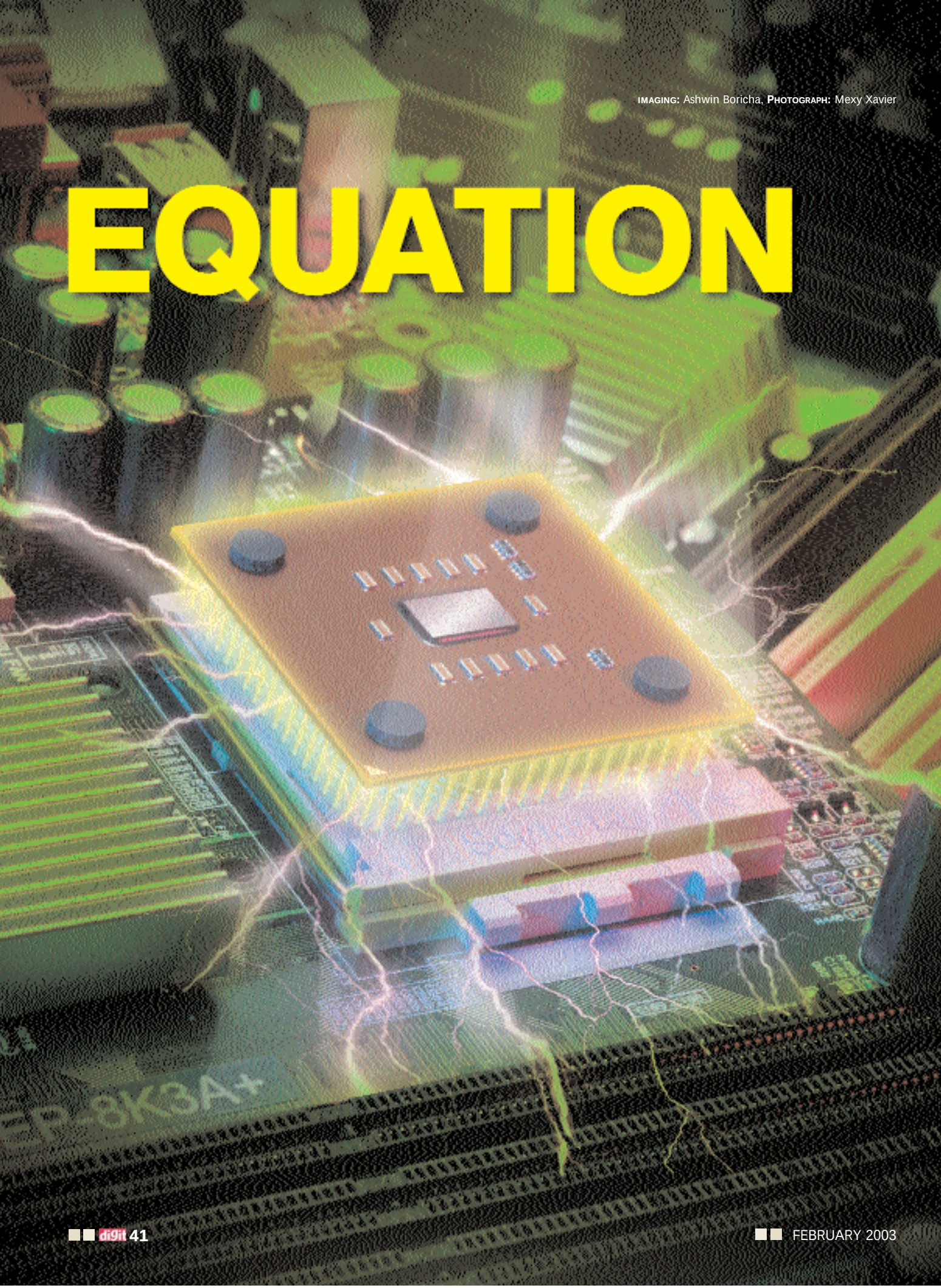
Next up we have the Bazaar section bringing in a wealth of gadgets. Two products from Palm appear on the handheld radar—both the high-end and feature-rich Palm Tungsten T and the budget Palm Zire are duly analysed. We also test a 1GB IBM Microdrive and the brand new Creative SoundBlaster Audigy2 Platinum, which features a culmination of all of Creative's former technologies. Also tested are the Labtec Pulse 420, a 2.1 speaker set; the Logitech MX500 Optical Mouse and the ACi Ethos 4 Laptop. The software front is represented by RestoreIT! Deluxe, a backup and restore application; and WebCafe, a tool meant for managing cyber cafes.

Processors + Motherboards

THE POWER



We invite you on board a comprehensive tour that will take you through a jungle of eight Intel and eight AMD processors, complete with pitfalls to avoid and star attractions to look out for. To provide further clarity, we evaluate 33 motherboards meant for Intel chips while the AMD platform is represented with 15 boards duly dissected and studied under our test analysis. Whether you are looking to obtain a new PC, a new processor or a new motherboard, we hope that this story will help you make the right buying decision.



IMAGING: Ashwin Boricha, PHOTOGRAPH: Mexy Xavier

EQUATION

Build a strong foundation and anything you build on top will be strong too. Tested here are 48 motherboards and 16 processors to help you select the right materials for your system's foundation

Inquire about the computer system that a friend or colleague has and the answer would likely revolve around the processor within. It is not surprising to find out that the majority of users make their buying decisions around processors. Everything else comes later. But what they are forgetting is the motherboard, the platform which contributes to a major part of the overall performance. Like a solid foundation to a house and a good chassis to an engine, a motherboard is vitally important to the whole picture. It can enhance, or hold back, the performance capability of a processor. Coupling an extremely fast processor with a mediocre board could seriously hamper performance just as using a low-end processor on a feature-rich, high-end board would.

Another major concern is the main area of application that you would be working with on your system. Do you really need a Rs 38,600 Intel Pentium 4 3.06 GHz processor to run Microsoft Excel? The theory of overkill would conclude the answer to be a no. Potential buyers should, therefore, not make the mistake of buying components without thinking about the applications they'll be using. We hope that this article will help you make the right choice whether you are in the market for a processor, a motherboard or for a complete solution. To do so, we present a comprehensive test that covers 48 motherboards and 16 processors from the stables of the major players, Intel and AMD.

Market analysis

The Indian PC market is always buzzing with activity. The reason for this is the easy availability of a wide range of components—in this case, processors and motherboards. The ever-decreasing prices due to stiff competition have led many users to upgrade to comparatively powerful CPUs such as the P4 or the Athlon XP range of processors. The same goes for motherboards too—you will be amazed by the sheer choice you have now, with boards based on different types of chipsets available for different processors.

Going by the current market trend, what we can conclude is that with the demise of the P-III processors for Intel and the Duron processors for AMD, users have now shifted their focus to buying processors and motherboards that hit the sweet spot in price and can be pushed for maximum performance gain. One example of this is the marriage of the P4 1.6 GHz (Northwood core) processor with the various boards such as the ASUS P4B266 and MSI 845PE Max 2 to name a few. This combination created waves in the enthusiast user community, because the P4 1.6 GHz could be easily pushed to 2.4 GHz without compromising the system's stability. Hence, though the boards were competitively priced, they also offered immense tweaking capabilities—an irresistible combination for the value-minded buyer.

How we tested

To test a processor's performance, we evaluated it using tools that gave us both a theoretical and real world picture. The test machine consisted of an Intel D845PEBT2 for Intel-based processors and the MSI KT4 Ultra for AMD chips. We used 256 MB of PC2700 333MHz DDR memory from Corsair. The ATi Radeon 9700 Pro was our choice of graphics card for the system and the Seagate Barracuda ATA IV 40 GB was used as the test hard disk drive. The monitor was a Samsung 75E 17-inch and the OS used was Windows XP Professional. For testing the performance of the processors, we used different CPU-intensive tests such as 3DMark 2001SE, Specview Perf (a 3D modelling benchmark) and POVRAY, which is an extremely CPU-

STTI Scoring

Based on its performance, and married with its price, each processor and motherboard was awarded an STTI (Suitability To Task Index) score. We chalked up three application areas and ranked the components tested (based on the STTI score) within each of these sectors: Gaming and Entertainment (performance 90 per cent, price 10 per cent weightage), Content Creation (performance 75 per cent, price 25 per cent weightage) and Office and Internet (performance 50 per cent, price 50 per cent weightage).

The area of Gaming and Entertainment is for those of you who wish to watch high-quality DVD movies or play next-generation computer-intensive games. Budget is not a major consideration within this category and we awarded just a 10 per cent weightage to price within this sector. Under Content Creation fall tasks such as working with Adobe Photoshop 7, 3ds max5, Maya, Adobe Premiere, etc. Price is of a greater importance here and is awarded a weightage of 25 per cent, performance getting the remainder 75 per cent. Office and Internet is the final category to consider. E-mail, chatting, Net browsing and document creation under Microsoft Office or other office suites, are some of the basic tasks that fall under this area. It is thus a very budget-conscious section where cost shares a hefty 50 per cent weightage with performance.

The STTI index provided a clear indication of the performance of the processors and motherboards in these application areas. For example, the STTI for Content Creation was calculated by allotting a greater weightage to tests such as the Photoshop 7.0 filter test than to the gaming tests. Similarly, for Gaming and Entertainment, a greater importance was allotted to the performance of a CPU under *Quake III Arena* and 3DMark 2001 SE; or the presence of features such as onboard RAID and six-channel integrated audio on a motherboard. Before making a buying decision, the first thing you need to define is the most common tasks you wish to perform using your computer. Then choose the relevant application area and within the test analysis, you will find the best processors and the best motherboards for your job.

Any processor or motherboard that distinguished itself by scoring an STTI of more than 70 under each of the above areas should be considered well worth buying. Finally, to present a comprehensive solution, we paired up the best processor and motherboard from within each application area (the best were the highest scorers, of course)—this pair would then be the best solution for the task at hand.

intensive test. We ran the benchmark at 800x600x16 with anti-aliasing off. Content Creation 2001, SiSoft Sandra 2003, PC Mark CPU Test and Adobe Photoshop were also used to evaluate the processors under various application areas. We also used real world tests such as audio and video encoding, and *Quake III Arena*.

As for the motherboards, we used a 256 MB, PC266 266 MHz memory module for testing all DDR boards even though quite a few of them supported DDR333. We had to do this since DDR 333 modules are a rare commodity in India. For RDRAM-based boards, we used a PC 800 memory module except for the ASUS P4T 533-R board that uses a 232 pin PC 800 memory. nVidia's Ti 4200 video chip from ASUS was our choice of graphics card for the systems that had an onboard AGP slot; for those that didn't, we used the onboard video chipset. For testing the boards that support HyperThreading, we used Intel's 3.06 GHz processor, whereas all other boards were tested using the fastest CPU that they supported.

How they fared

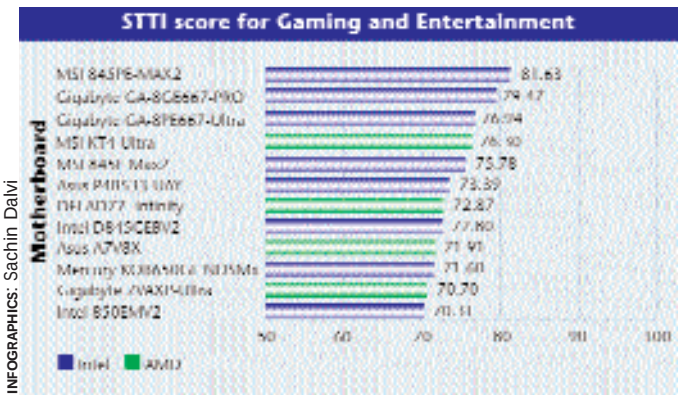
With their multi-gigahertz speeds and long pipelines, the Intel Pentium 4 processors are predictably fast. Add in the 512 KB cache and it does not come as a surprise that these pieces of silica shrug off any test thrown at them. They are also supported by good motherboards—Intel chipsets have always been good performers and stable too. Surprisingly chipsets from SiS and VIA are equally good and cheaper by a significant amount.

This does not stop an AMD platform from taking to the soapbox to preach affordability: the processors are fast enough and the motherboards do a decent job of supporting them, all tied in a bundle that is easier on the wallet. Here chipsets from VIA and SiS again shine bright and offer a good set of features and performance.

Gaming and Entertainment

Try playing *Medal of Honor: Allied Assault* on anything below a 700 MHz CPU and watch your system get pounded. You will notice that even if you pair this system with a high horsepower graphics card such as the Ti 4600 or the Radeon 9700 Pro, you still won't experience free-flowing gameplay—the CPU becomes a serious performance bottleneck.

To evaluate gaming performance we used *Quake III Arena* and 3DMark 2001. In the case of entertainment applications—whether you are watching DVD movies, converting your favourite Audio CDs into MP3 or encoding video files—pure CPU power is the call of the day. The video encoding test gives a clear idea of the number crunching ability of a CPU: the ALU



INFOGRAPHICS: Sachin Dalvi

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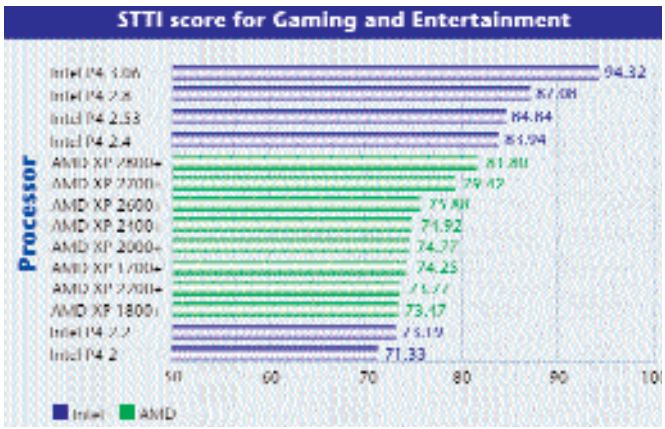


(arithmetic logic unit) and FPU (floating-point unit), to be exact. Since video encoding demands 100 per cent CPU utilisation, if the CPU fares well here, it can handle any other multimedia demands. To measure the performance of a processor during encoding, we encoded a standard MPEG-2 format video sequence using VirtualDub v1.4. The DivX codec used was version 4.01 and the setting for audio and video processing in VirtualDub was turned to full processing mode. The video compression bit rate was set at 900 Kbps.

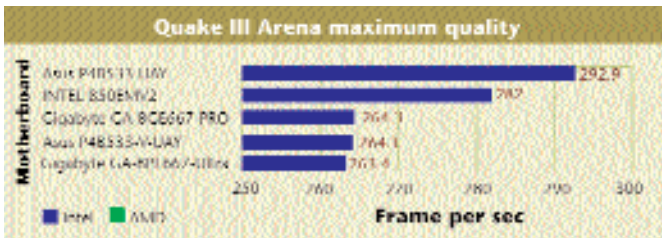
Entertainment is nothing without audio and nowadays, encoding audio is something that a PC user goes about doing very frequently. This also requires quite some amount of CPU power. The equation is simple: the faster the processor, the faster your audio will get encoded. To check just that, we used a wave file and encoded it into MP3 format and the time taken to get the job done was noted down.

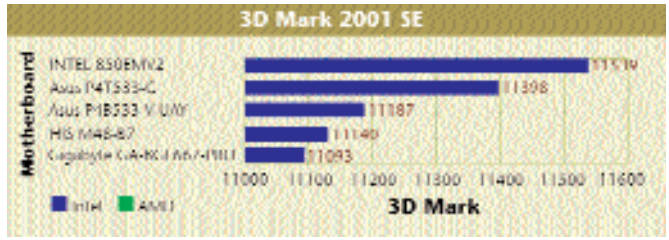
The best motherboards for gaming and entertainment

Here we present to you some handpicked motherboards that stormed the gaming and entertainment tests and proved to be rock solid.

The best board to buy for stunning gaming experience is one that offers plenty of memory tweaks. Here the board that simply blew off any competition as far as overall appeal is concerned was the MSI 845MAX 2PE. Here is what it features: support for Bluetooth, RAID, FireWire, USB 2.0, six-channel audio, and support for PC 333 DDR-RAM. And this red monster sports HyperThreading, a feature that can do all the wonder you can possibly think of if coupled with a Hyper threaded processor.

The board squashed the competition by its performance in the gaming arena. In *Quake III Arena* it squeezed 382 fps in the normal mode, which is very good considering the fact that we used a 266 MHz memory instead of 333 MHZ. In the high-quality mode, it logged 368 fps and 249 fps in the max quality mode—this fall can be attributed to the slow memory that we

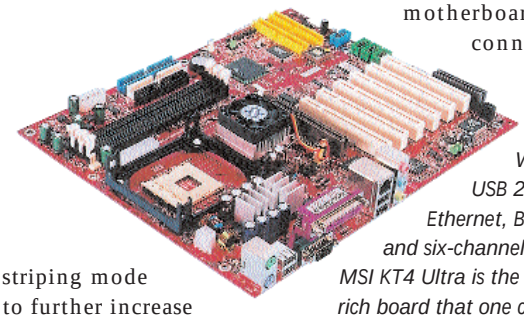




used, which caused a bottleneck. This is a very good example of what high-speed memory can do to the overall performance of the system.

The board logged a good score of 10933 in 3DMark 2001 SE, which by any standard is a good score for a board running a Ti4200 graphics card. The board gave an excellent score of 5338 in the PC Mark memory test—an excellent score. Compare this score with that of Intel's 850EMV2 board which runs on RDRAM memory running at 400 MHz. Although the gap between the two is notable, consider also that this board would perform much better when DDR 333 MHz memory sticks become more widespread. It thus becomes obvious that DDR memory is destined to give RDRAM the hiccups.

What's more, the MSI 845MAX 2PE's performance comes loaded with goodies one can drool over. With an onboard RAID controller hardwired onto the motherboard, you can connect two hard disks in the striping mode to further increase the disk subsystem speed to pull up some more fps when you play the latest games such as *DOOM III* that will demand every last bit from your system. To further enhance your gaming experience, the board features an onboard six-channel sound chip. Besides, you get four USB ports on the back panel. You also get FireWire ports so you use your PC for copying videos from your Camcorder. With an integrated Gigabit (1024 Mbps) LAN, playing games over your local network or over the Internet would be serious fun. The Northbridge adorns a nice silver heatsink-fan combo—a good feature and value addition by MSI. Apart from these things, support for Bluetooth by way of an optional Bluetooth kit further increases the scalability of the board. All these features, combined with a good performance, resulted in the board getting the highest STTI score of 81.63 in the field of Gaming and Entertainment.



With onboard USB 2.0, FireWire, Ethernet, Bluetooth, RAID and six-channel sound, the MSI KT4 Ultra is the most feature-rich board that one can buy

But this wasn't the only board that caught our attention. Among the 12 boards that scored an STTI above 70, the platforms were dominated by Intel solutions with a split of eight and four between Intel and AMD. Close on the heels of the MSI board were two offerings from Gigabyte, the PRO and the ULTRA variant for Intel processors. Also, not too far behind were two solutions from Intel: the RDRAM supporting 850EMV2 and the DDR-based D845GEBV2. Separated by less than 3 points on the Gaming STTI Index, the cheaper

Demystifying MHz		
Processor	**Core speed**	**Bus Speed**
Athlon XP 1500+	1333 MHz	266 MHz
Athlon XP 1600+	1400 MHz	266 MHz
Athlon XP 1700+	1467 MHz	266 MHz
Athlon XP 1800+	1533 MHz	266 MHz
Athlon XP 1900+	1600 MHz	266 MHz
Athlon XP 2000+	1667 MHz	266 MHz
Athlon XP 2100+	1733 MHz	266 MHz
Athlon XP 2200+	1800 MHz	266 MHz
Athlon XP 2400+	2000 MHz	266 MHz
Athlon XP 2600+	2133 MHz	266 MHz
Athlon XP 2700+	2166 MHz	333 MHz
Athlon XP 2800+	2250 MHz	333 MHz

Unlike Intel, which measures CPU speed in megahertz (MHz), AMD uses a system called PR rating. This table shows the corresponding MHz ratings for different flavours of Athlon XPs

(by more than Rs 2,000) DDR-based Intel board comes across as a better buy.

The SiS chipset-based Mercury motherboard surprised us with its great performance number (71.60). Considering its price, Rs 3,600, the Mercury KOB650GL is an outstanding buy under this application category.

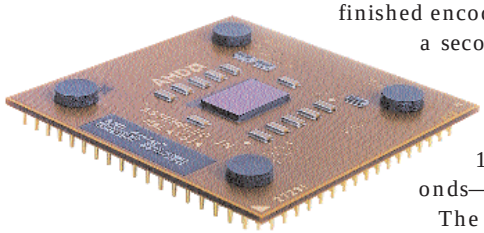
In the AMD camp, MSI stole ASUS' thunder by a decent margin. Scoring 76.30 STTI, the MSI KT4-Ultra is the best board that an Athlon can hope for: feature-rich (onboard six-channel sound, onboard FireWire, USB 2.0, Ethernet, RAID, Bluetooth, Serial ATA) and good performing. Only the DFI AD77-infinity came close to touching the MSI variant both in performance (score of 72.87 STTI) and in features. But when price is taken into consideration, at Rs 6,940 the MSI silences all and comes across as a great buy for this application area.

The best processors for gaming and entertainment

Although dominated by AMD processors, this application area saw the latest silicon square from Intel, the P4 3.06 GHz, annihilate its competition. This 3.06 GHz chip features the much-awaited HyperThreading feature, while the rest of the architecture is identical to other P4 chips. (*To learn more about HyperThreading, refer to the box, 'Virtual juggling: A look at HyperThreading'*).

This Intel chip was able to encode our test audio file of 51 MB to MP3 in just 17 seconds. In the video encoding test, it encoded the test file in 1 minute 28 seconds. Impressed? As good as this processor is, the 3.06 GHz is frequently bested by the Athlon XP 2800+ as you will soon see.

AMD Athlon XP 2800+, the Thoroughbred, managed to give the P4 3.06 GHz a serious run in every benchmark. Bear in mind, that the 2800+ runs approximately 800 MHz slower than the P4 3.06 GHz. Interestingly, it still manages to outperform the P4 in CPU-hungry tests such as audio and video encoding and even in our POVRAY test. The 2800+ finished encoding the video file in a second less than the P4 3.06 GHz; while it ripped the audio file into MP3 in 13 seconds 4 seconds—faster than the P4.

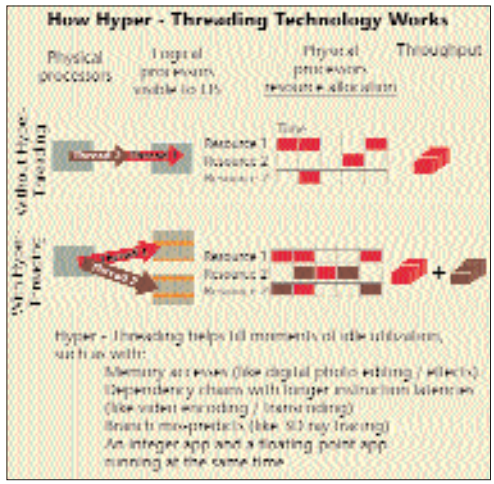


Based on the 0.13 micron Thoroughbred core, the 2800+ is the quickest of the AMD breed

The gaming tests is where the two part ways by a margin: in 3DMark 2001 the P4 scores a healthy 12,981 3D Marks, a good 500 points

Virual Juggling: A Look at HyperThreading

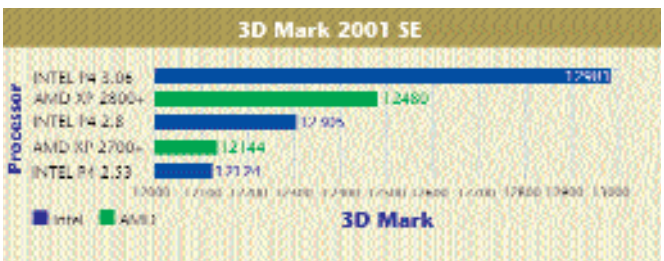
With the launch of their 3.06 GHz HyperThreaded processors, Intel claims to have delivered two processors in a single package. So what does HyperThreading (HT) do? Faster clock speeds is one way of increasing the computing power and the other way of increasing the output is by doing maximum work in a single clock cycle.

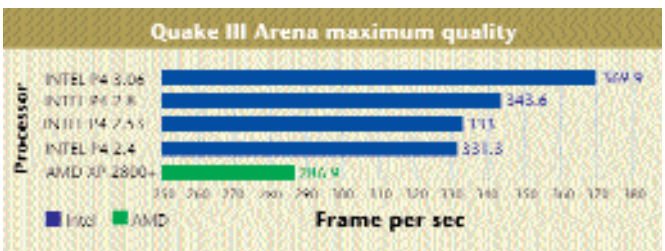


Consider a juggler who can theoretically juggle four balls but is juggling only three. HT is a means of ensuring that the number of balls is never less than four, an efficiency-increasing prospect. Under a multitasking environment, this means that the system resources are used in a manner such that at the end, a specific process is completed in less time. Technically, HT entails sending two data threads (think balls that need to be juggled) simultaneously to the processor (non-HT processors can handle only one thread at a time). The operating system gets an impression of two processors being present in the system and system resources are allocated in such a way that both the threads are executed simultaneously, allowing them to complete at the same time, instead of having to wait for one process to get over first. This increases efficiency and results in a decent performance gain.

So much for the theory, let us talk real-world now. A performance gain of not more than 25 per cent is expected from this technique, vis-à-vis traditional processors. Some tasks will be easier to carry out while others may suffer. In general, if one of the threads from a multi-threaded application (or one thread from one of two multitasked applications) is processor-intensive then HT will not have a positive impact on performance. Benefits are promised for two threads that do not strain resources. If multiple threads need access to the same resources, then the system could be rendered unstable or at the least, performance would take a nose dive: therefore, encoding music while watching a movie might yet pose a challenge to an HT processor.

HyperThreading requires certain prerequisites: the motherboard should support it, a small challenge, and more importantly software must be written with multiple threads in mind. Intel will supply a relevant compiler that will help developers do the latter. The OS should also be multi-threaded—Linux and Windows XP Pro are.





more than its nearest AMD rival, the Athlon 2800+ (12480 3D Marks). *Quake III Arena* is more comfortable with a processor that gives it raw speeds as is evident by the 369.9 fps it gifts the P4 3.06 GHz (at maximum quality)—way more than what the XP 2800+ scores (286.9 fps). Although the primary reason is the speed advantage, the huge L2 cache of the P4 processor (512 KB as against the 256 KB that the 2800+ employs) is another reason for the P4's domination in gaming. Thus, you will find that the first four positions in the Gaming and Entertainment STTI score table are held by Intel processors, the Intel Pentium 4 2.4 GHz coming in at number four with an 83.94 STTI, while the P4 3.06 GHz takes pole with a score of 94.32 STTI. A cheaper Intel solution would thus revolve around the P4 2.4 GHz processor, which costs the least of the four at Rs 12,800.

The closest AMD competitor to the 3.06 GHz Intel chip, the AMD XP 2800+ scores 81.80 STTI at a price of Rs 23,820. Going for this chip makes little sense (unless you already have an AMD-based motherboard) since it performs less than the P4 2.4 GHz but costs Rs 11,020 more than its rival.

However, to spot a bargain in the making, we need to climb down a couple of rungs to the 2400+ processor. From here to the 1800+, the AMD chips are a great mix of performance and affordability. The Palomino-cored AMD XP 1800+ shines with a score of 73.47 STTI and a price of Rs 4,140. Compare this to the nearest Intel counterpart, the P4 2.2 GHz (scoring 73.19 STTI) which is priced more than twice as much at Rs 11,600, and it becomes evident that AMD chips still rule the roost when it comes to performance at a digestible price.

Our recommended solution

These components make a killer combination for the ultimate gaming and entertainment solution. The MSI 845PE MAX2 offers everything a hardcore gamer could ask for and more. We tested the board using DDR 266 memory and came up with some amazing benchmark results. However, the real performance would be noticed when this board is coupled with DDR 333 memory and a fast Intel processor.

The MSI offers six-channel audio, onboard RAID, core frequency and voltage adjustments, and six PCI slots, leaving enough room for expansion. The board is also Bluetooth ready.

ASUS A7S266: The SiS740 chipset imparts a good feature set and performance score to this motherboard

Our processor of choice is the performance king, the Intel P4 3.06 GHz. The MSI board supports HyperThreading, making these an ideal performance couple. The processor is built on the Northwood core and has 512 KB of L2 cache—something that a gamer should gratefully accept.

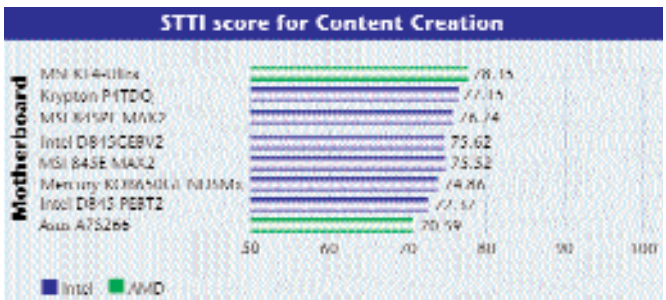
Content Creation

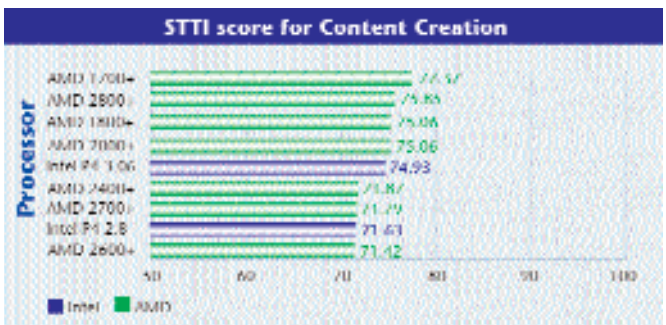
While working with 3D modelling and image editing applications, a lot of strain is put on the CPU. While it is true that faster memory and a faster hard disk increase performance in this area, a good CPU lays the foundation. We ran benchmarks based on 3D modelling and image editing applications to evaluate the processors under this category.

Our first test here was Specview Perf that runs scripts based on 3D rendering applications and outputs the final score in the form of an average fps. We also used Adobe Photoshop 7 filters and POVRAY image rendering test to evaluate CPU performance. Apart from this, Content Creation 2001, PCMark 2002 Pro and SiSoft Sandra 2003 Pro were used to check performance in individual areas such as FPU SSE, ALU, FSB bandwidth and so on.

In a real world environment, it's very difficult to say that a given processor is outright the fastest, since it entirely depends on the application that is used and how it uses the processor's instruction set and the operating system. Thus, a synthetic test such as SiSoft Sandra is used, which gives a theoretical indication of how well the processor performs. The CPU benchmark in SiSoft Sandra gives the performance of a CPU in terms of Dhrystone and Whetstone benchmarks.

Dhrystone is basically a benchmark that consists of a series of numerical samples, which simulate the real life usage of applications. By running these samples over and over we





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get the maximum number of operations the processor can perform and the final score is represented as MIPS (millions of instructions per second).

The Whetstone benchmark is used to indicate the FPU (floating point unit) strength. The benchmark consists of a series of floating point operation samples that are run over and over to find the maximum floating point operations the processor can perform—the score is represented as MFLOPS (Million Floating point Operations Per Second). But these MIPS and MFLOPS are only indicative of the kind of performance one can expect from each of the processors.

The best motherboards for content creation

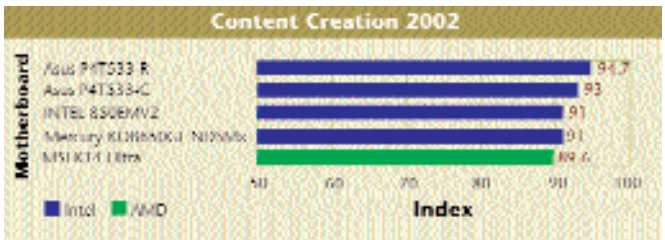
When it comes to productivity, motherboards for the Intel processor dominated the above 70 STTI list. These boards offer excellent performance and provide system stability—a plus for productivity applications that are extremely resource hungry.

However, the highest scorer was an AMD board, the MSI KT4-Ultra with 78.35 STTI. With support for Serial ATA (and the hard disk hot-swapping that this standard brings), this motherboard seems especially great for productivity application areas, where huge amounts of data are routinely transferred between colleagues and machines. Add to that the support for onboard RAID and the reason to invest in a SCSI disk diminishes even further. Bluetooth support will be a boon to those who demand wireless connectivity between cellphones, the PC and peripherals such as printers.

The ASUS A7S266 was the only other AMD solution that crossed the 70 STTI barrier: based on the SiS 740 chipset, the ASUS comes across poorly in supported features but costs about Rs 2,000 less than its MSI counterpart.

Of the eight boards that scored an STTI of more than 70, six belonged to the Intel camp. Chief scorer among them was the Krypton P4TDQ with 77.15 STTI. Based on the 845GL chipset, this motherboard has onboard video, sound, USB 2.0 and Ethernet. Although not exactly rich in features, it nevertheless belts enough of them to be considered a good buy for productivity applications and its price of Rs 3,630 makes it all the more attractive.

Two MSIs and an Intel board ran neck-and-neck with each other—the MSI 845PE-Max2, the Intel D845GEBV2 and the MSI 845E-Max2 scored 76.74, 75.62 and 75.52, respectively. The board that stole the thunder though was the Krypton KOB650GL. With a score of 74.86 and a price of Rs 3,600, this SiS chipset-based board came across as a great bargain in this particular application category.



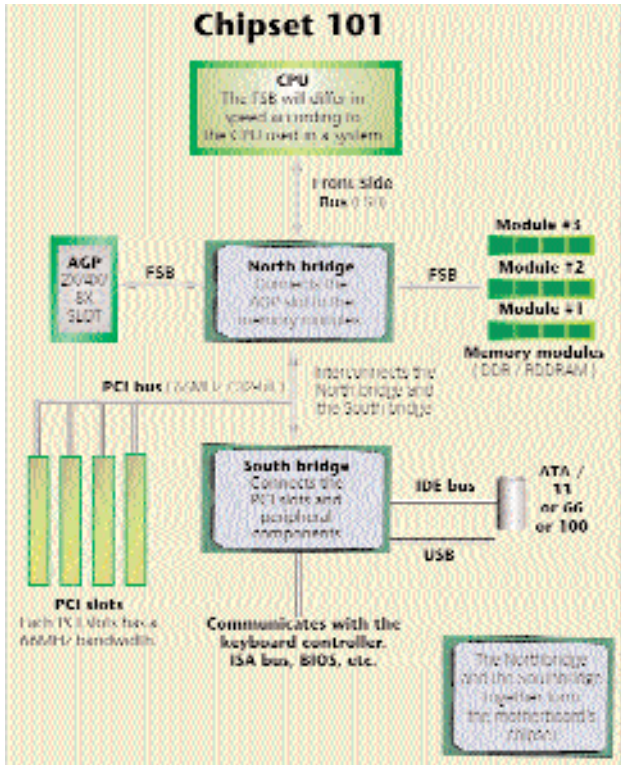
The best processors for content creation

The STTI score sheet for the area of content creation was dominated by AMD processors. Of the nine toppers, only two Intel processors managed to score more than 70 STTI points in this category.

The AMD processors, when first introduced, sported a 200 MHz FSB. As technology improved, we were able to get our hands on Athlons running on a 266 MHz system bus. The fastest AMD processors now operate at 333 MHz FSB and the first ones to extend support for this speed increase are the Thoroughbred range of processors from AMD—the 2700+ and the 2800+. Currently the chipsets that offer support for the DDR333 standard are nVidia's nForce2 and VIA's KT400 and KT333. The 333 MHz bus theoretically delivers a bus speed of

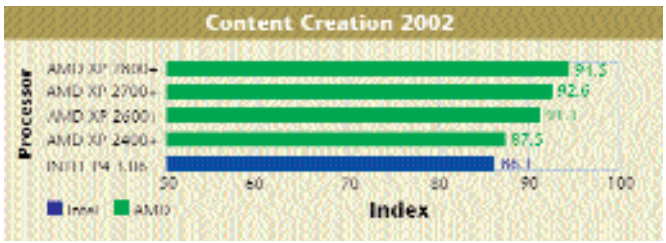
A Primer on the Chipset

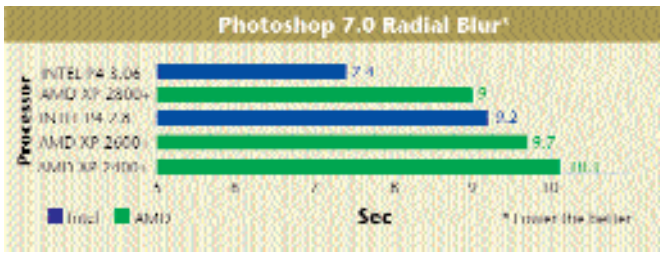
The chipset is the hub of all data transfers and all the components communicate through it. Each chipset consists of a pair of chips: a Northbridge that interfaces with the AGP bus, the processor and the memory bus; and the Southbridge that oversees data transfer between the PCI devices, the disk drives, the network, the USB ports, audio, keyboard controller, etc.



A chipset defines the feature set and the performance of a motherboard and by extension, the entire system. The maximum speed of a processor that the chipset supports is important—for further upgrades only the processor need be changed. For example, if a chipset supports up to 2.8 GHz CPUs and you currently have a 2 GHz CPU, you could upgrade to a 2.8 GHz CPU over a period of time, without having to invest in a new motherboard.

The type of memory that a chipset supports is also important. There are three types of memory running at different speeds—SDRAM (the slowest type), DDR SDRAM (faster than SDRAM) and RDRAM (theoretically, the fastest). The DDR variant is all set to become the new standard for memory as its prices are falling and RDRAM is being increasingly marginalised.



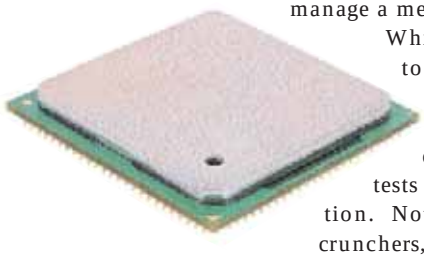


2.7 GBps. These impressive figures though, do not translate into the best solution for the application area of content creation.

The winner is the old workhorse, the AMD 1700+. At Rs 3,240, its STTI score of 77.37 seems all the more impressive. Close on its heels was the 2800+ but why shell out Rs 23,820, when a better solution costs some seven times less?

Going by pure benchmark numbers, the AMD Athlon XP 2800+ seemed to be running on steroids as it showed a serious sense of urgency by rendering the test image in our POVRAY benchmark in just 292 seconds—this was a serious blow to the P4 3.06 GHz processor as it was able to do the same but only after taking 43 seconds more. The main reason for this astounding performance is the XP's FPU. With its six processing pipelines, it makes number crunching look like child's play. Following close on the heels of the 2800+ was the 2700+, which too completed the test in an impressive time of just 302 seconds.

Next, as we move on to the SiSoft Sandra benchmarks, you will find that the P4 blasts through tests. In the CPU Normal benchmark, it was able to churn out a score of 9568. But what hit us on the head was the mind numbing score of 21855 in the FPU SSE (CPU Multimedia test). This score stamps the authority on the fact that the P4's inbuilt instructions are worth their salt. And the absence of support for SSE2 instructions is probably the reason why the AMD processors aren't able to post impressive scores in the synthetic benchmarks. This was further confirmed in the Specview Perf benchmark wherein the P4 3.06 GHz CPU scored a massive overall average score of 208.2 fps, while even the fastest AMD processor could manage a mere 138.6 fps.



Intel Celeron 1.7GHz: Based on the Willamette core this processor is not a great performer

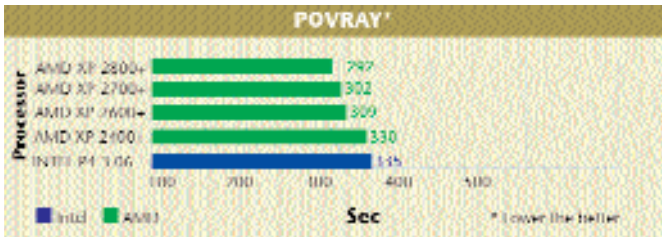
While theoretically SSEs seem to impress, practically they are rarely implemented with élan. This is evident when the Photoshop tests are taken into consideration. Note how the top number crunchers, the AMD 2800+ and the Intel P4 3.06 GHz, do almost equally well with Photoshop—SSE instructions make no difference to their performance.

SCORE BOARD Processors at a Glance

	AMD Athlon XP Processors							
	AMD 1700+	AMD 1800+	AMD 2000+	AMD 2200+	AMD 2400+	AMD 2600+	AMD 2700+	AMD 2800+
Features								
Codename	Thoroughbred	Palomino	Palomino	Thoroughbred	Thoroughbred	Thoroughbred	Thoroughbred	Thoroughbred
Speed (GHz)	1.47	1.53	1.67	1.8	2	2.13	2.17	2.25
Fabrication Process (microns)	0.13	0.18	0.18	0.13	0.13	0.13	0.13	0.13
Interface	Socket A	Socket A	Socket A	Socket A	Socket A	Socket A	Socket A	Socket A
Bus Speed (MHz)	266	266	266	266	266	266	333	333
L1 Cache (KB)	128	128	128	128	128	128	128	128
L2 Cache (KB)	256	256	256	256	256	256	256	256
Thermal Heat Spreader (Y/N)	✖	✖	✖	✖	✖	✖	✖	✖
Thermal Diode (Y/N)	✖	✖	✖	✖	✖	✖	✖	✖
Exposed Core (Y/N)	✔	✔	✔	✔	✔	✔	✔	✔
Performance								
Specviewperf (seconds)	130.7	131.9	132.4	132.3	132	132	134.2	138.6
POVRAY (seconds)	377	428	394	365	330	309	302	292
Content Creation Winstone 2001	76.4	78.9	80.6	82.2	87.5	91.1	92.6	94.5
PCMark 2002 Pro (index)	4406	4588	4953	5301	5813	6158	6358	6570
Photoshop 7.0 filters (seconds)								
Watercolour	8	7.3	6.8	6.4	5.8	5.6	5.5	5.4
Radial Blur	12.3	11.9	11.2	10.8	10.1	9.7	10.4	9
Lighting Effects	1.3	1.3	1.3	1.2	1.1	1.6	1.4	1
SiSoft Sandra 2003 Pro								
CPU Dhrystone	5501	5753	6253	6775	7519	8025	8156	8491
CPU Whetstone	2236	2337	2541	2744	3023	3252	3291	3409
CPU Integer	8143	8528	9269	10011	11105	11866	12027	12532
FPU SSE	8708	9055	9837	10692	11736	12516	12660	13275
ALU/RAM (MBps)	1930	1938	1943	1934	1931	1902	2351	2388
FPU/RAM (MBps)	1801	1807	1817	1830	1843	1840	2194	2213
3DMark 2001 (3D Marks)	10594	10708	11029	11182	11446	11697	12144	12480
Video Encoding (seconds)	116	114	108	104	100	97	91	87
Audio Encoding (seconds)	22	20	19	18	16	15	15	13
Quake III Arena (fps)								
Normal (640x480x16)	249.6	253.9	261.9	271.4	279.1	284.4	303.6	307.1
High (800x600x32)	247.8	251.8	258.2	269.3	276	279.4	301.7	305.8
Max (1024x768 x32)	234.1	233.6	244.5	252.2	255.2	261.3	284.2	286.9
Overall Score								
Suitability to Gaming and Entertainment	74.25	73.47	74.77	73.77	74.92	75.88	79.42	81.80
Suitability to Content Creation	77.37	75.06	75.06	69.47	71.87	71.42	71.79	75.85
Suitability to Office and Internet Tasks	83.43	75.12	72.14	58.23	58.92	55.48	55.94	56.27
Overall Product Rating	78.35	74.55	73.99	67.16	68.57	67.59	69.05	71.31
Warranty & Support	3 years	3 years	3 years	3 years	3 years	3 years	3 years	3 years
Overall Grade	A-	B+	B+	B	B	B	B	B+
Vendor Name	AMD Far East Ltd	AMD Far East Ltd	AMD Far East Ltd	AMD Far East Ltd	AMD Far East Ltd	AMD Far East Ltd	AMD Far East Ltd	AMD Far East Ltd
Phone	011-26238620	011-26238620	011-26238620	011-26238620	011-26238620	011-26238620	011-26238620	011-26238620
E-mail	rahul.singh@amd.com	rahul.singh@amd.com	rahul.singh@amd.com	rahul.singh@amd.com	rahul.singh@amd.com	rahul.singh@amd.com	rahul.singh@amd.com	rahul.singh@amd.com
Price (In Rupees)	3,240	4,140	4,980	9,420	11,580	17,820	20,940	23,820

Disclaimer: Prices are indicative and are subject to change

Intel Processors							
Intel Celeron 1.7	Intel P4 1.7	Intel P4 2	Intel P4 2.2	Intel P4 2.4	Intel P4 2.53	Intel P4 2.8	Intel P4 3.06
Willamette	Willamette	Northwood	Northwood	Northwood	Northwood	Northwood	Northwood
1.7	1.7	2	2.2	2.4	2.53	2.8	3.06
0.18	0.18	0.13	0.13	0.13	0.13	0.13	0.13
Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478
400	400	400	400	533	533	533	533
16	16	16	12	16	16	16	16
128	512	512	512	512	512	512	512
✔	✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔	✔
✖	✖	✖	✖	✖	✖	✖	✖
75.22	126.2	161.2	164.4	189.4	194.9	194.5	208.2
709	612	521	391	365	394	356	335
53.5	58.7	68.5	71.1	80.4	81.3	85.2	86.1
3994	4096	4895	5352	5868	6261	6875	7534
10.8	10.3	8.6	7.8	7	6.6	6.2	5.7
15.5	16.4	12.8	12	10.7	10.4	9.2	7.4
1.5	1.5	1.5	1.4	1.7	1.6	1.4	1.3
4618	4344	5393	5693	6097	7261	7804	9568
2240	2239	2635	2902	3165	3340	3695	5613
6792	6791	7983	8785	9584	10143	11214	14152
8633	8629	10159	11174	12189	12901	14255	21855
1937	2024	2038	2009	2565	2530	2527	2533
1990	2024	2039	2022	2565	2566	2535	2534
8085	8994	10693	10874	12110	12124	12305	12981
152	145	126	121	102	97	85	88
36	32	25	23	21	21	18	17
184.3	239.4	300.9	300.1	370.3	383.2	385.8	446.2
177.7	237.2	297.7	297.9	362.7	382	382.1	441.3
167.5	227.9	284.2	280.4	331.3	333	343.6	369.9
54.23	60.30	71.33	73.19	83.94	84.84	87.08	94.32
55.77	50.31	57.03	60.22	66.70	67.36	71.63	74.93
68.44	49.74	51.39	52.70	57.51	57.53	58.28	58.77
59.48	53.45	59.92	62.03	69.39	69.91	72.33	76.01
3 years	3 years	3 years	3 years	3 years	3 years	3 years	3 years
C+	C	B-	B-	B	B	B+	B+
Nebula Technologies	Nebula Technologies	Nebula Technologies	Nebula Technologies	Nebula Technologies	Nebula Technologies	Nebula Technologies	Nebula Technologies
022-22670567	022-22670567	022-22670567	022-22670567	022-22670567	022-22670567	022-22670567	022-22670567
pratik@ nebulatech.com	pratik@ nebulatech.com	pratik@ nebulatech.com	pratik@ nebulatech.com	pratik@ nebulatech.com	pratik@ nebulatech.com	pratik@ nebulatech.com	pratik@ nebulatech.com
3,550	7,350	10,200	11,800	12,300	15,372	20,160	38,600



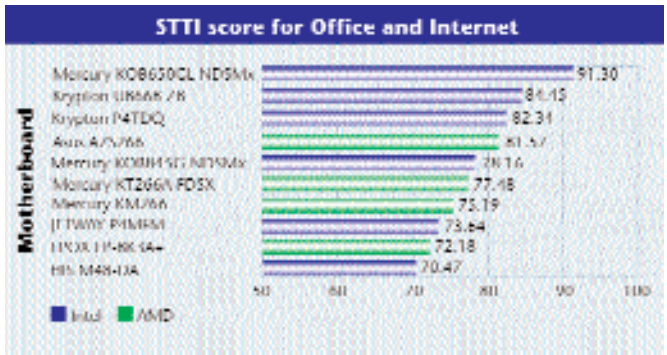
The Celeron continued to suffer in our benchmarks and even its speed couldn't save it. In the POVRAY benchmark, the Celeron took a painstaking 709 seconds (11 minutes 49 seconds) to complete the test. In the Specview Perf test too, it was last on the charts with a low score of 75.22 fps. Although performance was admirable, price played havoc with the Intel processors and caused their STTI scores to drop: the P4 3.06 GHz is a great performer by all means but its price tag puts it at number 5 (74.93 STTI), whereas the 2.8 GHz Pentium 4 is two notches further down at position 8 with a score of 71.63 STTI.

Our recommended solution

As far as content creation goes, nothing beats the MSI KT4-Ultra with an AMD XP 1700+ processor, the reason being extremely competitive pricing of both the motherboard and the processor. The MSI supports up to 3 GB of DDR memory. The AGP slot is the new and improved AGP 8x standard complaint, offering plenty of bandwidth for those 3D applications. The board also features onboard FireWire, Ethernet, USB 2.0, RAID and Bluetooth—heaven-sent for this application area. A total of six PCI slots leave plenty of room for future upgrades. The Athlon XP 1700+ processor is, of course, a great performer at its price point, posting healthy scores of 76.4 under Content Creation 2001 and 4406 under PCMark 2002 Pro.

Office and Internet

Office and Internet applications such as Microsoft Word, Excel, Macromedia Dreamweaver and Internet Explorer have become a part of our daily life. To test a CPU's performance under applications such as Word, Excel, Web authoring tools, etc, we used the Ziff Davis Business Creation benchmark that executes a script that runs all these programs in turn and then logs the score. To test the performance of applications such as WinZip, Macromedia Dreamweaver, etc we used the Ziff Davis Content Creation benchmark. PCMark 2002 Pro, a synthetic test, is more application specific, that is, the benchmarking applications are basically scripts written to perform a series of tasks and then log the resultant score. Hence, the way it uses the CPU instruction, or the OS, will directly be reflected in the score. For running office and Internet applications, one does not really need the fastest processor in the world. Here anything above a core speed of 1 GHz will do fine even for today's most demanding applications, if coupled with at least 128 MB of memory.



In Memory of Standards

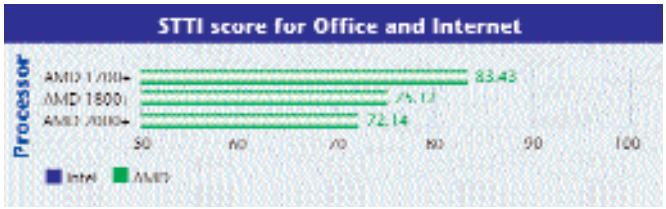
With the arrival of various memory standards, choosing a motherboard has become a more complicated and confusing task. At present, the market offers three different varieties of memory modules: SDRAM, DDR SDRAM and RDRAM. The problem has been compounded with the different incarnations of one standard itself. As an example, DDR SDRAM (also known as DDR RAM) is available as DDR266, DDR333, DDR400 and the latest, DDR433—the numbers denote the operating frequency of the memory module. Similarly, RDRAM also has many variants to choose from. The million-rupee question is, which memory standard should one adopt for optimum performance?

If you venture into the market for buying a memory module, more often than not you'll end up buying an SDRAM (Synchronous Dynamic Random Access Memory) stick, simply because it is the cheapest of the available standards and has been in use for quite some time now. Nearly all motherboards have chipsets that support this memory standard. The fastest variant is the PC133, where the memory runs at 133 MHz. SDRAM makes sense for those of you who wish to use their PC for office applications and Internet surfing. Keep in mind that this standard is on the verge of extinction and it could be out of the market within six months.

AMD adopted the DDR (Double Data Rate) SDRAM standard to counter Intel's RDRAM (RAMBUS Dynamic Random Access Memory) that had been introduced by Intel for its Pentium 4. As of today, DDR SDRAM is fast gaining a reputation as the most favoured and the most dominating of all memory standards. It's just a matter of time before it replaces SDRAM even in the low-end boards. Its success can be attributed to the performance gain, the falling prices and the strong support it enjoys from nearly all motherboard and chipset vendors.

DDR SDRAM has one significant point of difference from the SDRAM standard—data is transferred twice as quickly as its older cousin, hence the name. Moreover, with the introduction of new high-speed DDR memory standards such as DDR400 and DDR433, and the subsequent introduction of chipsets such as VIA's KT400 which support these standards, the performance gain that can be achieved is significant. The price factor is somewhat of a deterrent, with even the lowest speed DDR200 sticks costing almost twice as much as a PC133 module. Moreover, DDR400 and DDR433 modules aren't even available in the Indian market. Another sore point is the compatibility issues. Certain manufacturers mention in their manual the list of all memory manufacturers that the chipset supports.

RDRAM is still the fastest available memory for the Pentium 4. But its price has led to a low level of acceptance. With the new high-speed DDR standards such as DDR433 that promise performance levels on par with that of RDRAM, the performance advantage that RDRAM had also seems to have diminished. This could hammer the final nail into its coffin.



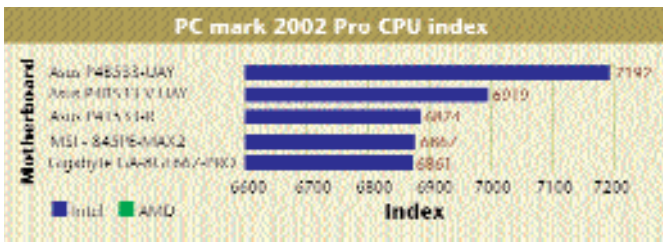
The best motherboards for office and Internet

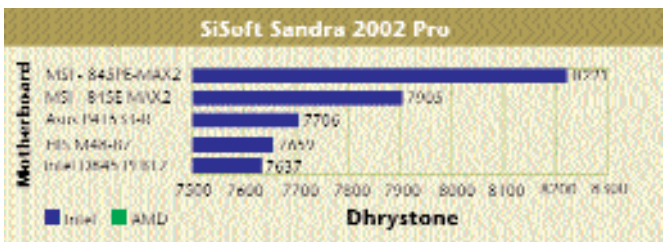
What kind of a motherboard does one require if one uses office applications along with occasional Internet surfing? A solution that has decent features and brings along good performance. Here a high-end motherboard would not be of much use as it would prove to be overkill. Users in this area also look for value options. Feature laden boards such as the MSI 845PE-Max 2 don't make sense due primarily to their price tag and additionally to the fact that they carry more features than are really needed for this area of application.

In this application area too, motherboards meant for the Intel processors continued to dominate. The Mercury KOB650GL took the first spot with a score of 91.30 STTI. Indeed, the excellent SiS 650 GL chipset gave the board onboard video, onboard sound, USB 2.0 and Ethernet—all the right stuff priced at Rs 3,600. The Intel 845G chipset-based Mercury KOB845G also appeared in the list with a score of 78.16 STTI—this one, however, does not have Ethernet on board.

Two solutions from Krypton managed to grab second and third positions—the Krypton U8668 Z8 and the P4TDQ scored 84.45 and 82.34, respectively. Both had integrated sound and USB 2.0. What separated the U8668 Z8 from the P4TDQ was that the former had Ethernet onboard, which the latter lacked. Bringing up the rear of the Intel pack was the Jetway P4MFM and the HIS M48-DA with scores of 73.64 and 70.47, respectively.

Over to the AMD front. The ASUS A7S266 came out tops. With a price of Rs 5,000 and a score of 81.57 STTI, this board is just the right mix of price, features and performance for an AMD processor. Two Mercurys, the KT266A and the KM266, also did well with 77.48 and 75.19 STTI, respectively. If price is factored in, then the Mercury boards shine even brighter—they are about Rs 1,500 cheaper than the ASUS board. Finally, with a price of Rs 3,650 and a score of 72.18 STTI is the VIA KT333-based EPOX EP-8K3A+, an onboard RAID controller being the feature that makes it stand out from the crowd of office and Internet application worthies.





Cheap VIA Integration

As of today, the consumer processor and chipset market is split unevenly between arch-rivals Intel and AMD. These companies provide high-end products at exorbitant prices. This keeps a PC out of the reach of one who wishes to use one for rudimentary tasks such as typing a document, surfing the Internet, playing music and exchanging e-mail. For such users, opting for a high-end machine is a serious waste of resource and money.

VIA has been manufacturing the CYRIX brand of processors which were on the lower end as far as price was concerned and they were compatible with any Socket 370 based motherboards, thus providing the ultimate value for money. But these processors never charmed the users. Recently, VIA launched the Eden platform which promises to deliver us into an era of cheap, integrated PCs. Using 0.13 and 0.15 micron technology, form factors are reduced along with power requirement and heat emissions—the solutions operate without cooling fans. Furthermore, the CPU, the Northbridge and the Southbridge are integrated into a single chip. The platform seems attractive since the sound, video and communication ports are embedded on the motherboard itself. The user has a choice of either an Eden ESP processor or a C3 processor. Above all, the entire solution costs half the price of an Intel P4 2.0 GHz processor.

The best processors for office and Internet

The best processors suited for this area are the different variants of the AMD processors, due to their competitive pricing. Indeed, only three processors scored more than 70 STTI in this category, all three AMD. The Athlon XP 1700+ takes the crown here with its impressive performance (83.34 STTI) at an unbeatable price of Rs 3,240. Those looking for the best value option need go no further. The 1800+ and the 2000+ also feature in the short list of three.

For those in the Intel camp, the Celeron 1.7 GHz comes across as the best you can get—priced at Rs 3,550, it is a decent scorer of 68.44 STTI. Everything else is either too costly for this category (such as the P4 3.06 GHz and the AMD XP 2800+) or does not perform to the mark. For instance, take the Intel P4 1.7 GHz—at Rs 7,350 and the lowest score of 49.47 STTI, it could not be more wrong for the application area of office and Internet work.

Our recommended solution

The best office and Internet solution should be competitively priced and should offer good performance and features for everyday usage. This brings us to the ASUS A7S266 board that does

SCORE BOARD Motherboards at a Glance

	ASUS A7S266	ASUS A7V8X	DFI AD73 PRO	DFI AD77-infinity	DFI AD77-PRO	DFI AZ30-EC	EPOX EP-8K3A+
Features							
Chipset	SiS 740	VIA KT400	VIA KT266A	VIA KT400	VIA KT400	VIA KM266	VIA KT333
Interface	Socket 462	Socket 462	Socket 462	Socket 462	Socket 462	Socket 462	Socket 462
Fastest CPU Supported	Athlon XP 2600+	Athlon XP 2800+	Athlon XP 2000+	Athlon XP 2200+	Athlon XP 2200+	Athlon XP 2000+	Athlon XP 2000+
Memory Supported/Max Memory	DDR/SD/2 GB	DDR/3 GB	DDR/3 GB	DDR/4 GB	DDR/4 GB	DDR/3 GB	DDR/3 GB
AGP Slot/Onboard Video/Type	✖/✔/4x	✔/✖/8x	✔/✖/4x	✔/✖/8x	✔/✖/8x	✔/✖/4x	✔/✖/4x
Onboard Sound/Integrated 6-channel Audio	✔/✖	✔/✔	✔/✖	✔/✔	✔/✔	✔/✖	✔/✖
Onboard FireWire/USB 2.0/Ethernet	✖/✔/✔	✔/✔/✔	✖/✔/✖	✔/✔/✔	✖/✔/✖	✖/✔/✖	✖/✔/✖
RAID	✖	✔	✖	✔	✔	✖	✔
Bluetooth Support	✖	✖	✖	✖	✖	✖	✖
Serial ATA	✖	✔	✖	✔	✖	✖	✖
HyperThreading	NA*	NA*	NA*	NA*	NA*	NA*	NA*
Core Voltage Adjustment	✔	✔	✔	✔	✔	✔	✔
Frequency Adjustment	✔	✔	✔	✔	✔	✔	✔
PCI Slots	4	6	5	5	5	3	6
Package Contents							
Manual	✔	✔	✔	✔	✔	✔	✔
CDs	✔	✔	✔	✔	✔	✔	✔
Necessary Cables	✔	✔	✔	✔	✔	✔	✔
Performance							
Quake III Arena (fps)							
Normal (640x480x16)	68	201	202	198	243	195	295.7
High (800x600x32)	50	199	205	197	234	194	291
Max (1024x768x32)	32	190	196	189	210	188	235
3DMark 2001SE (3D Marks)	1416	8978	9139	8790	8453	8730	9490
PC Mark 2002 Pro							
Memory Index	2519	2934	3083	2958	2853	2832	3149
Disk Index	863	776	963	944	962	973	994
CPU Index	4719	5219	4947	4889	4870	4846	4991
SiSoft Sandra 2003 Pro							
ALU/RAM (MBps)	1552	1819	1973	1884	1869	1797	2028
FPU/RAM (MBps)	1467	1675	1846	1753	1722	1670	1932
CPU Dhrystone	6284	6759	6161	6111	6249	6243	6260
CPU Whetstone	2540	2719	2483	2505	2507	2527	2520
CPU Integer	9260	10000	9230	9210	9233	9213	9264
FPU SSE	9787	10620	9674	9682	9751	9667	9870
Drive Index	31357	31418	25513	31670	30983	31093	30853
Sequential Read (MBps)	45	45	36	45	45	45	44
Random Read (MBps)	9	9	7	9	8	8	8
Sequential Write (MBps)	44	45	39	45	44	45	44
Random Write (MBps)	12	11	9	12	11	9	11
Content Creation Winstone 2001	78	88	85	85	85	82	86.2
Video Encoding (seconds)	127	109	118	112	118	114	108
Overall Score							
Suitability to Gaming and Entertainment	59.68	71.91	58.19	72.87	68.17	57.96	66.10
Suitability to Content Creation	70.59	66.21	54.91	67.44	58.17	56.71	67.35
Suitability to Office and Internet tasks	81.57	59.01	65.15	65.31	64.15	66.79	72.18
Overall Product Rating	70.61	65.71	59.42	68.54	63.50	60.49	68.54
Overall Grading	B+	B	B-	B	B	B-	B
Vendor	Neoteric Informatique	Rashi Peripherals	Zeta Technologies	Zeta Technologies	Zeta Technologies	Zeta Technologies	Abacus Peripherals Pvt Ltd
Phone	022-24172600	022-28260258	022-24102288	022-24102288	022-2410 2288	022-24102288	022-56923941
E-mail	sales@neoteric-info. com	ho@ rptechindia.com	tejas@ zetaindia.com	tejas@ zetaindia.com	tejas@ zetaindia.com	tejas@ zetaindia.com	enquiry@ abacusperipherals.com
Price (In Rupees)	5,000	11,950	4,450	8,950	6,450	4,450	8,000

Disclaimer: Prices are indicative and are subject to change **HyperThreading is currently a feature of the Intel platform* *** This motherboard failed the test*

Epox EP8KMM+	Gigabyte 7VAXP-Ultra	Krypton M7VKQ	Mercury KOB KM266 FDSM	Mercury KOB-730s-FSMx	Mercury KT266A-FDSX	MSI KT3ULTRA2	MSI KT4-Ultra	ASUS P4B533-UAY
VIA KM266	VIA KT400	KLE133	VIA KM266	SiS730s	VIA KT266A	VIA KT400	VIA KT400	Intel 845 E
Socket 462	Socket 462	Socket 462	Socket 462	Socket 462	Socket 462	Socket 462	Socket 462	Socket 478
Athlon XP 2000+	Athlon XP 2800+	Athlon XP 2100+	Athlon XP 2000+	Athlon XP 2600+	Athlon XP 2200+	Athlon XP 2200+	Athlon XP 2800+	Pentium 4 3.06 GHz
DDR/2 GB	DDR/3 GB	SDR/1 GB	DDR/SDR	SDRAM/1 GB	DDR/SDR/2 GB	DDR/3 GB	DDR/3 GB	DDR/2 GB
✔/✔/4x	✔/✖/8x	✖/✔/4x	✔/✔/4x	✔/64 MB/4x	✔/✖/4x	✔/✖/4x	✔/✖/8x	✔/✖/4x
✔/✖	✔/✔	✔/✖	✔/✖	✔/✖	✔/✖	✔/✖	✔/✔	✔/✔
✖/✔/✔	✔/✔/✔	✖/✔/✖	✖/✔/✖	✖/✔/✖	✖/✔/✖	✔/✔/✖	✔/✔/✔	✖/✔/✖
✖	✔	✖	✖	✖	✖	✖	✔	✖
✖	✖	✖	✖	✖	✖	✔	✔	✖
✖	✖	✖	✖	✖	✖	✖	✔	✖
NA*	NA*	NA*	NA*	NA*	NA*	NA*	NA*	✔
✔	✔	✖	✔	✖	✔	✔	✔	✔
✔	✔	✖	✔	✔	✔	✔	✔	✔
3	5	3	2	2	5	5	6	6
✔	✔	✖	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔	✔	✔
189	249	22	192	118	163	207	268	385.7
187	240	9	191	117	163	205	258	360.5
183	216	Failed **	186	116	161	201	222	292.9
8631	8276	Failed **	8683	Failed **	7866	9159	9144	10970
2707	3186	Failed **	2791	1511	2269	2979	3026	5226
815	961	841	828	980	908	957	993	987
4812	5009	4322	4845	3442	4686	4907	5245	7192
1770	2024	774	1789	597	1460	1919	1897	2009
1630	1932	764	1656	593	1349	1781	1781	2005
6207	6318	6268	6245	4583	6258	6238	6748	7358
2505	2530	2519	2513	1888	2513	2538	2719	3726
9207	9301	9239	9237	6912	9240	9252	9995	11304
9695	9838	9734	9697	7258	9711	9786	10608	14388
30963	30928	29748	31587	31664	31334	26488	30428	27940
45	45	45	45	45	45	37	44	41
8	8	9	9	9	9	8	8	7
45	45	31	45	45	44	37	43	39
9	11	11	11	12	11	11	11	9
80	88	Failed **	80	Failed **	78	85	89.6	89.4
122	103	155	116	Failed **	131	100	107	71
59.37	70.70	34.13	53.90	39.81	60.73	57.77	76.30	73.39
61.61	63.74	49.72	60.44	44.86	62.35	56.65	78.35	57.20
67.94	56.73	59.40	75.19	55.80	77.48	59.44	68.02	56.19
62.97	63.72	47.75	63.18	46.82	66.86	57.95	74.23	62.26
B-	B	C	B	C	B	B-	B+	B-
Abacus Peripherals Pvt Ltd	Tirupati Enterprises	Priya Ltd	Kobian India Ltd	Kobian India Ltd	Kobian India Ltd	Yogicomp	Priya Ltd	Zeta Technologies
022-56923941	033-22423861	022-22663611	080-5566626	080-5566626	080-5566626	022-28806582	022-22663611	022-24102288
enquiry@ abacusperipherals.com	gigabyte@ tirupati.net	sales_bom@ priyagroup.com	rohit@ kobian.com	rohit@kobian.com	rohit@kobian.com	info@yogicom.com	sales_bom@ priyagroup.com	tejas@ zetaindia.com
3,925	16,000	3,200	3,650	3,150	3,350	5,900	6,940	9,500

SCORE BOARD Motherboards at a Glance

	ASUS P4B 533-V-UAY	ASUS P4BGL-VM	ASUS P4S133-VM	ASUS P4S533-VM	ASUS P4SGL-VM	ASUS P4T533-C	ASUS P4T 533-R
Features							
Chipset	Intel 845 G	Intel 845 GL	SiS 650	SiS 651	SiS 650 GL	Intel 850 E	Intel 850 E
Interface	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478
Fastest CPU Supported	Pentium 4 2.8 GHZ	Pentium 4 2.2 GHZ	Pentium 4 2.2 GHz	Pentium 4 2.53 GHz	Pentium 4 2.4 GHZ	Pentium 4 3.06 GHz	Pentium 4 3.06 GHz
Memory Supported/Max Memory	DDR / 2GB	DDR / 2GB	SDR / 2GB	DDR / 2GB	DDR / 2GB	RDR / 2GB	RDR / 2GB
AGP Slot/Onboard Video/Type	✔ / ✔ /4X	✖/✔/4X	✔ / ✔ /4X	✔ / ✔ /4X	✖ / ✔ / 4X	✔ / ✖ / 4X	✔ / ✖ / 4X
Onboard Sound/Integrated 6-channel Audio	✔/ ✔	✔/✖	✔ / ✖	✔ / ✖	✔ / ✖	✔ / ✖	✔ / ✔
Onboard FireWire/USB 2.0/Ethernet	✖ /✔/✖	✖ /✔/✖	✖ /✔/✖	✖ /✔/✖	✖ /✔/✖	✖ / ✔ / ✖	✖ / ✔ / ✖
RAID	✖	✖	✖	✖	✖	✖	✔
Bluetooth Support	✖	✖	✖	✖	✖	✖	✖
Serial ATA	✖	✖	✖	✖	✖	✖	✖
HyperThreading	✖	✖	✖	✖	✖	✖	✔
Core Voltage Adjustment	✔	✔	✔	✔	✔	✔	✔
Frequency Adjustment	✔	✔	✔	✔	✔	✔	✔
PCI Slots	6	3	3	3	3	5	6
Package Contents							
Manual	✔	✔	✔	✔	✔	✔	✔
CDs	✔	✔	✔	✔	✔	✔	✔
Necessary Cables	✔	✔	✔	✔	✔	✔	✔
Performance							
Quake III Arena (fps)							
Normal (640x480x16)	287.4	96.9	201.4	262.6	72.2	249	304
High (800x600x32)	286.1	37.1	199	260.2	40.6	248	297
Max (1024x768x32)	264.1	19.8	189.2	230.3	24.6	227	239
3DMark 2001SE (3D Marks)	11187	1384	8550	9520	1125	11398	10942
PC Mark 2002 Pro							
Memory Index	5130	4540	3487	4384	4126	6122	6117
Disk Index	894	923	934	921	795	914	986
CPU Index	6919	5427	5312	5332	5344	6851	6874
SiSoft Sandra 2003 Pro							
ALU/RAM (MBps)	2004	1858	1009	1977	1801	2718	2754
FPU/RAM (MBps)	2009	1862	1009	1978	1800	2716	2755
CPU Dhrystone	7215	5992	5978	5937	5915	7204	7706
CPU Whetstone	3725	2927	2924	2898	2927	3696	3696
CPU Integer	11314	8855	8851	8768	8857	11205	11221
FPU SSE	14397	11265	11254	11138	11245	14265	14281
Drive Index	27840	27342	27453	27699	27503	27557	31401
Sequential Read (MBps)	40	39	40	40	40	40	45
Random Read (MBps)	8	7	7	7	7	7	9
Sequential Write (MBps)	40	41	41	41	40	40	44
Random Write (MBps)	9	9	8	8	9	9	11
Content Creation Winstone 2001	88	74	71.3	75.4	72.5	93	94.7
Video Encoding (seconds)	76	104	103	115	72	88	77
Overall Score							
Suitability to Gaming and Entertainment	69.08	43.05	53.61	59.21	44.42	63.40	66.91
Suitability to Content Creation	56.06	52.95	51.78	55.14	54.19	54.22	56.68
Suitability to Office and Internet tasks	57.97	59.62	58.57	61.99	58.96	59.15	51.19
Overall Product Rating	61.04	51.87	54.65	58.78	52.52	58.92	58.26
Overall Grading	B-	C+	C+	B-	C+	B-	B-
Vendor	Zeta Technologies	Zeta Technologies	Zeta Technologies	Zeta Technologies	Neoteric Informatique	Zeta Technologies	Rashi Peripherals
Phone	022-24102277	022-24102277	022-24102277	022-24102277	022-24172600	022-24102277	022-2826 0258
E-mail	tejas@ zetaindia.com	tejas@ zetaindia.com	tejas@ zetaindia.com	tejas@ zetaindia.com	sales@neoteric-info.com	tejas@ zetaindia.com	ho@ rptechindia.com
Price (In Rupees)	9,800	5,150	4,950	5,400	5,000	10,950	16,000

Disclaimer: Prices are indicative and are subject to change **HyperThreading is currently a feature of the Intel platform* *** This motherboard failed the test*

DFI NB30-BC	DFI NB35-BC	DFI NB71-BC	DFI NT72 SC	DFI PE 21-EC	DFI PM10-EC	DFI PM11-EC	Digi-link DGA-8LS533	Gigabyte GA-8GE667-PRO
Intel 845 GL	Intel 845 G	Intel 845 E	Intel 850 E	P4X333	VIA P4M266	VIA P4M266	Intel 845GL	Intel 845 GE
Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478
Pentium 4 2.53 GHz	Pentium 4 2.53 GHz	Pentium 4 2.2 GHz	Pentium 4 2.2 GHz	Pentium 4 2.53 GHz	Pentium 4 2.4 GHz	Pentium 4 2.4 GHz	Pentium 4 2.8 GHz	Pentium 4 3.06 Ghz
DDR / 2GB	DDR / 2GB	DDR / 2GB	DDR / 2GB	DDR / 3GB	SDR / 1GB	DDR / 2GB	SDR / 1GB	DDR / 2GB
✖ / ✔ / 4x	✔ / ✔ / 4X	✔ / ✖ / 4X	✔ / ✖ / 4X	✔ / ✖ /8X	✔ / ✔ / 4X	✔ / ✔ / 4X	✖ / ✔ / 4X	✔ / ✔ / 4X
✔ / ✖	✔ / ✖	✔ / ✖	✔ / ✖	✔ / ✔	✔ / ✖	✔ / ✖	✔ / ✖	✔ / ✔
✖ / ✔ / ✖	✖ / ✔ / ✖	✖ / ✔ / ✖	✖ / ✔ / ✖	✖ / ✔ / ✖	✖ / ✔ / ✖	✖ / ✔ / ✖	✖ / ✔ / ✖	✖ / ✔ / ✔
✖	✖	✖	✖	✖	✖	✖	✖	✖
✖	✖	✖	✖	✖	✖	✖	✖	✖
✖	✖	✖	✖	✖	✖	✖	✖	✖
✖	✖	✖	✖	✖	✖	✖	✖	✔
✖	✖	✖	✖	✖	✖	✖	✖	✔
✔	✔	✔	✔	✔	✖	✔	✔	✔
3	3	5	5	6	3	3	3	6
✔	✔	✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔	✔	✔
✔	✔	✔	✔	✔	✔	✔	✔	✔
121.6	243.3	234.3	206.4	223.8	220.2	217.5	103.5	289.8
54	243.7	234.1	205	222	216.2	216.9	42.6	284.2
37.3	241.2	232.3	198	208.2	197.2	220.4	23.4	264.3
1410	10121	9766	10238	9483	7939	9147	905	11093
4544	4935	4429	5302	4727	3173	4359	3337	5236
894	896	910	917	928	932	900	941	894
5328	5392	5291	5376	5348	5753	5272	6526	6861
1853	2047	2005	2492	2014	856	1990	782	1997
1855	2049	2005	2491	2015	856	1991	783	2003
5909	5898	5841	5918	5869	5676	5936	7324	7181
2902	2898	2886	2884	2881	2874	2894	3714	3706
8778	8767	8743	8721	8734	8718	8749	11259	11250
11167	11150	11103	11095	11098	11091	11125	14322	14312
27299	27708	27618	27365	27150	28129	27997	31339	24888
40	40	40	40	39	41	41	45	36
7	7	7	7	7	7	7	9	6
39	40	41	41	40	41	39	45	36
8	8	9	8	8	9	9	10	8
76.2	76.5	75.5	77.5	76.3	68.3	71.4	79.7	89.2
89	86	90	111	70	127	99	124	83
46.39	58.51	55.18	56.95	69.53	54.45	57.30	45.69	79.47
57.16	53.36	49.56	49.07	58.10	54.86	56.53	55.98	66.56
64.23	58.11	53.07	56.10	63.49	64.66	64.75	62.98	63.58
55.93	56.66	52.60	54.04	63.71	57.99	59.53	54.88	69.87
C+	B-	C+	C+	B	B+	B-	C+	B+
Zeta Technologies	Zeta Technologies	Zeta Technologies	Zeta Technologies	Zeta Technologies	Zeta Technologies	Zeta Technologies	D-Link India limited	Tirupati Enterprises
022-24102288	022-24102288	022-24102288	022-24102288	022-24102288	022-24102288	022-24102288	022-26526696	033-25542553
tejas@ zetaindia.com	tejas@ zetaindia.com	tejas@ zetaindia.com	tejas@ zetaindia.com	tejas@ zetaindia.com	tejas@ zetaindia.com	tejas@ zetaindia.com	sales@ dlink.co.in	mail@ tirupati.net
4,500	6,250	6,250	8,000	5,250	3,750	4,000	5,500	10,500

SCORE BOARD Motherboards at a Glance

	Gigabyte GA8P E-667-ULTRA	HIS M48-14	HIS M48-B7	HIS M48-DA	HIS M50-21	Intel D845 PEBT2	Intel 850EMV2
Features							
Chipset	Intel 845 PE	Intel 845	Intel 845 G	Intel 845 GL	VIA P4M266	Intel 845 PE	Intel 850 E
Interface Type	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478
Fastest CPU Supported	Pentium 4 3.06 GHz	Pentium 4 2.2 GHz	Pentium 4 2.8 GHz	Pentium 4 2.2 GHz	Pentium 4 2.4 GHz	Pentium 4 3.06 GHz	Pentium 4 3.06 GHz
Memory Supported/Max Memory	DDR/2 GB	SDR/1.5 GB	DDR/2 GB	SDR/2 GB	SDR/1.5 GB	DDR/2 GB	RDR/2 GB
AGP Slot/Onboard Video/Type	✔/✖/4x	✔/✖/4x	✔/✔/4x	✖/✔/4x	✔/✖/4x	✔/✖/4x	✔/✖/4x
Onboard Sound/Integrated 6-channel Audio	✔/✔	✔/✖	✔/✖	✔/✖	✔/✖	✔/✔	✔/✖
Onboard FireWire/USB 2.0/Ethernet	✖/✔/✔	✖/✔/✖	✖/✔/✖	✖/✔/✖	✖/✔/✖	✔/✔/✔	✖/✔/✖
RAID	✔	✖	✖	✖	✖	✔	✖
Bluetooth Support	✖	✖	✖	✖	✖	✖	✖
Serial ATA	✖	✖	✖	✖	✖	✔	✖
HyperThreading	✔	✖	✖	✖	✖	✔	✖
Core Voltage Adjustment	✔	✖	✖	✖	✖	✖	✖
Frequency Adjustment	✔	✔	✔	✔	✔	✖	✖
PCI Slots	6	6	3	3	3	5	5
Package Contents							
Manual	✔	✔	✔	✔	✔	✔	✔
CDs	✔	✔	✔	✔	✔	✔	✔
Necessary Cables	✔	✔	✔	✔	✔	✔	✔
Performance							
Quake III Arena (fps)							
Normal (640x480x16)	282.7	187.9	285.9	137.5	191.6	214	310
High (800x600x32)	279.9	184.9	284.4	55.8	191	183	306
Max (1024x768x32)	263.4	178.8	240.3	30.7	180	126	282
3DMark 2001SE (3D Marks)	10522	8699	11140	Failed **	8634	7179	11539
PC Mark 2002 Pro							
Memory Index	5264	3207	5285	3935	3249	5448	6128
Disk Index	894	926	926	883	921	899	932
CPU Index	6803	5276	6817	6636	5259	6769	6760
SiSoft Sandra 2003 Pro							
ALU/RAM (MBps)	2003	998	1984	1130	964	1964	2732
FPU/RAM (MBps)	2003	998	1987	1131	964	1966	2733
CPU Dhrystone	7350	5939	7659	7105	5934	7637	7240
CPU Whetstone	3706	2897	3683	3658	2887	3688	3668
CPU Integer	11250	8772	11174	11095	8754	11202	11136
FPU SSE	14313	11161	14209	14116	11123	14256	14165
Drive Index	27878	27830	27664	27359	27426	26927	27417
Sequential Read (MBps)	41	40	40	40	40	40	40
Random Read (MBps)	7	7	7	7	7	7	7
Sequential Write (MBps)	39	41	41	41	41	38	41
Random Write (MBps)	9	9	8	8	9	8	8
Content Creation Winstone 2001	88.9	69.4	89.3	82.8	69.8	87.2	91
Video Encoding (seconds)	92	125	70	114	104	96	88
Overall Score							
Suitability to Gaming and Entertainment	76.94	55.01	61.66	41.51	54.32	66.46	70.31
Suitability to Content Creation	66.15	59.52	62.14	59.25	57.77	72.37	63.90
Suitability to Office and Internet tasks	58.06	67.27	67.38	70.47	67.44	60.95	67.68
Overall Product Rating	67.05	60.60	63.73	57.08	59.85	66.59	67.30
Overall Grading	B	B-	B	B-	B-	B	B
Vendor	Tirupati Enterprises	Maxtone Electronics	Maxtone Electronics	Maxtone Electronics	Maxtone Electronics	Nebula Technologies Pvt Ltd	Nebula Technologies Pvt Ltd
Phone	033-25542553	022- 23016469	022- 23016469	022- 23016469	022- 23016469	022-2673 0567	022-2673 0567
E-mail	mail@ tirupati.net	meplsales@ maxtone.com	meplsales@ maxtone.com	meplsales@ maxtone.com	meplsales@ maxtone.com	pratik@ nebulatech.com	pratik@ nebulatech.com
Price (In Rupees)	13,000	3,700	5,200	4,100	3,400	8,500	9,000

Disclaimer: Prices are indicative and are subject to change **HyperThreading is currently a feature of the Intel platform* *** This motherboard failed the test*

Intel D845GEBV2	Jetway 845 LDM	Jetway P4MFM	Krypton U8668 Z8	Krypton P4TDQ	Mercury KOB650GL NDSMx	Mercury KOB845G-NDSMx	MSI 845E Max2	MSI 845PE-MAX2
Intel 845 GE	Intel 845 GL	VIA P4M266	VIA P4M266	Intel 845 GL	SiS 650 GL	Intel 845 G	Intel 845 E	Intel 845 PE
Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478	Socket 478
Pentium 4	Pentium 4	Pentium 4	Pentium 4	Pentium 4	Pentium 4	Pentium 4	Pentium 4	Pentium 4
3.06 GHz	2.53 GHz	2.2 GHz	2.4 GHz	2.2 GHz	2.8 GHz	2.8 GHz	2.53 GHz	3.06 GHz
DDR/2 GB	DDR/2 GB	DDR/SDR/2 GB	DDR/SDR/2 GB	DDR/2 GB	DDR/SDR/2 GB	DDR/SDR/2 GB	DDR/2 GB	DDR/2 GB
✔/✔/4x	✖/✔/4x	✔/✖/4x	✔/✔/4x	✖/✔/4x	✔/✔/4x	✔/✔/4x	✔/✖/4x	✔/✖/4x
✔/✖	✔/✖	✔/✖	✔/✖	✔/✖	✔/✖	✔/✖	✔/✔	✔/✔
✖/✔/✖	✖/✔/✖	✖/✔/✖	✖/✔/✖	✖/✔/✔	✖/✔/✔	✖/✔/✖	✖/✔/✔	✔/✔/✔
✖	✖	✖	✖	✖	✖	✖	✔	✔
✖	✖	✖	✖	✖	✖	✖	✔	✔
✖	✖	✖	✖	✖	✖	✖	✖	✖
✖	✖	✖	✖	✖	✖	✖	✖	✔
✖	✖	✖	✖	✖	✖	✖	✔	✔
✖	✔	✔	✔	✔	✔	✔	✔	✔
6	3	3	3	3	2	2	6	6
✔	✔	✔	✖	✖	✔	✔	✔	✔
✔	✔	✔	✖	✖	✔	✔	✔	✔
✔	✔	✔	✖	✖	✔	✔	✔	✔
381.9	123	291.5	255.8	128	364	233	278.6	382.9
357.6	53.1	284.7	253.8	48	348	196	279.5	368
255.4	36.8	237.4	238.2	25	259	172	260.2	248.9
10997	1372	9206	9470	1847	10238	7702	10926	10933
5406	4555	4450	4213	5632	4957	5057	5217	5338
916	901	916	809	925	958	841	909	907
6812	5419	5368	5308	6832	6628	6744	6842	6867
1990	1865	1891	1984	2477	1978	1976	1982	1988
1989	1866	1890	1987	2488	1976	1984	1985	1989
7309	5762	5994	5932	7101	7256	7271	7905	8221
3691	2928	2922	2883	3659	3671	3686	3689	3699
11209	8859	8840	8750	11101	11143	11177	11200	11233
14260	11277	11248	11115	14121	14183	14238	14254	14293
28133	27898	28055	27019	28221	31454	30415	27496	27535
41	40	41	39	41	45	44	40	40
7	7	7	7	7	8	8	7	7
41	41	41	40	41	45	45	39	41
9	9	9	8	9	11	11	8	9
89	74.3	74.7	73.6	87.8	91	83	84.6	89.2
85	102	95	95	62	98	95	76	98
72.80	43.46	57.17	64.30	54.10	71.60	62.57	75.78	81.63
75.62	59.62	60.36	67.71	77.15	74.86	66.34	75.52	76.74
64.04	63.37	73.64	84.45	82.34	91.30	78.16	66.82	62.94
70.82	55.48	63.72	72.16	71.20	79.25	69.02	72.71	73.77
B+	C+	B	B+	B+	A-	B	B+	B+
Nebula Technologies Pvt Ltd	Anirox Technologies	Anirox Technologies	Priya Ltd	Priya Ltd	Kobian India Ltd	Kobian India Ltd	Priya Ltd	Priya Ltd
022-2673 0567	022-28655282	022-28655282	022-22663611	022-22663611	080-5566626	080-5566626	022-22663611	022-22663611
pratik@ nebulatech.com	vivek@ anirox.com	vivek@ anirox.com	sales_bom@ priyagroup.com	sales_bom@ priyagroup.com	rohit@kobian.com	rohit@kobian.com	sales_bom@ priyagroup.com	sales_bom@ priyagroup.com
7,200	4,680	3,960	3,200	3,630	3,600	5,100	6,200	9,000

Decision Maker

You wish to	Look out for this in a processor	Look out for this in a motherboard	Products suited to your task	Our platform of choice
Play games, watch DVD movies, burn MP3 CDs, encode video files	A processor with more than or equal to 256 KB of L2 cache, high core speed, higher memory bandwidth	Support for a high-end processor and memory. More than four PCI slots, more than two memory slots, features such as USB 2.0, Serial ATA and Bluetooth	Intel Pentium 4 2.0 GHz to 3.06 GHz on an MSI 845E MAX2 or a Gigabyte GA-8GE667-PRO board. AMD XP 1800+ to AMD XP 2800+ on an MSI KT4 Ultra or a DFI AD77-infinity motherboard	Intel Pentium P4 3.06 GHz processor on the MSI 845GE MAX2 motherboard Price: Rs 50,500
Work with content creation applications such as Adobe Photoshop and Adobe Premeire	A processor that is high on performance and comes reasonably priced	Support for features such as USB 2.0, FireWire, Serial ATA, RAID, Bluetooth, onboard video and onboard sound	Intel Pentium 4 2.08 GHz or a 3.06 GHz on a Krypton P4TDQ or MSI KT4-ULTRA board. Any AMD processor on an MSI KT4 Ultra or an ASUS A7S266 motherboard	AMD XP 1800+ on an MSI KT4 Ultra motherboard Price: Rs 10,180
Work with office applications such as Microsoft Word and browse the Internet	A processor that has enough power and is light on your pocket	Support for features such as onboard video and onboard sound, along with USB 2.0.	An AMD XP 1700+, 1800+ and 2000+ processor on an ASUS A7S266 or a Mercury KT266A-FDSX motherboard	AMD XP 1800+ on an ASUS A7S266 motherboard Price Rs 8,240

Your Smart Buying Checklist

BUYING TIPS

Buying motherboards

■ A motherboard may present itself in various versions. The MSI 845 MAX2, for example, is available as Pure, FIR and FISR, where the Pure is the base model and the others have certain feature additions such as RAID, USB 2.0, etc but for minimal increments in price.

■ If you are a hardcore gamer or prefer over-clocking, then check that the space around the CPU is quite spacious so that you can install a larger heatsink-fan combo to keep it cool.

■ While buying a motherboard, ensure that its chipset supports both the speed of your processor and the speed of the Front Side Bus (FSB).

■ With your application area in mind, ensure that your motherboard is sufficiently feature rich. In particular, make sure that it has enough PCI slots and memory slots for future expansion.

■ If cost is not a hindrance, opt for a motherboard that has both an onboard video chipset and an AGP slot. This will give you greater flexibility while making a future upgrade.

■ Ensure that your motherboard has an onboard sound chipset and if you so require, integrated Ethernet.

■ While buying a motherboard, check whether the board supports the type of memory that your system has: buyers of DDR SDRAM should be especially careful in this regard.

Buying processors

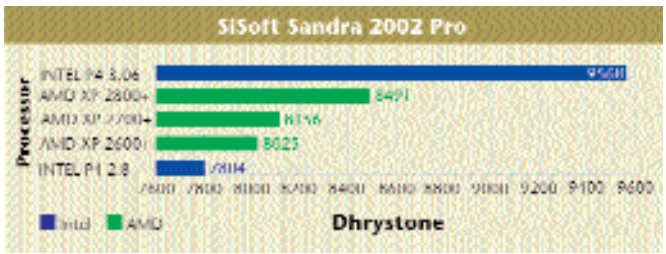
■ Present generation CPUs are power hungry; ensure that you have an SMPSrated at least at 250 W, preferably 350 W.

■ Whether you buy from Intel or AMD, make sure that you are buying genuine. This can be confirmed by the hologram seal on the Intel CPU box. For AMD, make sure that the plastic casing is not broken.

■ If you plan on CPU-intensive tasks such as graphics processing, animation and gaming, opt for one that has 256 KB or more L2 cache. The Pentium 4 Northwood has 512 KB of L2 cache, for example.

■ The new AMD processors sporting the Thoroughbred codename require less core voltage and have low power dissipation and this makes them expensive. Hence, if power requirement and heat dissipation is not an issue, you can opt for the Palomino core which is much cheaper.

■ Invest in a good heatsink-fan combo for your processor, even if you do not plan on overclocking your system.



just that. The board features onboard video, sound, USB 2.0 and Ethernet and these add to the overall appeal of the board. The Athlon XP 1700+ makes a great combination with this board, because of its pricing. As mentioned earlier, an extremely fast processor would be overkill, which is why the XP 1700+ is our choice for the best solution.

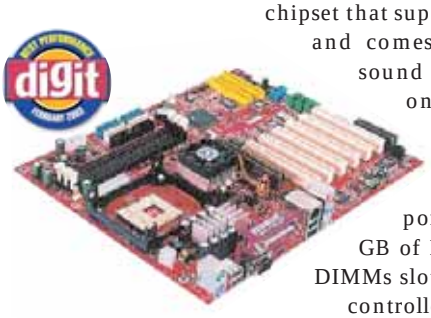
What it all leads to

From our test analysis and scoring, one facet of the AMD v/s Intel war comes across clearly: although AMD processors are great performers and on the whole, affordably priced, they are let down by their motherboards, more specifically their chipsets. This becomes all the more apparent in the Content Creation application area where AMD processors bagged nine of the 10 top spots but their motherboard counterparts only managed to gain two positions within the same category. The SiS 740 chipset came out as the best AMD supporter, followed at some distance by the VIA KT266A and the VIA KM266 here. As far as performance chipset goes, nothing touches the VIA KT400 that beats within the feature-rich heart of the MSI KT4-Ultra.

On the other side of the fence the picture was truly reversed: while good performers, Intel processors cost an arm, a leg and then some. The motherboards available for these processors are varied, numerous and it is not too hard to find one that performs well and is low-priced—such as the SiS 650GL-based Mercury KOB845G. Cost no factor, nothing can beat an Intel-based solution for stability and performance under mission-critical applications or games. The Athlon XP range of processors offer great value for all application areas, especially the office user who needs decent performance at a reasonable price.

Motherboards

The winner of our Best Performance Award is undoubtedly the MSI 845PE Max2. This board is built around the Intel 845PE chipset that supports HyperThreading and comes with a six-channel sound capability through its onboard AC'97 5.1-channel sound decoder. The motherboard supports a maximum of 2 GB of DDR RAM with three DIMMs slots. A Gigabit Ethernet controller is also integrated on the board. Another interesting feature is the presence of an onboard Promise RAID controller with RAID 0 as striping and RAID 1 as mirroring. The board is also USB 2.0 ready and has six PCI slots, one 4x AGP slot and one CNR slot. Diagnostic LEDs help trace system problems without opening the chassis. Live Update, a BIOS updating software for Windows, lets you update the BIOS in a snap. PCAlert4, a diagnostic utility, gives information about various system parameters, such as CPU temperature, core voltage and fan speed, and displays a warning when threshold limits are crossed. The board has a very decent design with a fairly simple layout. But the space around the processor feels a little cramped since the power connector is present right next to the processor, along with the RAM modules. Thus, very little space is left, making removing the power connector a problem. All other connectors are logically placed and easy to access. The AGP card has a lock that helps in securing the display card firmly to the slot.



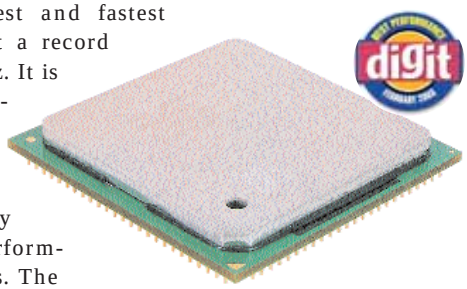
MSI 845PE Max2: The MSI supports HyperThreading, Bluetooth and RAID

As far as the best value motherboard goes, our choice was clear. The Mercury KOB650GL NDSMx takes the Best Value Award without any hurdles. This board features support for the socket 478 range of Intel processors. One of the features that you could find handy in this board is that it supports both DDR and SDR memory standards. The board features onboard graphics but does not leave out on the AGP 4X port either. Apart from this you will also find onboard sound, USB 2.0 and Ethernet support. The only area where we found the board could have done better was the number of PCI slots—it features just two. The board is extremely suited for running office and Internet applications and its low price makes it a great buy. The package includes the manuals, driver CDs and the necessary cables.

Mercury KOB650GL NDSMx: Onboard sound and video make the Mercury an ideal low-cost solution

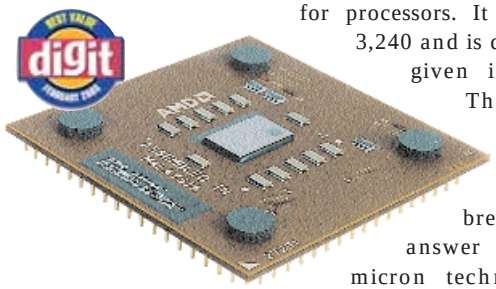
Processor

Our Best Performance Award for processors goes to the P4 3.06 GHz. Intel's latest and fastest processor runs at a record speed of 3.06 GHz. It is built on the Northwood core, so we have 512 KB of L2 cache that would definitely please all the performance-hungry users. The processor features Intel's much-hyped HyperThreading technology, which makes the OS think as if it were working with two processors instead of one. The processor left no stone unturned to post some of the best scores ever and stayed ahead of the competition in most of the benchmarks. The processor makes the ultimate buy for those who demand the best performance, price no barrier.



Intel Pentium 4 3.06 GHz: Now, with HyperThreading, this P4 is the fastest consumer chip in the market

The AMD Athlon XP 1700+ takes the Best Value Award for processors. It is priced at Rs 3,240 and is quite the bargain, given its performance. The 1700+ we received was built on the thoroughbred core, AMD's answer to the 0.13-micron technology. Due to this, the processor consumes less power as compared to the previous core, the Palomino. The Athlon XP1700+ features 256 KB of L2 cache and the Front Side Bus runs at a speed of 133 MHz DDR. As far as performance goes, this one does impress, considering its price. It was able to beat all its competitors with its price-to-performance ratio and scored the highest rating of 78.35 overall STTI.



AMD XP 1700+: Based on the Thoroughbred core, the 1700+ runs cool and affordable

YATISH SUVARNA, SANKET NAIK and AHMED SHAIKH

Bazaar

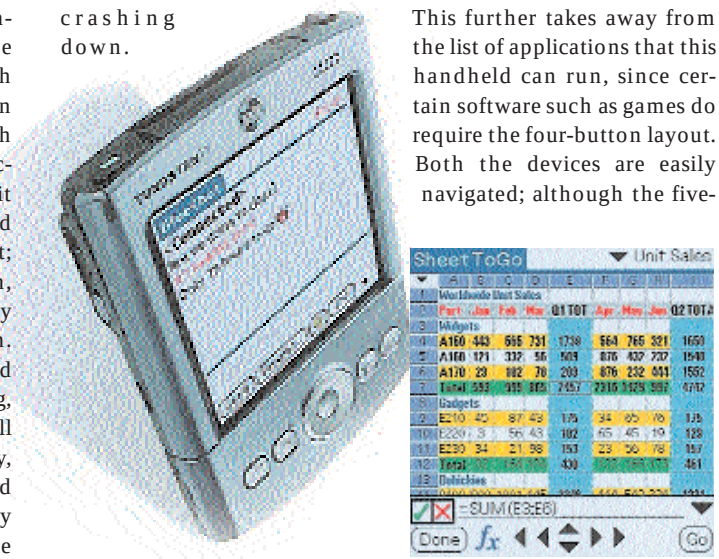
We test the latest and the best hardware and software products available in the market

Tungsten T and Zire

Palmistry: Fated to change the way you perceive a handheld

Here are two products from Palm that could not be more different from each other. The fact that one of them is meant for the corporate power-user (the kind that eats spreadsheets for lunch) while the other for the humble student (the kind that skips lunch for pending assignments) is apparent from the onset. Marvel at the smooth metallic finish of the Tungsten T (corporate grey, to go with the pinstripe suits); a form factor tiny enough for a snug fit within the palm of your hand and inside your shirt pocket; and a clear sleeve of tough, transparent plastic for very effective screen protection. While the Tungsten T would be at home in a board meeting, there's the Zire too that is all attitude and screams trendy, with a bright silver-white and grey colour tone and a sturdy plastic casing that benefits the device with a very light weight. Screen protection on the Zire is afforded by a blue rubber flap which, while functioning adequately, is also a real pain since it gets in the way while the device is in use.

Turn the handhelds on and the philosophy behind the looks extends to what lies beneath—the operating system. The Tungsten thus stays at the forefront of innovation thanks to the new Palm OS 5.0. Apart from support for faster ARM-based processors, the OS also extends a helping hand to the Tungsten's excellent display screen—a 320x320 resolution, 16-bit TFT that is admirably supported by sharper, more readable fonts, spruced up icons and new applications. While improved stability and backward-compatibility is advertised, a few old applications did manage to bring this device crashing down.



The Palm Tungsten T

Pros: *Small form factor, Bluetooth connectivity, one handed navigation, excellent display screen, good software bundle*

Cons: *Costly, limited multimedia features*

The Zire sticks to the tried and tired OS 4.1, packed with just enough features for the entry-level product that it is. This low-end handheld is very stable and can theoretically run the many thousands of applications that are available for the older OS. Theoretically, since the Zire is seriously limited by a meagre 2 MB of storage capacity (non-expandable at that), it cannot run decent games or office applications.

Another impeding implementation for the Zire is that it sports a non-standard number of buttons on its face. While the Tungsten T has the usual four-button layout, in addition to a new and useful five-way navigator, the Zire finds itself two buttons short of the norm. This further takes away from the list of applications that this handheld can run, since certain software such as games do require the four-button layout. Both the devices are easily navigated; although the five-way button is absent on the Zire, able comrades in the guise of two scroll buttons pitch in. The four application buttons on the Tungsten T rise above the surface of the device and offer good tactile feedback. The navigator button on the T is a first for any Palm device. This pad is a concave metal button that can be pressed up, down, left or right. Enclosed in the centre is a separate domed button that functions as the Select key. This configuration is great for games and allows you to use the Tungsten with just one hand. Zipping between applications could have been even faster on this device with a more intelligent implementation of the Select button.

Input of data on both these devices is done via the stylus and Grafitti. The latter is a means of entering letters by using the stylus—while some learning is involved, the process is fairly intuitive. However, it isn't time-effective—there is only so much you can type at a stretch when you are entering data one letter at a time! For those weaned on the keyboard, Palm does offer a foldable, pocket-sized QWERTY peripheral for the Tungsten T. Users of the Zire would have to be content with Graffiti since the device does not have a Universal Connector where peripherals such as a keyboard might dock.

The Zire is evidently a very lean device, built for one thing alone: personal information management (PIM). As such, all the usual suspects are present: Address Book, Date Book, Clock, To Do List, Memo Pad, Note Pad, Calculator and Expense; an e-book reader is sourly missed. With PIM applications such as these, the 2 MB storage capacity seems more than enough to store some 6,000 addresses and five years of appointments, with room for more. Moreover, games such as *Mine Hunt* and *Hardball*

are included within a CD to while away the time.

To accommodate a lower powered battery and thus reduce overall price, the Zire does the unforgivable: it carries a display that isn't backlit—a move that vastly reduces usability of the device. Moreover, a 16-shade monochrome screen coupled with a 16 MHz processor imparts a sluggish performance—applications are slow to load and the scrolling is visibly stuttered.

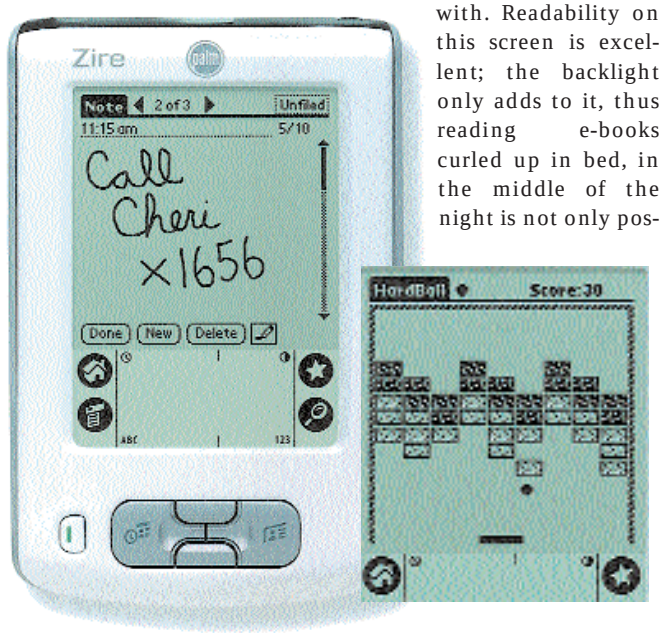
The Tungsten carries PIM applications and then some. Notable additions are Documents To Go Professional (v5.0), VersaMail, Web Browser Pro and Voice Memo. These let the device read, edit and synchronise Microsoft Office files, send and receive e-mail, access the Internet and capture your thoughts as voice memos (stored as WAV files), respectively. Documents To Go deserves more than a mention—the software is very capable of maintaining the format of Office documents. In Word, for example, headings, fonts, bullets, embedded images and tables in a PC-based document are accurately converted to a format suitable to the Tungsten T. Editing is somewhat limited but the changes in formatting are successfully synched with the original document. Spreadsheets are similarly treated (although the Professional version cannot create a chart, something reserved for the Premium version), as are presentations. Cross-integration of software is also neatly executed. VersaMail supports HotSync mail synchronisation (between PC and handheld) as well as direct POP and IMAP connections for multiple accounts. It also supports attachment conversion: Word, Excel, and PowerPoint files can be automatically converted during synchronisation to and from a format suited to Documents To Go.

Multimedia such as video clips, digital audio files, photos and games are extremely responsive and great to look at on the Tungsten. This is possible largely due to the 144 MHz dual-core processor that packs in an integrated DSP co-processor for accelerating media-rich applications, and the 65,000+ colour display. The transreflective TFT screen is a joy to behold, especially with the high-resolution fonts that OS 5.0 bundles with. Readability on this screen is excellent; the backlight only adds to it, thus reading e-books curled up in bed, in the middle of the night is not only possible but also very easy on the eyes. The T supports polyphonic tones, MIDI and WAV playback. Its processor also supports MP3 decoding. However, a suitable player is sadly absent.

The T runs on a rechargeable Lithium Ion polymer battery that lasts for a little more than 3 hours. Recharging is done via a HotSync USB cradle and it takes 2 hours. While low power indication is present, a visual cue for a full charge is notably missed in both the Palm devices. The Zire does amazingly well as far as battery life is concerned—a similar test on this device saw it chug along for 13 hours straight! Recharging the Zire is done via an AC adapter and data synching via a USB cable.

The Tungsten can communicate using the integrated Bluetooth and an IR port. Accessing the Internet on the handheld alongside a Bluetooth-compliant GSM/GPRS phone (such as the Sony Ericsson T68i) is a real treat. Data transfer between devices is also possible via the IR-port up to a range of 5 feet. An SDIO slot allows expansion of memory (up to 512 MB from the built-in 16 MB); interfacing of peripherals such as a camera and experiencing multimedia-rich video games distributed on both SD cards and MultiMediaCard media. A headphone jack for stereo audio and a Universal Connector for peripherals such as the keyboard mentioned earlier, complete the package that is the Tungsten T.

Reiterating the obvious-both, the products are meant for vastly different audiences and application areas. The Tungsten T is packed with features, is high on speed and is just what the doctor ordered for the gadget-deprived. The Zire, on the other hand, acts as the perfect supplement for those hoping to sink their teeth into a handheld that is a little more that a PIM device.



The Palm Zire

Pros: *Affordable, good battery life, comprehensive PIM applications*

Cons: *No Palm Universal Connector, no backlight, no expansion slots*

Palm Tungsten T
Price: Rs 28,500
Contact: Tech Pacific Technology (India) Limited
Phone: 022-55960101

SPECIFICATIONS

159 gm, 16 MB RAM, Palm OS 5.0, 320x320, 65,536 colours reflective TFT display, Texas Instruments OMAP 1510 144 MHz processor, rechargeable Lithium Ion polymer battery, HotSync USB cradle with battery charger, Bluetooth 1.1 compliant, microphone, 3.5 mm stereo headphone jack and speaker, one-touch voice recording, dual expansion via SD/MultiMediaCard expansion slot, Palm Universal Connector for peripheral attachment, Infrared port

Palm Tungsten T	A-
Performance	
Build Quality	
Value for money	
Features	
OVERALL	

Palm Zire
Price: Rs 6,200
Contact: Tech Pacific Technology (India) Limited
Phone: 022-55960101

SPECIFICATIONS

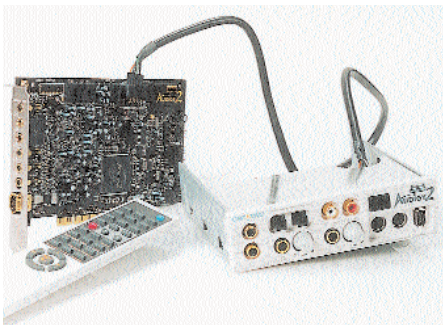
109 gm, 2 MB RAM, Palm OS 4.1, 160x160, 16-shade monochrome display, Motorola Dragonball EZ 16 MHz processor, rechargeable Lithium Ion battery with charger, standard Mini USB connector with Palm HotSync Cable, Infrared port

Palm Zire	B-
Performance	
Build quality	
Value for money	
Features	
OVERALL	

Creative SoundBlaster Audigy2 Platinum

Listen easy

The Audigy2 Platinum is a culmination of all of Creative's former technologies and more. Apart from the universal Line In and Line Out outputs and Microphone input, the Audigy2 also incorporates a 5.1-compatible



S/PDIF mini-jack output and an SB1394 port. The SB1394 port opens up a host of possible applications and opportunities, especially if your board does not support FireWire. In addition, the option of using coaxial or optical S/PDIF, and internal connectors for the CD In inputs are also provided. It also has a 15-pin MIDI/game port on the internal bracket. There are two Line In inputs with gain control, for connecting devices such as your electric guitar. As with Sound Blaster Audigy, the Audigy2 supports time-scaling, which makes it easier to pick up guitar solos. The infrared port enables remote controlling for additional convenience.

On the features side, the Audigy2 has a 106 dB Signal to Noise Ratio (SNR), which means there are almost no distortions, even at high volumes. It supports DVD Audio playback and the 24-bit 192 or 96 KHz linear PCM sounds much sharper than CD Audio. The Dolby Digital EX 6.1 decoding gives a great surround effect, with the addition of a rear centre channel for precise surround sound. The 32-bit effects engine with real-time effects, mixing and 3D positioning capabilities is a real boon for hardcore gamers. It supports Direct Sound 3D, EAX 1.0, 2.0 and EAX Advanced HD. Apart from this it also has 64 hardware managed polyphonic voices and is compatible with Windows Media Audio 9. Sound recording can be done at 8, 16 or 24 bits at a frequency of 96 KHz. The card also has two 16-channel MIDI hardware synthesizers.

But that's not all. The package comes with over 4 GB of fun programs, including games such as *Soldier of Fortune II: Double Helix*, *Hitman 2: Silent Assassin* and programs such as Traktor DJ, Ulead 5, Video studio, a DVD sampler CD, demo CD and the installation CD.

Some other programs included in the package are Creative Media Source, Audio Stream Recorder 2, Creative Diagnostic, Mini Disc Centre, Creative Wave Studio, Speaker Calibrator, SoundFont Bank Manager, Surround Sound Mixer, Speaker Settings and Steinberg Cubasis VST. And let's not forget the inclusion of a user-friendly quickstart guide.

The main improvements in the Audigy2 are in the form of sound quality—both in recording and playback—and the 6.1 channel support for movies and games. It also features THX multimedia certification, guaranteeing crystal-clear audio.

The Audigy2 Platinum is certainly aimed at making an impact on the world of the music editing enthusiast and hardcore gamer. At Rs 15,899, though, it's on the list of only those select few who demand nothing but the best.

Price: Rs 15,899
Contact: Compuage Infoco Ltd
Phone: 022-23842200
Fax: 022-23842210
E-mail: sameer@compuageindia.com
Web site: www.compuageindia.com

SPECIFICATIONS

DVD-Audio capability (24-bit with 192 KHz in stereo and 96 KHz in 5.1), 106 dB Signal to Noise Ratio, 6.1 surround sound capability, EAX Advanced HD support, WMA 9 support, FireWire port

Creative SoundBlaster Audigy2 Platinum	B+
Performance	▶▶▶▶▶
Build quality	▶▶▶▶▶
Value for money	▶▶▶▶▶
Features	▶▶▶▶▶
OVERALL	▶▶▶▶▶

Labtec Pulse 420 2.1-channel speakers

On a jarring note

The Pulse 420 scores well in the looks department and the satellites are cute to look at. The speaker system is very easy to set up, due to the colouring system. The satellites are designed well, and they can either be placed on the desk or hung on a nail without any additional fittings to the speaker. The wires are approximately 8 feet long and the connections go to the subwoofer, placed under the desk. The satellite, input and DC connections all go into the subwoofer. The headphone jack and volume controls are placed on the right satellite.

The speakers displayed an inconsistent performance, performing well in some tests and below par in some others. The speakers sounded loud and clear when Audio CDs and MP3 files were played and they also passed the frequency tests with ease. The main problem area was the bass and subwoofer tests. Because of the light weight of the woofers, at high volumes, the whole subwoofer vibrates rather alarmingly and slowly moves across the floor.

Another flaw is the absence of a detailed manual and a troubleshooting guide. But the final nail in the speaker's coffin is its price. At Rs 3,450, it is nearly equal to a low-end 4.1 set. This could have been overlooked if the speakers were excellent and provided amazing levels of sound. However, in the current market scenario, where low-end 2.1 speaker sets start from Rs 1,000, the Pulse 420's pricing is difficult to justify.

Price: Rs 3,450
Contact: Rashi Peripherals Pvt Ltd
Phone: 022-28260258/59
Fax: 022-28221012
E-mail: ho@rptechindia.com
Web site: www.labtec.com

SPECIFICATIONS

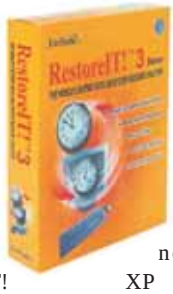
Two satellites with subwoofer, five watts RMS per satellite, 15 watts RMS for subwoofer, 40 Hz to 20 KHz frequency response

Labtec Pulse 420	C+
Performance	▶▶▶▶▶
Build quality	▶▶▶▶▶
Value for money	▶▶▶▶▶
Features	▶▶▶▶▶
OVERALL	▶▶▶▶▶

RestoreIT! 3 Deluxe

Crash-proof your PC in one step

RestoreIT! 3 is quite simple to install. The wizard asks you which drive to include in the static restore point and asks for the partition that needs to be split. This new partition is used to back up the selected drive(s). On our test PC, it reduced the primary partition by 10 per cent and created a new RestoreIT! partition of 4 GB.



If your OS crashes and you are unable to boot, you would still be able to restore your entire backup since RestoreIT has a built-in operating system of its own that is the first to get control of your system. Apart from the backup and restore options, you can even lock, unlock, rename, and delete a restore point. There's also an Option command in the View menu that shows you the properties of the RestoreIT! partition by default.

The Schedule tab allows you to set up restore points automatically, which can be created during startup or while the system is running. You can even disable automatic creation of restore points.

The setup lets you change your password, as well as select authorisation at system startup. Unlike the BIOS password which can be cleared by a CMOS reset, this one is permanent.

We tested it on a newly-installed Windows XP machine without installing the soundcard drivers, Ethernet card and display controller. Then we installed the wrong drivers, crashed the system and restored it using RestoreIT! 3—the system was restored successfully. RestoreIT! 3 is a reliable, user-friendly and easy to use program at a great price.

Price: Rs 2,750
Contact: B. M. Technologies
Phone: 022-28728921
Fax: 022-28729028
E-mail: bmtech@vsnl.com
Web site: www.farstone.com

SPECIFICATIONS

Package contents: Software CD and a user's guide
System Requirements: 133 MHz CPU, 32 MB RAM, Windows 9x/Me/NT/2000/XP, FAT16/FAT32/NTFS file system, 15 MB hard disk space and 10 per cent hard disk drive space for backup files

RestoreIT! 3 Deluxe	B+
Performance	
Ease of use	
Value for money	
Features	
OVERALL	

IBM Microdrive 1GB

A small drive from Big Blue

The latest Microdrive from IBM is a 1 GB drive that you can easily slip into your wallet. The package includes a PCMCIA converter, a detailed manual and a driver floppy for Windows 9x. The drive measures a mere 36x42x5 mm and uses GMR (Giant MagnetoResistive) heads for reading and writing data on to the disk. The primary advantage of GMR heads is their greater sensitivity to magnetic fields emanating from the disk. This increased sensitivity makes it possible to detect smaller recorded bits and to read these bits at considerably higher data rates. Also, large signals from GMR heads overcome the electronic noise, thus reducing errors in data accessing.

The drive requires the newer CompactFlash+ slot standard. It connects to a laptop using the bundled PCMCIA converter but a desktop PC will need a USB card.

The drive took 6 minutes to read 650 MB of data and 12 minutes to write the same. In the SiSoft Sandra test, the drive logged a drive index score of 1312, which is slightly low for a removable drive at 3600 rpm. In other tests, the drive logged a very high CPU utilisation—around 94.8 per cent.

The IBM Microdrive provides excellent storage space in a very small form factor. With a price tag of Rs 18,000, the drive is surely on the expensive side, but still is cheaper compared to a Flash memory stick.

Price: Rs 18,000
Contact: Spectra Innovations Inc
Phone: 080-5092149
Fax: 080-5092148
Web site: www.ibm.com

SPECIFICATIONS

1 GB capacity, CF+ Type II interface, 128 KB segmented buffer, integrated controller, 3,600-rpm rotational speed

IBM Microdrive 1GB	B
Performance	
Build quality	
Value for money	
Features	
OVERALL	

ACi Ethos 4 Laptop

In the lap of Ethos

Ethos is based on an Intel Pentium 4 1.7 GHz Mobile Processor, has 256 MB of DDR RAM and 13 different ports. It has a COM port, an LPT Port, two USB ports, a FireWire Port, an infrared port, two ports for sound in/out, a volume control knob, an external VGA port, an RJ11 (telephone line) connector, an Ethernet port, a PS port for Video Out and a PS/2 port for the mouse or keyboard. Apart from these, a PCMCIA socket is available to add extra devices. It also has a Kensington lock for security.

To test its performance, we used Battery Mark 4.01, Content Creation 2001, Business Winstone 2001, SiSoft Sandra Pro and *Quake III Arena*. On the performance front, its scores are pretty well rounded.

The touch pad is smooth and sensitive to mouse movements. However, clicking is less responsive.

The package holds a notebook, a power adapter and a driver CD within a laptop bag. Any kind of documentation was absent.

After considering its performance, features, value and the current competitive market, ACi's Ethos 4 scores only an average mark.

Price: Rs 76,990
Contact: Allied Computer International (Asia) Pvt Ltd
Phone: 022-26733120/4
Fax: 022-26733119
E-mail: sales@aci-asia.com
Web site: www.aci-asia.com

SPECIFICATIONS

Pentium 4 1.7 GHz Mobile Processor, 256 MB DDR RAM, 40 GB hard disk, 14.1-inch TFT screen, SiS 650 display card, 1.44 MB floppy drive, 24x QSI CD-ROM drive, Realtek RTL8139 Ethernet adapter, Smart Link 56K voice modem

ACi Ethos 4 Laptop	B-
Performance	
Build Quality	
Value for money	
Features	
OVERALL	

Zenith Premium Business PC

Compact and powerful

This is a compact workstation that uses an Intel 845 GV motherboard (with HyperThreading support), thus doing away with bulky expansion cards.

The mainboard comes with an onboard 4x AGP controller that can be allocated up to 64 MB of system memory. The onboard AC97 audio codec makes up the sound system. Also included is an integrated LAN controller and four USB 2.0 ports. The storage susbsystem comprises a 40 GB hard disk, 1.44 MB FDD and 52x CD-ROM drive. All of this is housed inside a very classy silver and black case. However, this small case causes a ventilation problem. It brings along an OS of your choice, at extra cost and a lot of free software for Windows.

The ill-fitted side panel causes a prodigous amount of noise and the two-button scroll mouse has a jerky scroll wheel. The multimedia keyboard includes a scroller.

The Zenith Premium Business PC, at Rs 65,000, is designed to be the pride of a CEO's desk.

SPECIFICATIONS

Pentium 4 3.06 GHz CPU with 533 MHz FSB and 512 KB cache, 256 MB DDR266 RAM, Intel 845GV motherboard, 40 GB, 7,200-rpm hard disk, onboard sound and graphics controllers, 52x CD-ROM drive, 1.44 MB floppy drive, Smart Office keyboard, scroll mouse, 15-inch CRT monitor, 180 watt stereo speakers

Zenith Premium Business PC	B+
Performance	▸▸▸▸▸
Build quality	▸▸▸▸▸
Value for money	▸▸▸▸▸
Features	▸▸▸▸▸
OVERALL	▸▸▸▸▸

Price: Rs 65,000
Contact: Zenith Computers Ltd
Phone: 022-8377300
Fax: 022-8364859
Web site: www.zenith-india.com

UMAX Astra4700

Scanning made easy

UMAX's Astra4700 is a high-performance flatbed scanner with a high optical resolution of 1200 dpi and 48-bit colour capability that lets you obtain sharper images. The scanner comes with a USB 2.0 connection for faster connections and wider bandwidth. It brings along a bundle of programs such as MGI's PhotoSuite III SE, Abbyy FineReader OCR and PaperCom Document Manager.

It has three one-touch buttons that perform functions such as e-mailing, and scanning and copying paper documents. The installation was pretty simple—it comes with a power adapter and USB cable, so you just need to plug it in. We used a USB 1.1 enabled port for the test.

While the manual states that you just need to run the installation CD for acceptance by Windows XP, upon doing so, we found out that the TWAIN button was not highlighted. According to the manual, this is natural as XP installs the drivers automatically, but the scanner was not present in the installed devices list. Finally we had to go to the Drivers folder on the CD and install the driver manually.

We scanned the test 8x10 text document in black and white mode at 600 dpi in 42 seconds. A colour photograph was scanned at 600 dpi and 48-bit colour in 4 minutes 6 seconds. The same image was then scanned in the greyscale mode at 16 bits and 600 dpi resolution in 1 minute 34 seconds. A true USB 2.0 interface will cut down the time taken by these tests. The same image was scanned at 300 dpi and at 600 dpi resolution with 85 per cent accuracy.

The Astra4700 is a high-quality scanner, but Rs 11,950 is a steep price to pay, unless quality is your priority.

SPECIFICATIONS

Single-pass, colour-interlaced CCD scanner, 1200x2400 dpi optical resolution, maximum document size 8.5x11.7-inches, 48-bit colour depth, USB 2.0 interface, 16 watts power consumption

UMAX Astra4700	B
Performance	▸▸▸▸▸
Build Quality	▸▸▸▸▸
Value for money	▸▸▸▸▸
Features	▸▸▸▸▸
OVERALL	▸▸▸▸▸

Price: Rs 11,950
Contact: Neoteric Informatiqe
Phone: 022-2417 2600
Fax: 022-2418 5294
E-mail: sales@neoteric-informatique.com
Web site: www.umax-europe.com

Wipro LQ 5400 dot matrix printer

Bulk-printing workhorse

Wipro claims its LQ 5400 dot matrix printer to be the fastest in its category. Both serial as well as parallel interfaces have been provided at the back of this 24-pin, 136-column printer and the power cord has adequate reach.

You can feed paper from five different paths and the dual tractor enables two different kinds of paper to be loaded at the same time for efficiency. You can also choose the printer fonts and the pitch from the front panel, which is quite handy while operating in DOS.

A lever on the printer lets you print multiple copies at once—useful while printing bills, labels and reports. The printer is as noisy as any other dot matrix printer, but is very cost-efficient as its cartridge is comparatively cheaper (approximately Rs 200) as compared to Inkjet printers. (Rs 700). The print quality is clear even with small fonts and is consistent throughout the page.

However, the printer is quite bulky and occupies a considerable amount of desk space. The drivers were shipped on a floppy drive, which is quite obsolete in these times.

SPECIFICATIONS

24 pins, 136 column, 450 cps printing speed, five paper paths with dual tractor, serial and parallel interface

Wipro LQ 5400 dot matrix printer	B
Performance	▸▸▸▸▸
Build quality	▸▸▸▸▸
Value for money	▸▸▸▸▸
Features	▸▸▸▸▸
OVERALL	▸▸▸▸▸

Price: Rs 28,000
Contact: Wep Peripherals Ltd
Phone: 022- 26397418
Fax: 022-26397393
E-mail: helpdesk.mumbai@wepindia.com
Web site: www.wepindia.com

HP Photosmart 130

A cute little photo printer

If you own a digital camera and want a printer to print directly from it, consider the Photosmart 130. It is a specialised photo printer, unlike others which are just conventional inkjet printers with improvised photo printing capabilities. It comprises an LCD display, a collapsible paper feeder, a cartridge compartment and rubberised buttons. It is USB 2.0 ready and compatible with different types of memory. The only sore point is that IBM's Microdrives are not supported.

If you have an HP direct-printing compatible camera, you can directly hook the camera to the printer. However, you can only print photos measuring up to 4x6 inches. Images can be printed in both JPEG and TIFF format at a resolution of up to 4800x1200 in the automatic mode. The LCD is small and does not allow a preview of the photo and is divided into two parts—one for displaying the status and the other for displaying the printer setup information. It also sports a backlight. One sore point is the missing USB cable.

We tested the printing quality and the time taken using the accompanying HP special glossy paper for the automatic mode, in which the printer selects the best resolution by itself. The 4x6-inch borderless test photos were reproduced fairly well, but not too fast; it took about 2 minutes for each photograph.

At a price tag of Rs 8,999, the Photosmart offers good value for money.

SPECIFICATIONS

USB 2.0 interface, maximum resolution of 4800x1200, maximum paper size supported 4x6 inches, supports CompactFlash type I or II, SmartMedia, Memorystick, Multi Media Card or Secure Digital memory cards

HP Photosmart 130	B
Performance	
Build quality	
Value for money	
Features	
OVERALL	

Price: Rs 8,999
Contact: Hewlett-Packard India Ltd
Phone: 011-26826000
Fax: 011-26826053
E-mail: seema_dawar@hp.com
Web site: www.hpindia.com

Logitech MX500 Optical Mouse

Click away!

The MX500 uses optical technology, thus freeing you from the chore of regular maintenance. It has a host of buttons that are configurable for various applications. Its black and grey colour combination catches the eye. Instead of close-fitting left and right buttons, the top surface of the mouse is made of one curved piece of silver plastic. The surface splits in two towards the front, giving you the left and right buttons. The left side is curved inwards so that your thumb rests easily without much strain.

The MX models ship with Logitech MouseWare version 9.7, which covers Windows 95, 98, NT 4.0. Me, 2000, XP Professional and XP Home Edition, as well as Mac OS 8.6. We installed the mouse on Windows XP and the OS recognised it. But to configure and make use of all the buttons, you will have to install the bundled applications. Ergonomically, the configuration is quite good, with all the buttons well-designed and well-placed for easy access.

As far as the gaming performance goes, the mouse performs really well. Although a tad heavier than a normal mouse, it feels and handles much better, even for extremely fast and intensive games such as *Quake III*.

Overall, the MX500 is a very well-balanced pointing device—great for desktop, business and gaming use. The only downside is its price—a stifling Rs 4,700.

SPECIFICATIONS

USB interface, optical sensors, 800 dpi resolution, maximum speed of 40 inches per second

Logitech MX500 Optical Mouse	B+
Performance	
Build quality	
Value for money	
Features	
OVERALL	

Price: Rs 4,700
Contact: Rashi Peripherals
Phone: 022-28260258
Fax: 022- 28221012
Web site: www.logitech.com

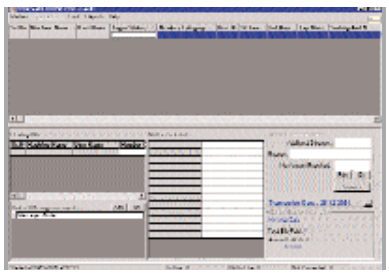
WebCafe

Cafe management made easy

WebCafe is a nifty cyber cafe management software that takes care of all of the everyday problems faced by cyber cafe owners such as recovering a formatted hard drive, cash inflow and calculations.

It offers a lot of benefits to both, administrators as well as clients, by preparing customised bills. Administrators can automatically get the bill as soon as the user logs off. You can also keep a track of machines that are in use and log off or shutdown any PC on the network or bar your customers from visiting certain Web sites by specifying typical words.

Apart from all the benefits to the owners, it's very useful to surfers as well—the client module can freeze the usage of all applications till the user has logged in. Thus, a surfer can fully optimise his stay at the cyber cafe and not worry about the bill, as the timer can be frozen whenever he is not using the PC. Surfers can also check their bills anytime during their stay.



The program is advisable for big cyber cafes that need to manage a lot of PCs. A demo version of WebCafe is available on the Net for an evaluation period of 15 days.

SPECIFICATIONS

System Requirements: Pentium-class CPU, 64 MB RAM, 20 GB hard disk drive, Windows 98 or higher

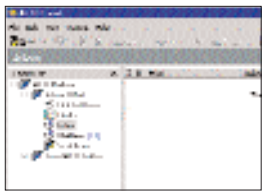
WebCafe	B-
Performance	
Ease of use	
Value for money	
Features	
OVERALL	

Price: Rs 700 per client
Contact: Rhombus Tech Pvt Ltd
Phone: 022-28501416
Fax: 022-56926600
E-mail: contact@rhombustechnologies.com
Web site: www.saysnetsoft.com

ACT! 6.0

Management by time

ACT! helps you plan your hours, days, months or even years. The software has an inbuilt mechanism to import or export as well as synchronise its own calendar with that of Outlook 2000 or later.



In ACT! You can make your contacts as detailed as you like, by linking notes containing any information, including the entire history of discussions between you and your contact. If supported with proper hardware, and if you have caller ID enabled on your phone, you can view detailed caller information even before you pick up the phone.

Accessing contact details is quite easy. You can search for contacts based on any field or a combination of fields. Besides all this, ACT! provides a way to manage e-mails too.

Installing the software is a matter of just a few clicks. As soon as the software is started, a wizard helps you set up your e-mail account. There are detailed manuals in PDF format that explain the different options available in ACT!

Although a bit unstable (it is prone to giving error messages and crashing suddenly), it emerges as a very worthy piece of time management software.

SPECIFICATIONS

Pentium 133 MHz CPU, 64 MB RAM, 50 MB free disk space, modem (optional), Microsoft TAPI-enabled telephone, hardware and Caller ID support (optional), Windows 98/2000/Me/NT 4.0/XP, Internet Explorer 5.5.
Supported Networks: Novell NetWare 5.0, Microsoft Networks, Synchronisation to Palm OS handhelds 3.0

Price: Rs 6,860
Contact: Interact Commerce Corporation
Phone: 011 2691 9303
Fax: 011 26919305
E-mail: indiaactsales@act.com
Web site: www.act.com

ACT! 6.0	B
Performance	
Ease of use	
Value for money	
Features	
OVERALL	

MSI Dragonwriter 48x16x48x

A good writer

MSI's Dragonwriter claims maximum read and write speeds of 48x on CD-Recordables and a maximum write speed of 16x on CD-Rewritables.

This CD-RW is built on the new Oak technology developed by MSI, which provides buffer underrun protection. The package includes Nero Burning ROM CD writing software, a blank CD-R and CD-RW, along with manuals for the writer and Nero. The only flaw is the absence of the IDE cable.

It offers a 2 MB buffer and features AWSS (an auto-balancing and anti-vibration System), EAC (Enhanced Adaptive Control monitor for accuracy when writing) and a Dual Radiation system for preventing overheating.

The drive has the ability to transfer data for Read/Write at 7200 KBps and for Rewrite at 2400 KBps, using the CAV (Constant Angular Velocity) writing method. It supports the R/W/RW Disk-at-once, Track-at-once, Multisession, Packet writing and Raw writing methods. The access time required by the drive is 100 ms.

The writer supports almost all disk formats—CD-R, CD-RW, CD-ROM (mode 1 and mode 2), CD-ROM XA (mode 2, form 1 and form 2), CD-DA, Bootable CD, Photo CD (single- and multi-sessions), Video CD, CD-Extra, Mixed mode CD, and CD-text.

The drive is relatively noiseless even at high speeds and the build is sturdy.

The performance of the product is excellent. It takes 3 minutes to write assorted data of 700 MB, and 5 to 10 seconds for an Audio CD. It wrote a rewritable CD in 5 minutes 15 seconds.

The read speeds are equally fast, and you can copy a movie/game CD in less than 3 minutes. The read speeds are equally fast, and you can copy a movie/game CD in less than 3 minutes.

SPECIFICATIONS

48x writing, 16x re-writing, 48x reading speed; 2 MB buffer; Oak buffer underrun protection technology

Price: Rs 3,750
Contact: Yogi Comp
Phone: 022-28832931
Fax: 022-28806582
E-mail: info@yogicomp.com
Web site: www.msi.com.tw

MSI Dragonwriter 48x16x48x	B
Performance	
Build quality	
Value for money	
Features	
OVERALL	

Watchdog 2.0

The invisible eye

Watchdog II is a computer monitoring and spy software. It acts like a camera inside a computer, keeping track of the applications that runs on any computer on the network. You can even ban certain applications such as Solitaire and restrict access to certain sites.

It also allows you to chat with one or more people in your network. You can actually see a screenshot of any computer at any given moment and review the work being done and provide instant feedback using the chat module. You can also send an alert message to any user or shut down computers on your network remotely.

Watchdog II maintains a deleted files log, giving you information of all the files deleted by the users of your network. You can also have the client e-mail you the log if you are not expected to be near the server module for a long time.

The client is a stealth application, which is not visible in the task manager, cannot be deleted once it is started, and restarts automatically when Windows starts.

You can opt for a single license if you want to install it only on your home PC, or opt for a multiple client licenses and use the server module to monitor multiple PCs.

SPECIFICATIONS

System Requirements: Pentium-class CPU, 64 MB RAM, Windows 98, 10 MB free disk space

Price: Rs 500 (approximately)
Contact: Rhombus Technologies Pvt Ltd
Phone: 022-28501416
Fax: 022-56926600
E-mail: contact@rhombustechnologies.com
Web site: www.rhombustechnologies.com

Watchdog II	B
Performance	
Ease of use	
Value for money	
Features	
OVERALL	

Canon ImageCLASS MPC600F

An all-in-one solution

The Cannon MPC 600F offers you a printer-cum-fax machine-cum-copier-cum-scanner. The Bubble Jet printer offers a resolution of 2400x1200 dpi, allowing for sharp text and photo-quality colour prints. It printed a black and white document with 10 per cent text coverage at 12 ppm, and A4 size colour images in 45-60 seconds. You can print on a wide variety of media, from transparencies to T-shirts.

The printer has one black and three separate colour cartridges, so you can replace just the cartridge that runs out, thus saving on ink and money. The colour cartridges cost approximately Rs 600 each and the black cartridge costs Rs 800. The cost of printing a black and white document is approximately Re 1, and approximately Rs 2.75 for a colour print.

The scanning function supports 65 to 1200 dpi scans. You can scan to photo or scan to doc, which saves the scanned image in a specified folder. However, you don't get a document preview, so you cannot scan the document in part. With the automatic document feeder (ADF) you can save precious time by loading up to 30 sheets at once, and scan them with a single command. It took 35 seconds to scan in black and white mode at 300 dpi, and 60-90 seconds to scan colour images at 600 dpi.

The device uses its scanning technology for the copier function too. It took 45 seconds to make a copy of a black and white document; there is an option for colour copies also. However, using the machine as a copier is an expensive proposition—the cost of copying in black and white mode comes to Re 1 (the market rate is 50 paise), while a colour copy would cost Rs 2.75 (which is cheaper than the market rate).

You can use the fax function by providing the destination fax number after printing the document. You can also fax the document directly from the computer.

The device supports both USB and parallel ports to connect to a computer, but you don't need a computer interface for paper faxing or for making copies of documents. An LCD display shows the machine status as well as error messages such as paper jam, empty cartridge, etc.

SPECIFICATIONS

Printer, fax, scanner and copier; USB and parallel interfaces; no need of PC for copying and faxing; colour copying; internal mailbox to store incoming faxes; separate cyan, magenta and yellow cartridges for maximum cartridge efficiency

Canon MPC600F	B+
Performance	
Build quality	
Value for money	
Features	
OVERALL	

Price: Rs 41,500
Contact: Canon India Ltd
Phone: 011-6806572
Fax: 011-6807180
E-mail: brijesh@canon.co.in
Web site: www.canon.co.in

Freecom FM-1 USB Stick - 64 MB

Your data warehouse

Freecom's FM-1 USB Stick is a small, thumb-sized, lightweight external storage device that is extremely simple to use—just plug it into any USB port and it gets automatically detected in Windows XP and 2000 as a removable drive. For Windows 98, drivers are provided in the accompanying CD. Once you plug in the device, you get a removable drive added to the Windows Explorer window. You're now ready to share data—just copy files to the drive. An LED on the drive blinks to show that data is being transferred. It also comes with a USB cable in case your USB port is in a difficult-to-reach place.

The FM-1 is ideal for storing and sharing digital pictures, music files, text files, spreadsheets and presentations—basically, just about anything that you might need to carry around with you. Despite its size, the construction is quite rugged—it is designed to resist water and dust.

It transfers 64 MB of data in just 3 minutes. The accompanying CD contains drivers for Windows 98 SE, password protection software for Windows, a quick install guide and the software manual.

However, given its 64 MB storage capacity, the FM-1 is useful for people who have to share small amounts of data between computers. For people who have greater data storage or transferring needs, there are alternatives available with capacities of up to 1 GB.

Price: Rs 7,500
Contact: JS Equipments
Phone: 022-23810713
Fax: 022-23860976
E-mail: jse@vsnl.com
Web site: www.freecom.com

SPECIFICATIONS

64 MB capacity, USB 1.1 interface, data access rate of over 1 MBps (read) and 800 KBps (write), data retention up to 10 years, multifunctional LED indicates power on (green) and read/write access (red), OS support for Windows 98 SE/Me/2000/XP, MAC OS 9/10.x, Linux 2.4

Package contents: Freecom FM-1 USB Stick (weatherproof), Security Password Protection software, Software Suite including Auto Mail, PC Lock, Secure & Zip, Magic Disk, preinstalled on USB stick and included on CD, USB connection cable (extension cable from desktop back panel to stick), neck strap

Freecom FM-1 USB Stick - 64 MB	B
Performance	▶ ▶ ▶ ▶ ▶
Ease of use	▶ ▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶ ▶
OVERALL	▶ ▶ ▶ ▶ ▶

Odyssey ATX-403A computer case

Of roses and thorns

The ATX-403A is a mini-tower case designed for Pentium 4 systems.

First the good things: the case has a 350 watt power supply—enough for high-end systems not too loaded with USB devices or a DVD writer. There's a separate power connector for the monitor. There's a hot air vent and an exhaust fan at the bottom of the SMPS, bang over the CPU once the motherboard is fixed, and a blowhole and fan near the top. Also featured is a screw-less design for opening the case—a single thumb-screw holds the whole arrangement in place. Even the expansion cards are held in place by plastic locking arrangements; however, these do not sit perfectly on large cards such as Creative's Sound-Blaster Audigy2.

The icing on the cake is the cool blue power LED.

Now for the bad things: the SMPS has only four large and one small power connector—a big disadvantage if you have a Radeon 9700, Audigy 2 or a floppy drive, all of which need a small connector. Everything in the case is riveted, making it difficult to add or remove drives. The power supply connector of the motherboard slightly obstructs the audio cable. Also, the RAM sticks slightly block the hard disk.

Overall, it's a worthy product, that is if you don't mind the price (Rs 2,080).

Price: Rs 2,080
Contact: Compuage Infocom Ltd
Phone: 022-23842200
Fax: 022-23842210
E-mail: info@compuageindia.com
Web site:
www.compuageindia.com

SPECIFICATIONS

Mini tower, P4-compliant power supply, 350 watt power rating, side-mounted USB and sound connectors

Odyssey ATX-403A Computer Case	C+
Performance	▶ ▶ ▶ ▶ ▶
Build quality	▶ ▶ ▶ ▶ ▶
Value for money	▶ ▶ ▶ ▶ ▶
Features	▶ ▶ ▶ ▶ ▶
OVERALL	▶ ▶ ▶ ▶ ▶

A case that matters

Agent 001 does a case study

I have long held the belief that the world population is divided into two kinds of people—those who live in a 64-bit colour world of deep purples and metallic blues, and those who live in shades of beige. And since I have long lived in the funky town of motherboards and graphics cards, why should my world be beige?

Thus started my hunt for a new PC cabinet that matched my style, but still fitted the state of my wallet—I would have to cap my purchase at Rs 2,000. And so off to our favourite haunt, Lamington Road.

At the first shop, the vendor showed me some cabinets ranging between Rs 850 and Rs 1,300. Even though he insisted that these models dominated the market, they didn't gel with me. Since my desk is home to every PC peripheral, I wanted a cabinet with all the razzmatazz—3.5-inch drive open bays (for floppy or Zip drives) and closed bays (for hard drives); 5.25-inch bays for CD-ROM and DVD-ROM drives; and plenty of room for additional cooling fans.

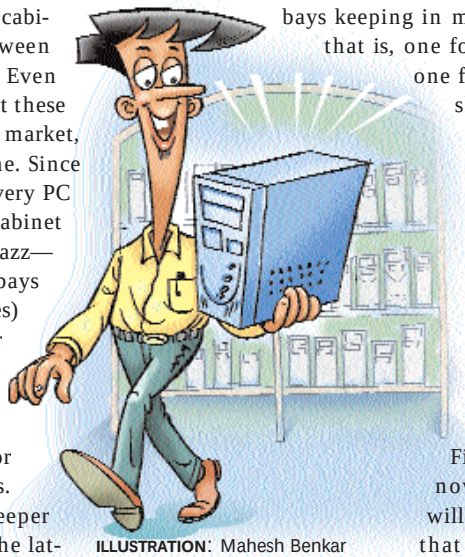


ILLUSTRATION: Mahesh Benkar

The shopkeeper showed me an ibox (the latest entrant and on the heavier side at 8 kg in this range), and cabinets from Kobian, Intex and Odyssey. He also showed me models from Mercury, another prominent brand that offers a wide range with features such as CD racks, USB ports, and blue florescent lights on the front when a PC is switched on. Intex is also a major player, but is popular mostly with assemblers—SI Odyssey and Kobian are more popular with users.

Keen to explore further, I decided to do some window-shopping and sauntered into a shop, which I felt had what I wanted. After listening to my wish-list, the shopkeeper told me that the power capacity (SMPS) of the cabinet should also be an important consideration. An SMPS of less than 250 watts should be avoided. You should ideally look for power supplies that are Intel or AMD certified. And the SMPS should have support for an extra connector in case you're opting for a P4. He also cautioned me to not plug in things with high wattage requirements, such as electric heaters, into the same circuit as the computer.

This vendor also cautioned me that many manufactures choose thinner materials to construct their cases, thus reducing price but also compromising on the quality. According to him, I'd be better off with a fibre cabinet costing up to Rs 2,000. A decent buy would be ideally with a 250+ watts SMPS with at least three 5.25-inch bays keeping in mind the expansion, that is, one for a CD-ROM drive, one for CD-Writer plus a shelf for keeping CDs.

He educated me on some snazzy features in the chassis. Many cases now come with pre-cut 80 mm holes for 80 mm fans that mount onto the side panel of the case. Front-mounted USB and FireWire ports are now all the rage. You will have to make sure that your motherboard supports the correct connection to the connection on the case. Removable drive cages are a requirement for most high-end cases. These drive cages come in all shapes and sizes, and now many of them offer an 80 mm fan that can be put directly in front of your hard drive in order to achieve good air flow.

So as you see, there's a lot more to this case. With case modding catching on, case manufactures should offer much better with time. Many companies now offer custom fan grills, back lights, plexiglass side panels and fan buses. But in India, only the experienced users ask for it.

I had enough of window shopping. Of all the cabinets, the one that caught my eye was the Performance Plus 660 AMG from Antec. A rugged 10-kg piece, it has three 5.25-inch and five 3.5-inch bays (two convertible). On the front bezel is a small plastic spring-loaded flap to give access to two USB and one FireWire connection. The internal wiring quality is excellent with the motherboard power supply connector wire wrapped in nylon net. Besides, it has seven expansion slots, a 3003 W power supply and a washable air filter. It was all that I wanted. Ah! But then he told me the price—Rs 7,650.

I finally settled for the Odyessy ATX-403A—a metallic silver beauty with a neon light and a provision for a CD rack. It has four 5.25-inch bays and neat looks to support my latest list of peripherals. And yes, it has additional hard disk slots so I can ramp up on space if my movie files grow out of hand. Besides, it's screwless and comes with a nifty security lock. The flipside is that since every thing in the case is riveted, it's difficult to add or remove drives. The power supply connector of the motherboard slightly obstructs the audio cable. Also, the RAM sticks slightly block the hard disk. But given my budget, this seemed to be a good choice at Rs 2,080

SHOPPING TIP

- Look for the number of external and internal drive bays.
- If you're not a power user, opt for a slimmer case such as the mini tower or the slimline case, which is large enough to house your components, and yet takes up less room. A mid-tower ATX case will give you the right balance between a roomy case for future upgrades and a space saver.
- Ensure that your motherboard fits into the computer case. The standard motherboard form factor today is ATX or MicroATX. Also check the length of your existing PCI and AGP cards and whether they fit your cabinet choice.
- Good case design also includes spaces for fans.
- Check for the presence of front mounted ports. Is the cabinet easy to work with or will it have to be completely disassembled to get to certain parts of the computer? The in-thing in this area is screwless cabinets with a security lock.

BEHIND THE MOVIES

IMAGING: Ashwin Boricha

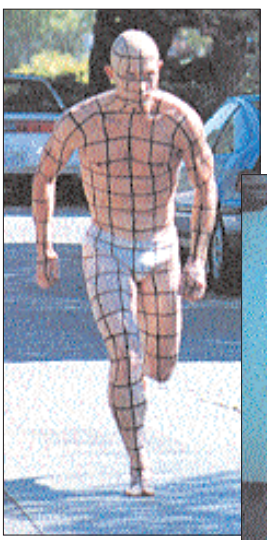
Discover the magic that makes the latest movies larger than life

"You can't rush art", the old man repairing Woody tells an impatient toy collector in *Toy Story II*. Likewise, the spellbinding effects that we see on the big screen today—be it *The Matrix*, *Jurassic Park* or *Shrek*—take hundreds of manhours to craft. Many events such as the sinking of the Titanic or the simulation of tornadoes and explosions, now take place in the studios.

When Hollywood was young, special effects were spun by stop-motion animation and optical printing. An optical printer is a camera and projector operating together to take a photograph. Optical printers and various rear and front projection techniques were used to merge live action with backgrounds. For instance, in 1933, special effects pioneer Willis O'Brien brought the King Kong model to life by photographing it frame by frame, while optical printers and various compositing techniques were used to merge the gorilla with backgrounds and actors.

Computer animators now create more detailed and complex characters with 3D modelling software. The movement too looks more natural as computers can accurately control frame blurring and blending. Besides, high-resolution scanners have replaced movie optical printers. Once digitised, shots can be composited, enhanced or worked on by digital animators and artists. After the special effects are completed, the footage is scanned back to 35 mm negative and is ready for printing and projection.

Take the case of *The Lord of the Rings*—Peter Jackson and his team from WETA Digital, a New Zealand based FX company, not only created a Middle-earth but also designed an entirely digital universe for *The Lord of The Rings* trilogy with digital creatures such as Gollum, Treebeard, Balrog and the eye of Sauron. The transformation of Gollum—from a hobbit-like creature named Smeagol to something scarier through his own encounter with the Ring—was done by a combination of computer animation and sophisticated motion-capture technology using fluid dynamics.



For the film, The Terminator, black-grid painted Robert Patrick was filmed and the reference footage was scanned

The result: A T-1000 animation

To gather motion capture data, an actor is fitted with a suit that has reflective markers or lights at every joint. The actor moves on a special stage and 3D cameras watch the actor from a number of different angles. Computer software then tracks all of the markers and, with the help of a technician, bind them together into a stick figure that accurately duplicates the motion of the actor. The concept of fluid dynamics governs everything from airflow over a wing to any type of moving water.

Peter Jackson wanted a natural look, so Gollum's realistic joint movement is based on actual organic muscle and bone, seen rippling under his translucent, but flesh-like skin. The computer artists even studied anatomy books to

create a realistic view inside Gollum's skin. The filmmakers also brought in character actor Andy Serkis to give Gollum a range of voices—from melancholy to menacing.

Post-production digital magic

A typical film might have 1,000 to 1,500 shots in it, and they get spliced together one after the other to create the whole film. The film then enters the post-production phase. It is here that a major part of the computer magic potion is introduced.

Now, the parts of the film in which digital effects need to be added are digitised. Special Effects need a holistic understanding of how the audio-visual sensory parts of our body and brain perceive the world around us, and then use this information to simulate events. It's important because the Principle of Motion Picture is based on the phenomenon of persistence of vision—our eyes can retain a picture for a fraction of a second. If a series of still pictures is flashed before the eyes in rapid succession, the eyes see it as a scene depicting smooth action.

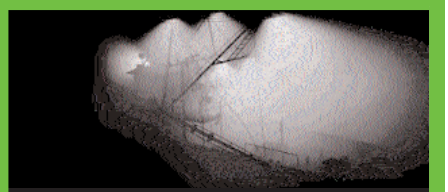
Compositing, a special effects technique, relies on the way our mind perceives motion. The object and its reference points are necessary to perceive motion in a scene. Compositing is the process of adding all of the different layers of a shot together to create the final shot. The compositing artist incorporates all the elements in the right order so that they overlay each other properly to create the final shot. Directors now extensively use a motion-control camera which is controlled by a computer, and can be programmed to precisely duplicate the same movement repeatedly. With motion control, multiple elements can be filmed in exactly the same way, allowing the images to be aligned for compositing.

Brewing the Perfect Storm

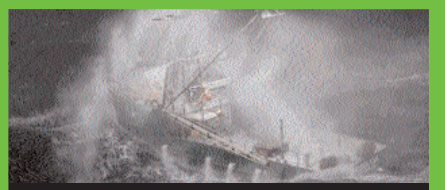
George Lucas and his special effects company, Industrial Light and Magic (ILM), have a special place of mention in the world of movie special effects. ILM began in the 1970s with the cult series *Star Wars* (1977). ILM also digitally created the realistic-looking dinosaurs for *Jurassic Park*. John Anderson, in-house scientist for ILM, used fluid dynamics to develop a simulation of the ocean that could be manipulated for *The Perfect Storm*. The simulation needed to handle everything from rippling, still water, to waves the size of a 10-storey building. Basic fluid dynamic simulation provided the foundation for the body of the ocean, and became known as the bottom water in the film.

Most of the actual 3D modelling work (*see box, 'Bringing a 3D Model to Life'*) was done in Maya, made by Alias Wavefront which uses C++ to allow animators and designers to write their own custom plug-ins. *The Perfect Storm* team wrote more than 30 plug-ins for Maya for this movie. They also wrote several stand-alone applications for specific aspects, such as shaders and particle systems of the ocean scenes.

Splash created by boat crashing into water

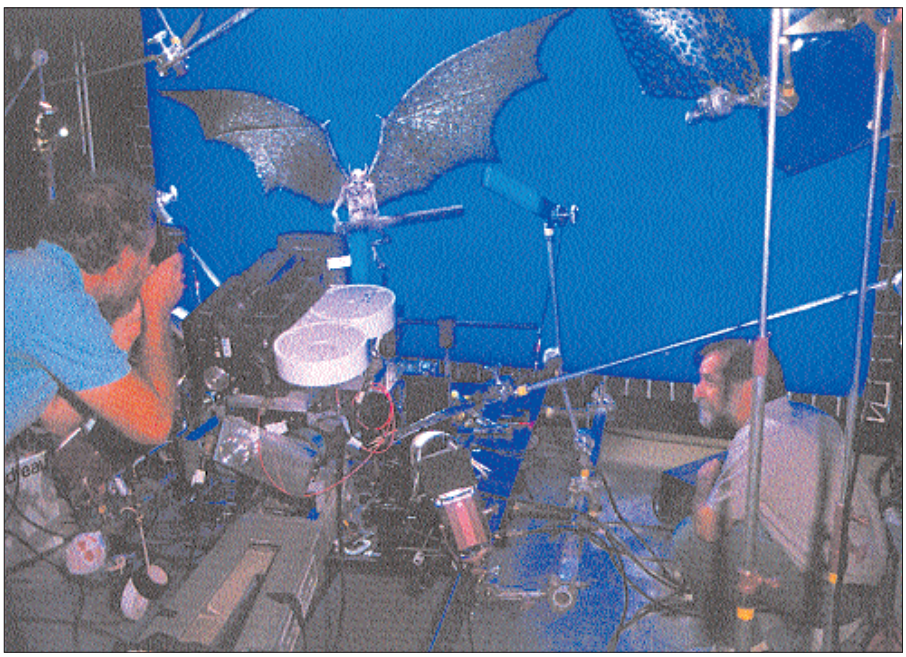


Boat's lighting model



Frame of the final shot with all elements integrated

Photo Courtesy: ILM



Testing the animatronic Sardo, a character in the movie, The Golden Child, before its blue-screen debut

In this context, blue and green screens (technically called Chromakeying) may have intrigued you. Do you recall the cycles flying in the film *ET*? In *Star Wars*, Luke flies his X-wing fighter down the trench of the Death Star with Twin Ion Engine fighters in close pursuit. The X-wing fighter, TIE fighters and the trench were all models. All these illusions were created by a special effects technique known as travelling matte or blue screen. The models are filmed separately against blue backgrounds and the footage is then combined in multiple layers to make the final film. The blue screen lets you combine two or more pieces of film into one. The actor cannot wear anything blue, as it will show up as a hole. With computers, blue screen shots are easier because computers can create the mattes and combine the shots automatically.

Animatronics

A related technology and much older technique is Animatronics. Animatronic creatures are quite life-like—think *Jaws* and *Jurassic Park*. An animatronic is a mechanised puppet that may be pre-programmed or remotely controlled. A complicated animatronic could take up to two years from conception to completion.

Creating the spinosaurus animatronic—among the largest animatronic creations ever built for a motion picture—for the movie, Jurassic Park 3

Photo Courtesy: *Stan Winston Studio*

First, an artist creates a preliminary sketch of the creature, with the help of a specialist, say a palaeontologist, as for a dinosaur. Then a maquette (miniature model) is built which is followed by a full-size sculpture. A mould is created from the sculpture and the body is cast. Then the animatronic components are put together and tested for bugs.

Building the various components usually takes the longest time. Most of the creatures developed at the California-based Stan Winston Studio (SWS)—creators of special effects in movies such as *A.I. Artificial Intelligence*, *Jurassic Park*, *What Lies Beneath*, *Alien*, *The Terminator* and *The Sixth Sense*—require parts that are not easily available. For the Spinosaurus, SWS is said to have built almost everything themselves, dividing their work into three main categories:

■ **Mechanical:** Nearly all of the mechanical systems used in the Spinosaurus are hydraulic. Another group developed the electronic control systems needed to operate the animatronic. Almost all the movements of the Spinosaurus are manipulated by specialised remote-control systems known as telemetry devices.

■ **Structural:** All electronic and mechanical components need something to attach to and control and the skin must have a frame to maintain its shape. This is done by building a plastic and steel frame.

■ **Surface:** The skin of the Spinosaurus is made of foam rubber. This is a special light and spongy rubber that is made by mixing air with liquid latex rubber and then curing (hardening) it.

But I just want my home video

The list of special effects is endless. This may inspire you to make a small movie yourself. If you own a digital camcorder, all you need to do is point and shoot to create a home video. Once you have all the raw footage, you can convert the scenes into a polished, professional production. Even George Lucas shot a large part of the *Attack of the Clones* with Sony HDW-F900 HDCAM camcorders outfitted with high-end Panavision lenses and saved a lot of cash and film.

If you plan to use your desktop computer for video editing, it should have a FireWire (IEEE 1394 to connect different pieces of equipment) port to connect to the camera. These support the DV editing format. We now have a few camcorders available with USB 2.0 ports. These are faster than FireWire and support the DVD format but not DV. We recommend a fast CPU and lots of memory since rendering and writing can consume a lot of power and disk space. Then you need video-editing software.

If you use Adobe Premiere, for instance, the process will create huge AVI or MOV files on your hard disk. You then need to choose the shots you need and arrange them, making a timeline. You line the shots up in sequential order and then play them as a sequence.

And how about my digital camera? First, the audio experience is missing (there are a few digital cameras that have audio capabilities too). Most digital camcorders capture about 30 fps (NTSC) or 25 fps (PAL), while most digital still cameras capture only 15 fps (there are exceptions such as the Sony F717 digital). Finally, digital cam recorders are capable of capturing at least an hour of motion and sound while most digital cameras can shoot only about 15-30 seconds. But given the pace at which technology moves, it's only a matter of time till we can have a full motion movie on a digicam.

Video-editing software

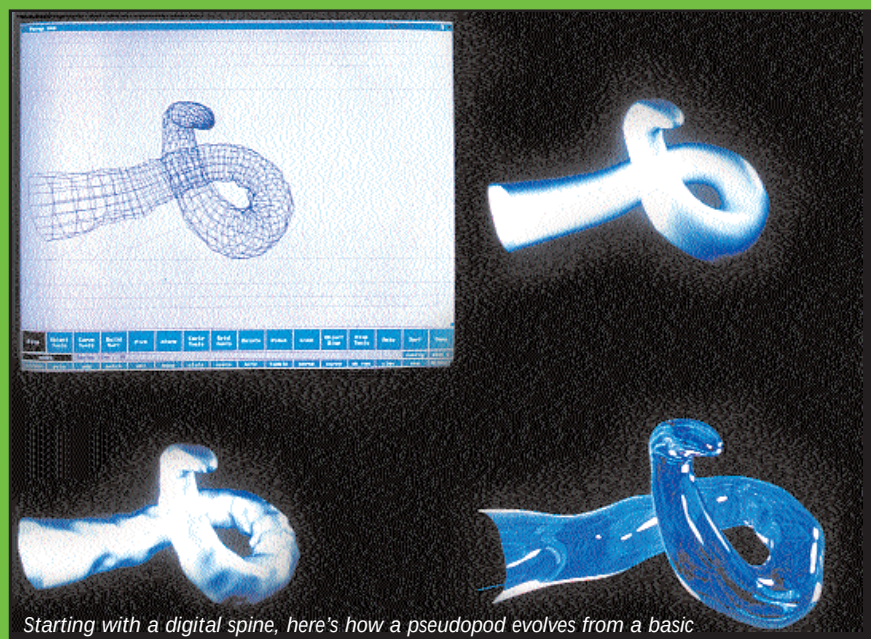
There are more than 150 video-editing software available for use such as Adobe Premiere 6.5. While working with Real-Time Preview, you can use the Adobe Title Designer, MPEG-2 export (Windows only), DVD authoring (Windows only) and audio tools to create video productions. The titling feature, Adobe Title Designer, comes with 90 PostScript fonts. Mac users obviously can't take full advantage of the Windows-only features. Premiere ships with good documentation, including a well-written user guide, online help and an excellent training CD-ROM from Total Training. It comes bundled with a third-party DVD-authoring program, Sonic Solutions DVDit LE.

Final Cut Pro is the only nonlinear editor that supports DV, SD and HD editing formats and analog video. It gives several options for managing your captured footage and includes a suite of powerful tools for adding cool effects and titles, and for compositing. You can get a real-time effects preview with the built-in G4 real-time effects architecture or use third-party PCI cards for real-time editing with render-free playback at SD and HD. You can create 2D and 3D animated titles, video cubes and page curls with tools from BorisFX, CGM, and third party After Effects plugins. You can work around the differences between cameras, lighting situations and even capture devices with the high-precision video calibration tools. Final Cut Pro 3 lets you output your projects for the Web (with compression), DVD or broadcast in DV, SD or HD format. It provides simultaneous video output to a computer monitor, an NTSC or PAL TV monitor, a VCR or a camera. But at nearly Rs 50,000, it is relatively over-priced for the home user.

Bringing a 3D Model to Life

Making objects look real involves a deep understanding of shapes, surface textures, lighting, perspective, depth of field and anti-aliasing.

A human body may require thousands of shapes to be put together into a structure called a wireframe. The wireframe needs to be given a surface—a surface has colour and texture and reflects light. The computer should be able to choose from millions of different colours for the pixels making up an image. Variety in texture comes both from mathematical models for surfaces ranging from frog skin to gelatine and stored texture maps that are applied to surfaces. Adding a surface to the wireframe begins to change the image from something obviously mathematical to a recognisable picture.



Starting with a digital spine, here's how a pseudopod evolves from a basic tube to a rippling, reflective surface

This is where Apple has introduced the Final Cut Express (Rs 15,000 approx). It provides professional-level editing, compositing and real-time effects for full-featured DV editing. You can choose from hundreds of transitions, filters and effects, including the bundled library of digital video effects from CGM. You can also preview effects in real time without rendering. It also lets you mix up to 99 tracks of audio (eight in real time) at the subframe level.

Windows Movie Maker 2 makes home movies fun and easy, letting you create, edit and share your home movies right on your computer with a few simple drag-and-drop moves. Add special effects, music and narration. Then share your movie via the Web, e-mail or CD. The Movie Maker, which comes with built-in support for Windows Media Video 9 compression, is a free product of the XP license and can automatically grab video from a camcorder, edit and analyse clips and create a short home movie, complete with music and credit. Movie Maker 2, which supports high-speed FireWire connections, also comes with a new feature called AutoMovie which promises to make the movie-making process a 5-minute job. The software includes nearly 30 video effects to jazz up home movies, video transitions to set scene changes with creative fades, wipes and other effects commonly used on television shows. It is built with more than 40 titles and credits.

Video editing with Final Cut Pro

Ulead Video studio 6 lets you transfer video from DV/D8/Hi8 camcorders, VCRs, PC cameras and TV tuner cards and comes for less than Rs 5,000. Save time and disk space by capturing DVD-ready MPEG video straight from your camcorder or other device. Automatically split captured video scenes into separate easy-to-manage files. Scan your DV/D8 tape and select the parts you want. Then batch capture the clips with a click of the mouse.

The package includes over 100 Hollywood-style transitions, and 30 customisable filters for touching-up video and adding creative effects. You can animate text along motion paths, add voice narration, plus create soundtracks from favourite music CDs and MP3 files. You can also preview editing changes in real-time, arrange clips and add transitions with drag-and-drop ease using storyboard layout and edit audio, video and titles with frame-level accuracy in the Timeline mode.

To roll it all up

A director can now change lighting and weather conditions, or remove and add objects, and enter into a realm of digital potentialities that have profound effects on the entire mode of production. And it's only a matter of time before computer-generated virtual actors called synthespians or vactors get the creamy roles. But digital effects are no substitute for human emotions or a good storyline for that matter. So what are you waiting for? Get a good script and get cracking on your movie.

LESLIE D'MONTE

Play it again, Sam

Move on from MP3 to four of the most advanced audio formats of today and enjoy high fidelity and low file sizes

Long, long ago, in the decade of bad taste in the last century, a new audio format jumpstarted the audio revolution with the PC. Even today, almost two decades later, MP3 is almost the *de facto* standard for storing music with its promise of good CD Audio quality and small file sizes. But audio compression technology did not stop at MP3. Dramatic improvements in personal computing technology and rapid advances in the field of audio compression are moving towards that perfect audio compression within a small file size.

Audio compression 101

The quest is on for the compressed audio format that sounds every bit as good as the uncompressed audio file. An uncompressed CD Audio occupies roughly 10 MB of space for every minute, so the files have to be reasonably compressed to store them. To achieve such perfect compression, mathematical techniques are used to model the working and psycho-acoustic responses of the human ear.

Audio compression is of two types—lossless compression makes perfect copies of the original wave file when you uncompress the file, keeping the data intact, like a Zip file compression. Lossy file compression, on the other hand, distorts some of the data, causing the file to lose some information.

The human hearing range is most sensitive to frequencies between 2 and 4 KHz. Audio file compression is achieved by removing those inaudible sections of the pure audio file which lie above and below the human threshold of hearing. Typically, each codec uses complex and unique mathematical algorithms to shrink the size of a pure sound file, with a minimal loss of quality. Smaller files are, of course, advantageous for both storage and transferring between computers. While greater compression is possible, especially in the case of lossy codecs, it comes at the price of quality. Thus, an ideal balance between acceptable quality loss and small file size is needed.

Not all bits are created equal

Many formats have tried to improve upon the MP3 promise of high fidelity audio with smaller file sizes. Some of them are pretty much extinct with their developers having abandoned the standard, but a handful of plucky and battle-hardened formats have survived, each using a different way to cram in more music.

The two primary reasons that MP3 achieved cult status were the easy availability of MP3 files before the music industry drove the bootleg MP3 industry underground and the easy availability of quality MP3 playing software. For any format to take over from where MP3 left off, it will need to have these two factors and more. It will need to catch the interest of the developer community that democratised the MP3 revolution by creating shareware/free MP3 players, entire archives of MP3s online and peer to peer file swapping services.

Four formats are poised to take the baton from MP3 . Admittedly, they are not riding the popularity wave yet, but they could well emerge as dominant formats.

MP3PRO

Web site: ***www.mp3prozone.com***

The proprietary MP3PRO standard was developed by Thomson Multimedia in 2001, and they share the patent rights with the Fraunhofer Institute.

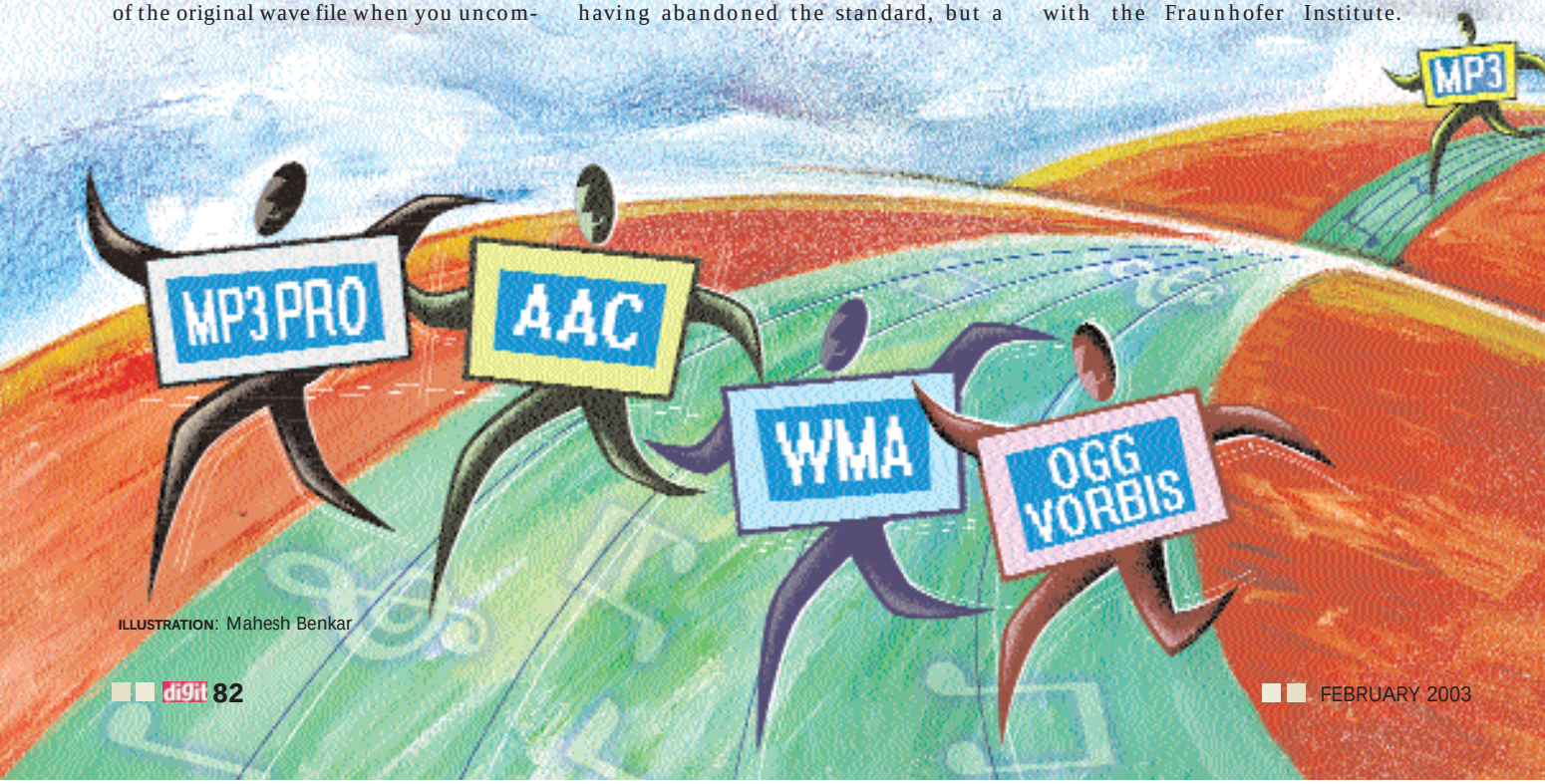


ILLUSTRATION: Mahesh Benkar

Jargon Buster

Bitstream: This is the coded audio data.
Codec: The component of the software that compresses and decompresses the audio file on the fly. It encodes the raw audio data into the bitstream and then decodes the bitstream while playing the file. For example, the well known codecs for MP3 are LAME and Fastenc.
Constant Bit Rate (CBR) and Variable Bit Rate (VBR): These indicate the actual bit rate at which the audio file has been encoded. CBR is a technique by which the compressed audio file is encoded at a constant bit rate throughout the song. With VBR, the bit rate of the song varies through the length of the song. For example, quieter sections are encoded at a lower bit rate and louder sections are encoded at a higher bit rate.
Digital Rights Management (DRM): This is a system used to ensure that copyrighted audio and video can be securely distributed. It involves encrypting the files with a license key that has to be present to use the file. If you lose or don't have the license key, the encrypted files cannot be played.
Spectral Band Replication (SBR): This is the extra piece of information that is written into the MP3 file as a separate stream from the normal MP3 audio data. This extra data, when read through a compatible MP3PRO decoder, allows the decoder to guess what the high frequencies sound like so they can be added to the MP3 file on the fly. This is an effective form of improving quality because the high frequencies are not stored in the MP3 file, allowing the encoder to allot bits to the more important areas of the song.
Transcoding: This is the process of converting one compressed format file to another.

While appearing similar to the MP3 standard, it improves on it by using a technology called SBR (Spectral Band Replication). Essentially, SBR reproduces those high frequency components called the PRO components that are lost during normal MP3 encoding. By combining a low bit rate MP3 file with this SBR data, we get a full-bandwidth audio file with full bass and precise treble. With SBR, MP3PRO is able to reproduce the quality of a 128 Kbps encoded MP3 file, at 64 Kbps encoding quality, resulting in files half the size of an MP3 file. However, plain MP3 files encoded at 192 KHz and above have superior sound quality compared to MP3PROs at 96 KHz—the maximum encoding quality possible within MP3PRO.

This format is backward compatible, so older portable MP3 players can read MP3PRO files simply by ignoring the PRO component. Software support on the decoder end is freely available—Winamp has introduced a plugin and recent versions of other jukebox players have also included support. Unfortunately, on the encoding front, Thompson has a demo version called the MP3PRO Audio Player that only allows 64 Kbps encoding quality. Hence, you will be required to buy software that comes with the MP3PRO codec to encode files at 80 or 96 Kbps, such as that shipped with Nero Burning Rom.

MP3PRO is aimed at applications involving streaming audio, Web casting and Internet radio. For the desktop user, this format is suitable only if the file size is just as important as audio quality—if you enjoy the quality of MP3 music at 128 Kbps, then consider shifting over to MP3PRO to save on desktop real estate.

dBpowerAMP Music, Converter 9.0 and dMC, plugins for encoding to WMA 9, Ogg Vorbis, AAC, MP3PRO decoder, dBpowerAMP Power Pack, and, Thompson MP3PRO Player/ Encoder, PsyTEL AACENC v2.15 AAC encoder and decoder (includes plug-in for Winamp), Winamp 2.81, MP3PRO decoder plugin for Winamp, WMA 9 system codecs
Find them on the Mindware CD

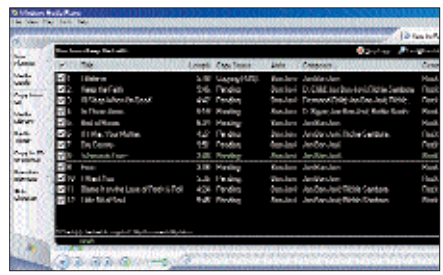
Windows Media Audio

Web site: *http://www.microsoft.com/windows/windowsmedia/default.asp*

Arguably the most popular patented and proprietary format after MP3, Windows Media Audio (WMA) proves a close rival to the MP3 standard. Made only for Windows users, this format just got better with the recent release of the WMA 9 codecs. WMA 9 can capture audio feed with a very impressive 24 bit/96 KHz sampling rate in either stereo or 5.1-channel or 7.1-channel surround sound—so you can record your music in discrete digital surround sound. Unlike the earlier versions, WMA 9 also has a lossless codec and it sounds just as good with a good old stereo arrangement. Users claim that WMA 9, encoded at a bit rate of just 48 Kbps, sounds as good as MP3 encoded at 128 Kbps. With WMAs encoded at 96 Kbps, you have sound fidelity and clarity only achievable in MP3s encoded at 192 KHz and above!

WMA supports VBR encoding, which is ideal for squeezing in maximum quality within a minimal file size. Of course, there is a caveat—Microsoft's continued support for DRM (Digital Rights Management) means that distributing copyrighted WMAs is severely restricted. The licensed file is encrypted with the license key that restricts you from storing or playing multiple copies of the file. Microsoft tracks the transfer of the license across computers too.

The hardware and software support for WMA 9 is just as good as it's for the MP3 standard. The format is backward compatible and decoder support comes in the form of the old Winamp WMA codec.



Windows Media Player 9 can convert your music CDs into high-quality WMAs

As far as encoding is concerned, you will need the new WMA 9 system codecs along with encoding software, or have Windows Media Player 9 installed.

With Microsoft's muscle backing WMA 9, it's well on its way to becoming the dominant format in the digital music arena. The format is well featured to suit diverse users, from artists wanting to distribute their music online securely to home users who need to encode a stack of CDs.

Ogg Vorbis

Web site: *http://www.xiph.org/ogg/vorbis/index.html*

This is a completely open, free source audio format that strives to replace all proprietary, patented formats. It achieved enormous popularity almost immediately after the Fraunhofer Institute decided to get tough on the MP3 standard patents

and enjoys extensive developer support.

Ogg Vorbis is a lossy codec that compresses music in a technique similar to, but vastly better than MP3. It supports VBR, which lets you tweak the settings to get fine fidelity for less space. There is no encoding quality limitation specified—the encoders can support an amazing 16 to 500 Kbps in stereo and 32 to 256 Kbps in mono mode. Here, quality is not measured in kilobits per second, instead an arbitrary 10-point scale is used—quality level 0 is equivalent to 64 Kbps, level 5 is roughly 160 Kbps and level 10 is about 400 Kbps. If you want near Audio CD quality, stick to level 3 or 4 in which the audio quality and file size are best adjusted.

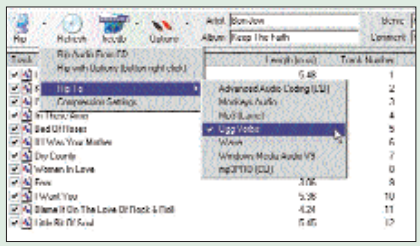
Most players have been supporting Ogg Vorbis through plugins for some time now. Winamp, for instance, natively supports Ogg Vorbis. On the encoding front, software such as dBpowerAMP converts your existing audio files to Ogg Vorbis within a few clicks. The software support is expected to significantly increase over time, with more and more users seeing Ogg Vorbis as the format that offers the right mix of quality and size. The music industry is veering sharply away though—Ogg Vorbis, like MP3 and unlike WMA, has no safeguards against piracy.

Hardware support too is sadly lacking—you will have to wait a while to play Vorbis files on your portable boom box. Iomega and Rio are two companies all set to make Vorbis playing devices, if the consumer demand is strong enough to support them.

Ogg Vorbis is a potential rival to the MP3 format and it will continue to get better because of the flexibility that allows for significant tuning and training of the algorithm, even after the format is frozen—and all this for free, with no copyrights and patents!

Start the Ripping!

The best part about working with audio formats is that most of the shareware and free jukebox software can mix a lot of compressed audio formats. We will use the dBpowerAMP Music Converter to convert pure uncompressed audio into high-quality Ogg Vorbis, WMA and AAC files. It has a simple interface and offers the convenience of single-click conversions from within Windows Explorer. It also supports a wide range of lossy and lossless formats by way of plugins. For MP3PRO enthusiasts, try the demo player/encoder by Thomson Multimedia



dBpoweramp Music Converter, a one-stop-solution for most format conversions

that plays both MP3 and MP3PRO files.

- With the Audio CD of choice in the CD-ROM drive, go to ***Start > Programs > dBpowerAMP Music Converter*** and click on dBpowerAMP Music Converter Audio CD Input. This will open the CD dialog box, listing out the Audio CD track details. Choose ***Rip > Rip To*** and choose the format that you want to encode your music to.
- Once you set your format, all you have to do is click Rip, and encode with the preset values. If you want to tinker under the hood and play with the quality settings, then try ***Rip > Rip with options***, or simply right-click on Rip. This will open up the codec options box. Click on Convert to start encoding.

If you already have wave files or compressed audio files that you would like to encode into a different format, just navigate to the file's location in Explorer, right-click and choose Convert To. Then select the format of your choice and access the options. After that, click on Convert to start the process.

Thomson MP3PRO Audio Player encodes your MP3PROs

For MP3PRO, you can use the demo MP3PRO player/encoder by clicking on Select to choose the source file. Next, click on Encode to access the encoding facility. Click Encode again on the dialog box to generate the MP3PRO file. For all formats, experiment with VBR for better compression quality.

You can also use Nero Burning Rom, however, the bundled plugin is a demo version that allows only 30 operations. Its encoding quality ranges from 24 Kbps for the mono mode to 96 Kbps for the stereo mode.

Avoid converting your existing MP3 files into any of these formats—instead of the superior audio quality you expect, there will be further loss in quality. Instead, re-rip from your Audio CDs and encode into these formats to get clear, high fidelity audio.

AAC

Web site: *http://www.vialicensing.com/products/ mpeg4aac/standard.html*

One of the most promising formats on the skyline is the patented AAC (Advanced Audio Coding) standard. In the late 1990s, this format was sidelined by MP3, as it demanded unrealistic computing resources for encoding and decoding. But now, AAC is being promoted as the audio data compression standard of the 21st century. It is now an official standard under ISO-MPEG, with Via Licencing currently in charge of licensing the technology.

AAC has become the base for a number of sophisticated audio codecs, including AT&T's a2b and will also be used in the MPEG-4 standard. The standard can record data in both mono and stereo mode, and up to a maximum of 48 channels of data! Add to that sampling rates of 96 KHz and broadcast quality at a bit rate of 320 Kbps for 5.1-channel sound and you have the future of compressed digital audio.

The standard is made up of three different 'profiles', which differ from each other in sound quality. Studies conducted by MPEG show that AAC profiles encoded at 128 Kbps and 96 Kbps bit rates rank way ahead of MP2 at 192 Kbps and MP3 at 128 Kbps. While this and numerous other tests show that AAC ranks ahead of the contenders, including WMA, its popularity is severely restricted by the fact that it is very tightly licensed. This may change though—AAC is widely regarded as one of the highest-quality formats for distributing music on the Internet and is also targeted towards streaming audio. However, despite improvements in computing technology, the processor requirements for both encoding and decoding are rather high. Moreover, software support is quite limited—as far as decoders go, there is a plugin for Winamp. On the encoder side, AACenc is available for non-commercial use only, while you can

Feature Comparison

Audio Format	Near CD quality	CD quality	Sound quality At near CD quality (subjective)	Compression ratio at near CD quality	File Size for near CD quality (using MP3 as base)	Encoding speed (subjective)	Winamp support	Support in hardware devices	Compression type
MP3	128 Kbps	160/192 Kbps	Acceptable	11:1	1	Fast	Natively supported	Yes	Lossy
MP3PRO	64 Kbps	80/96 Kbps (max)	Acceptable	20:1	0.5	Fast	Plugin required	Limited	Lossy
WMA	48 Kbps	64/80 Kbps	Good	25:1	0.4	Fast	Natively supported	Yes	Lossy and Lossless
Ogg Vorbis	Quality level 3/4	Quality level 5	Good	14:1 (approximate)	0.8	Slightly Slow	Natively supported	No	Lossy
AAC	32/48 Kbps	96/128 Kbps	Good	30:1	0.3-0.4	Very Slow	Plugin required	Limited	Lossy

use dBpowerAMP for converting your CDs with a plugin. Hardware support too is a while away—rumours of portable players are in the air, but the format itself is yet to pick up.

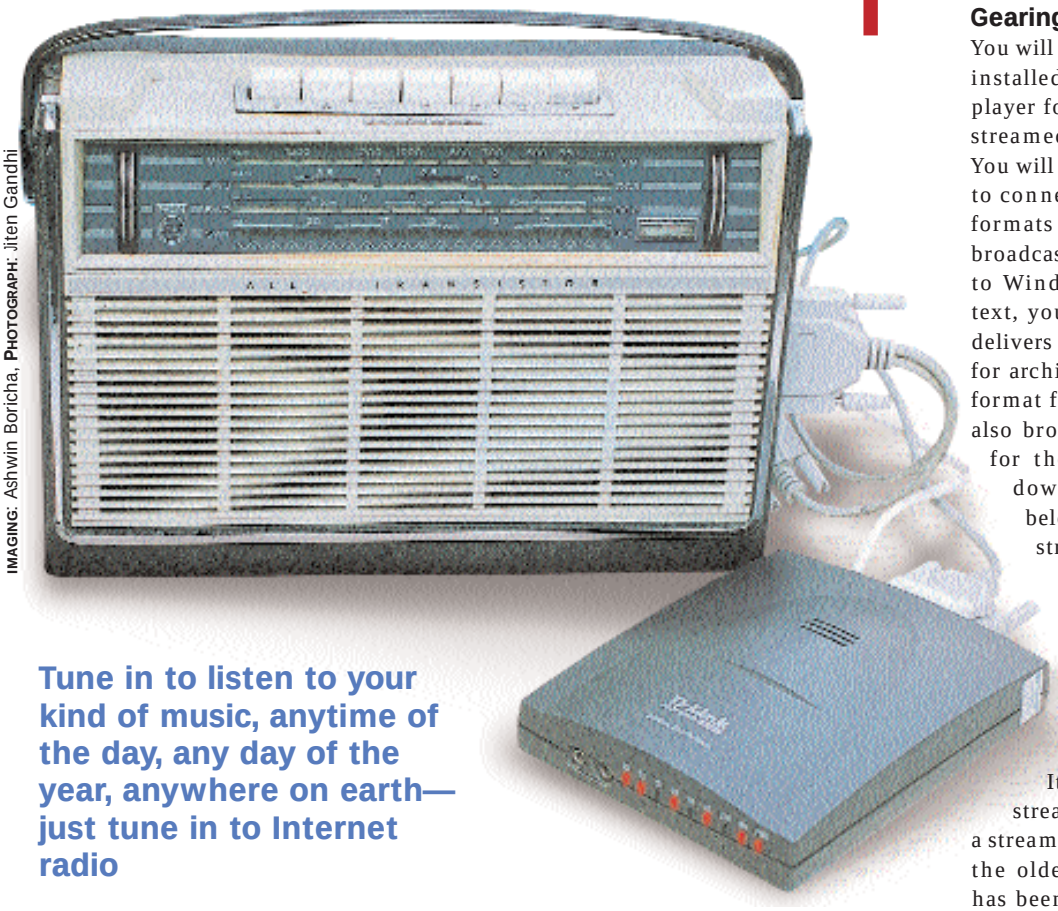
The next note

MP3 may be aging, but development is still in progress to produce encoders that are leaner and produce better audio fidelity, with lesser audio artefacts. And it still rules the P2P roost as the most traded commodity online. So while the MP3 standard cannot be discounted yet, the future of digital audio clearly belongs to other standards—WMA and Ogg Vorbis aim for top-of-the-line quality, while MP3PRO gives us small yet clear files. The crystal ball also shows the emergence of MPEG-4, bringing full-blown multimedia integration across the spectrum, not just bits and pieces.

Even with complex mathematical algorithms that accurately model the psycho-acoustic responses of that incredible human organ, the ear, and what you may hear about listening room tests, there is only one real testing ground: how good does your music sound when you play it on your computer? The human ear is the final judge of quality.

SRINIVASAN RAMAKRISHNAN

Music on tap



IMAGING: Ashwin Boricha, PHOTOGRAPH: Jiten Gandhi

Tune in to listen to your kind of music, anytime of the day, any day of the year, anywhere on earth—just tune in to Internet radio

In the good old days of the last century, before TV was king and when computers were made of vacuum tubes, you could crank up the radio and tune in to music, sports, debates and news through the airwaves. Back then, this was how history came alive—be it World War II or when the first man landed on the moon. Radio Ceylon and Vividh Bharati reigned supreme before the television boom of the 1980s and the emergence of FM radio.

Windows Media Player 7
Find it on the Playware CD
RealOne Player, Winamp 2.81, Radio@Netscape Plus Player
Find them on the Mindware CD

Today, though tuning into a radio channel of your choice is easier, you still have to search for a good station. And then, no commercial radio station transmits what you want, all day long. This is where the Internet comes to the rescue. For some time now, the more demanding among us have been tuning in to Web-based radio stations. The Internet boasts of thousands of radio stations, making it the ultimate user's market. With Internet radio, you don't need to hunt down the frequencies or look up programme guides—you are never restricted by frequencies and time. You don't need any extra high-tech gear either; most of what is needed is already on your desktop.

info Philips has introduced the world's first streaming audio system, the Streamium MC-i200 that connects to the Internet via a broadband connection

Gearing up the radio shack

You will need to have a few software tools installed to hear your tunes online—a player for the common formats that are streamed over the Internet is required. You will also need a plain dial-up modem to connect you to the Internet. As far as formats and players go, some stations broadcast in Real Audio and others stick to Windows Media Audio. In this context, you have Shoutcast, a system that delivers live audio or audio-on-demand for archived broadcasts. It uses the MP3 format for audio delivery. Some stations also broadcast proprietary formats and for these you would be required to download their players. Discussed below are some of the more popular streaming formats.

Real Audio and Windows Media

RealNetworks's Real Audio (***www.real.com***) was a dominant format in the initial days of Internet radio stations. It is designed explicitly for streaming and is still very popular as a streaming format. Despite being one of the oldest formats around, Real Audio has been constantly improved upon by its designers.

To listen to Real Audio-based broadcasts, you need to install the RealOne player, which also lets you play Real Media video files.

The Windows Media Audio (WMA) format is another excellent format for streaming audio. With recent improvements in the underlying technology, it results in very good sound quality (*refer to the article, 'Play it again Sam' on page 82*).

WMA files can be played with Windows Media Player (***www.windowsmedia***) that comes bundled with Windows. You may need to install a newer version though, to take advantage of the improved technology. WMA is steadily becoming a popular

format for streaming audio and video. WMA at 20 Kbps encoding quality is definitely comparable to MP3 at 64 Kbps. With higher bit rates, the audio sounds very crisp and smooth.

With the abundance of streaming audio on the Internet leading to a large number of me-too radio stations, the quibbles over licence fees for using formats have only just started. Some stations prefer to use their own proprietary streaming formats; still others depend on underlying RealNetworks or Windows Media streaming technology, but use their own player interface. Among the notable proprietary options is Spinner, which offers you over 175 stations to choose from. Spinner has now tied up with Netscape, and the service is called Radio@Netscape Plus (***www.spinner.com***). You need to install the Radio@Netscape Plus player to get connected to their vast collection of stations.

Shoutcast Radio

Shoutcast radio (***www.shoutcast.com***) is brought to you by Nullsoft, the folks behind Winamp. Shoutcast is more than just a streaming system. For hardcore radiophiles, it is a way of life. It streams out music in the MP3 format, so all you require is any standard MP3 player. With Shoutcast giving broadcasters all the tools they need for free, enthusiasts from all over the wired world have set up their own radio stations. Tuning in and listening is easy—just pick up a radio station that plays your favourite music and groove to the beat.

Since all you need to transmit using Shoutcast is bandwidth, loads of songs and a couple of Winamp plugins, it has become enormously popular with small time independent broadcasters, as well as those who would like to host a radio station over a LAN. This offers you the radio equivalent of the Swiss Army Knife when it comes to content. All Shoutcast Internet broadcasters can list their radio stations at Shoutcast's Web site, so you can search through radio stations right there. The radio stations can choose the bit rates for the stream quality, so pick up a radio station that delivers good quality and doesn't hog your bandwidth—if you choose a bit rate of 64 kbps or lower, the stream of audio sounds good even over a dialup connection.

You now have the tools and the know-how, so let's tune in to some great stations.

Shoutcast: broadcasting to your home

Tune in

If you are listening to one of the stations that broadcast using a proprietary player, the easiest way to locate a station of your choice will be using the player itself. Radio@Netscape Plus for example, lets you select the genre and station straight from the player. The quality of the audio is really good and you get to choose from 175 niche channels across the board. With such services, you do have to put up with the advertisements, but in Radio@Netscape Plus they occupy an unobtrusive corner of the player.

To explore and go beyond the beaten path, you need a radio station guide. One of the best we recommend is the guide at RadioTower (***www.radiotower.com***). This station guide offers you a huge selection of stations located across 80 countries and over 20 different genres. You can pick up stations that transmit in Real Audio and WMA formats. The lower bit rate stations sound very clear with WMA—definitely recommended for modem users.

Live365 (***www.live365. com***) is the granddaddy of all streaming sites and claims to be the world's largest Internet radio network. You can choose between downloading the proprietary player and using your existing one. Other than this, be sure to check out Shoutcast—it has close to 3,000 radio stations neatly sorted by genre and bit rate. With the sheer number of stations available, it's easy to access a fast server. An old dependable site is the RealNetworks's RealOne Guide, (***www.home.real.com***) that lets you choose from a variety of streaming entertainment in Real format.

RadioTower: towering over the rest

Streaming Technology that Needs Broadband

Well, if radio can get this good, then video has got to be better. In many parts of the wired world, people are logging on to view Web TV. It's true. It's happening. But you need a broadband connection. And no, cable Internet access (at least by Indian standards) just won't do—try getting hold of a DSL line that gives you 384 Kbps access or greater.

Here's what you can expect: entire TV shows, encoded at good quality and movies, both online and offline. In the US, you can currently logon to MovieLink at ***www.movielink.com*** and legitimately purchase and download a movie for as little as $2.95 (around Rs 150). This is not a low-grade knock-off copy—you are sold a high-quality print. Of course, there are controls embedded into the movie to limit the usage and spread. You can also catch live sports broadcasts at places such as Willow TV (***www.willow.tv***) that screens entire cricket matches in good quality video over broadband. Oh yes, you will never miss the news with nearly all big news channels carrying their broadband Web-casts.

Jargon Buster

DMCA: Short for the Digital Millennium Copyright Act, which protects and upholds US copyright laws in digital media.

Encoding quality: This is the measure of the quality of the encoded (compressed) audio. It is measured in Kbps (kilo bits per second) and higher values indicate a better encoding quality.

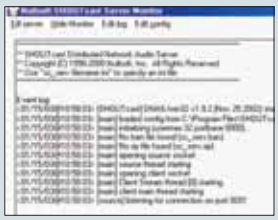
RIAA: Short for the Recording Industry Association Of America, it is the main music industry lobby group within the USA.

Streaming media: The media (audio/visual) is not conventionally downloaded before playback, instead it is continuously streamed from the Internet and cached locally before it is displayed.

On Air: RJ, Anyone?

Setting up your own radio station doesn't require a closet full of complex electronics and thick cabling—just a desktop computer and plugins. You will need to get hold of Shoutcast's Server and the Shoutcast Source DSP plugin. You will also need any 2.x version of Winamp and a good taste in music.

STEP 1 First, install the Shoutcast Server and choose the GUI version during install. Then, install the Shoutcast Source DSP plugin. After installation, start the server from ***Start > Programs > Shoutcast DNAS***. The server starts with the GUI monitor. If you want to tweak and play around with the default settings, click on Edit config to access the config file. Follow the instructions here and you can't go wrong.



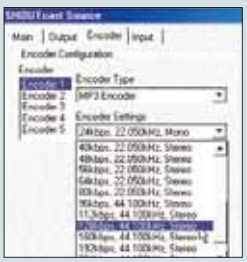
The Shoutcast server monitor

STEP 2 Start Winamp and load in your favourite songs. Then start the Shoutcast Source DSP plugin from ***Options > Preferences*** and select DSP/Effect Plugin.

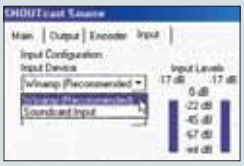
Select the Nullsoft Source DSP plugin from the list

Choose the Nullsoft Shoutcast Source DSP plugin from the list. This opens up the Shoutcast Source DSP settings menu. The Main tab shows you the status of the five output streams listed. If you are not connected, you will see 'Not Connected' under status.

STEP 3 You also have three more tabs. Click on Encoder and set the MP3 encoding quality settings. Here the default settings are fine—tweak them only if you are certain that you have enough bandwidth. Under Input, select Input device as Winamp. However, should you be hosting a live show, with feed coming in through the soundcard, choose soundcard input. This would require a microphone or external signal to be connected to your soundcard. So drop that in and add a dash of RJing!



Set encoding quality here



Select the input source here

STEP 4 Now click on Output to check out the output settings. The default connection settings are fine; if you have changed anything in the Server config file, this is the time to update that entry here. Finally, for that additional pizzazz, click on Yellowpages to configure the essentials, including the name and listing details.

Output sets your connection settings

At Windows Media's Radio Centre (***http://www.windowsmedia.com/mg/Radio.asp?***), check out the vast range of stations spread across genres that broadcast in the WMA format. Find great Indian music at Radio Of India (***www.radioofindia.com***), or check out Sur Sangeet Radio (***www.sursangeet.com***). Yahoo! Launchcast serves out good content at ***http://launch.yahoo.com/launchcast/***, while Radioio (***www.radioio.com***) lets you access music from a lot of popular bands from different periods.

If you are looking for independent artistes, try the stations at Shoutcast. For other niche music, you can try any of the above sites and search within the particular genre—for example, if Beethoven is what you want, then one of the most popular radio stations online would be Beethoven.com (***www.beethoven.com***), which is listed across most of the station guides. Incidentally, many terrestrial stations broadcast on the Web too. These radio stations bring on their full range of radio entertainment and programming online and can be tuned in to from their home page or RadioTower.

And there's more

There is more to Web radio than just music—the entire range of radio programming that you can access from the airwaves can be plucked off the Web waves. There are stations where you can get the latest news and listen to debates on current events that matter. BBC (***www.bbc.co.uk/radio/***) and CNN (***www.cnn.com/audio***) have their entire range of radio programmes online. You can tune into their news, current affairs and lifestyle programs and also catch up on sport commentaries. If technology news is your thing, CNET's News.com (***www.cnet.com/broadband/0-7227152.html***) features a wide range of radio programmes that deals with personal technology, tech news, as well as talk shows on the emerging technologies of the day. WebRadios (***www.webradios. com***) has an assortment of channels, most of which are located in North America, broadcasting local news. Their music section is quite comprehensive—you get to choose from a smaller list of genres, but there are many stations listed for each. For up-to-the-minute news and talk shows throughout the day, log on to the New York Times online (***www.nytimes.com***) and tune into their Web radio station. In fact, you will find more online than is possible with offline radio.

Bookmarking your favourites, with Winamp

Even offbeat content is easily accessed, thanks to the unconventionality of the Internet. If you missed the radio plays of the early 20th century, or

Get hold of your IP address here

STEP 5 Now, the great moment…click on Connect to start streaming. But how do you get people to hear your station? If you are on a LAN, find out your IP address by typing ***ipconfig*** at the command prompt or right-click on the Network Neighbourhood and click on Properties. Then select TCP/IP from the list, and click on Properties. This will display your IP address. Take it down, and pass it on.

STEP 6 To tune into your station, ask everyone to click on the ***Add File > Add URL*** option from the playlist editor in Winamp (or any other MP3 player) and type in your IP address, followed by your port, in the following fashion: ***http://128.128.6.54:8000/*** where 128.128.6.54 is your IP address and 8000 is the port number.

STEP 7 Like to show off even more? Ask everyone to type in your IP address and port number on the browser address bar to open up your radio station home page.

What makes Shoutcast so good is that you can stream many different kinds of soundfiles that are encoded to MP3 on the fly, doing away with multiple file conversions. While some Shoutcasts do skip or pause due to the bandwidth, for a service that is used by so many amateurs, the overall quality is impressive. Incidentally, Shoutcast stations generally host fewer listeners—typically, the largest stations have about 100 users. If you add more than 30 users to a medium size bandwidth, your server will soon creak with users complaining of bad audio quality. For more information, check out the documentation at ***http://www.shoutcast.com/support/docs/***. There is also an open source version of this system called Icecast, which functions in a similar fashion. Based primarily for the Linux platforms, Icecast hasn't reached the level of popularity that Shoutcast has today.

Voila! Your radio station homepage!

CNET radio: all technical talk, all day long

news broadcasts from London in the darkest hours of World War II, or if you just want to go retro and deep into the last century, here is your chance. Old Time Radio (OTR) channels boast of rich historical content and can be found on Live365 and Shoutcast. Since amateurs host many of these sites, expect diverse content, with some channels focussing on the historical news broadcasts and others playing music that was then popular, and yet others streaming entire radio shows.

If you are a gaming enthusiast, tune in to XGR Radio (***www.xgr.com***), Internet's first all-day gaming radio station. Here you can catch breaking gaming news, interviews with gaming gurus and game makers, and game reviews. Shoutcast also features several stations that are dedicated to gaming.

If live music is more to your taste, try out the Shoutcast channels beaming out concert audios across a variety of genres. Finally, there is also the peer-to-peer version of radio. This is at PeerCast (***www.peercast.org***), which uses the same Gnutella protocol that powers up file swapping services such as KaZaA, BearShare and eDonkey. PeerCast lets the broadcaster set up anonymous streaming broadcasts, which can be received by all those connected to the PeerCast client.

So now that you have all these options, you will need to compose a list of must-hear stations; most proprietary players let you maintain a list of stations that you can access immediately. If you are using Winamp, you can bookmark your stations through the Bookmarks options.

A word of caution

A wet blanket to the gung-ho world of Net radio is the heavy royalty schedules slapped on the Internet-only radio stations. The argument is simple: if you are streaming out copyrighted music, you should pay. The RIAA (Recording Industry Association of America), bolstered by the American DMCA (Digital Millenium Copyright Act), wants artistes to get paid for these streams. The costs involved are now pushing many Web radio stations, including non-profit, university- based radio stations, out of business.

The quest for royalty payments started last year, with charges coming to 70 cents per song per thousand listeners (from when the stations have started broadcasts). A sum like this could spell the end for most, if not all, stations.

Recent moves in November 2002 have tried to change the fee structure. However, it appears that the consumer will end up paying for usage. Bigger stations are reconsidering their strategies and the smaller stations are slowly moving underground. The Internet community is fighting back through peer-to-peer technologies such as PeerCast that allow for anonymous broadcasting.

The immediate lookout, however, is brighter than it appears. Despite all the copyright and royalty wrangles, there is always going to be some amateur rebel broadcaster out there, using his desktop computer as a radio station. Shoutcast, MP3 and PeerCast have led to the boom of Internet radio broadcasting, but with the copyright laws kicking in, the fun is more muted these days.

With a lot of enthusiastic broadcasters and users, a modem user can easily tap into the gigantic radio Web, and all this just at the cost of connecting online.

The spirit of radio isn't dead; it's just been reincarnated. Internet radio breaks all the geographical boundaries and has no airwave signal strength issues. The future is pure music with the promise of high-quality audio and visual streaming entertainment. Video may have killed the radio star, but the Internet has regenerated it.

SRINIVASAN RAMAKRISHNAN

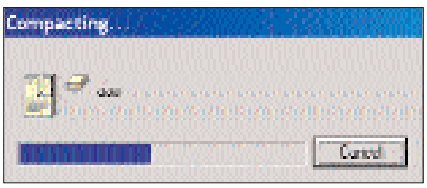
30 Minutes Expert

Operation cleanup

Many of us have unmanageable mailboxes overflowing with official mail we don't want to delete, yet see no use for it in the immediate future. Thousands of messages fill up the mail client, making it painfully slow, unstable and quite a mess. Here's how you can reduce some of the load and cut out the overheads, without losing any important mail.

Outlook Express

When you delete a message from a folder or move it to another one in Outlook Express, the information of the message is still maintained in the original folder. Over time, this accumulates to a lot of unnecessary wasted space. The simplest way to slim down this junk space is to click ***File > Folders > Compact All Folders***. Clicking on Compact will clean out only the current folder. Unlike Outlook, Outlook Express cannot distinguish old mail from the current, letting only the latter load.



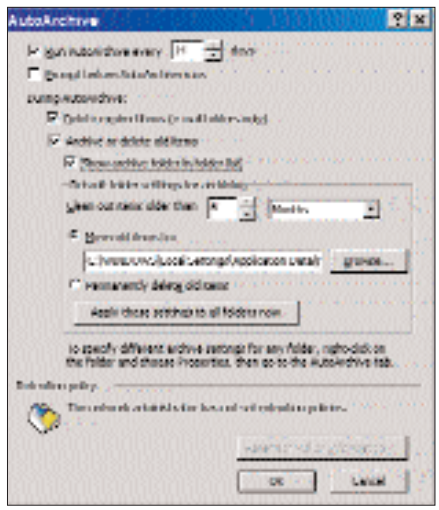
Compacting folders in Outlook Express

Outlook

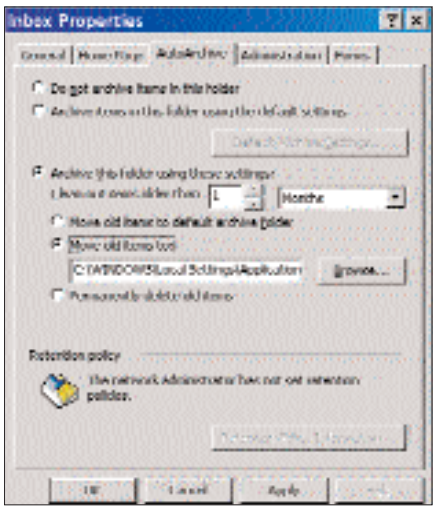
In Microsoft Outlook, you can manage you incoming e-mails and message folders by configuring the options just once. You can configure the archiving feature to remove all your old e-mail to a separate file so that you see only the recent messages and load the older ones when needed. This way your e-mail client is no longer bogged down by the a huge number of messages and you can still retain all your important information and access it any time you want to.

To set up automatic archiving in Outlook, open ***Tools > Options*** and switch to the Other tab. Here, click the AutoArchive button to set it to run at specific intervals, the default being every 14 days. You can set the older e-mail to be moved to an archive folder, or permanently delete it. Click the 'Apply these settings to all folders now' button and you are all done.

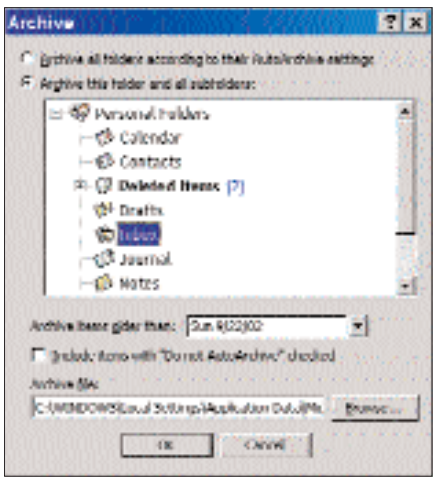
If you maintain several message folders such as 'Boss', 'Friends' and 'Research', some of them may contain



Set up automatic archiving for all folders in Outlook



You can have different archiving options for each folder



Manually archive folders in Outlook

info

An easy way to set up different automatic archiving options is to first configure the default settings for all folders with the most common options, then modify the properties of the ones that need to be different

communication you need to refer to more often than others. Thus, typically the 'Boss' folder needs to be archived less frequently than the 'Friends' folder. This is especially true if you have a lot of message rules that automatically direct your e-mail to the correct folders.

It is possible to set up different archiving options for each individual folder. All you have to do is right-click on the particular folder and click on Properties. Switch to the AutoArchive tab and set up the frequency and archiving rules as per your requirements. If you want even more control over the archiving functions, you can manually archive the folder of choice by selecting it and clicking on ***File > Archive***.

VEER KOTHARI

Missing identities, skewed history, compatibility issues, dying music, disappearing arrows—the doctor will see you now...

A failing hard disk

Q. I've been facing a strange problem lately. Windows shows an error message about the name and location of files and folders that I know are there on the hard disk—I've been working with these files till recently. Is my hard disk about to crash?

Rama

Via e-mail

A It could simply mean that a rogue software has scrambled your data or that it is an isolated hardware glitch.

Run ScanDisk and set it to examine the entire disk for physically damaged sectors. If you're using Windows 98 or Me, click ***Start > Programs > Accessories > System Tools > ScanDisk*** and enable the Thorough option. In Windows 2000 and XP, open

Let ScanDisk automatically correct all errors it encounters

My Computer, right-click the drive, select ***Properties > Tools*** and click the Check Now button under Error-checking. Next, check 'Automatically fix file system errors' and 'Scan for and attempt to fix bad sectors'.

If ScanDisk reports only a few logical errors, such as cross-linked or fragmented files, let ScanDisk repair the files. But if it reports more than a few physical errors, it's time to immediately back up your data. It is a good practice to run ScanDisk once a month to catch hard disk problems in time. Also, try using Search to locate the files in case they've been moved accidentally. Run an anti-virus program to eliminate the possibility of the filenames being changed due to a viral attack.

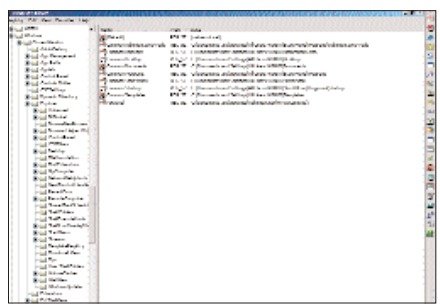
Double trouble

Q. I am facing a peculiar problem with Windows 2000 Server. The programs in the Startup folder or the All Users Startup folder starts twice, slowing down my startup.

Rita Joshi

Via e-mail

A The likely reason for this is that the registry entries for the two Startup folders are pointing to the same place. The All Users Startup folder is usually located in



The Registry Editor is a very powerful tool for modifying Windows settings

C:\Documents and Settings\All Users\Start Menu\Programs\Startup. The user-specific Startup folder is the same except that the username replaces 'All users'. Verify these locations in Windows Explorer. Open the registry (go to ***Start > Run*** and type ***regedit***) and browse to the following keys: HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Explorer\Shell folders
HKEY_LOCAL_MACHINE\Software\Microsoft\Windows\CurrentVersion\Explorer\User Shell Folders
HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\Shell folders
HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Explorer\User Shell Folders

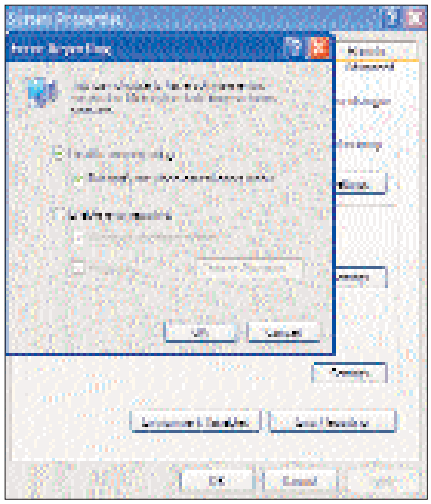
For each key, examine the right-hand pane for values named Startup or Common Startup. The All Users Startup can be correctly identified as %ALLUSERSPROFILE%\Start menu\programs\Startup, and the user-specific startup as %USERPROFILES%\Start Menu\Programs\Startup. Double-click to fix the ones that point to the wrong folder.

Error reporting gets irritating

Q. If any of my programs causes a fatal error, Windows XP doesn't force me to reboot, but it keeps asking me if I want to send a report to Microsoft, which is quite annoying. Is there some way I can stop this?

Natasha

Via e-mail



Disable error reporting in Windows XP

A Allowing Windows XP to send the error report to Microsoft has some advantages to it—it helps the company develop patches to make the OS more compatible with applications. But if this is happening too often, you can disable it. Right-click on My Computer and select Properties. Select ***Advanced > Error Reporting*** and disable error reporting. If you have an application that causes a lot of errors, you can even disable error reporting for specific programs by clicking Choose Programs.

Lost identities

Q. Ever since I installed the service pack 1 upgrade for Windows XP, I haven't been able to use my multiple e-mail identities in Outlook Express 6—I can only access the main identity.

Should I uninstall service pack 1 for Windows XP or reinstall the other identities with the associated e-mail addresses?

Sarita Ramakrishnan
Via e-mail

A There is an easier workaround for this problem. Select ***Files > Identities > Manage Identities*** and uncheck 'Use this identity when starting a program'. Now every time you start OE, you will be prompted to select an identity. If you want to switch identities, restart OE and select another identity.

Skewed History

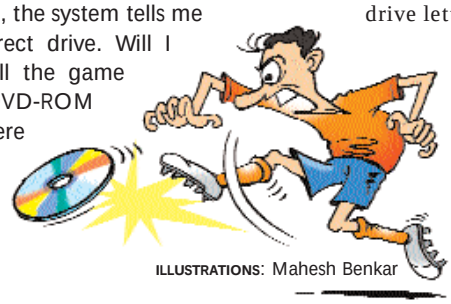
Q. When I type ***www.t*** in Internet Explorer's address bar, the auto fill-in suggests a site I find distasteful and have never visited. Is there a way to remove the site from Internet Explorer's address bar auto fill-in?

Nikhat
Via e-mail

Unable to kick-off FIFA

Q. I had used my external CD-ROM drive to install *FIFA Football 2002*, but that drive has developed a fault and needs to be repaired. My problem is that when I try to run the game from my DVD-ROM drive, the system tells me to use the correct drive. Will I have to reinstall the game using the DVD-ROM drive or is there another solution to this?

Shalini Mazumdar
Via e-mail

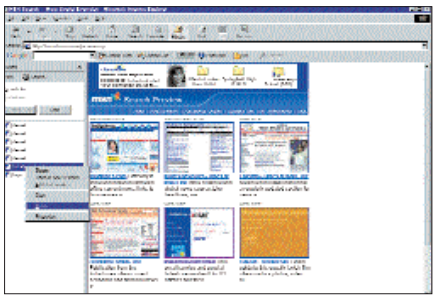


ILLUSTRATIONS: Mahesh Benkar

A *FIFA Football 2002* and other games that require you to use the installation CD to start playing the game, work only when the CD is in the drive from which you installed the game.

If you reinstall the game from the other drive, you would lose your saved games and seasons. A simpler solution would be to simply swap the drive letters for your CD-ROM and DVD-ROM drives. In Windows 98, go to Device Manager and right-click on CD-ROM. Next, under Properties, select the new drive letter from the list.

If you are running Windows XP, go to ***Control Panel > Performance*** and ***Maintenance > Administrative Tools > Computer Management***. Select Disk Management from the left pane and locate the two drives in the graphical view on the right. Right-click on the DVD-ROM drive, select Change Drive Letter and Paths, and assign it the letter originally held by the CD-ROM drive. Similarly, change the drive letter for the CD-ROM drive.



Selectively delete URLs from your IE History

A Somebody using your PC must have visited the site in question, as the AutoComplete entries in IE's address bar are drawn from your IE history.

A drastic step would be to get rid of the entire history list by clicking ***Tools > Internet Options*** and clicking the Clear History button, but why lose the benefit of auto completion? You can prevent a particular URL from appearing in the address bar: click the History button on the toolbar, click on Search and locate the URL. Then right-click each page in the history list that matches the URL, and delete.

Formatting text from the Web

Q. Text copy-pasted from the Web into Word often has odd formatting and carriage returns after every short line of text. This makes the article take up quite a few pages when I take a printout. Is there a quick way to format such text so I can remove the carriage returns in one go, instead of deleting them one by one?

Manish Saxena
Via e-mail

A You can remove the carriage returns through the Find and Replace dialog box in Word. Before you begin, make sure that there's a blank line between paragraphs. Bring up the Find and Replace dialog box by pressing [Ctrl] + [H] and clean the document as follows:

Step 1: Replace ^l with ^p (here ^l represents a new line (manual line break) and ^p represents a paragraph mark).

Step 2: Replace ^p_ with ^p (here the underscore represents space).

Step 3: Replace _^p with ^p (the underscore represents a space). Steps 2 and 3 ensure that you don't miss out the paired paragraph marks because of any intervening space.

Step 4: Replace ^p^p with %$#@. In this step the actual paragraph breaks (a pair of paragraph marks represents the blank lines separating the true paragraphs) are replaced with a text string that does not appear in the document.

Step 5: Replace ^p with a space. This takes care of any stray paragraph marks.

Step 6: Replace %$#@ with ^p^p. This restores the correct paragraph breaks.

In the Find and Replace dialog box, click on More and expand the Special drop

down list to select these characters. You can record these steps as a macro, which you can apply every time you copy text from the Web.

An issue of compatibility

Q. I recently upgraded to Windows XP Pro, but some of my old games and programs don't run in XP. What could be the problem?

Basant Kulkarni

Via e-mail

A You can get your legacy applications to work in XP by trying out the different compatibility modes. Right-click on your application's shortcut and in Properties, click the Compatibility tab to launch the Compatibility wizard. Select either the Windows 98 Compatibility mode or Windows 2000 Compatibility mode and see if your application works. If it doesn't work, try selecting the Disable Visual Themes option. If the application still doesn't work, try dual-booting your PC with Windows 98 or another OS that you know works with the app. Remember to first install the older OS and then the more recent one. For example, install Windows 98 first, and then install XP on another partition.

The Compability option allows older games to be played in Windows XP

Missing msconfig in Win2000

Q. I am running a PC with Windows 2000 Pro with Service Pack 2. After a spree of experimentation, I ended up with a lot of programs running on startup. As a result, my system takes ages to load. However, I cannot locate msconfig.exe in Windows 2000 for cleaning out the System Tray. Please help.

Anand Kukreja

Via e-mail

A Unfortunately, msconfig is not included in Windows 2000, but there is a way to check which programs are starting up with Windows and weed out the ones you don't want.

First of all, look in the Startup folder in your Start menu and delete the shortcuts you don't need. Next, go to the registry (click Run in the Start Menu and type ***regedit***) and browse to HKEY_LOCAL_ MACHINE\SOFTWARE\Microsoft\Windows\Current version\Run. Each key in this folder starts an application that runs every time Windows starts—remove the ones you don't need. However, we suggest that you don't remove any program that's located in the c:/winnt or c:/windows directory or any of their subdirectories. Also, as a general rule, retain any shortcuts that run toward RUNDLL32.EXE.

Dim memory

Q. I have a PC with a Pentium III 800 MHz processor. The motherboard is an 815 chipset motherboard. I recently upgraded my memory and installed a 512 MB RAM module in my PC. Though my system reads installed memory as up to 512 MB RAM, it shows as just 256 MB in the Windows 98 Control Panel. Why is this so?

I also experience hiccups when playing *Quake III Arena*, even though I have a 32 MB nVidia GeForce card. Even the audio gets

FAQs

Transferring files

I often need to take work home and I do this by copying files to a removable media and then copying them back onto my home computer's hard disk. After I've finished my work, I copy the files to the removable media again, so I can cart it back to work. Is there a better way to transport files between my work and home computers?

Ramez Mistry

Via e-mail

There's an old DOS command that makes it much easier to transfer files. This command works with hard drives, Zip drives, CD-RW (via packet-writing software such as Roxio's Direct CD) and other removable media.

Right-click a blank space on the desktop or in Windows Explorer's right pane and select ***New > Shortcut***. In the Create Shortcut wizard, enter ***xcopy "import folder name*.*" x:\transfer /d /y /s***. Here, 'import folder name' is the location and name of the folder you want to copy and 'x' is the drive letter of your removable medium. For instance, if you want to copy from c:\Windows\Desktop\Work via your floppy drive (a:), enter ***xcopy "C:\Windows\Desktop\Work*.*" a:\transfer /d /y /s***. Click Next and name the shortcut 'Export'. Click Next, choose an icon for the shortcut if you want to, and then click Finish. In Windows 98 and Me, right-click the shortcut and select Properties. Under Program, check 'Close on exit' and click OK.

Now select the Export shortcut and press ***[Ctrl] + [C]***, then ***[Ctrl] + [V]*** to create a new shortcut called Copy of Export. First rename this as Import and then right-click it and select Properties. Click the Program tab and reverse the two paths so that the one to the transfer folder on your removable medium comes before the one to the hard drive folder. For instance, change the example above to xcopy a:\transfer "C:\Windows\Desktop\Work*.*" /d /y /s. Click OK.

Create similar shortcuts on your home computer.

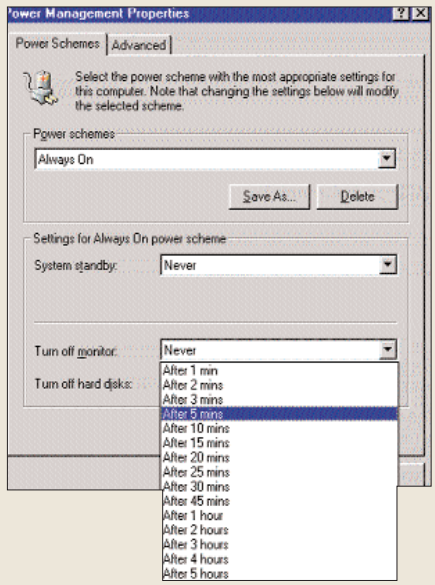
Next time you want to transfer files, put a disk in the drive and click your Export shortcut. To access the contents on the other machine, put the disk in the computer and click the Import shortcut.

Save Our Screen

I have heard that running a screensaver program prevents the screen from burning out and helps prolong the life of the monitor. Is it true? What else can I do to prolong the life of my monitor?

Mitoo

Via e-mail



Set Windows to automatically shut down the monitor after a certain period of inactivity

In the days of monochrome monitors, characters (such as the C:\ prompt in DOS) and images could get permanently burned into the screen if the screen was left static for too long. Today's monitors are sturdier.

The best thing you can do to prolong the life of your monitor is to switch it off when not in use. You can set Windows to automatically power down the screen if it's been inactive for a certain period of time. If you have Windows 98 or Me installed, click ***Start > Settings > Control Panel > Power Management***. Under the Power Schemes tab, select a time from the drop down menu next to 'Turn off monitor'.

Your monitor's worst enemies are heat and water—add a fan if your display is running hot and keep it safe from moisture.

stuck during games or if I play music while working in Photoshop. Please help.

Santosh R.

Via e-mail

The reason for your RAM problem is that your motherboard doesn't support 512 MB RAM DIMMs. The 815 chipset motherboards have three DIMM slots that together support a total of 512 MB RAM—they don't support a solitary 512 MB DIMM. If you exchange your RAM for two 256 MB modules, it will show up correctly.

Regarding your gaming woes, even a very old GeForce is more than enough to play *Quake III Arena*, unless you are playing the game at a resolution over 1024x768. Also, disable the motherboard's onboard graphics from the BIOS and/or the Device Manager. Make sure that you have the latest Intel chipset drivers (for the motherboard) and the latest nVidia drivers (for the GeForce graphics card) installed. Finally, make sure you have the latest version of DirectX (***www.microsoft.com/directx***).

If you want hassle-free audio, consider replacing the onboard audio with a soundcard. But before you spend any money, check that the audio problem is not because you have the wrong drivers loaded for your onboard audio. If you do decide on a soundcard, make sure you uninstall your audio drivers and turn off the onboard audio in the BIOS or via the motherboard jumper before you install the soundcard.

Did I kill my graphics card?

I recently bought a new PC with 512 MB of PC2100 DDR SDRAM, an AMD Athlon XP 2100+ processor, a GeForce4 Ti 4600 graphics card and a KT333 motherboard. Everything was working fine, till I exchanged the graphics card with the one in my old computer—now I am unable to boot. I've put back the GeForce4 in my new machine, but still nothing. Have I caused my graphics card some serious damage?

Shiv

Via e-mail

The most likely reason for your trouble is that you've shaken something lose while you were switching cards. But just to make sure that your GeForce4 is still fine, try booting your older PC with the card installed in it.

To fix your new PC, reinsert the GeForce4 and make sure it's firmly in place. Also reseat the other components such as the memory and power to make sure that nothing came lose while you were tinker-

When the music died

Q. Whenever I play an MP3 file on my laptop, there is an interruption at the beginning of the song and then it continues to play. If I stop and replay the song, it runs fine. My laptop is a Compaq Presario with a 533 MHz AMD K6 and 96 MB of RAM and I have the latest versions of MusicMatch Jukebox and Windows Media Player. I've redownloaded some songs, updated the drivers and even defragmented and scanned my hard drive for errors, but the problem persists.

Swadesh

Via e-mail

A. There's nothing wrong with your laptop or your media players, except for the fact that your laptop is just too slow—the specifications you've listed are the minimum requirements for running MusicMatch Jukebox and Windows Media Player. And remember, like Zip files, MP3s also have to be decompressed before they can be played—this process can be quite taxing for an older processor running a new, resource-hogging media player while simultaneously running other software in the background. You can verify this by playing some of your MP3s on a faster desktop PC.

To solve your specific problem, try running a light and no-frills software MP3 player such as Sonique (***www.sonique.com***) on your laptop. Also remove unnecessary applications from the System Tray so that they don't load automatically at startup—for instance, you could temporarily disable some applications such as the anti-virus program and the IM. Go to ***Start > Run*** and type ***msconfig***. Click on the Startup tab and uncheck anything you don't want to automatically launch (you can always enable these later).

These steps should help you squeeze out enough power from your laptop to play your songs.

ing. If the motherboard has an onboard speaker, enable it; if the speaker is external, ensure it's plugged in so that you can hear if you are getting a POST beep code error.

No arrows

Q. How do you remove those ugly little arrows that appear over icons in Windows 98?

Username

Via e-mail

A. It is very simple to get rid of the shortcut arrows. Just download TweakUI from Microsoft's Web site (you can get the Windows XP version at ***www.microsoft.com/windowsxp/pro/ downloads/powertoys.asp***).

After installing TweakUI, launch the program and open the Explorer tree and then the shortcut selection. Change the Setting from 'Arrow' to 'none'.

Send your computing problems to *sos@jasubhai.com* or write to Digit, D-222/2, Om Sagar, MIDC, Nerul-400 706, and we may answer it here!

tips & tricks

Power Builder

Want to build that dream machine? Here are tips from power users on how to build a souped up system—the fastest and most stable, this side of the Arabian Sea

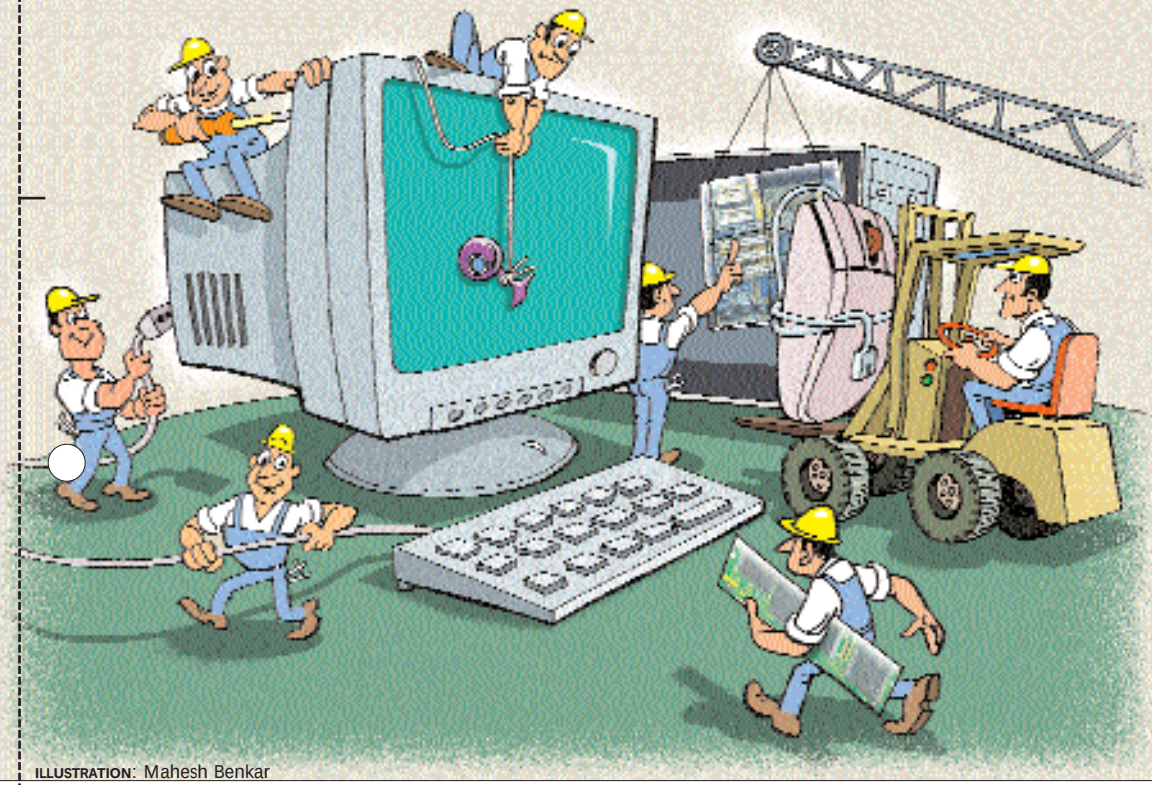


ILLUSTRATION: Mahesh Benkar

contents

Power tweaks for Windows 98

Find it on the Mindware CD

10 POWER TIPS FOR INTEL-BASED SYSTEMS

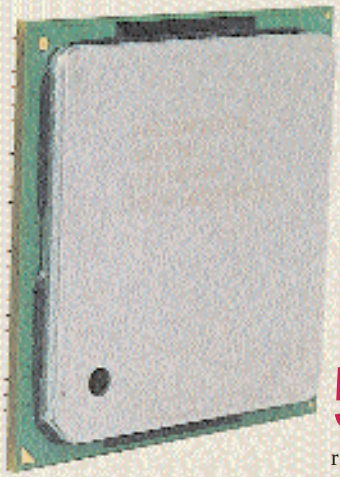
The right installation will pave the way for trouble-free operation and let you harness the full potential of your PC. Keep in mind the following tips while buying and installing an Intel-based processor

1 Keeping your cool

Since processors are continuously stressing on faster speeds, cooling becomes an important issue—gift your processor a rated heatsink and cooling fan combination. Most processors come with the heatsink and cooling fan in tow, but you may require a better cooling solution, especially in the case of the Pentium 4 processors.

2 How much thermal paste?

If your heatsink is covered by thermal tape, you don't need to apply any thermal paste. Otherwise, apply just a dab—too much thermal paste and it will ooze out. Also make sure there are no air bubbles.



The Pentium 4's Thermal Heat Spreader protects and dissapates heat from its core

3 Power to run

Due to additional power requirements, all Pentium 4 processors need the extra +12 V rail to run correctly. Therefore, make sure the power supply for your new processor has the necessary four-pin +12 V connector that goes into the ATX12V connector on your motherboard—both your power supply and motherboard should support this connector.

4 Go for quality

Don't skimp on the motherboard—a high-quality motherboard may make you a few thousand rupees poorer, but will guarantee far greater stability and support for hardware, chipset and BIOS. You'll also get more features such as more overclocking options and integrated peripherals.

5 BIOS updates

Make sure you buy a motherboard that offers regular BIOS and driver updates on the company Web site. This spells great support for newer hardware and helps iron out the bugs and flaws that may crop up. Newer BIOS updates can also mean significant performance boosts.

6 To HyperThread or not?

Intel's new 3.06 GHz processor now incorporates a technology called Hyper-Threading, which enables the processor to perform far better when running multiple applications simultaneously. However, this comes at a price and you should opt for it only if you need the high performance for executing multiple tasks. You will also need to confirm if your motherboard supports HyperThreading.

7 A question of memory

The current scenario gives users the choice of SDRAM, DDR and RDRAM memory in a Pentium 4-based system. DDR memory offers high data transfer bandwidth and is priced lower than RDRAM. However, RDRAM's higher data transfer rate makes it ideally suited to demanding applications such as gaming, CAD modelling and graphics-intensive, texture-heavy applications. Also, RDRAM needs to be installed in pairs, unlike the DDR or SDRAM—this needs to be kept in mind while buying memory modules. These three types of memories cannot be used on the same system, therefore, choose your camp with care as you will not be able to change your memory type later without also changing the motherboard.

8 Willamette or Northwood

While the newer Northwood Pentium 4 processors built around the 0.13-micron fabrication process are more popular than their older 0.18-micron Willamette counterparts, the latter is still available in the market. The Willamette processors draw more power and therefore generate more heat. Also, the Northwood processors integrate twice the amount of L2 cache (512 KB) as compared to 256 KB integrated by the Willamettes.

9 Special drivers

Intel supplies drivers for the new 800-series chipsets (including the 845, 845-DDR and 850 chipsets) called the Intel Application Accelerator driver—another fancy name for the UDMA drivers. These increase the performance of your IDE devices quite significantly. They offer better boot times and also surpass the 137 GB limitation of the IDE drives in the native Widows drivers.

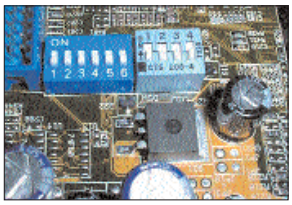
10 Application support for special instruction sets

Intel processors have special instruction sets such as SSE2 that help deliver better performance with certain types of data. Ensure that you look out for applications that support these special instruction sets when using a P4 processor. In some cases, you might need to install specific patches that let these applications use the special instruction sets.

THE RIGHT WAY TO INSTALL A PROCESSOR

STEP 1 Preparing the motherboard

Set your motherboard to run at the correct core voltage, bus frequency and clock multiplier settings by consulting the manual. In some cases, you may need to do this through the DIP switches on the motherboard or



DIP switches to set the correct bus frequency and clock multiplier settings

the Frequency/Voltage settings in the BIOS.

STEP 2 Preparing the processor

Next, apply thermal paste on your processor by using a thin plastic visiting card—a plastic card is best suited to spreading the paste smoothly all across the surface of the processor core. You can also extend this paste around the

Smoothly apply the thermal paste to the processor core so that there are no air bubbles

core, but smoothen out the paste such that there are no air bubbles. Also, the paste should be in contact with every portion of the processor core.

STEP 3 Preparing the heatsink

Next, locate the region on the underside of the heatsink where the processor is going to touch the processor core. This is usually in the centre of the flat area of the heatsink. Once you have ascertained this

On the heatsink, apply thermal paste on the area that will be in contact with the processor core

zone, wipe it clean of any dust. Then evenly spread some thermal paste, carefully avoiding any air bubbles.

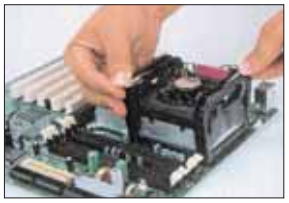
STEP 4 Seat the processor in the socket

Clamp the processor firmly into the socket on the motherboard and make sure that it is correctly aligned with the pins. Do so without applying too much force on the processor.

Firmly seat the processor in the motherboard socket

STEP 5 Install the heatsink

Place the heatsink on the processor gently, but firmly—take care not to damage the core of the processor. Make sure that the heatsink is seated such that it is in complete contact with the processor core, then fasten the clasps into



Make sure the heatsink is firmly latched onto processor socket

the retention hooks of the processor socket to ensure that it is in firm contact with the processor.

STEP 6 Connect the CPU fan

Finally, connect the CPU fan on the correct point on the motherboard. Make sure that the heatsink assembly is firmly seated—there should be no play in it.

There, you're now good to go!

Connect the CPU fan to the motherboard

10 POWER TIPS FOR ATHLON-BASED SYSTEMS

Since you belong to the AMD camp, consider the following steps to build a reliable and high-performance system

1 Take care while mounting the processor

AMD processors have a very delicate processor core as the silicon is exposed on top of the chip. Therefore, great care needs to be taken to ensure that the processor is not damaged by rough and incorrect installation of the heatsink. Ensure that the heatsink is installed flat down—do not angle it or try to slide it in, as this would graze the top of the processor or chip its sides and render it useless.

2 Keep it cool

AMD processors are extremely susceptible to heat and it is critical that they be kept cool. Therefore, the CPU has to be plugged in before powering on the system, otherwise the CPU and possibly the motherboard would be damaged within seconds of switching on the system. Also see that the CPU fan is correctly mounted on the system using thermal paste so that it maintains good contact between the heatsink and the processor *(refer to the box, 'The Right Way to Install a Processor', for more details on how to do this).*

3 Stick to ratings

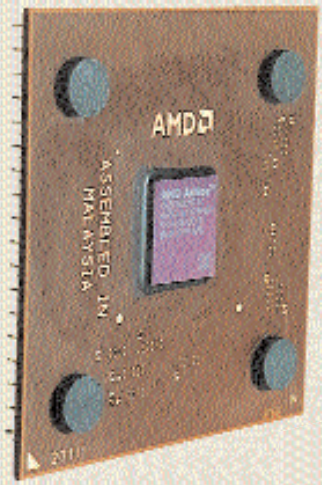
Always use a CPU heatsink and fan combination that has been certified by AMD. If you prefer to buy a separate one, make sure it is rated and can run with your particular processor as Athlon has stringent cooling requirements.

4 Power considerations

If you plan to use the faster Athlon processors (2000+ and above) along with power-hungry peripherals such as a CD-Writer, large hard disks and a powerful graphics card, use a high-quality power supply with a rating of at least 300 watts. Most low-end power supplies cannot deliver clean power to systems built on these components, resulting in an unstable system.

5 Follow the instructions

AMD processors also have specialised instruction sets like 3DNow! which streamline the power of certain applications. To realise the full potential of these processors, make sure that your applications integrate support for the special instructions. In some cases, you might need to load special patches to enable the support.



The AMD's exposed core invites damage

6 A matter of memory

The AMD processors let you choose between SDRAM and DDR memory. While SDRAM is the cheaper of the two, DDR memory offers higher bandwidth and it is continually evolving in terms of technology and speed. SDRAM is a good cost-effective option if you plan to run memory-intensive applications. However, DDR's inherent speed and falling prices make it a good investment for the future.

7 Which processor?

AMD gives you three choices in processors. While the Duron range offers reasonably good performance given its price, it makes sense to choose the Athlons as Duron processors are on their way out. Here again, you get to choose between the older Palomino processors built around the 0.18-micron process and the newer Thoroughbred processors built around the 0.13-micron process. While the latter boasts higher clock speeds, lower power consumption and consequently better performance, not all motherboards support them. Ensure that your motherboard inherently supports these processors before buying them. Optionally, you could download a BIOS update that would enable the support, if your motherboard allows it.

8 Don't scrounge

A cheap motherboard will run your processor, but will also put the stability and reliability of your system at risk. Also, there are plenty of features that a good-quality motherboard allows you in the form of better hardware support, cutting-edge features and even support for overclocking. A branded motherboard will also feature BIOS and driver updates on its Web site.

9 Drive it in

Ensure that you download and run your AMD motherboard with the latest chipset drivers for high performance and to eliminate possible bugs and compatibility issues. Visit the chipset manufacturer's Web site frequently for newer driver updates.

10 BIOS updates

Make sure you buy a motherboard that offers regular BIOS and driver updates on the company Web site. This spells great support for newer hardware and helps iron out the bugs and flaws that may crop up. Newer BIOS updates can also mean significant performance boosts.

10 TIPS ON INSTALLING MOTHERBOARDS

The motherboard is the physical and electronic foundation of your system. Here are a few tips that will help smoothen the installation process and enable it to be installed in a stable manner

1 Get it set right

Before you install the motherboard, consult the accompanying manual—you may have installed motherboards numerous times, but manufacturers add last minute addendums that describe special considerations or last-minute changes incorporated into the board. Also, mark out all the jumper settings in the manual tables so that they correspond to your processor, RAM and other system components. Tick the appropriate jumper settings; this makes it easier to implement these settings during installation.

2 Handle with caution

The motherboard has very sensitive electronic components that are susceptible to damage by static charge. Therefore, ensure that you are properly grounded (touch a metallic object to get rid of static electricity) and that the mother-

board is kept in its anti-static packaging until the time of installation.

3 Setting the jumpers before installing it

Set the jumpers to their correct positions before installing the motherboard into the system cabinet. Doing this lessens your chances of missing any critical settings and it is also far easier to access certain jumpers when the board is outside the system.

4 Mount the processor and RAM before installing

It can be quite difficult to mount the processor, especially the heatsink, after the board is seated in the cabinet, since the power and IDE cables get in the way. Therefore, mount the processor, the heatsink and fan and the RAM modules when the motherboard is outside the system. This also allows you to visually verify if the heatsink is properly seated on the processor.

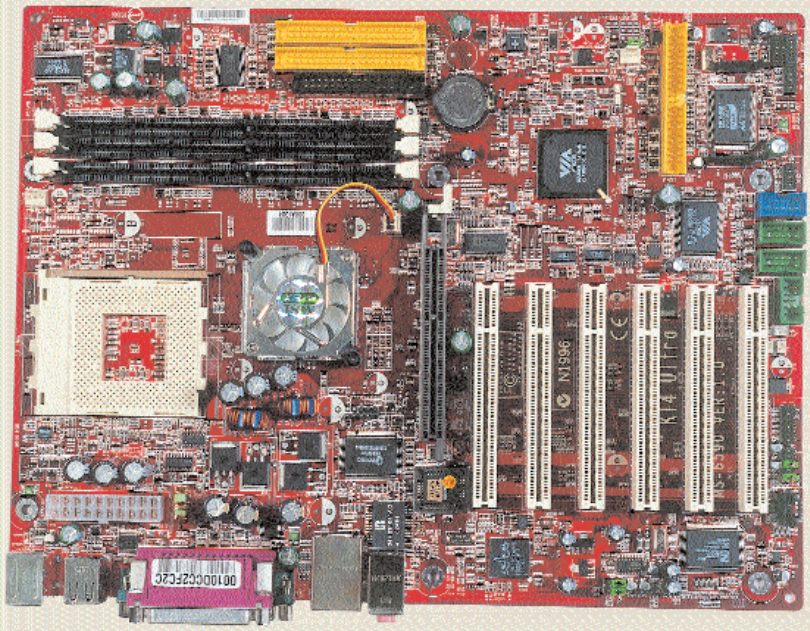
Remember to connect the CPU fan to the correct point on the motherboard.

5 Ensure a comfortable fit

The power conditioning capa-citors next to the processor socket can get in the way of mounting the CPU heatsink. Make sure that your heatsink does not push against these, as this could damage or even dislodge them from the motherboard. Also, in the case of special heatsinks, verify that it is not large enough to push against other surface mounted components close to the processor socket.

6 Anchoring the board

Make sure that your motherboard is comfortably seated in the cabinet. Preferably, your cabinet should have a detachable backplate—this lets you mount the motherboard using the spacers and mounting screws outside the system. Ensure that the motherboard has anchor points near all the extremities of the board so that it will be firmly seated and all its edges are adequately supported.



Some boards, like this MSI KT4 Ultra, include a fan for its chipset—something to look out for

7 Tighten later

Most of the time, one would tighten all the screws of the motherboard upon placing it into the system. A better option is to lightly fasten all the mounting screws so that there is still a bit of play in the motherboard after it has been mounted. Tighten the motherboard's mounting screws after the rest of the add-on cards have been placed in their respective PCI or AGP slots. This helps alleviate any unnecessary build-up of stress by cards that might have been forced into a slot.

8 Take care while attaching the IDE cables

The IDE cables are usually situated near one edge of the motherboard. Therefore, care needs to be taken that the board is not bent when plugging in the ends of the cables. This could cause breakages in the delicate tracks on the motherboard's surface, rendering it useless.

9 Attach the CPU fan

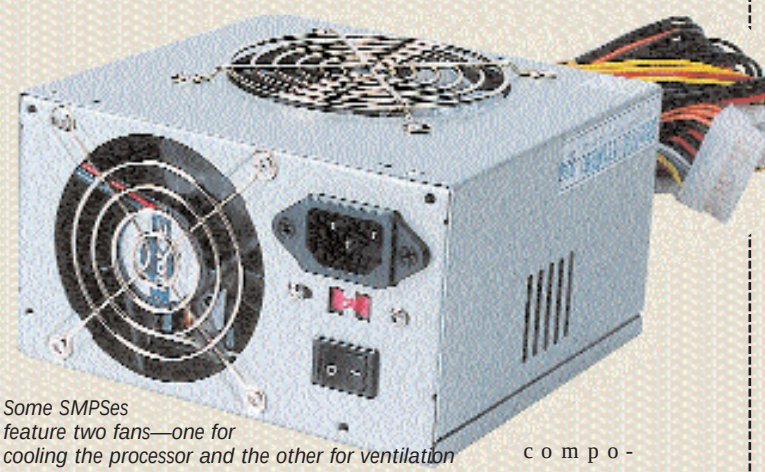
This cannot be stressed enough—ensure that the CPU fan is plugged into the correct point on the motherboard. Failing to do so could result in your CPU and motherboard being permanently damaged—and all this could happen within seconds of powering up the system, leaving you with absolutely no time to correct your mistake!

10 Listen for diagnostic beeps

Remember to connect the motherboard speaker. Study the motherboard manual for deciphering the sequence of the diagnostic beeps that are emitted when the motherboard is powered up—a single short beep means things are in order. Otherwise, you need to diagnose what's wrong with the help of the beep sequence. Check if all fans are spinning, and that the cards and RAM modules are properly seated.

10 POWER SUPPLY CONSIDERATIONS

With today's power-hungry processors and system peripherals, a good power source is critical for a smooth and reliable operation



Some SMPSes feature two fans—one for cooling the processor and the other for ventilation

1 Make sure you have enough juice

Very often, the standard power supplies that come with the system casings have a bare minimum power rating of 235 watts. While this is suited to very basic systems, the power requirements in your super system could soon supersede this low-end power supply. It is therefore wise to choose the highest rating your budget will allow—at least 300 watts, or in the case of peripheral-packed gaming rigs and workstations, even 500 watts.

2 Trust the brand

There are numerous brands of power supplies on the market, many of which use very low-quality parts. Stay away from these and spend a little more on a reputable and reliable brand such as Codegen or Antec.

3 Watch the weight

As a rough rule of thumb, take two power supplies of the same rating but different brands and see which one is heavier. Usually, a heavier power supply implies that higher quality components such as heat sinks, capacitors and transformers are used and this translates into higher quality. Lighter power supplies usually comprise of lower-quality components fabricated of cheaper and hence lighter materials. The lighter weight may also mean that some components, such as the heatsink, are completely left out.

4 Special processor compatibility

Depending upon your processor, make sure that your power supply can provide the juice required to run the processor. Look for any indication that the power supply is rated for use on AMD or Intel-based systems specifically. In the case of Pentium 4-based systems, look out for the presence of the ATX12V four-pin connector that is needed to power Pentium 4 processor-based computers.

5 Beware the bundles

Most power supplies bundled with the system casing are of low quality since their cost has to be integrated into the cost of the system. Beware of these power supplies and make sure that their rating is high enough for your particular processor, peripherals and internal system components. If need be, opt to trade in the integrated power supply with another of a higher rating, quality and brand, and offer to pay the price difference.

6 Go in for the highest

Even though you might not need the additional power, it makes sense to invest in a power supply that is rated slightly higher than for your application. Also, a higher rating does not mean that it necessarily draws more power—it will only draw as much power as is needed by your particular mix of system components.

7 How's the head count?

You may find out, much to your dismay, that the number of power supply heads from your SMPS may be lesser than the number needed by your hard disk, CD/DVD/CD-RW drive, etc. This is another factor you need to consider—your power supply should have enough power connectors, so that you do not need to invest in additional Y-cables for powering all your components.

8 SMPS cooler

In most systems, the SMPS fan shoulders the burden of cooling all the components. This makes it important for the fan to be powerful enough to handle the airflow in the system, without letting too much heat to be developed within the system.

9 Lower the noise

The SMPS fan tends to make a lot of noise due to the vibration. To prevent this, the SMPS unit must be firmly fastened to the casing, with no play in it. A loose attachment causes the power supply to vibrate excessively and can also cause component stability problems in the future.

10 Clean the fans regularly

The SMPS fan is one of the biggest components in the system and sometimes serves as the only duct for directing the heated air outside the system. Hence, it is very prone to dust and needs to be cleaned regularly to prevent dust build-up within the SMPS and the fan. A blower or brush does a competent job of dislodging any dirt or dust stuck on the fan blades.

10 TIPS FOR COOLING

Now that your system is up and running, it is important that you keep it cool for greater reliability. A cool system is also better equipped to handle overclocking experiments

1 Case cooling fans

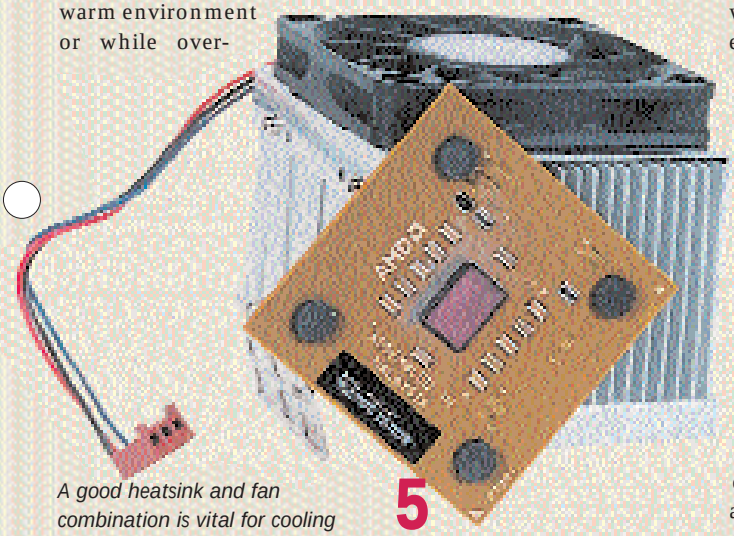
If your casing has provisions for cooling fans, invest in a couple of good ones. A CPU fan concentrates on only the processor and additional system cooling fans draw hot air from heat-generating components such as the CD-ROM, chipset and graphics card, maintaining a constant airflow within the system cabinet.

2 Upgrade your processor cooling

While the bundled heatsink and CPU fan do a good job of cooling the CPU during normal operations, you will need a more robust solution if your system is situated in an especially warm environment or while overclocking. In such cases, choose a more powerful solution from brands such as ThermalTake or CoolerMaster. Also, see to it that the CPU fan has an airflow of at least 34 cfm (cubic feet per minute) for reliable cooling under strenuous thermal conditions.

3 Of frequencies and voltages

While installing your motherboard and processor, make sure that your voltage and frequency settings are at their correct values, unless you mean to be overclocking them. An incorrect setting could run sections of your system with higher voltage and frequency ratings than they are meant to, resulting in higher heat levels. Therefore, consult the motherboard manual while setting the voltages and frequencies.



A good heatsink and fan combination is vital for cooling your processor

5

4 Get a system dashboard

Most systems have applications that monitor the sensor chip on your motherboard to keep you informed about the current temperatures, frequencies and voltages of its critical components. This is especially useful while overclocking, when you want to keep the rated thermal levels under safe limits.

5 Arrange your cables

Internal cables such as your IDE, power and sensor cables can cause a mess within the system and hamper the airflow. Make sure that these cables are correctly ordered and tied together to circulate the air within the cabinet for more efficient cooling.

6 Double-barrel cooling

Opt for a casing that has at least two blowholes with provisions for cooling fans. One fan should be placed in the front and the other in the rear of the system for smooth circulation.

7 Additional cooling

If you are going to carry out overclocking experiments, make space for additional cooling for your processor, graphics card, RAM and motherboard by modifying your system casing and installing more fans.

8 Go with the brushless

Invest in a brushless type of cooling fan as these are far more efficient—they ae silent and feature a higher rpm as compared to older fans.

9 Clean the fans regularly

Case cooling fans are susceptible to picking up dust and dirt from the environment and need to be taken care of. If they are too clogged with dust, they could slow down or even stop rotating completely, causing overheating or even failure of components. Clean out these fans with a brush or a blower so as to dislodge any build-up of dust on the fan blades. It is wise to keep your system covered during the day when it is not being used as this prevents dust from settling on it.

10 Keep the system away from dusty environments to prevent dirt clogging

Keep your system away from dusty environments—this includes open windows facing main roads or construction sites. While a sealed, air conditioned room is best suited to a computer, today's computers are hardy enough to work well in a normal room, but care needs to be taken that they are not in direct sunlight, causing unnecessary build-up of heat.

10 OVERCLOCKING TIPS

Now that your system is all set firmly, you may feel the urge to push its performance that extra mile. Here are a few things you need to keep in mind before embarking on any overclocking adventure

1 With a little help from your motherboard

Firstly, consult the manual to make sure that your motherboard supports overclocking through jumper settings or BIOS tweaks. Once you are sure that you can change the CPU's core voltage, clock multiplier or bus speed, only then should you go about pushing your system harder.

2 Tighter control of voltage/frequencies

Opt for a motherboard that offers fine control of parameters such as the core voltage, clock multiplier and bus frequency. If these parameters can be incremented by small units, your overclocking experiments can be that much more controlled and safer.

3 Processor permission

Most processors allow overclocking only to a certain extent. Others, by virtue of their design, allow overclocking to greater degrees. A processor with a lower amount of L2 cache, a smaller fabrication process and a lower bus speed support can be overclocked to far greater extents as it has more room for expansion.

Most processors today have their clock multipliers locked and this prevents them from being tweaked through that component. In such cases, the bus speed needs to be used, but take care so that the rest of the system is not adversely affected.

4 You are on your own!

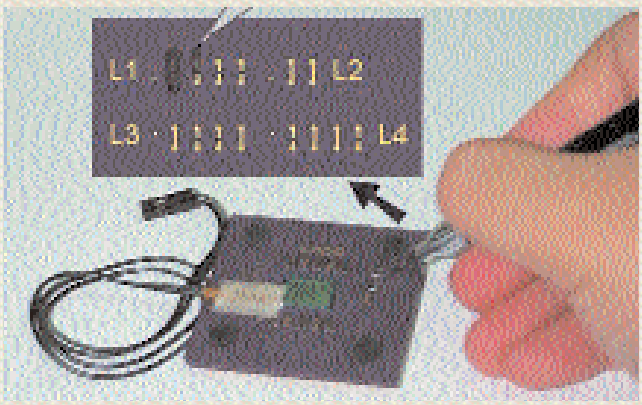
Keep in mind that your warranties will not cover any damage cause by tweaking; so be very sure of the extent to which you can push your system safely. This is especially applicable if you want to modify any part of your hardware to accommodate experiments.

5 Ramp up your cooling

The first by-product of a tweaking experiment will be the generation of heat in your critical components. Therefore, make sure that you have adequate cooling for components such as the processor, RAM and motherboard chipset. If necessary, purchase a better heatsink or cabinet cooling system.

6 Multiplier or bus speed?

You can increase the effective speed of your system by either increasing the clock multiplier or the bus frequency. However, since most processors are clock-locked, you will have to take the bus-frequency route. However, in this case, installing a system monitoring software would be a good idea to keep tabs on your temperatures, voltages and frequencies. See that limits are not exceeded—temperatures should not exceed 60° C and voltages should not swing more than 5 per cent away from their rated values. Throttle back as soon as you feel that your system is reaching its limits and if it shows any signs of instability.



Some AMD processors require their L1 bridges to be shorted with a graphite pencil before overclocking them

7 Overclock in steps

Start out your overclocking at the rated settings and work your way up in small increments—do not be overzealous. Working in small steps allows you to closely monitor your system for signs of instability, before pushing it to the next level.

8 Tablulate your findings and find out the most stable setting for your system

At each step of your overclocking adventure, tabulate the present frequency, voltage and thermal levels of your processor and system. At each stage, run a strenuous application such as a looping game benchmark and look for any signs of instability. Your tabulated results will pin down the point at which your system runs most stable.

9 Monitor the status of your system

Throughout your overclocking efforts, monitor your system temperatures and voltages very closely. It is critical that they remain within limits for your system to run reliably. Failing to do so will result in shortening the life of your processor or even failure.

10 Run an acid test

Once you've overclocked to satisfaction, you need to run a burn-in application for at least 4 hours. This will ensure that your overclocked computer will run all your applications reliably, without lag or failing.

It's only a game; it's more than a game. Even as the debate rages on, millions of people all over the world come home from an unforgiving day, shed their ties, pick up their sword of Blood Fire, get together with friends and head out to slay dragons. The debate, to them, is pointless. Where does the real end and the virtual begin, they ask, when life and game are two sides of the same personalit, the essence of what makes them human

pick a life, any life

Martin is a sad man today. Guild leader and close friend Peter passed away a day ago. Now there was a personality—67 years old, level 61 Druid and a lover of life who alas, also suffered from a heart condition that would eventually prove terminal. Within the land of *EverQuest*, Peter was a legend. Surefoot he was called, and Surefoot was a leader of repute: an astute diplomat who could charm a Dire Bear to sacrifice her cubs for the greater good of humans. He had the heart of a lion. Martin recalled the concern that Peter genuinely expressed when he could not log on to the game server for two weeks. "He wanted to know what happened, so I told him."

What had occurred was this: for weeks Martin had relentlessly pursued a gruelling multi-part quest, at much cost to his real life. With the last phase complete, he headed over to the in-game character which was designed to reward him. Martin brought forth the trade window and ritualistically, with reverence, handed over the desired item—to no effect. The character did not know what to make of the very real blood, sweat and tears that manifested themselves as a bunch of pixels within its virtual inventory. Martin was furious. Here he was expecting pomp and glory and all he got was a blank stare. He petitioned the game masters (designers of the game who answer to queries and offer solutions) but none proved helpful. The anger turned to rage, got together with the frustration now building, and poured itself out in the manner of an overgrown tantrum that wishes to be a raging fit. Martin spat at his monitor, his chair flew to the corner of his room, splintering into nothing. Still spewing pent up anger, he headed to his door and punched it repeatedly. Several blows later Martin realised, with much pain, that he had cracked his knuckles, bones now glued together with bleeding skin. "My doctor will have an interesting visitor today," he thought aloud.

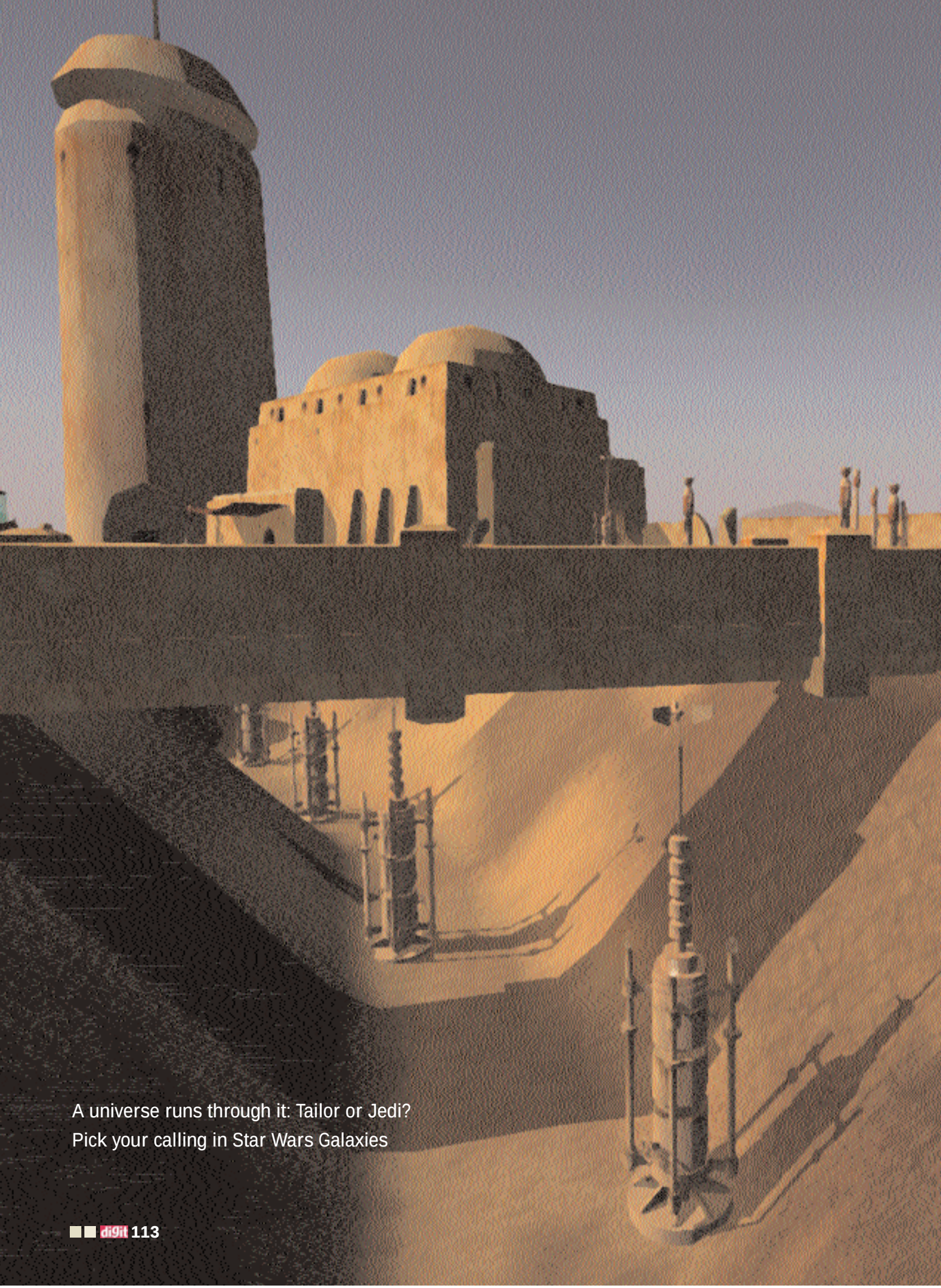
Martin expected sympathy from Peter over this tale. What he got was a series of LOLs and ROFLs a mile long. The reaction put a new perspective on the incident and the bitter-sweet irony of pain relieving anguish hit him like a bad joke. He indulged in the laughing session and felt all the more better for it.

Yes, Peter would be missed. He should, however, not let his emotions belittle this parting ceremony, he scolded himself. Surefoot deserved a grand farewell and as Master Of Ceremonies, Martin would ensure that grand this day would be. He typed his eulogy to an attentive band of elves, druids, fighters and rangers; and framed within that digital moment, smeared with tears of remembrance; both the virtual and the real Peter lived on.

Being a social animal

Occasions more joyous than a funeral are held in the world of MMORPGs (Massively Multiplayer Online Role Playing Games). Induction ceremonies, victory celebrations, levelling parties (thrown when characters level up, gain experience), even birthday bashes are a common occurrence in games such as *Ultima Online*, *EverQuest* and *Asheron's Call*. Marriages too! Women are a rarity in these realms (most of them are men) and for better or for worse, they are much sought after.

Relationships have a different flavour in the virtual world. In many ways they are more honest, more real. "It's easy to open up to someone when he or she cannot see you," says Mullen, a veteran of Ultima Online. "I have shared thoughts and emotions online which I would never dare reveal to the closest of my real friends." It is a bonding that expresses itself as both on-screen and off-screen romance. Mady, a 41-year-old, found solace in one such online relationship—the guy even moved across states in the US and paid her a one-month visit. The virtual ground they had covered together paved the way for a smooth real-world get-together and before long, they were chatting and laughing without a care in the world. "I sold everything, moved east and married him," chirps Mady, "I do not



A universe runs through it: Tailor or Jedi?
Pick your calling in Star Wars Galaxies

regret it for one second."

When relationships build and break over e-mails and IMs, why should a game world offer less? Indeed it offers much more. People find that they have gained confidence and are more assertive in their life. And why not? They just organised 300 people from across the globe to get together and slay evil. An exercise highly recommended for the self-esteem.

Dark Age of Camelot: *A land of dragons and magic*

A lucky few find that ever-elusive thing called love, even hope—in an online survey, 31 per cent of respondents claimed to be more benevolent within a game than they are in real life. Some even use online quests as substitute therapy: "I find myself much more satisfied venting my stress through repeated slashes of an imaginary sword on an imaginary creature and having someone there to listen without the face-to-face, truly personal connection other mediums of therapy offer," says an *Asheron's Call* player. "Plus it costs a lot less per month. And while this does certainly sound quite like a narcotic, I would rather be dependent on a game world than on a more damaging physical drug that wouldn't offer the same connection with others nor the true tranquillity, as opposed to an artificial hallucination as a result of some recreational pharmaceutical."

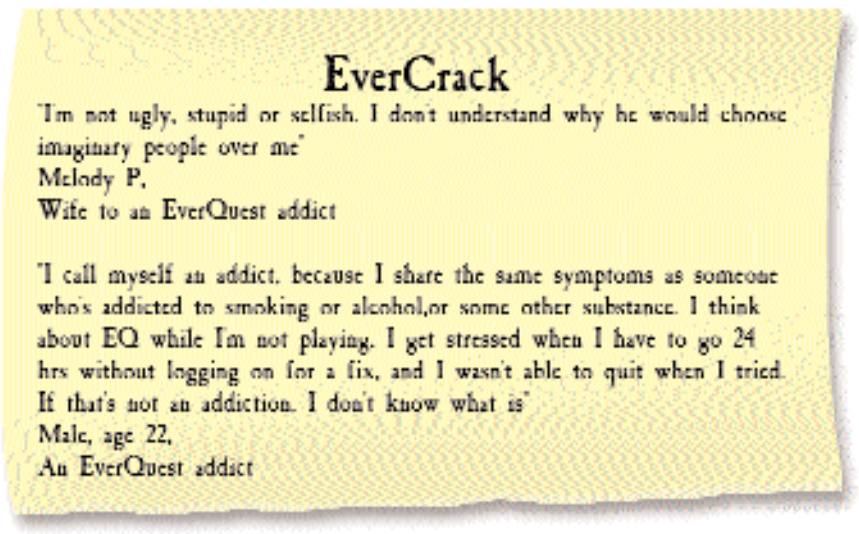
The darker side is desperate addiction and a paranoid schizophrenia that rises from the pits of a CD-ROM disk. You will, thus, come across cases such as that of a mom who sued industry giant and owners of *EverQuest*, Sony, after her son killed himself. Or like that of a father who nurses a similar grievance over his son who committed suicide after a failed online, in-game relationship. While the mom tried to attract media attention to a very real problem, dad started an online forum where those addicted to games in general and MMORPGs in particular, share their experiences and hopes. You may also hear of the Korean boy who died at his keyboard because he neglected his health for days together, over a game. Or the college student who played so much that he imagined orcs and goblins in the real world, chasing him into the arms of insanity.

You dream it, we build it

If the pixellated mess that represents games such as *Ultima Online* and *EverQuest* generate such emotions, what will the next wave of titles bring to shore? *EverQuest* has more than 433,000 paying customers who generate $5 million (almost Rs 25 crore) a month for the Japanese giant. It is thus without surprise that realms that promise much more are popping up all over.

If dragon slaying doesn't appeal to you, kind sir, may we interest you in this world, where you can be a nefarious sea-pirate! Or how about this one, if you wish to take to space and fulfil every *Star Trek* fantasy? You can zoom around stars, between wormholes, inside your Frigate class ship, taking down rogues and villains, or being one! Mine the asteroids, establish trade routes and trade organisations. Heck! You can buy this planet right here! We will throw in a moon for beauty's sake. There is much more sir, much, much more. You can jack yourself into the online world of *The Matrix*, or grab a lightsaber and flow with the Force in a digital rendition of the *Star Wars* universe. Someone else? A superhero perhaps? A lone, desperate gun fighting for survival in an equally desperate post-apocalyptic, cyberpunk world? Gandalf from *The Lord of the Rings*? What's that you say? You want to be a rock star? Well, step right up and take to the stage. Do mind the dwarves, kind sir, they are a sensitive lot.

As technology advances on the warhorse of faster hardware and the



paved pathways of a broadband connection, it blurs and distorts everything it passes; trampling both definitions (what is real, Morpheus wondered) and ethics, gleefully throwing paradoxes. Take visual information, for example—computers are fast reaching the point where what you see within a game will be indistinguishable from what lies outside your window. Mommy will be one taunt short: yes mom, there are birds and trees and seas and butterflies and people inside this game. Real people, most of my friends, are in here. Look! Uncle Vijay says hi!

Dragon Empires, an MMORPG in the making, promises to offer the most realistic world that does not exist. "One of the really cool features of the game is that the landscape and sky naturally light the faces and bodies of characters. We don't need to add shadow textures or shading on textures to highlight face features, for example, because when light falls on the face and body, it gets lit naturally. No shadow texture under the nose or chin is required; the game will do this for you. The effect is quite exciting as you can see the sun form a halo behind someone's head and their face will be in shadow; when lit from below, characters look quite scary and the differences in head shapes and looks are really accentuated by natural shadows, all of which help to make characters look real," beams an artist working on *Dragon Empires*.

It's not a crime if you are making it

Even economy is not spared the simulation it never asked for. *Dragon Empires* takes a somewhat simplified approach: you can establish trade routes between cities and the outback, the cost of goods traded being inversely proportional to the ease with which they are procured. If travelling does not suit your complexion, then you can settle down and set up a factory that manufactures weapons or pottery (raw materials come from the traders). You could even set up a trade union with fellow players, one that manipulates prices, monopolises and guards its business—as seen on TV! A central market is the hub of activity, items are exchanged for money, a track of goods is kept and the equation of demand and supply imparts a dynamic flux to the rise and fall of commodities. The rare today, becomes common place tomorrow.

> **"The sad truth is that in many ways *EverQuest* is better than real life. It gives me an opportunity to feel free"**
>
> AN *EVERQUEST* FAN

Star Wars Galaxies offers a mind-numbing 50 professions that you, as a player, can immerse in. Everything from tailoring, to becoming a Jedi is covered. And what does Jack do with the money he makes selling pastries? Why, he builds himself a house! Or buys one already furnished. The money keeps flowing; both within the game and outside—from the very real pockets of Jack into the coffers of some very happy people at Sony and LucasArts.

Even here, the faculty of the human brain to take the seemingly simple and colour it with layers of intrigue and complexity does not fail. Feel the undercurrent of the designed economies of these online worlds and very real, unintended and surprisingly profitable ventures ebb and flow with delight. If you don't have something it becomes gravely important to own, money is just a hurdle. This fact often raises the status of rare weapons, armour and spells to godly heights. Even the mundane and the gross such as horse manure and bits of grass are fervently worshipped, uncommon as they are. The entrepreneurs come out of the woodwork. Rare commodities are bought and sold for real money. Auctions are held, credit card numbers are flashed and a gamer logs-off with less cash and a digital addition that he was never meant to possess within a digital realm he calls home. Players have been known to pay as much as $1,500 for a weapon and $350 for a pair of boots. This real-unreal nexus is a lucrative $1 million business for some.

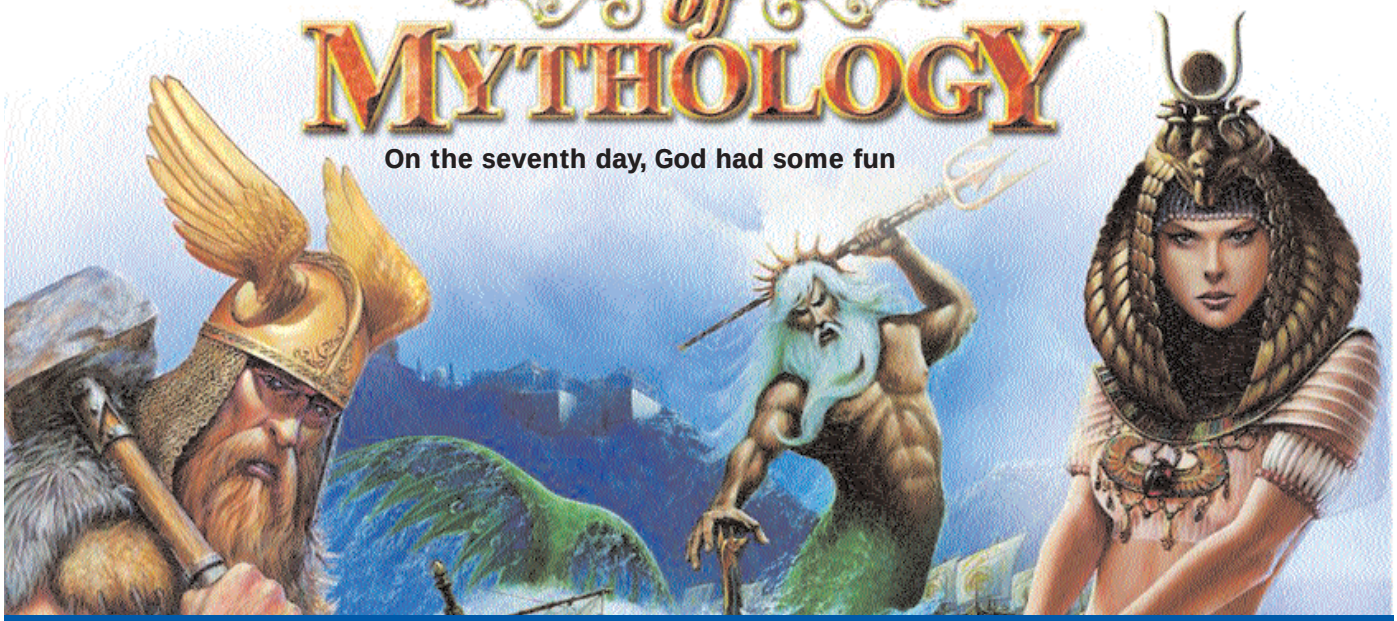
So why should the game developers and publishers be left out? Trying and failing to stop these underground activities, companies are shrugging and joining in the merriment. Sweden-based MindArk for one, plans to tie real commerce with its upcoming game, *Project Entropia*. Real money is used to transact within the game and game money earned and saved can be converted into real green. If you really wish to be a millionaire, perhaps you are in the wrong business. Here lies the Internet economy that was expected but never arrived. It was just playing games with us and having a good time.

AHMED SHAIKH

SOME EXCERPTS FROM: ARIADNE—UNDERSTANDING MMORPG ADDICTION BY NICHOLAS YEE, OCTOBER 2002. HTTP://WWW.NICKYEE.COM/HUB/ADDICTION/HOME.HTML

AGE of MYTHOLOGY

On the seventh day, God had some fun



A mortal guide to the immortals

Zeus
The god of the sky and supreme deity of the Olympians, Zeus can lay mighty smite on a single enemy unit with god power Bolt. His myth technology, Olympic Parent, increases the life blood of the Greek heroes.
Faster moving Hoplites
Infantry more damaging to buildings
Start with 25 favor, a 200 favor limit
Faster favor generation

Poseidon
This god of the sea draws wild animals by use of god power Lure. Your cavalry will have increased line of sight when his myth technology, Lord of Horses, is unlocked.
Cavalry costs less to produce
Militia appear at destroyed buildings
Using markets costs less

Code	Effect
ATM OF EREBUS	Grants 1000 gold
TROJAN HORSE FOR SALE	Grants 1000 wood
JUNK FOOD NIGHT	Grants 1000 food
MOUNT OLYMPUS	Grants full favor
LAY OF THE LAND	Reveals the map
UNCERTAINTY AND DOUBT	Hides the map
THRILL OF VICTORY	You win the game
CHANNEL SURFING	Skip to the next mission in the campaign
L33T SUPA H4X0R	Lets you build faster
DIVINE INTERVENTION	Lets you reuse a used god power
PANDORAS BOX	Grants several random god powers
WRATH OF THE GODS	Grants god powers

Press [Enter], type the code, then press [Enter] to activate. All the codes must be in the upper case

Hades
God of the dead, ruler of the Underworld, all-round nice guy. Four guardians can he summon to protect your Town Center, such is his god power, Sentinel. He will make a good father as Vault of Erebus, his myth technology, provides a steady stream of gold.
Dead soldiers may generate shades
Buildings have more hitpoints
Archers have stronger attack

Odin
Leader of the Norse gods, Odin has a thing for wisdom, war, death and poetry. He also listens to The Doors! Animals will multiply faster under his god power, Great Hunt. Infantry can get around quicker when Lone Wanderer, his myth technology, is unveiled.
Human units regenerate
Ravens for exploration
10 per cent faster forage
Hill Fort units have more hitpoints

Thor
Much mojo is sensed in the god of thunder, wielder of mighty Mjollnir, wearer of skirts and funny helm. God power, Dwarwen Mine, can create a gold mine out of thin air anywhere on the map. Villagers can lay more hurt on wild animals once Pig Sticker, his myth technology, is revealed.
Special armoury available in all ages
Dwarves gather food and wood faster
Cheaper dwarves

Loki
Not too low-key, the son of giants and fire god is a repeat felon and a mischievous trickster. Use his power, Spy, to observe the comings and goings of any enemy unit. His myth technology, Eyes in the Forest, improves the infantry's line of sight.
Heroes in combat summon Myth Units
Myth Units cost less favor
Ox Carts cheaper, faster, but weaker
Longhouse units train faster

Ra
Who Ra for the god of sun? Everyone, for his power, Rain, grants faster farm harvest to villagers. Hurrah once more as Skin of the Rhino, his myth technology, improves armour and attack of labourers.
Priests can empower buildings
Pharaoh empowers better
Chariots and camels have more hitpoints, move faster
Monuments cost less, are stronger

Isis
Mum to Horus, wife to Osiris, Isis can increase the gather rate of gold thanks to god power, Prosperity. She's the best pal of the Nile, the river that provides free food once the Flood of the Nile is invoked.
Monuments shield from enemy god powers
Town Centers get a +3 population bonus
Improvements are cheaper
Obelisks are cheaper and built faster

Set
Murderer of his brother Osiris, the god of chaos is all Set for bad examples. His Vision reveals an unexplored section of the map, whilst Feral, a myth technology, lets converted animals cause greater damage to foes.
Pharaoh can summon animals
Priests can convert animals
Slinger and Chariot Archer train faster
Barracks, Chariot Works, and Siege Camp cost less

Battlefield 1942

Multiplayer or bust!

Battlefield 1942 is based on conflicts during World War II. The game plays across four theatres of operation, spread across 16 maps. As a soldier, you can equip yourself with one of the five kits that give you different skills and abilities. A Medic, for example, has good healing abilities but a weak machine gun, while an Engineer can repair vehicles and carry explosives. Regardless of the chosen kit, a player can operate any vehicle or gun emplacement, as and when a mission calls for it.

Vehicles found, though appreciably numerous (land, sea and marine units abound), are difficult to master—shooting from within them is best done in first-person mode, whereas effective manoeuvring requires the third-person view. Toggling between the two soon becomes a necessary reflex. Primarily designed to be a multiplayer game, 1942 nevertheless offers a single-player campaign, an addition meant to familiarise the player with the vast arsenal of weapons and vehicles. This offering is bogged down by the AI—friendly units will seldom prove useful during missions, whereas opponents have god-like aim and instincts. Combined, this imparts a frustrating layer to this mode of play. Multiplayer tries to make up and low-ping LAN games are indeed cool. The Internet though, plays a spoil sport. But here the bugs in the game prove a major disappointment—sound issues and disappearing units add to the long load times. These problems may be solved over time and the game would play to potential, but as it stands, *Battlefield 1942* is an average single-player game and an above average multiplayer one—and it desperately needs some patching.

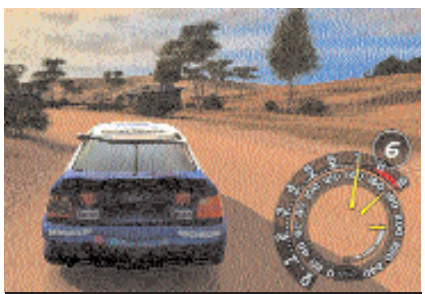
***SEA-SONED WARRIOR:** One healthy serving of bombs coming up!*

Genre: Action ■ **Developer:** Digital Illusions ■ **Distributor:** Gayatri Impex ■ **Phone:** 022-23870260 ■ **Web site:** www.ea.com/eagames/official/battlefield1942 ■ **Price:** Rs 1,299 ■ **System requirements:** Pentium 500 MHz processor or equivalent, 128 MB RAM, 32 MB T&L AGP/PCI video card
Rating: ★★☆☆☆

Microsoft RalliSport Challenge

Car-dinal fun

With just the right blend of simulation and arcade physics, supported by good graphics and believable damage modelling, *RalliSport* serves up a potent cocktail of some fun rallying. The game combines four different types of competitions: Hill Climb, Traditional Rally, RallyCross, and Ice Racing, each with its own set of cars. *RalliSport* boasts an impressive stable of 29 licensed cars and several bonus wheelers. The AI is competent and competitive, and poses a healthy challenge as you slide and roll your way through the 48 tracks (safaris in Africa, hill climbs in the US, ice racing on frozen Nordic roads and more). Cars can be fiddled around for changes in power ratio, suspension, gear ration, steering, etc and the process is friendly enough to comprehend. The graphics are a mixed fare with detailed tracks but the environmental effects could have been more believable. Furthermore, an absence of a cockpit view further takes away from an immersive experience that could have been achieved. The soundtrack is very atmospheric—thumping sounds and heavy riffs set the tone for some fast in-the-mud action. *RalliSport* is a feature-rich challenge that should not be missed by any fan of rally racing.



***DANGEROUS CURVES AHEAD:** Good looking, great driving*

Genre: Racing ■ **Developer:** Digital Illusions ■ **Distributor:** Microsoft India ■ **Phone:** 011-6294600 ■ **Web site:** www.microsoft.com/games/rallisportchallenge ■ **Price:** Rs 2,649 ■ **System requirements:** Pentium 733 MHz processor or equivalent, 128 MB RAM, 32 MB T&L AGP/PCI video card ■ **Rating:** ★★★★☆

Combat Flight Simulator 3

Point me at the sky

The third offering of the successful series takes you back to 1943, an era when propellers dominated and jets were hesitantly making their way out of hangers. You get to fly 18 distinct planes over 100 different locations in Germany, France and Great Britain. The planes are modelled in good detail and the terrain engine can spawn anti-tank units randomly, giving every mission a unique challenge. The game offers three modes of play: an instant action setting for those who wish to be airborne immediately and on the back of foes; a Missions option offers more complex and scripted scenarios, including training exercises; and finally, there is the Campaign, wherein the player is offered a strategic map and missions are generated on-the-fly.

RELAX, ITS JUST SMOKE: *Realistic graphics and believable flight dynamics form a neat package*

The game also adds some role-playing elements to the mix—as a pilot, you have to balance your personality amongst three factors: vision, a tolerance to G-force and health points. A fighter pilot will thus go in for better vision and less health points as opposed to a bomber who would prefer vision to G-tolerance. These points can be adjusted at any time during gameplay.

The game is a visual treat that unfortunately requires a hefty system configuration to run smoothly. Add to that the learning curve of a typical simulation game (your keyboard may not have enough keys to accommodate the crowd of controls) and the result will likely keep most gamers away. Simulator fans should not miss this one though—it is a satisfying flight of fancy.

Genre: Simulation ■ **Developer:** Microsoft ■ **Distributor:** Microsoft India ■ **Phone:** 011-6294600 ■ **Web site:** www.microsoft.com/games/combatfs3
Price: Rs 2,535 ■ **System requirements:** Pentium 400 MHz processor or equivalent, 128 MB RAM, 16 MB T&L AGP/PCI video card
Rating: ★★★☆☆

The Art Of Deception

Trust No One

You can lock down your patched and updated PCs with the best firewalls, encrypt your network traffic with unbreakable algorithms and keep your physical security beefed up to prevent unauthorised access, but one weak link leaves you vulnerable—the human factor. This human factor is what notorious 1990s hacker Kevin Mitnick says is manipulated for illegally accessing data from top government and private networks in the eye-opening book, *The Art of Deception*. The book shows you that intruders fingering your confidential data are not just a bunch of script kiddies. They are smooth-talking social engineers attacking your data from inside. Social engineering is the term used by computer security professionals for the process that involves gaining someone's trust by lying to them and abusing that trust to gain illegitimate access to systems.

The book is a fascinating read, with Mitnick tutoring us on how easy it is to talk people into revealing sensitive information such as their passwords, authentication procedures, corporate data and nearly everything that is confidential.

You won't find Mitnick showing his own tricks though—he follows an anecdotal style from beginning to end, picking on some true incidents and scenarios that are common place in a work environment. The essence of the book is about how human beings crave to trust—a friend, a fellow employee, maybe a superior at work, and how social engineering abuses this human instinct. *The Art of Deception* outlines dozens of social engineering scenarios ranging from phone phreaking to accessing confidential material; every one of which has worked. Mitnick relates one instance of industrial espionage, where a smart operator walks into a company in the absence of the boss, claiming to be a business partner, befriends everyone from the secretary up over lunch, and later convinces the tech head to reveal confidential plans for a new product.

It's true that none of these incidents are path breaking or revolutionary. Nor are security professionals going to learn anything new about these techniques or how to protect their networks against them. But the book shows all us desk penguins the ways in which we can be manipulated into disclosing our confidential security data through the innocent conversation we make with colleagues and friends throughout the day. The aim is to make us less susceptible to social engineering. A must read for anyone who's been a hacking victim.

Publisher: Wiley Dreamtech India Pvt Ltd ■ **Distributor:** Prakash Books ■ **Phone:** 011-3243050 ■ **Fax:** 011-3246975
E-mail: sales@praskashbooks.com ■ **Web site:** www.wileyreamtech.com ■ **Price:** Rs 295
Rating: ★★★★☆

Tales from the Road

New marketing conquests and contact with innovative thinking of a different kind

Smooth talk

Ever so often, members of the Digit team travel to different parts of the country to hear directly from our readers about what they like in Digit and the kind of content they'd like to see more of. Recently, Nabjeet Ganguli, Vinith Shetty and Hari Raghavan from the Digit Marketing team were on such a mission that took them to Aurangabad, Ahmednagar and Baroda, and brought them in touch with the student community in these cities.

Now, our marketing folk, like their ilk anywhere else, are glib-talking people, masters in the art of presentations. Their language of choice is Hinglish, but they smoothly shift to chaste English for hi-brow client meetings. Aurangabad was a different cup of tea however. Our elite marketing team were requested to communicate with the students in Hindi alone.

This was trouble as the trio's previous experience with chaste Hindi was limited to cursing and screaming obscenities and they found themselves for the first time spluttering, stammering and stuttering through their presentation.

ILLUSTRATIONS: Mahesh Benkar

But the disadvantage didn't last for long. They soon turned this into a friendly competition amongst themselves, trying to outdo each other in their Hindi speaking skills. To the extent that now that they are back in the office, they take wicked delight in throwing shudhh Hindi at the unsuspecting resident geeks.

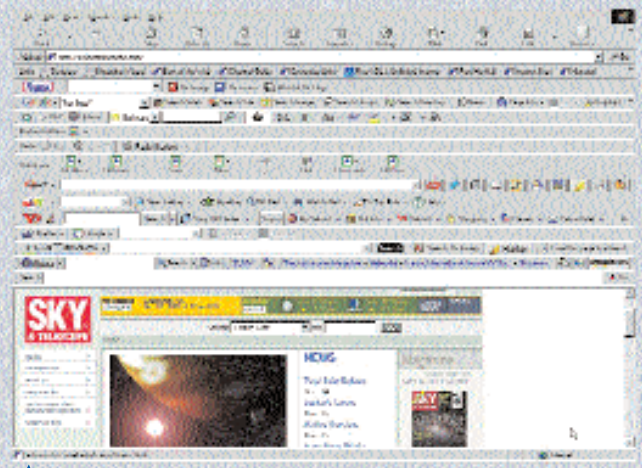
On a different note, the threesome claim to have become experts in survival in any part of the country. They give advice to anyone who cares to listen, on how to tackle the local rickshawwallas in different cities, and where to get food at odd hours.

In the meantime, we are thinking of revenge by sending them on a trip down south, where they can try their hands at Tamil too!

Toast of the town

Never the one to let go of an opportunity to visit his hometown Delhi, Deepak readily volunteered when the Test Centre needed to send some reviewers up North. Badri, our latest recruit in the Test Centre, didn't, but was forced to tag along anyway. Unluckily for Badri, this trip was scheduled in the dead of winter and being a pukka Mumbai-ite he wasn't used to the chilly weather. So even while Badri acted as a cold tortoise, hiding inside the hood of his red jacket, Deepak, the Dilliwala, insisted on taking him food hopping around the capital city.

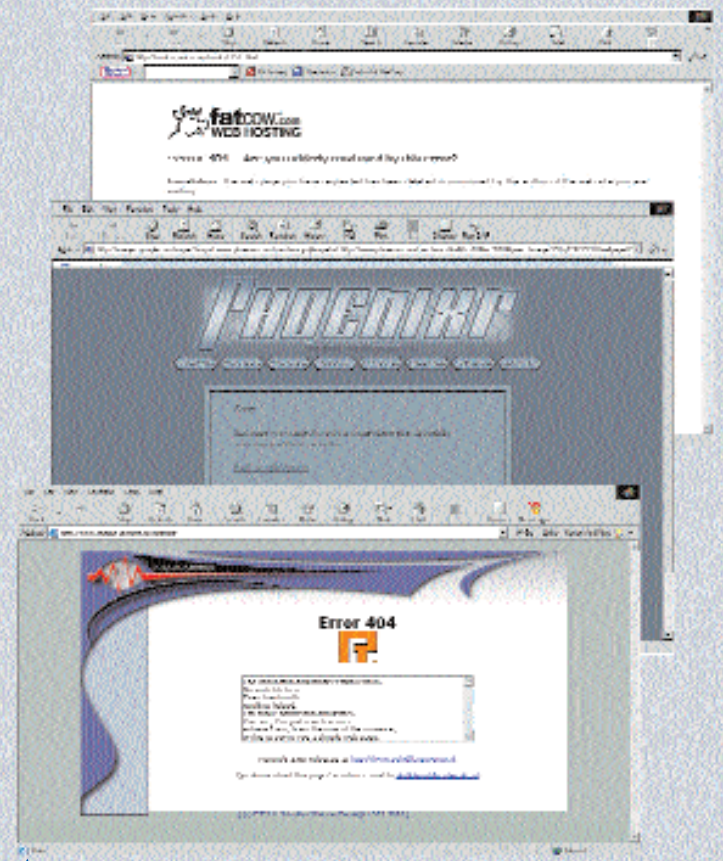
First stop Dilli Haat. For those in the dark, Dilli Haat is famous for its various regional food stalls from all across India. After a fulfilling meal of rajma-chawal from the Kashmir stall, Deepak decided to treat Badri to fruit beer (non-alcoholic we may add), a speciality. Since it's popular with the local crowd, most of the food stalls serve fruit beer. However, to their disappointment, they discovered that owing to a power outage, fruit beer was not available anywhere. But being Digit wallas, they were not prepared to take things at face value, and decided to investigate without much luck until they chanced upon the Bihar stall. This was the only stall dishing out fruit beer by the glassful. And no, they hadn't hit on a way to technologically bypass the electricity outage—the Bihar stall was using regular bottled soda for making the fruit beer (instead of the more common albeit unusable electric fountain machines). Three cheers to innovative thinking!



▲ **One toolbar too many** *Submitted by: Aaliya Shaikh*

Isaac Newton sees Apple fall down.
As he watches, he says with a frown
"Support it is lacking
And it needs more hacking.
There are better computers in town."

▲ *Taken from the Net*



▲ **Now here are some page errors that are a joy to read!**
Taken from the Net

Animal Planet *Taken from the Net*

We bring you your horrorscope...

Aquarius Jan 20 - Feb 18

There is a new girl in office–she's witty, intelligent and good-looking; you find out she already has a steady Intel. With the moon in Shani shadowing your prospects, its quality-time with your mouse again this Valentine.

How much is one 'CALL' in Rupees?! ▶
Submitted by: Anirban Gupta

Your chance to bite back!

Highlight the lighter side of computing. Mail your contributions to: Backbyte Digit, Plot D-222/2, TTC Industrial Area, MIDC, Shirvane, Nerul, Navi Mumbai 400 706 or e-mail us at backbyte@jasubhai.com